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# Making FIFA World Cup Qatar 2022 Truly Healthy and Safe: Strategies and Legacy for Present and Future Sporting Events

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***Abstract***

*Aside from the FIFA men's World cup, fewer other global sporting events have the potential to attract the undivided attention of global leaders and citizens. It is arguable the most influential global sporting event. Thus, the FIFA World Cup Qatar 2022 has been themed "Healthy 2022 World Cup - Creating Legacy for Sport and Health", and the goal is to make the event the most successful, healthiest, and safest sporting event in recent human history. The event is meant to rekindle the global conversation around the double disease pandemic that is presently ravaging the world. The fast and furious Covid-19 and the subtle and steadily progressing non-communicable diseases (NCDs). The event organizers also intend to use the platform to provide and implement health promotional strategies that will successfully prevent and control the spread and progression of these diseases and influence most global football enthusiasts to cultivate healthy and sustainable lifestyle changes. A successful event may likely be a model and legacy for future sporting or social events. However, for the FIFA World cup Qatar 2022 to be effective in changing unhealthy behaviours and in promoting safe and healthy lifestyles, it should have some vital components. The planning and execution of such a project need to be systematic, comprehensive, and evidence-based. This review briefly discussed the global impacts of Covid-19 and NCDs, the importance of combating these diseases through the FIFA World cup Qatar 2022, and finally suggested strategies that will likely ensure the event achieves its set goals and objectives.*

***Keywords:*** *Covid-19, FIFA World cup Qatar 2022, Health Promotion, Healthy lifestyle, non-communicable diseases, Safety.*

## Introduction

The FIFA men's World Cup tournament is, by all standards, the epitome of global single-sporting events [1]. It is arguable the most widely viewed and most influential global sporting event in recent human history [2]. It was estimated that about 3.57 billion people (aged 4 years and above) globally, which translates to more than half (51.3%) of the global population, watched on media at least one of the football matches of the FIFA World Cup Russia 2018 [2]. Thus, the 4-yearly event meant a lot to the unity, peace, and economic development of many nations. The tournament also affords the host nation, in particular, FIFA, and other major stakeholders to communicate their thoughts and positions subtly and overtly on pressing global social issues and propose new initiatives to the world, especially as it relates to global politics and development.

The State of Qatar has always been known to be a strong advocate for sport and its potential in promoting good health and in reducing the burden of non-communicable diseases (NCDs). This, the nation has demonstrated through different innovative programs and initiatives, such as the National Sports Day, the National Nutrition and Physical Activity plan, etc. [3]. Through these noble programs and initiatives, Qatar has been able to set standards and

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roadmaps for achieving adequate physical activity and a healthy lifestyle for its approximately 2.8 million citizens and residents [3]. The chance to host the FIFA World Cup in 2022 came at no better time for Qatar to communicate to the world the potential mutual benefits of sport and health, and by so doing, may bring a positive change and a legacy to the world [4]. A unique opportunity that the nation cannot and definitively will not allow slipping away [1].

## Methods

The review was based on the available English literature from electronic databases in Google search engine, Google scholars, Academia, ResearchGate, and MEDLINE database. The websites of reputable and relevant public health organizations and institutions, such as the Supreme Committee for Delivery & Legacy, FIFA, World Health Organization (WHO), World Economic Forum (WEF), American College of Lifestyle Medicine (ACLM), Public Health Ontario, National Association of Chronic Disease Directors, National Institute of Health (NIH), Wellness Council of America (WELCOA), etc., were also visited for relevant and current information. Some of the keywords that were searched include FIFA World cup, FIFA World Cup Qatar 2022, double disease pandemic, Covid-19 prevention and control, non-communicable diseases (NCDs) prevention strategies in mass gathering, healthy lifestyle and safety in mass gathering, lifestyle medicine, etc. The inclusion criteria were – topics relating to Health promotion and FIFA World Cup Qatar 2022; article type from review, case report, and original research; articles published between 1998 and 2021; and articles written in English language only. While editorial, letter to the editor, and commentary articles were excluded from the review. A total number of 4,521 articles were retrieved. They were visualized, profiled, cleansed, prepared, analyzed, and summarized, out of which 35 most relevant articles were utilized for the review.

## Results

### Healthy 2022 World Cup: The Plan

Armed with the desire to leave a legacy through the 2022 World cup, the State of Qatar teamed up with FIFA and the WHO to start a project that may have a remarkable and lasting impact on the world and may forever change the direction of global public health, economy, and the global developmental indices. The FIFA World Cup Qatar 2022 has been themed "Healthy 2022 World Cup - Creating Legacy for Sport and Health". The goals and aspirations of the State of Qatar are to host a successful sporting event, but more importantly, to be a beacon for global health promotion by hosting the healthiest and safest sporting event in recent human history. The event is meant to increase the awareness and promotion of physical and mental well-being among the local populace, participants, spectators, and the entire interconnected world. Furthermore, it is meant to create a legacy that ensures that health and safety are vital considerations and focus for future major sporting events [5-9].

As informed by the WHO, the organizers of the event are meant to engage in joint activities that will ensure that the promotion of physical and mental well-being, healthy lifestyle, and health security, are the central focus of the FIFA World Cup Qatar 2022 [5]. The event is meant to leverage football's global power and influence to ignite, catalyze, and probably cement the aspiration for a healthy and active lifestyle, disease prevention, and a safer world in the hearts and minds of every global football enthusiast [6]. Ultimately, the global mega sporting event is meant to support the actualization of certain global public health and developmental initiatives, such as the WHO's strategic vision of "Health for All by All," by 2023, the UN's Sustainable Development Goal

(SDG) 3, and the Generation Amazing program [3, 5].

To achieve these, the organizers of the event had set up a team called the Host Country Health and Safety Assurance team, which is meant to work in collaboration with other internal and external stakeholders to achieve the set goals. The team's primary responsibilities are to deploy different strategies to promote the awareness, advocacy, and encouragement of safe and healthy lifestyle practices during the World Cup tournament. Some of such strategies include – the delivery of health awareness and education messages and initiatives via different media on the need to increase the consumption of healthy diets, increase engagement in physical activity, promote mental health; stop the use of tobacco products; promote health security, and safe mass gathering by ensuring strict compliance with health and safety standards at all official and non-official sites; regular conduction of health and safety inspection and audit; routine health screening for the stakeholders; and encourage workplace health promotion initiatives for the event workers. These are meant to be commenced right from the FIFA Arab Cup Qatar 2021, all through the FIFA World Cup Qatar 2022 and beyond, impacting the present and future generations [3, 5-7, 9].

## Discussion

### The Double Global Pandemic in the Lens of the FIFA World Cup Qatar 2022

The 'Healthy 2022 World cup' is a noble and divine initiative that came at no better time than now, when the world is battling to survive under the burden of a double disease pandemic. On one side, the fast and furious Covid-19 pandemic is revenging the world, overwhelming many communities, bringing many health systems and economies to chaos, and claiming many lives prematurely. Just about 2 years since its outbreak, Covid-19 has been confirmed in more than 330 million people, and it has directly caused more than 5.5 million deaths globally (Figure 1) [10]. Indeed, Covid-19 is arguably the world's most devastating health crisis in living memory [6]. Despite the invention of vaccines and other innovative public health and clinical prevention and treatment strategies, the frequent surge in Covid-19 waves in many communities and constant mutation of variants shows how ruthless and resilience the SARS-Cov-2 virus can be and the constant threat it poses to global health, stability, and development. The FIFA World Cup Qatar 2022 offers another golden opportunity to demonstrate stronger global resolves and resilience against the Covid-19 pandemic.

Although it may not be obvious to many, another group of diseases of pandemic proportion is subtly and steadily traversing the length and breadth of the world, causing far more havoc than Covid-19 [11-13]. These diseases even hold the potential to drag the economy of many nations into recession and perhaps depression in the next few decades. Non-communicable diseases (such as hypertension, heart disease, diabetes mellitus, obstructive pulmonary diseases, obesity, cancers, etc.) presently account for the highest morbidity and mortality rates globally. For instance, among the global population (18 years and above), about 22% (25% of men and 20% of women) are presently living with high blood pressure, 9% are diabetic; while about 1.9 billion are overweight, and another more than 650 million are obese [14]. Combined, NCDs account for about 41 million global deaths annually. This is equivalent to about 71% of all global deaths every year (see figure 2) [14,15]. Furthermore, the burden of NCDs is striking hard on the productive force of the world, killing more than 15 million people between the ages of 30 and 69 years every year [15].

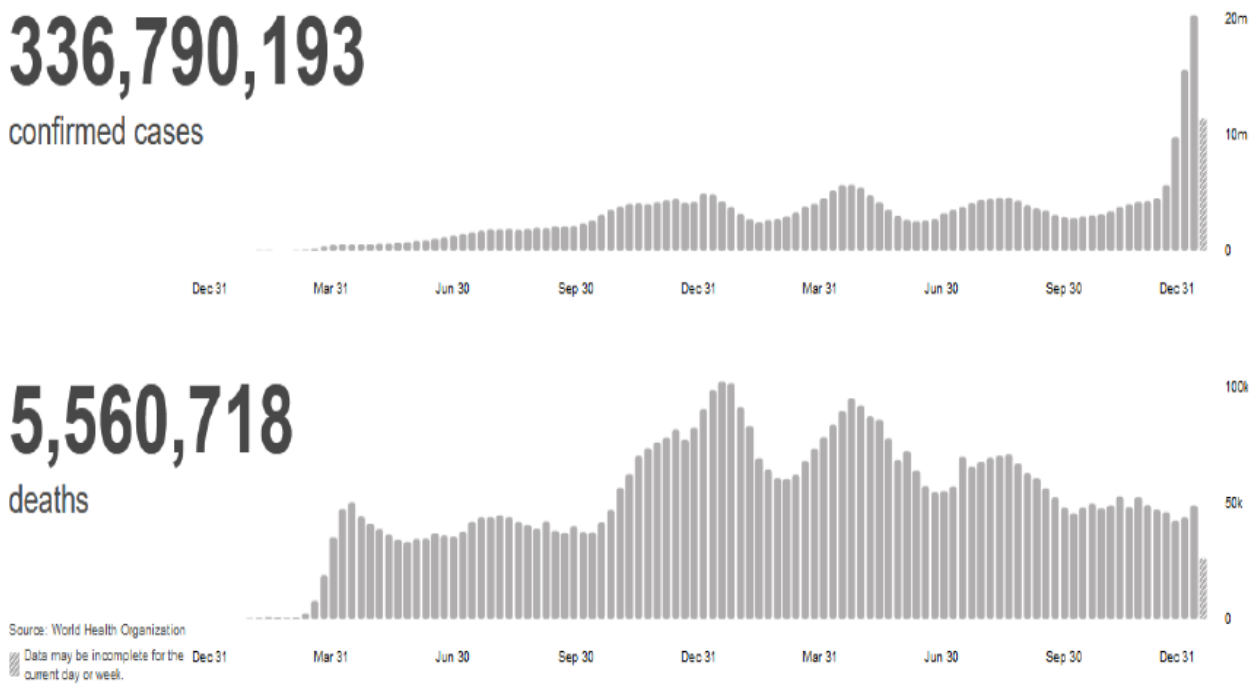


**Figure 1:** Timeline of Covid-19 morbidity and mortality rates from December 2019 to December 2021

Source: World Health Organization [10]

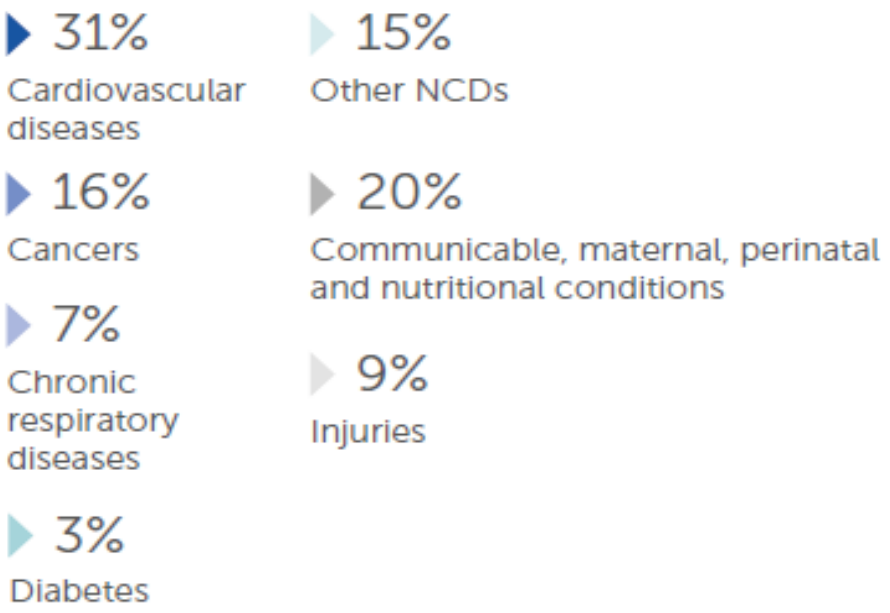


**Figure 2:** Percentage of Global Mortality Rates from different diseases in 2016

Source: World Health Organization [14]

The direct and indirect costs of treating NCDs are also enormous for many individuals and nations. Every year, every person diagnosed with NCDs that are living in low-income countries spent about US$ 25, those in lower-middle-income countries spent about US$ 50, and those in upper-middle-income countries spent about US$ 139 to manage these sets of chronic diseases [16]. This direct cost of NCD-related healthcare is expected to rise to more than US$ 30 trillion worldwide, while the global cumulative output loss from NCDs has been estimated to rise to about US$ 47 trillion over the next two decades [16]. Consequently, the annual

death rates and negative health and economic impacts resulting from NCDs alone are more than those from Covid-19, malaria, HIV/AIDS, birth-related conditions, natural disasters, and terrorism, all combined [14, 15].

Even the comparatively high incidence, hospitalization, and case-fatality rates of Covid-19 that were recorded in many countries have been strongly associated with the high prevalence of underlying NCDs among the people living in such countries [17-19]. The presence of most NCDs tends to create chronic systemic inflammation in the body, which often enhances the pathophysiological processes that are involved in the disease evolution of Covid-19, thereby worsening the prognosis of the disease [17-19]. More alarming, all projections suggest that the prevalence and mortality rates of NCDs will continue to increase globally. By 2030, the global average age-standardized NCD-related mortality rate is expected to rise to about 510.5 per 100,000 population, while the global average mortality for NCD-related deaths is expected to rise to about 75.3% of total deaths [20]. This paints only a gloomy, uncertain, and dangerous future for everybody in the world, regardless of their geographic location and socioeconomic status.

Unhealthy lifestyle and behaviours (such as frequent consumption of unhealthy diets, physical inactivity, overweight/obesity, substance abuse, poor sleep, poor stress management, and social isolation/loneliness) in the presence of a favourable environment are the root and underlying determinants responsible for the rising global burdens of both Covid-19 and NCDs [21-24]. Consequently, measures that successfully change people's unhealthy behaviours and lifestyles practices, improve their health consciousness and literacy, and ensure a healthier and sustainable environment, will most likely result in the downward spiral of these two deadly pandemics [24, 25]. Particularly, if well executed, the FIFA World Cup Qatar 2022 will be the ideal event to orientate and motivate the world on how to prevent, treat, and sometimes reverse NCDs through health promotion and lifestyle medicine principles [3].

A poorly planned or managed FIFA World Cup in 2022 may not help the course, and the event may just be a perfect platform to add to the growing global burden of NCDs. Historical antecedents have shown that previous mega-sporting or mass social events are potential public health risks. They are potential avenues and opportunities for some athletes and spectators to engage in many unhealthy behaviours and lifestyles, such as tobacco use, risky alcohol use, consumption of unhealthy foods, poor sleep, risky sexual exposure, etc. [2,26]. These disease-promoting unhealthy behaviours and lifestyles, which are usually fueled by peer pressures and the feeling of the need to 'enjoy the moment', may just escalate during the FIFA World Cup Qatar 2022, contrary to the tournaments' set goal and objectives [27-29].

The world is presently at an unprecedented crossroad; anymore indecision or wrong steps as regards public health policies and programs may set the global developmental indices back, possibly far into the stone age. More than ever before, the world needs to come together, be more deliberate, and more strategic in fighting the two 'dreaded pandemics' that are threatening to reverse the hard earn global growth and development. We must stop the onslaught of Covid-19 through better global coordination and collaboration. More importantly, and perhaps more urgently, we must jointly find solutions to the rising global burden of NCDs and their threat to global stability and economic growth. The theme and objectives of the FIFA World Cup Qatar 2022 came at no better time. Events, such as the FIFA World Cup Qatar 2022, offer an opportunity for the State of Qatar and the entire Arab nations to not only make a stronger statement against Covid-19 and NCDs but also provide direction to the world on how best to tackle these global menaces, and how to make

global health systems more lifestyle-sensitive and health promotion oriented [3].

Moreover, a situation in which leagues of national and international sporting and entertainment champions and influencers are professing the same goodwill messages on healthy lifestyle and safety, through a global platform like the FIFA World Cup Qatar 2022, may likely have an immediate and long-term positive impact on the global community [3]. The event may just be the right spark to positively change the course of global public health history forever. For the first time in a long while, a global sporting event may mean more than just promoting entertainment, peace, unity, and wealth; it may also provide direction in the pursuance of global good health and sustainability of lives.

However, the task of using sport to promote health and prevent diseases through a global mega sporting event such as the FIFA World Cup is a delicate operation that may end up as a mere delusion and a sheer waste of energy and resources, if not well planned and executed. Moreover, the preparation, delivery, and outcomes of a poorly planned or executed project may have significant negative impacts on the socio-economy and health system of the host country and a negative legacy for future sporting or social events [4]. Thus, what is worth doing is worth doing well. It is worth it that the FIFA World Cup Qatar 2022 event focuses its energy on promoting health and preventing diseases; it will also be much more worth it if the project is delivered in a systematic, comprehensive, and scientific manner, following international best practices.

## Recommendations

### The Strategic Plans of Delivering an Evidence-based Healthy 2022 World Cup

Based on the available evidence, the incidence, hospitalization, and case-fatality rates of COVID-19 can be significantly reduced through public health and behavioural change strategies that effectively prevent humans from having contact with the SAR-CoV-2 virus and optimize the resilience of the human immune system against the virus. Such measures may include – good personal hygiene and protection, adequate environmental sanitation, appropriate physical distancing and avoidance of crowded gatherings, healthy lifestyle practices, vaccination, routine screening for infected cases, and isolation of suspected and confirmed Covid-19 cases [30,31]. Also, since the onset and progression of most NCDs are lifestyle-related, the rates of developing these sets of diseases and their related disabilities can be effectively reduced through positive lifestyle and behavioural changes that minimize the influence of the risk factors on the pathophysiology of the chronic NCDs [21, 22].

To achieve an effective campaign against NCDs in particular, studies have shown that mass health awareness and educational messages coupled with routine health screening programs alone, as planned by the organizer of FIFA World Cup Qatar 2022, may be ineffective and grossly insufficient. Available documents suggest that the organizer might have inadvertently adopted a health promotion intervention strategy called ‘activity-centred approach’, and not the more evidence-based ‘results-oriented approach [32].’ The central focus of the ‘activity-centered approach’ is to plan and implement a series of presumed appropriate health promotion activities, some of which may neither impact the desired outcome of the event organizers nor the health needs of a significant number of the target population. While the central focus of the ‘result-oriented approach’ is to implement health promotion intervention strategies that have the potential to impact the organizer's desired outcome as evidenced by improved health indices of a significant number of the target population [32]. As opposed to the ‘activity-centered approach’, the interventions in the ‘results-oriented approach’ are systematically researched, and diligently designed and implemented, tailored to

the health needs of most of the target population [32].

As they use to say, 'old habits die hard'. Any health promotion and change of behaviour strategy or approach that is not comprehensive, systematic, evidence-based, and expertly delivered may likely not be sufficient to change age-long disease-promoting unhealthy lifestyles. The appropriate health promotion strategies should allow the target population to increase their control over and improve their health through a wide range of evidence-based health educational and behavioral change strategies, delivered systematically in a supportive environment [33]. Consequently, the organizers of the FIFA World cup Qatar 2022 should consider some important evidence-based and result-oriented health promotion strategies and initiatives in their quest to achieve a successful 'Healthy 2022 World Cup'. Such strategies should include:

**Employ the Services of Public Health Promotion and Lifestyle Intervention Specialists**

Public health promotion and lifestyle intervention specialists should be included in the core event planning team. These experts are to review all the proposed plans and programs of the events guided by the theme and objectives of the tournament. They are to ensure that the planning, execution, and evaluation of the event reflects the principles of health promotion and lifestyle medicine [3]. When necessary, the team is meant to consult with relevant national and international experts to deliver a comprehensive, culturally sensitive event that is executed to international standards and may be easily replicable by other similar future events.

**The Event should be Guided by Evidence-based Theoretical Frameworks**

The planning and execution of the event should be done with the guidance of specific theoretical frameworks or models in health promotion and behavioural change. Using these theories as a guide will ensure that the entire planning and executions of the different health promotion activities of the FIFA World Cup Qatar 2022 are evidence-based and grounded in solid theories of health promotion. This may result in higher rates of successful and sustainable behavioural change among the target populations. Since the event is a mega-event that will involve multiple, and sometimes simultaneous, activities, it is best if the event is planned around one primary theoretical model, after which multiple secondary theoretical models may be used at different points of the event – depending on the nature of the health promotion activities and the target population.

The Ecological model of health promotion and behavioural change is an ideal model that may be adopted as the primary theoretical model for the FIFA World Cup Qatar 2022 [3, 33]. The Ecological model highlights how peoples' physical, social, and psychological factors interact with their environments. It further suggests how different interventions can take advantage of the multilevel interactions to ensure sustainable behavioural change [3, 33, 34]. The Social Cognitive Theory (SCT) is another good primary theoretical model that can be used successfully during the FIFA World Cup Qatar 2022. The SCT describes the dynamic relationship between peoples' personalized factors and environmental factors and how such can assist in changing unwanted behaviours and lifestyles [33, 34].

The secondary theoretical models that should be considered at different points and for different events during the FIFA World Cup Qatar 2022 tournament are the Health Belief Model (HBM) and the Transtheoretical Model (TTM). The HBM may be used as a guide when designing and delivering different generalized and targeted health awareness and educational messages during the event. The TTM may be useful after health and/or lifestyle screening is done, in which specific health risks have been identified, and specific behavioural change intervention needs to be implemented for different people

based on their level of readiness to change [23, 33, 34].

**The Event should be Guided by Evidence-based Conceptual Frameworks**

Since the process and contents of a project are both essential to its success, the 'Healthy 2022 World Cup' should also be delivered with the guidance of a solid conceptual framework. This will ensure that a systematic and stepwise process is followed in the execution of the project. A result-oriented conceptual framework will also ensure that all the contents of the project are comprehensive, meet the health needs of the target population, and are expertly guided by the events' theme and objectives. Many conceptual frameworks are available for use during FIFA World Cup Qatar 2022. However, any evidence-based conceptual framework should emphasize at least three basic areas of influence – the physical environment, the psychosocial environment, and the personal health resources [35].

The physical environment includes all the external factors that may enhance or obstruct health and safety practices during the event. These may include equipment, marketplaces, recreational parks, restaurants, nightclubs, climatic conditions, etc. The psychosocial environment includes the event's health and safety culture, as well as the perceived attitudes, beliefs, values, daily practices, and commitment towards the success of the project by both the organizers and the target population. The personal health resources are all the health promotion information, services, resources, and opportunities that are provided to the target population to motivate or support their plans to improve or maintain personal safety, healthy lifestyles, and optimal physical and mental health throughout the event [35]. The personal health resources of the FIFA World Cup Qatar 2022 should prioritize Covid-19 prevention initiatives and target the six pillars of Lifestyle Medicine intervention (diet, physical activity, sleep, stress, substance abuse, and social connectedness/positive psychology) [3, 23].

Furthermore, the event's conceptual framework should be a stepwise process that contains the following five basic steps: assessment, prioritization, operational plan, specific interventions, and evaluation [35, 36].

a. **Assessment of the Health and Safety needs of the Participants**

The assessment of the health and safety needs of all the people involved in the FIFA World Cup Qatar 2022 should be done as baseline data. This is perhaps the most important step toward achieving a healthy and safe event [36]. It will allow the organizers to know the exact health and safety needs they should focus their intervention on and provide them with data that can be used for proper planning, monitoring, and evaluation. Using standardized tools (confidential surveys or checklists), data should be collected on – peoples' personal health data (including health and lifestyle risks, underlying diseases, attitude to behavioral change, etc.), and the physical environment of the event (including possible hazards, existing health and safety protocols at all official and non-official sites, etc.). All these should be well documented and promptly analyzed.

b. **Prioritization of the Identified Health and Safety Needs**

Using predefined criteria, the health needs of the participants should be prioritized. The criteria may include considerations such as ease of implementing the solutions, the severity of risks, direct cost-benefit analysis, indirect costs of ignoring the identified needs, etc.

c. **Design an Operational Plan for the Event**

A comprehensive operational plan should be crafted. The operation plan is meant to be the central document that will guide all the stakeholders on the role they are meant to play at a particular time. It will also contain all the health promotional strategies that can be best adapted for each identified health and

environmental need and the cost implication of each intervention.

d. **Implement Specific Interventions**

Some of the interventions may include – the delivery of generalized and specific awareness and education messages via different media platforms; personalized therapeutic lifestyle prescription; behavioural change counseling; enforcement of personal protective wears and other health and safety measures; provision of affordable healthy foods and other health promotional resources (such as gym, smartwatch, easy-to-read booklets and books, websites, wellness Apps, etc.), access to health-oriented restaurants and recreational parks, etc.

e. **Evaluation of the Planning and Delivery of the Event Programs**

The whole process should be adequately monitored, while appropriate follow-up and referral processes should be implemented. Also, a comprehensive evaluation should be done after the event. All the learned lessons and challenges should be well documented for use as a guide by future mega-events.

Careful implementation of these strategies may be particularly important in preventing and controlling the incidence of Covid-19 and the prevalence of NCDs during a mega public event, such as the FIFA World Cup Qatar 2022 [6]. In addition, the strategies may likely achieve the following among the target population – better physical and mental resilience; improvement in cardiometabolic, musculoskeletal, immune, mental, and emotional health; reduction in the onset and progression of many cancers; prevention and control of obesity; foster stronger social connectedness and friendship; improve overall wellbeing; ensure healthy aging and better quality of lives; and prolong their life expectancy, regardless of the gender or age group [3, 6, 22, 23].

## Conclusion

Counting on the right political will, the collaboration and coordination of all stakeholders, the availability of resources, and the adoption of the right health promotion strategies, the vision and goal of a 'Healthy 2022 World Cup' can be driven effectively into the hearts and minds of every football lover, and healthy lifestyles may become the habits of many people in the world starting from 2022. A well-executed Healthy Qatar 2022 may serve as a turning point and a guide to the world in the global quest to prevent, control, and reverse the rising global double burdens of Covid-19 and NCDs. Indeed, the FIFA World Cup Qatar 2022 may be regarded as the healthiest and safest mega-event in recent human history. Thus, the FIFA World Cup Qatar 2022 offers a rare and golden opportunity to the State of Qatar and other stakeholders. The organizers must fully seize the opportunity and ensure the event leaves an indelible mark on the sands of history.

## Conflict of Interest

The author declares no conflict of interest.


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# Epidemics and Vaccination Dilemma in Complex Networks: A Case Study of Kosefe and Shomolu Local Government Area Lagos Nigeria

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***Abstract***

*Vaccination is undoubtedly one of the foremost important preventive measures of modern times; epidemics are feared as one of the most damaging phenomena in human societies. Aim: The thesis unveiled how the interplay between the probability of infection, vaccine effectiveness, and cost gives rise to non–linear responses in vaccine uptake. The study design was a cross-sectional descriptive study that used pretested closed-ended questionnaire that was distributed to the respondents. The sample size of 375 was adopted, which was calculated from the target population using the Cochrane formula for sample size calculation. Parents/guardians that strongly believe politicians should be role models that encourage vaccination were 61.87%, while 50.67% of mothers/caregivers were not sure if there is still a link between MMR vaccination and autism. The majority of parents/guardians (55.47% + 29.87%) strongly agree plus agree that media reports on vaccination programmes encourage them to vaccinate their children. 32.80% strongly agree, and 22.40% agree that the media exaggerates reports about disease outbreaks. Conclusion: The level of education plays an important role in the level of knowledge and attitude towards epidemics and vaccination. Income and Cost of vaccines affect vaccination uptake because of the present economic situation in Nigeria. Media plays a key role in vaccination campaigns, awareness, and intervention and should be promoted more to achieve the goal of ensuring all children are vaccinated properly. Doctors and Public Health Nurses have a major role to play in terms of influencing parents/guardian's vaccination uptake.*

***Keywords:*** *Epidemics, Vaccination, Networks.*

## Introduction

Research on the epidemic outbreak in complex networks has a root that goes back to the start of the 21st century [1] when it had been shown that enormous fluctuations within the degrees of people in social networks considerably strengthen the incidence of epidemic outbreaks. Vaccination is undoubtedly among the foremost important preventive measures of recent times; epidemics are feared to be the majority of damaging phenomena in human societies. An example is the recent COVID 19 pandemic which Nigeria is inclusive. Recent research has explored the pivotal implications of individual behaviour and heterogeneous contact patterns in networked populations, including the numerous feedback loops that exist between vaccinating behaviours and disease propagation [2]. Interdisciplinary explorations in data analysis have given rise to theoretical epidemiology, as additionally on the speculation of epidemic processes in complex networks. From classical models assuming well-mixed populations and ignoring human behaviours to recent models that account for behavioural feedback and population structure, we have made progress in understanding disease transmission and disease dynamics, plus using this information to plan and execute preventive strategies.

With the newest advances in science and technology, today, safe and effective vaccines exist for several of the uttermost common

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infectious diseases, like smallpox (already eradicated), measles, polio, influenza, hepatitis, chicken pox and diphtheria and also the use of vaccines has been estimated to save lots of scores of children's lives each year [3]. However, because of the high economic cost of vaccination and sometimes also personal beliefs and the perception of vaccination aftereffects, people usually regard vaccination as a voluntary rather than a compulsive measure. This leads to behavioural vaccination, borrowing the framework of behaviour dynamics within the scientific theory and psychology, which becomes a useful research framework to elucidate real-world disease spreading and prevention [2].

An emerging disease is one that has newly appeared in a population or that has been known for some time but is raiding increasing in incidence or geographic spread or occurrence such as Covid 19, first observed in Wuhan, China in December 2019. A re-emerging disease is one that once was a major problem in a particular country or globally, and then declined in incidence, but is again becoming a public health problem.

Immunization through the vaccination of populations has been estimated to annually prevent 2-3 million deaths from infectious diseases such like measles, diphtheria, pertussis, and tetanus [4]. This number may rise substantially with the improvement of strategies to further increase global vaccine coverage [5]. Aside from negotiating long-term protection against the disease to the vaccinated individual, vaccination has an excellent important community-level benefit. Sufficiently high vaccine coverage makes it difficult for the pathogen to discover susceptible hosts, thereby conferring herd immunity to the entire population [6, 7].

Consequently, even those members of the community who are unable to receive vaccination, like newborns and immune-suppressed individuals, are protected against the disease. In essence, any disease caused by a pathogen that only has human hosts are often eradicated by mass immunization, provided there's a sufficiently efficacious vaccine that's readily available. Such an outcome has been realized for smallpox [8, 9] and is predicted to be achieved for polio [10, 11]. Conversely, the presence of a remarkable fraction of non-immunized individuals, which disrupts the population's herd immunity, might evolve in the recurrent outbreaks of vaccine-preventable diseases like measles, mumps, and pertussis [5]. Elucidating the mechanisms that promote wider acceptance of vaccination amongst the population can therefore help explicate the causes behind the failure of immunization programs.

One in all the foremost important challenges in implementing a successful immunization program is to make sure that enough individuals consent to get vaccinated. This decision may well be supported with plenty of factors like an individual's knowledge about the prices, including perceived side-effects, and benefits of vaccination, in addition to the social, economic, and cultural environment to which they belong [12]. The shortage of public confidence in the efficacy and/or safety of vaccines can cause an increase to vaccine hesitancy (that is., delay or refusal to be vaccinated despite the availability of vaccine services) [13], and in extreme cases, generate vaccine scares [14, 15]. Even when there is the absence of any bias against a vaccine as a matter of fact, vaccine uptake inside the population may vary over time with changing prevalence of the disease. Indeed, it's expected that individuals are more likely to urge themselves to be vaccinated when there's a big risk of getting infected [16]. Conversely, low disease incidence may often result in a drastic decrease in vaccine uptake, presumably due to the lower perceived risk of contracting the disease [17]. This means that when the threat of infection is high, the individual incorporates a powerful incentive to be vaccinated, while sometimes of lower risk, the individual might be tempted to avoid vaccination and free ride on the

herd immunity provided by immunized members of a population without bearing any cost herself. However, if everyone argues during this manner and avoids vaccination, it can leave the population completely exposed to invasion by the pathogen.

Nigeria is one of the ten countries in the world where most of the incompletely immunized children live despite the massive investments in immunization programme by governmental and non-governmental organizations. There's a disparity within the rate of immunization incompleteness between the north and south of the country, with the previous having an increase in proportion. This disparity may be explained by the factors that operate at individual, community, and state levels. Low level of educational attainment, high level of poverty, poor antenatal care attendance and hospital delivery, and a higher population of rural inhabitants, including poor socioeconomic status, are more pronounced across the northern region [18].

## Research Aim, Objectives, and Assumptions

**Aim**: The aim of this Thesis is to unveil how the interplay between the probability of infection, vaccine effectiveness, and cost gives rise to non–linear responses in vaccine uptake.

## Specific Objectives

The specific objectives are:

1. To establish socio-cultural factors as defined by education, religion and cultures that affect infection in Kosofe and Shomolu Local Government Area of Lagos, Nigeria.
2. To outline socio-cultural factors as defined by education, religion and cultures that affect vaccine effectiveness and uptake in Kosofe and Shomolu Local Government Area of Lagos, Nigeria.
3. To examine economic factors that affect vaccine uptake among the residents of Kosofe and Shomolu Local Government Area of Lagos, Nigeria.
4. To determine the probability of infection, vaccine effectiveness, and cost that give rise to non-linear responses in vaccine uptake.

## Literature Review

Nigeria contributes the highest number of global pneumonia child deaths [19]. Pneumonia – a preventable disease – kills more children globally than some other infections [19]. Pneumonia claimed the lives of over 800,000 children under the age of 5 last year globally, or one child every 39 seconds, in line with the 2019 analysis [19].

Nigerian children made up the outrageous number of those who died, with an estimated 162,000 deaths in 2018 – 443 deaths per day, or 18 every hour [19].

In Nigeria, 19% of child deaths were because of pneumonia in 2018, and it was absolutely the highest killer of children under-five in 2017 [19].

"Pneumonia has been confirmed to be a deadly disease and takes so numerous children's lives – although this is mostly preventable [19]. And yet, this killer disease has been largely forgotten in the world and national health agendas [19]. We should and be capable of changing this," said Pernille Ironside, Acting UNICEF Representative in Nigeria [19].

The biggest risk factors for child pneumonia deaths in Nigeria are malnutrition, indoor air pollution from the use of solid fuels, and outdoor air pollution [19]. While Nigeria is battling with the recent report by the World Health Organization, WHO, which shows that Nigeria topped the list of different nations with unvaccinated children from measles, including the newest Multi-Indicator Cluster Survey, MICS/ National Immunization Coverage Survey, that also showed that the country continues to be far behind the Global Vaccine Action Plan, GVAP, of achieving 90 per cent vaccinations of children, the 2017 International Vaccines Access Centre, IVAC, report released in 2019 showed that Nigeria not only ranks among countries with the worst burden of the disease but also among the countries that are yet

to improve interventions aimed towards reducing the deaths and treating effectively [19]. Health watchers are worried that more Nigerians may lose their lives if nothing is carried out urgently to arrest the trend [19].

Most global child pneumonia deaths occurred among children under the age of two, and almost 153,000 within the initial month of life [19]. Reflecting on the alarm about this forgotten epidemic, six leading health and children's organizations launched an appeal for global action in 2019 [20].

In January 2019, the group hosted world leaders at the Global Forum on Childhood Pneumonia in Spain. Pneumonia is caused by bacteria, viruses or fungi and leaves children fighting for breath as their lungs fill with pus and fluid. More children under the age of 5 died from the disease in 2018 than from some other diseases. 4,37,000 children under five died because of diarrhoea and 272,000 to malaria [21].

Just five countries were accountable for over half of child pneumonia deaths: Nigeria (162,000), India (127,000), Pakistan (58,000), the Democratic Republic of Congo (40,000) and Ethiopia (32,000) [21].

Children with immune systems weakened by other infections like HIV or by malnutrition, and people living in areas with high levels of air pollution and unsafe water, are at far greater risk [21. If properly diagnosed, the disease is prevented with vaccines and simply treated with low-cost antibiotics [21]. But tens of millions of children are still unvaccinated – and one in three with symptoms doesn't receive essential medical aid or treatment [21].

Children with severe cases of pneumonia might also need oxygen treatment, which is hardly ever available in the poorest countries to the children who need it [22]. Funding available to tackle pneumonia lags far behind other diseases [22]. Only 3% of current global communicable disease research spending is allocated to pneumonia, despite the disease-causing 15% of deaths in children under the age of 5 [22].

"Increased investment is critical to the fight against this disease," said Pernille Ironside [22]. "Only through cost-effective protective, preventative and treatment interventions delivered to where children are – including especially the foremost vulnerable and hardest-to-reach - will we be able to save hundreds of thousands of lives in Nigeria." Said Pernille Ironside [22].

In a joint call to action, the six organizations urge:

1. Governments within the worst-affected countries to develop and implement Pneumonia Control Strategies to minimize child pneumonia deaths, and to enhance access to primary health care as a part of a wider strategy for universal health coverage.
2. Richer countries, international donors, and private sector companies to increase immunization coverage by reducing the price of key vaccines and ensuring the successful replenishment of Gavi, the Vaccine Alliance; and increasing funding for research and innovation to tackle pneumonia.

Boosting efforts to fight pneumonia could avert over 2 million child deaths from pneumonia and other major diseases in Nigeria, a new analysis has found [22].

The modelling by Johns Hopkins University was released in 2020 as nine leading health and children's agencies host the world's first global conference on childhood pneumonia in Barcelona [22].

In 2018, 71 million children did not get the recommended three doses of pneumococcal conjugate vaccine (PCV), thereby putting them at a higher risk of pneumonia [22]. Globally, 32% of children with suspected pneumonia were not taken to a health facility [22]. That figure rose to 40% for the poorest children in low- and middle-income countries [22].

Forecasts showed that 1.4 million children under the age of five might die from pneumonia

over the next decade in Nigeria, on current trends – the highest number of any country in the world and more than 20% of childhood deaths from pneumonia globally [22].

However, an estimated 809,000 of those deaths would be averted by significantly improving services to prevent and treat pneumonia [22].

Researchers also found out that boosting pneumonia services can create an additional 'ripple effect', preventing 1.2 million extra child deaths from other major childhood diseases at the same time [22].

Pneumonia is caused by bacteria, viruses or fungi and leaves children fighting for breath as their lungs fill with pus and fluid [22]. The disease is the leading killer of children in Nigeria, causing 19% of under-five deaths [22].

Most pneumonia deaths can be prevented with vaccines and easily treated with low-cost antibiotics [22]. But more than 40% of one-year-olds in Nigeria are unvaccinated, and three in four children suffering from pneumonia symptoms do not get access to medical treatment [22].

At the sentinel sites, children less than five years of age admitted with diarrhoea, regardless of duration or presence of blood in the stool, can be enrolled in the surveillance sites but children with hospital-acquired diarrhoea will be excluded. Each of the sites is expected to collect a minimum of 150 stool samples per year. According to data collected from the sentinel sites, 2,043(47%) of the 4,377 cases enrolled over an 8-years period are positive for Rotavirus, with a case fatality rate of 1.3%. The incidence of rotavirus diarrhoea is highest in the months of January and February each year [23].

### Null Hypothesis

High cost gives rise to non-linear responses in vaccine uptake, and there may be other significant determinants like level of education, religion, media, choice, and decision of the head of the family, which determine epidemics and vaccination dilemmas.

## Methodology

### Study Design

A descriptive cross-sectional study was carried out to assess the epidemics and vaccination dilemma among parents/childcare givers at Kosofe and Shomolu LGA.

### Description of Study Area

This study was conducted in Kosofe and Shomolu Local Government Area in Lagos State, Nigeria. Kosofe means 'nothing is free. This underscores the diverse commercial activities which characterized the indigenes and early settlers of the area in the mid-nineteenth century, the people were noted for massive trade in vegetables, fruits, maize, cassava, and fish. Its location at the gateway to the metropolitan Lagos further entrenches Kosofe as an important name in commerce in modern-day Nigeria [24]. The present-day Kosofe is still a bustling commercial Centre, being the terminal for all food items from all parts of the nation. This is understandable as Lagos State remains the major market for all agricultural products from the hinterland as a result, the present-day Kosofe is mainly occupied by traders, civil servants and elites, no wonder Kosofe's motto reads thus: "cradle of excellence [24]."

Kosofe is located at the Northern part of Lagos State. It is bounded by (3) other Local Governments, namely: Ikeja, Ikorodu and Somolu. It also shares a boundary with Ogun State. Its jurisdiction comprises of seven wards and encompasses an area of about 17.85sq/km. its headquarters is at Ogudu Road, Ojota, Lagos. Presently, Kosofe falls under the East Senatorial District [24].

Despite the diversity of its dwellers, the Local Government is very peaceful, and the relationship between the different groups is very cordial. This gives a favorable background for the development of the area [25].

Shomolu, also spelled Somolu, is a town, in Lagos State, southwestern Nigeria, just north of Lagos city. A residential suburb of Lagos, the

town is plagued by problems of overcrowding, poor housing, and inadequate sanitation [26]. Most of its inhabitants are Yoruba. The town's local activities include work in leather handicrafts and printing. The population of the Shomolu local government area is 402,673. Bariga area used to be a part of Somolu local government until it was carved out as a Local Community Development Area. Somolu local government forms a part of the Lagos East Senatorial zone and also has a lawmaker representing the district at the Federal House of Representatives [27].

Epidemics occur everywhere in the world, including in Kosefe and Shomolu Local governments. We carried out our research at Health Centre at Kosofe LGA called Oworoshoki health centre, General Hospital Gbagada, and the popular R Jolad is a good place to study and capture epidemics and vaccination dilemmas.

**Study Population**

The population is comprised of all the parents/childcare givers in Kosofe and Shomolu LGA. The study subjects were Mothers/Fathers/Childcare givers/guardians that use Kosofe LGA Health Centre, General Hospital and R Jolad hospital to vaccinate their children. This comprised of those that take vaccines as well as track epidemics of both emerging and re-emerging diseases.

## Inclusion Criteria

Mothers/Fathers/Child caregivers/Guardians that use Kosofe LGA Health Centre, General Hospital and R Jolad hospital to vaccinate their children with their consent.

**Exclusion Criteria**

Mothers/Fathers/Childcare givers/Guardians that do not use Kosofe LGA Health Centre, General Hospital and R Jolad hospital to vaccinate their children.

**Sample Size Determination**

The Cochran formula is [28]:

$$n = \frac{Z^2{}_{pq}}{d^2}$$

n = desired sample size (when population is greater than 10,000).
Z = Standard normal deviate at 95% confidence interval = 1.96.
P = proportion of residents of Mushin LGA with severe adult illnesses or behavioural illnesses, respondents preferred doctors in government facilities (48.1% and 59.9%, respectively) [29].
P = 59.9%.
q = 1 - p, 1 - 0.599 = 0.40.
d = Margin of error desired 5% = 0.05.

Therefore,

n = $1.96^2$ x 0.599 x $0.40/0.05^2$ = 0.9204/.0025 n = 368.

To make allowance for non-response and attrition, 5% will be added using the formula

If $n_r$ = 5% Divide n by (100% - 5%) = 95% = .95

Final $n_f$ = 368/.95 = 387

The sample size was determined in order to have 95% confidence limits of 5% maximum error of the estimate when the probability is 59.9% [29]. This leads to a requirement of 368 residents. For a no-response expectation, the sample size was increased to 387 residents. 375 completed questionnaires were used.

**Sampling Technique**

The technique of Multistage sampling was used to obtain cross-sectional data for this study in Lagos state. The Lagos state was divided geographically into 37 Local governments Area.

Therefore, the sample size of 387 residents was distributed according to the number of residents in each LCA as follows:

Stage 1: The balloting method of simple random sampling was used to pick 2 LGA.

Stage 2: The balloting method of simple random sampling was used to select 3 Health facilities (a Health Centre, government, and private hospital) from the Stratified list of hospitals.

Stage 3: Simple random sampling method using patient's registers was used to select the patients that were sampled in each hospital.

## Method of Data Collection

Questionnaire was developed for this study based on the previous research questions related to epidemics and vaccination dilemmas. A pilot study was carried out for 20 residents with children, and necessary modifications will be carried out. The questionnaire contains four sections. The first is the demographic section, which contains questions regarding age, gender, marital status, education level, household income, occupation, and health insurance. The second section was designed to assess participants' knowledge and understanding of epidemics and on use of the vaccine. The third section of the questionnaire consists of questions on knowledge of all vaccines for children.

The investigator explained the study to the participants, including the conditions for participating, as well as privacy and confidentiality for data collection. Although the study was free from any serious ethical issues, the researcher designed a participant's information sheet that explained the voluntary nature of the study in detail, and the anonymity and confidentiality in the study. Necessary translation of the contents of the tools for this research will be done to assist the less learned but with care not to influence or distort the judgment of the participants. The researcher, through trained health workers for data collection, gave the participant's information sheet and questionnaire to eligible and willing participants at the various places designated for data collection.

### Ethical Considerations

Ethical approval was obtained from the Research and Ethics Committee of Lagos University Teaching Hospital. Permission was also obtained from the Chairman of Lagos state health service commission and Lagos University Teaching Hospital Health Research committee before the commencement of the study. Participation was voluntary, all the participants were required to provide written informed consent, and they were assured of the confidentiality regarding information collected from them.

## Results

### Section A: Socio-Demographic Data

The mean, modal ages and standard deviation of Parents, were 32.82 years, 30 years old and 5.86. The youngest respondent was 17 years old, and the oldest respondent was 59.

**Table 2.** Socio-demographic Characteristics of Parents/Guardians

| Characteristics | Frequency n = 375 | Percentage (%) |
|---|---|---|
| **Hospital Respondent used for vaccination** | | |
| General Hospital Gbagada | 122 | 32.53 |
| R Jolad Hospital Gbagada | 123 | 32.80 |
| Oworoshoki Health center | 114 | 30.40 |
| Both Gbagada General and R Jolad Hospital | 5 | 1.33 |
| Both Gbagada General & Oworoshoki health center | 6 | 1.60 |
| Gbagada General, R Jolad hospital and Oworoshoki health center | 5 | 1.33 |
| **Sex of respondent** | | |
| Male | 25 | 6.67 |
| Female | 350 | 93.33 |
| **Marital Status** | | |

| | | |
|---|---|---|
| Single | 12 | 3.20 |
| Married | 361 | 96.27 |
| Divorced | 1 | 0.27 |
| Separated | 1 | 0.27 |
| **Education** | | |
| No formal education | 2 | 0.53 |
| Primary | 1+0 | 2.67 |
| Secondary | 110 | 29.33 |
| Tertiary | 253 | 67.47 |
| **Religion** | | |
| Christian | 314 | 83.73 |
| Islam | 60 | 16.00 |
| Others | 1 | 0.27 |
| **Employment Status** | | |
| Employed | 140 | 37.33 |
| Unemployed | 38 | 10.13 |
| Self employed | 197 | 52.53 |
| **Income** | | |
| <50,000 Naira | 148 | 39.47 |
| 50,000 – 99,999 | 85 | 22.67 |
| 100,000 – 150,000 | 71 | 18.93 |
| >150,000 | 71 | 18.93 |
| **Health Insurance status** | | |
| Yes | 144 | 38.40 |
| No | 231 | 61.60 |
| **Mode of vaccine payment** | | |
| Free (Subsized by Government) | 227 | 60.53 |
| Health Insurance | 16 | 4.27 |
| Out of pocket payment | 92 | 24.53 |
| Free and Health insurance | 7 | 1.87 |
| Health insurance& out of pocket | 24 | 6.40 |
| Free, Health insurance & out of pocket | 9 | 2.40 |

An interesting observation was made while collecting data at an Oworoshoki Health center and General hospital Gbagada, some mothers came with R – Jolad vaccination cards. When we interviewed them, they said they gave birth at R -Jolad and their health insurance paid for the expenses and some primary vaccines, but they could not afford to pay for vaccines like Pneumococcal, Rotavirus, Measles, Mumps, Rubella etc. and were the reason they came to Oworoshoki Health Centre. Surprisingly some mothers that met me at R Jolad and Oworoshoki health Centre saw me at General hospital Gbagada, and this is to justify that 1.33% of parents use the 3-health facility while 1.60% use Both Oworoshoki and R – Jolad hospital for vaccination and 1.33% use General hospital Gbagada and R – Jolad hospital for vaccination. The population of children that uses R Jolad hospital for vaccination in a day was not as much as children that use Health center and General Hospital Gbagada. It is interesting to note that R

Jolad parents often come together to get their children vaccinated. This was not common in Oworoshoki health center of General Hospital Gbagada.

Majority of the parents/Guardian were self-employed (52.53%), and most mothers are self-employed to create more time for their children. Mothers now learn skills like tailoring, hair styling, event management and are most involve in networking business, buying, and selling. Thirty – seven percent of our parents/guardians were employed and most of them complained of not having the time or getting permission from their various organizations to take their children for vaccination. Thirty – eight percent of our parents/guardians were unemployed. Most health insurance companies do not cover vaccines like Rotavirus, Cholera, Flu, HPV etc.

The modal number of children is 2 followed by 1 and then 3. Parents in these categories were found at R Jolad hospital, probably because of their level of education and cost of the vaccine. We can see that parents now try to have the number of children they can afford to train because of the economy. The parents that have 4, 5, 6, and 7 children use Oworoshoki Health center and General hospital, respectively.

Almost all our respondents (99.47%) vaccinate their children except for 2 Nannies who do not have their own child/children. In Nigeria, we often use the word 'immunization' for vaccination.

**Section B: Knowledge of Epidemics and Vaccination**

From Table 2 below, 84.80% of the parents/guardians strongly believe that it is important for their children to receive all the necessary vaccines while 0.80% disagree.

Most (61.87%) of parents/guardians strongly believe politicians should be role models that encourage vaccination, while 4.53 strongly disagree. Half (50.67%) of mothers/caregiver were not sure if there is still a link between MMR vaccination and autism; 21.07% and 18.13% strongly agree and agree respectively that there is a link between the MMR vaccination and autism; 6.13% and 4% strongly disagree and disagree respectively that there could be a link between MMR vaccination and autism.

The difference between parents/guardian that worry or do not worry that vaccinations are irreversible is 1.60%, this is a vaccination dilemma and about 21.60% were still not sure if they are worried that vaccinations are irreversible. This simply means that we need to continue creating awareness campaigns on vaccination/immunization. Majority of parents, 70.93% believe vaccination programmes are worthwhile. This is a good vaccination dilemma.

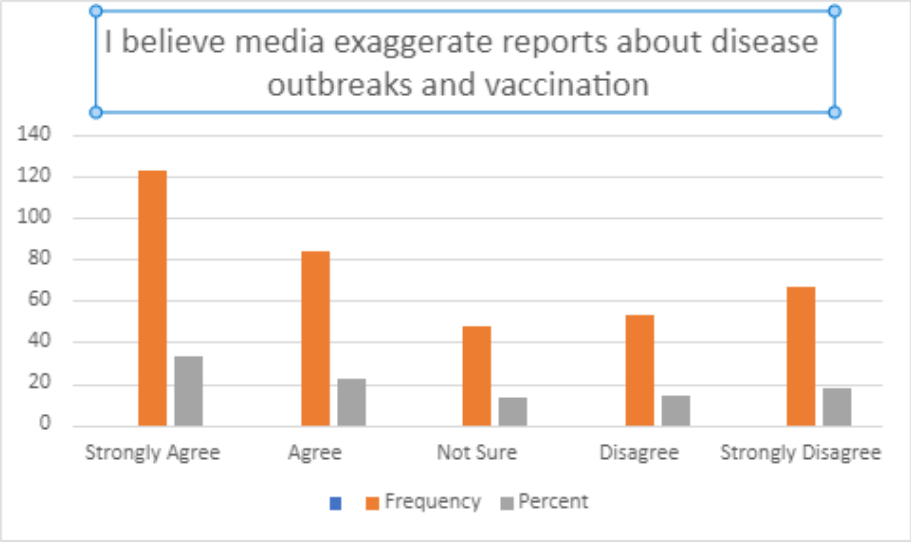


**Figure 1.** I Believe Media Exaggerate Reports about Disease Outbreaks and Vaccination

The horizontal (x) axis represents the categories (responses); The vertical (y) axis represents a value for those categories. In the graph above, the values are percentages and frequencies. Parents/guardians (32.80%) strongly agreed, and 22.40% agreed that the media exaggerates reports about disease outbreaks. While 12.80% were not sure, 14.13% disagreed and 17.87 that the media does not exaggerate reports about disease outbreaks. Some Mothers further explained that the Nigerian government is using the media to exaggerate reports about COVID – 19 so as to get funding from the international community. Some mothers at Oworoshoki health centre and General hospital Gbagada do not believe that there is COVID – 19 and were not taking proper safety measures as seen at R Jolad hospital, where most mothers were so cautious, wore nose masks, maintained social distancing, were seen with sanitizers which they were often using for themselves and children. This is where the level of education plays an important role in the level of knowledge and attitude towards epidemics and vaccination.

**Table 3.** Respondent's Knowledge of Epidemics and vaccination

| **Respondents** | **Frequency n = 375** | **Percentage (%)** |
|---|---|---|
| **I believe it is important for my child to receive all vaccinations** | | |
| Strongly agree | 318 | 84.80 |
| Agree | 48 | 12.80 |
| Not sure | 4 | 1.07 |
| Disagree | 2 | 0.53 |
| Strongly disagree | 3 | 0.80 |
| **I believe politicians should be role models that encourage vaccination** | 5 | 1.33 |
| Strongly agree | - | - |
| Agree | 232 | 61.87 |
| Not sure | 81 | 21.60 |
| Disagree | 22 | 5.87 |
| Strongly disagree | 23 | 6.13 |
| **I still believe there could be a link between MMR vaccination and Autism** | 17 | 4.53 |
| Strongly agree | 79 | 21.07 |
| Agree | 68 | 18.13 |
| Not sure | 190 | 50.67 |
| Disagree | 15 | 4.00 |
| Strongly disagree | 23 | 6.13 |
| **It worries me that vaccinations are irreversible** | 110 | 29.33 |
| Strongly agree | 85 | 22.67 |
| Agree | 65 | 17.33 |
| Not sure | 81 | 21.60 |
| Disagree | 71 | 18.93 |
| Strongly disagree | 73 | 19.47 |
| **I worry about possible side effects of vaccination** | | |
| Strongly agree | 104 | 27.73 |

| | | |
|---|---|---|
| Agree | 92 | 24.53 |
| Not sure | 42 | 11.20 |
| Disagree | 75 | 20.00 |
| Strongly disagree | 62 | 16.53 |
| **Media report on vaccination encourages me to vaccinate my child** | 85 | 22.67 |
| Strongly agree | 208 | 55.47 |
| Agree | 112 | 29.87 |
| Not sure | 18 | 4.80 |
| Disagree | 22 | 5.87 |
| Strongly Disagree | 15 | 4.00 |
| **I believe vaccination programmes are worthwhile** | | |
| Strongly Agree | 266 | 70.93 |
| Agree | 96 | 25.60 |
| Not sure | 8 | 2.13 |
| Disagree | 4 | 1.07 |
| Strongly disagree | 1 | 0.27 |
| **Do you make decision for your child's vaccination?** | 9 | 2.40 |
| Yes | 354 | 94.40 |
| No | 21 | 5.60 |

More than half of parents/guardians (27.73% and 24.53%) strongly agree and agree respectively, that they worry about the possible side effects of vaccination. Only 11% were not sure if they worried or not. This is a negative vaccination dilemma that needs intervention.

The majority of parents/guardians (55.47% + 29.87%) strongly agree plus agree that media reports on vaccination programmes encourage them to vaccinate their children. This means that media plays a key role in vaccination campaigns, awareness and intervention and should be promoted more to achieve the goal of ensuring all children are vaccinated properly.

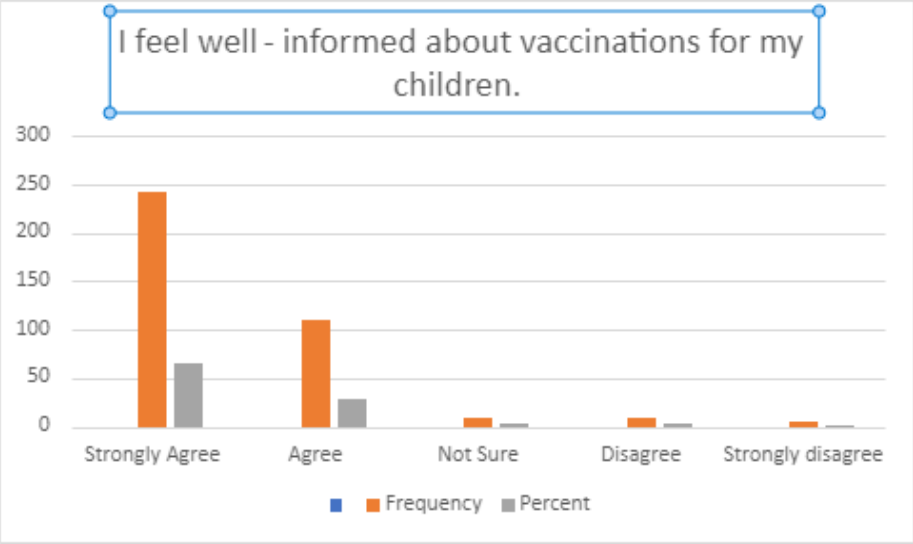


**Figure 2.** I Feel well - Informed about Vaccinations for my Children.

The horizontal (x) axis represents the categories (responses); The vertical (y) axis represents a value for those categories. In the graph above, the values are percentages and frequencies. Approximately sixty – five percent of the respondents strongly feel and 29.07% feel that they are well informed about vaccinations for their children, while only 1.33 strongly felt, 2.40% they were not well informed about vaccinations for their children and 2.40% were not sure if they felt informed or not about vaccinations.

The majority of the respondents (94.40%) were responsible for making a decision for their children's immunization, like remembering the next appointment, bring the child/children to the hospital for immunization, keeping the immunization card properly and making payment for vaccination while only 5.60% were not responsible for making a decision for their children's immunization because they need the Husband to make payment for vaccination, give his consent and drive to wife and child/children to the hospital for immunization.

**Highest level of Education of Respondent * I Believe it is important for my Child to Receive all the Necessary Vaccinations**

Chi-square tests = 73.50, P value = 0.000.

This means that there was a significant positive association between the level of education and knowledge of parents on epidemics and vaccination. The level of education of parents had an influence on their knowledge of epidemics and vaccination uptake.

**Highest Level of Education of Respondent * I believe Media exaggerate Reports about Disease Outbreaks and Vaccination**

Chi-square tests = 29.26, P value = 0.004.

This means that there was a significant association between the level of education and knowledge of parents on epidemics and vaccination. The level of education of parents had an influence on their knowledge in terms of if they believe they believe media exaggerated reports about disease outbreaks and vaccination.

**Highest level of Education of Respondent * I feel well-informed about vaccinations for my children**

Chi-square tests = 31.24, P value = 0.002.

This means that there was a significant association between religion and the knowledge of parents on epidemics and vaccination. The religion of parents had an influence on their knowledge in terms of if they feel well informed about vaccinations for their children

**Which Hospital do you use for the Vaccine? * It Worries me that Vaccinations are Irreversible**

Chi-square tests = 121.47, P value = 0.000.

This means that there was a significant association between the choice of hospital and the knowledge of parents on epidemics and vaccination. The choice of the hospital of parents had an influence in terms of if they worry that vaccination is irreversible.

**Which Hospital do you use for the Vaccine? * I Worry about the Possible Side Effects of Vaccination**

Chi-square tests = 36.95, P value = 0.012.

This means that there was a significant association between the choice of hospital and the knowledge of parents on epidemics and vaccination. The choice of the hospital of parents had an influence in terms of if they worry about the possible side effects of vaccination.

**Which Hospital do you use for Vaccine? * Media Report on vaccination Programmes Encourage me to Vaccine, my Child**

Chi-square tests = 31.41, P value = 0.050

This means that there was a significant association between the choice of hospital and the knowledge of parents on epidemics and vaccination. The choice of the hospital of parents had an influence in terms of media reports encourages them to vaccinate their children.

**Section C: Healthy practices**

**Table 4.** Level of Importance for keeping Children Healthy - Healthy Practices for Child/Children

| Healthy practices (in percentage) | Not at all important | Somehow important | Important | Quite important | Very important | Extremely important |
|---|---|---|---|---|---|---|
| Brushing their teeth twice a day | 2.67 | 7.20 | 4.80 | 7.20 | 12.00 | 66.13 |
| Eating healthy food | 0.00 | 0.27 | 0.53 | 1.60 | 3.73 | 98.87 |
| Getting enough sleep | 0.27 | 0.80 | 1.33 | 2.40 | 5.60 | 89.60 |
| Getting outside each day | 6.13 | 4.53 | 13.60 | 14.67 | 12.53 | 48.53 |
| Getting plenty of physical activity | 1.33 | 0.53 | 3.20 | 6.40 | 14.13 | 74.40 |
| Getting their vaccines on time | 0.00 | 0.80 | 0.27 | 2.67 | 5.07 | 91.20 |
| Having a safe and happy home life | 1.07 | 0.00 | 0.80 | 1.60 | 3.73 | 92.80 |
| Having regular dentist and doctor check-ups | 9.33 | 4.27 | 4.80 | 8.53 | 12.27 | 60.80 |
| Taking vitamins and/or nutritional supplements | 1.33 | 1.07 | 1.87 | 5.60 | 10.40 | 79.73 |
| Washing their hands regularly | 0.53 | 0.00 | 0.27 | 2.40 | 7.73 | 89.07 |
| Wearing nose mask regularly in public | 11.20 | 1.33 | 2.40 | 3.47 | 8.27 | 73.33 |

From Table 4 above, 66.13% of parents/guardians felt it was extremely important to brush their child's/children's teeth twice a day. Only 2.67% felt it was not at all important to brush their children's teeth twice daily because sometimes they get home tired from work very late at night. The majority (93.87%) felt it was extremely important for their child/children to eat good food so as to enhance growth and build immunity. It is good to note that none of the parents/guardians said it was not at all important.

Most (89.60%) of parents/guardians which is majority felt it was extremely important for their child/children to get enough sleep which is the best form of rest and enable their parents/guardians to rest especially nursing mothers. Only 48.53% of parents/ guardians felt it was extremely important for their child/children to get outside each day. This is because of the current Covid–19 pandemic and lockdown measure. Majority of parents/ guardians (74.40%) felt it was extremely important for their child/children to get plenty physical activity so as to prevent obesity amongst their children.

Almost all of parents/guardians (91.20%) felt it was extremely important for their child/children to get their vaccines on time and non said it was not at all important. Majority (92.80%) of parents/guardians felt it was extremely important to have a safe and happy home while 1.07% said it was not at all

important. This practice is good for the mental and physical health if all family members.

It was amazing to note that 60.80% felt it was extremely important to go for doctor's check-ups for their children, but parents don't practice this as required, and 9.33% of parents/guardians felt it was not at all important. Approximately eighty percent of parents/guardians felt it was extremely important for their children to take vitamins and/or nutritional supplements. Eighty-nine percent felt it was extremely important for their child/children to wash their hands regularly so as to prevent contracting diseases. This is a very good practice. Approximately seventy-three percent of parents/guardians ensure that their child/children wear nose masks.

**Section D: Attitudes towards Epidemics and Vaccination**

**Table 5.** How Important do you Feel it is for your Child to Receive Vaccinations to Protect him/her against the Following

| Diseases | Not at all important | Somehow important | Important | Quite important | Very important | Extremely important |
|---|---|---|---|---|---|---|
| Blood infections | 2.40% | 0.00% | 0.27% | 2.67% | 6.40% | 88.27% |
| Chicken Pox | 3.20% | 0.27% | 0.27% | 1.07% | 4.27% | 90.93% |
| Cholera | 4.53% | 0.53% | 0.00% | 1.07% | 5.87% | 88.00% |
| Diphtheria | 1.07% | 0.00% | 0.80% | 1.33% | 7.73% | 89.07% |
| Ear infections | 2.67% | 0.00% | 0.80% | 2.67% | 6.93% | 86.93% |
| Flu | 7.20% | 0.53% | 1.07% | 1.60% | 6.13% | 83.47% |
| Hepatitis A | 4.27% | 0.00% | 0.53% | 1.33% | 3.20% | 90.67% |
| Hepatitis B | 1.60% | 0.27% | 0.00% | 0.80% | 4.00% | 93.33% |
| HPV | 8.00% | 0.27% | 0.27% | 1.60% | 4.27% | 85.60% |
| Measles | 1.33% | 0.53% | 0.00% | 1.07% | 4.00% | 93.07% |
| Meningitis | 1.07% | 0.53% | 0.27% | 0.53% | 4.53% | 93.07% |
| Mumps | 1.07 | 0.27% | 0.53% | 1.87% | 4.53% | 91.73% |
| Pneumonia | 1.87% | 0.00% | 0.80% | 1.07% | 4.80% | 91.47% |
| Polio | 0.80% | 0.00% | 0.53% | 0.53% | 4.53% | 93.60% |
| Rotavirus | 4.80% | 0.00% | 0.53% | 0.80% | 5.07% | 88.80% |
| Tetanus | 0.80% | 0.00% | 0.53% | 1.33% | 4.53% | 92.80% |
| Whooping Cough | 1.07% | 0.27% | 0.80% | 0.80% | 3.73% | 93.33% |

**Table 6.** Respondents Attitude towards Epidemics and Vaccination

| Respondents | Frequency n = 375 | Percentage (%) |
|---|---|---|
| **How concerned are you that your child could still contract a vaccine-preventable disease for which he or she has been vaccinated for?** | | |
| Not at all concerned | 76 | 20.27 |
| Somehow concerned | 42 | 11.20 |
| Quite concerned | 50 | 13.33 |
| Totally concerned | 172 | 45.87 |
| Not sure/it depends on | 35 | 9.33 |
| **How likely do you think it is that one or more childhood vaccines may cause long term negative side effects?** | 5 | 1.33 |
| Not at all likely | 132 | 35.20 |

| | | |
|---|---|---|
| Somehow likely | 36 | 9.60 |
| Quite likely | 47 | 12.53 |
| Totally likely | 71 | 18.93 |
| Not sure/ it depends on | 89 | 23.73 |
| **How concerned are you that your own child may contract a vaccine – preventable disease and suffer a serious reaction to the disease?** | | |
| Not at all concerned | 80 | 21.33 |
| Somehow concerned | 33 | 8.80 |
| Quite concerned | 44 | 11.73 |
| Totally concerned | 164 | 43.73 |
| Not sure/it depends on | 54 | 14.40 |
| **How concerned are you that your own child may experience a bad reaction to a childhood vaccine?** | | |
| Not at all concerned | 77 | 20.53 |
| Somehow concerned | 37 | 9.87 |
| Quite concerned | 48 | 12.80 |
| Totally concerned | 163 | 43.47 |
| Not sure/it depends on | 50 | 13.33 |

Less than half (45.87%) of parents/guardians were totally concerned that their child/children could still contract a disease for which he or she has been vaccinated. Some parents further explained that some children that have taken measles and chickenpox vaccination still had measles afterwards. It is amazing that 20.27% of parents were not concerned that their child/children could still contract a disease for which he or she has been vaccinated.

Approximately forty-three percent of parents/guardians were totally concerned that their own child may experience a bad reaction to a childhood vaccine, while 20.53% were not at all concerned and 13.33% were not sure/it depends. This is a negative vaccination dilemma.

**Table 7.** In Nigeria, a Doctor or Nurse who is Administering a Childhood Vaccine must get Informed Consent from the Parent or Caregiver Accompanying the Child. How Well - Informed do you Feel about the Risks of the Following Vaccines

| Vaccines | Not at all informed | Somehow informed | Informed | Quite informed | Very informed | Extremely informed |
|---|---|---|---|---|---|---|
| Cholera | 8.27% | 1.07% | 2.93% | 8.00% | 7.73% | 72.00% |
| Diphtheria | 6.13% | 1.07% | 4.00% | 8.80% | 8.00% | 72.00% |
| Flu | 10.67% | 1.07% | 3.20% | 8.53% | 6.93% | 69.60% |
| Hepatitis A | 6.93% | 0.80% | 3.20% | 7.20% | 5.87% | 76.00% |
| Hepatitis B | 4.80% | 0.80% | 2.93% | 8.00% | 7.47% | 76.00% |
| HPV | 13.33% | 1.33% | 3.73% | 8.53% | 7.20% | 65.87% |
| Measles | 4.27% | 1.33% | 1.87% | 6.40% | 8.27% | 77.87% |
| Mumps | 5.87% | 1.60% | 4.00% | 8.53% | 8.00% | 72.00% |
| Pertussis (Whopping cough) | 4.53% | 1.33% | 2.93% | 7.73% | 7.20% | 76.27% |
| Pneumonia | 5.07% | 2.13% | 3.20% | 6.13% | 7.73% | 75.73% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Polio | 4.53% | 1.33% | 1.87% | 7.20% | 5.87% | 79.20% |
| Rotavirus | 10.40% | 0.80% | 2.67% | 6.13% | 8.53% | 71.47% |
| Rubella | 6.40% | 1.07% | 3.47% | 7.73% | 6.67% | 74.67% |
| Tetanus | 4.80% | 1.33% | 2.93% | 8.27% | 6.13% | 76.53% |
| Varicella (Chicken Pox) | 8.53% | 0.53% | 2.40% | 7.47% | 5.87% | 75.20% |

**Table 8.** How Well Informed do you Feel about the Benefits of the Following Vaccines

| Vaccines | Not at all informed | Somehow informed | Informed | Quite informed | Very informed | Extremely informed |
|---|---|---|---|---|---|---|
| Cholera | 6.67% | 0.00% | 2.13% | 4.53% | 9.07% | 77.60% |
| Diphtheria | 4.80% | 0.27% | 1.60% | 6.13% | 10.40% | 76.80% |
| Flu | 9.60% | 0.53% | 2.13% | 5.60% | 9.07% | 73.07% |
| Hepatitis A | 6.13% | 0.27% | 1.60% | 5.87% | 8.27% | 77.87% |
| Hepatitis B | 4.00% | 0.53% | 1.33% | 5.07% | 6.67% | 82.40% |
| HPV | 11.20% | 0.53% | 1.07% | 5.60% | 9.87% | 71.73% |
| Measles | 4.53% | 0.80% | 1.07% | 4.80% | 6.93% | 81.87% |
| Mumps | 5.60% | 0.27% | 2.93% | 6.13% | 10.40% | 74.67% |
| Pertussis (Whopping cough) | 3.20% | 0.80% | 2.40% | 5.07% | 9.60% | 78.93% |
| Pneumonia | 4.27% | 0.53% | 2.13% | 6.13% | 9.07% | 77.87% |
| Polio | 2.67% | 1.07% | 2.13% | 4.00% | 8.27% | 81.87% |
| Rotavirus | 8.00% | 0.00% | 2.67% | 4.00% | 8.00% | 77.33% |
| Rubella | 4.80% | 0.00% | 3.47% | 5.87% | 8.80% | 77.07% |
| Tetanus | 2.67% | 0.80% | 2.67% | 4.00% | 8.27% | 81.60% |
| Varicella (Chicken Pox) | 5.60% | 0.53% | 1.87% | 4.00% | 9.87% | 78.13% |

The majority (87.20%) of parents/guardians indicated that it would be extremely helpful, and 10.13% of parents/guardians said it would be quite helpful to have more information about the benefits and possible health risks of childhood vaccines, with statistics and data that are complete, easy to understand and not biased to sway your decision in a certain direction.

**Table 9.** How Well Informed do you Feel about the Health Risks Related to Contracting the Following Diseases

| Diseases | Not at all informed | Somehow informed | Informed | Quite informed | Very informed | Extremely informed |
|---|---|---|---|---|---|---|
| Blood infections | 4.80% | 0.53% | 2.67% | 8.27% | 10.13% | 73.60% |
| Chicken Pox | 4.80% | 0.53% | 2.135 | 6.40% | 10.13% | 76.00% |
| Cholera | 7.47% | 0.80% | 1.60% | 7.20% | 9.60% | 73.33% |
| Diphtheria | 4.80% | 1.33% | 2.67% | 10.13% | 8.80% | 72.27% |
| Ear Infections | 4.53% | 1.07% | 3.20% | 7.47% | 10.67% | 73.07% |
| Flu | 8.53% | 0.53% | 2.93% | 8.00% | 9.07% | 70.93% |
| Hepatitis A | 6.13% | 1.07% | 1.87% | 6.40% | 8.80% | 75.73% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Hepatitis B | 3.20% | 1.07% | 2.13% | 6.13% | 8.53% | 78.93% |
| HPV | 11.73% | 0.80% | 2.67% | 7.73% | 10.40% | 66.67% |
| Measles | 3.20% | 0.27% | 1.87% | 7.73% | 9.07% | 77.87% |
| Meningitis | 3.47% | 1.33% | 2.13% | 8.00% | 9.60% | 75.47% |
| Mumps | 3.47% | 1.87% | 3.20% | 8.27% | 9.87% | 73.33% |
| Pneumonia | 3.47% | 1.07% | 3.47% | 7.20% | 9.07% | 75.73% |
| Polio | 2.40% | 0.80% | 1.87% | 5.87% | 8.00% | 81.07% |
| Rotavirus | 7.47% | 0.80% | 1.87% | 7.73% | 8.80% | 73.33% |
| Tetanus | 2.40% | 1.33% | 2.40% | 6.13% | 9.07% | 78.67% |
| Whooping cough | 2.67% | 0.80% | 1.87% | 6.93% | 9.33% | 78.40% |

The majority (78.93%) of parents/guardians indicated that it would be extremely helpful, 12.27% said it would be quite helpful, 5.07% didn't know if they were sure or not, and 3.20% felt it would be somehow helpful to have more information about the prevalence of the vaccine preventable childhood diseases in your LGA/in Lagos state.

**Table 10.** How Concerned are you about the Possible Risks and Reactions Related to the Following Vaccines?

| **Vaccines (in %)** | **Not at all Concerned** | **Somehow Concerned** | **Concerned** | **Quite Concerned** | **Very concerned** | **Extremely concerned** |
|---|---|---|---|---|---|---|
| Cholera | 15.47 | 2.67 | 2.67 | 5.07 | 9.87 | 64.27 |
| DPTP – Hib (5-in-1) | 8.27 | 2.40 | 3.73 | 5.07 | 8.00 | 72.53 |
| dTap (diphtheria, tetanus, pertussis) | 9.33 | 2.40 | 2.93 | 5.33 | 9.33 | 70.67 |
| Flu | 17.07 | 2.67 | 2.13 | 5.87 | 8.80 | 63.47 |
| Hepatitis B | 10.40 | 2.13 | 1.60 | 5.60 | 9.33 | 70.93 |
| HPV | 16.27 | 2.13 | 2.13 | 6.40 | 7.73 | 65.33 |
| Meningococcal | 9.60 | 2.67 | 1.87 | 6.40 | 8.53 | 70.93 |
| MMR (Mumps, Measles, Rubella) | 8.00 | 2.40 | 2.93 | 6.13 | 9.33 | 71.20 |
| Pneumonia | 9.33 | 1.87 | 2.40 | 6.67 | 9.33 | 70.40 |
| Polio | 9.87 | 2.13 | 2.13 | 5.33 | 8.53 | 72.00 |
| Rotavirus | 15.73 | 1.60 | 2.40 | 5.33 | 8.00 | 66.93 |
| Varicella (Chicken Pox) | 14.13 | 2.40 | 1.87 | 5.07 | 9.07 | 67.47 |

**Table 11.** What are the most Important Factors you Consider when Deciding to get your Child Vaccinated?

| **Most important factors to consider for child vaccination (in %)** | **Not at all important** | **Somewhat important** | **Important** | **Very important** | **Extremely important** |
|---|---|---|---|---|---|
| Doctor recommendation | 2.67 | 1.07 | 9.87 | 13.87 | 72.53 |
| Effectiveness of the vaccine | 11.20 | 0.53 | 8.00 | 13.60 | 66.67 |
| Personal experience with the disease | 32.53 | 4.00 | 10.67 | 10.93 | 41.87 |
| Public health nurse recommendation | 8.27 | 3.20 | 8.53 | 11.20 | 68.80 |

| | | | | | |
|---|---|---|---|---|---|
| Recommendation by trusted friend/family | 49.33 | 6.67 | 11.73 | 8.53 | 23.73 |
| Requirement by school/daycare | 16.53 | 5.07 | 13.07 | 15.47 | 49.87 |
| Risk level of the disease | 25.33 | 2.13 | 6.93 | 12.27 | 53.33 |
| Safety of the vaccine | 9.07 | 0.53 | 7.47 | 14.13 | 68.80 |
| Seriousness of the disease | 16.00 | 0.80 | 8.00 | 14.93 | 60.27 |
| Side effects of the disease | 26.40 | 1.07 | 6.67 | 12.27 | 53.60 |
| Side effects of the vaccine | 25.87 | 1.07 | 6.40 | 14.13 | 52.53 |

We also found out that most schools in Lagos do not request children's vaccination/immunization cards before enrolment but are mandatory in Abuja.

The mean, modal age and standard deviation parents/guardians gave for their oldest child/children were 2.21 years, 1 – 6 years and 0.94.

**To the Best of your Knowledge and Memory, which of the Following Vaccinations has your Oldest Child had?**

Parents/guardians yes that their oldest child/children have received 5-in-1 - Diphtheria, Tetanus, Pertussis, Polio, Hib (recommended at 2, 4, 6 & 18 months) (99.73%), MMR - Mumps, measles, rubella (recommended at 12 months and 2 or 5 years) (92.53%), Hepatitis B (recommended at 2, 4 and 6 months or pre-teen) (99.73%), Pneumococcal (recommended at 2, 4, 6 and 12 months) (97.33%), Meningococcal C (recommended 3 doses starting before 12 months) (88.80%). While parents/guardians no that their oldest child/children have not received Varicella - chickenpox (recommended at 12 months) (64.80%), Influenza/Flu (recommended 1 to 2 doses between 6 and 23 months) (78.93%), HPV - Human Papilloma Virus (recommended for girls in Grades 6 and 9) (95.47%), Cholera (from 12 months) (72.53%), Rotavirus (recommended 2 doses at 6 weeks and 10 weeks) (65.33%).

**If you did not Fully Follow the Recommended Nigeria Immunization Schedule for your Oldest Child, What were your Reasons?**

The reasons parents/guardians gave for not following the recommended Nigerian immunization schedule for their oldest child were: At Oworoshoki health centre some secondary vaccines were not available like Rotavirus, cholera, Flu, HPV, Hepatitis A and Chicken pox vaccine. Some babies were newborn, 2, months, 3 months, 6 months, 9 months, 10 months, 11 months old and could not take vaccines that are not for their ages. Some said Because of their child's studies, some parents were ignorant, misinformed and not aware of some vaccines like Cholera, Flu and HPV. Some complained of Cost, Financial constraints, lack of funds and time to take permission from work, and some could not find my child vaccination card, a mother said that immunization is not very important, Lack of knowledge of rotavirus benefits. Attitude of health workers discourage mothers from going to hospitals to vaccinate their children same as fear of contracting Covid – 19.

The mean, modal age and standard deviation parents/guardians gave for their youngest child/children were 1.55 years, 0 – 12 months and 0.69. Total number of youngest children was 280.

**To the Best of your Knowledge and Memory, which of the Following Vaccinations has your Youngest Child had?**

Parents/guardians yes that their youngest child/children have received 5-in-1 - Diphtheria, Tetanus, Pertussis, Polio, Hib (recommended at 2, 4, 6 & 18 months) (99.64%), MMR - Mumps, measles, rubella (recommended at 12 months and 2 or 5 years) (77.86%), Hepatitis B (recommended at 2, 4 and 6 months or pre-teen) (98.93%), Pneumococcal (recommended at 2, 4, 6 and 12 months) (98.33%), Meningococcal C (recommended 3 doses starting before 12 months) (76.79%). While parents/guardians no that their youngest child/children have not received Varicella - chickenpox (recommended at 12 months) (71.43%), Influenza/Flu (recommended 1 to 2 doses between 6 and 23 months) (76.79%), HPV - Human Papilloma Virus (recommended for girls in Grades 6 and 9) (96.43%), Cholera (from 12 months) (77.14%), Rotavirus (recommended 2 doses at 6 weeks and 10 weeks) (62.86%).

**If you did not Fully Follow the Recommended Nigerian Immunization Schedule for your Youngest Child, what were your Reasons?**

The reasons parents/guardians gave for not following the recommended Nigerian immunization schedule for their youngest child were: At Oworoshoki Health centre some secondary vaccines were not available like Rotavirus, cholera, Flu, HPV, Hepatitis A and Chicken pox vaccine. Some babies were newborn, 2, months, 3 months, 6 months, 9 months, 10 months, 11 months old and could not take vaccines that are not for their ages. Some said Because of their child's studies, some parents were ignorant, misinformed and not aware of some vaccines like Cholera, Flu and HPV. Some complained of Cost, Financial constraint, lack of funds and time to take permission from work, some could not find my child vaccination card, a mother said that immunization is not very important, Lack of knowledge of rotavirus benefits. Attitude of health workers discourages mothers from going to hospitals to vaccinate their children, same as fear of contracting Covid–19. Some mothers had Busy schedules, were tired and had no time, while some mothers said Pneumococcal was not available many years ago both at Oworoshoki health centre and General Hospital. Some could not get their children vaccinated because of the Covid-19 lockdown.

**Have you Heard of Covid -19 Vaccine?**

The majority (87.73%) of parents/guardians have heard of COVID – 19 vaccines, while 12.27% of parents/guardians have not heard of COVID – 19 vaccines.

**Will you Give your Child Covid - 19 Vaccines if Available?**

More than half (53.07%) percent said they won't vaccinate their children if COVID – 19 Vaccine is available, while 46.93% of mothers agreed to give their children COVID – 19 vaccines if available.

**If yes/no to Vaccinate your Children with Covid – 19 Vaccine give Reasons**

**Yes, reasons feedback**: "Safety first, if it is given for free, I will ensure my child takes it. If it is a preventive vaccine, then it's a welcomed initiative.

**No reasons feedback:** "Because i feel it has not passed through clinical trials, I am not yet sure of the effectiveness of the vaccines, it is not important".

## Discussion

The proportion of parents living in Kosofe and Shomolu Local Government Area that are currently using vaccination is very high and vaccination hesitancy for the primary vaccine is very low. This is because the media also had influence on parents' knowledge, attitude towards epidemics and vaccination, plus healthy practices. We are accepting the Null Hypothesis that "High cost gives rise to non-linear responses in vaccine uptake and there may be other significant determinants like level of education,

religion, media, choice and decision of the head of a family which determine epidemics and vaccination dilemma".

Cost, if not addressed, can undermine several components of vaccination delivery, including vaccine acceptance. Improving vaccination cost is therefore crucial to achieving better vaccination outcomes as well as the greater goal of knowledgeable caregivers and communities – important contributors to improving child health in many settings. The affordable cost could improve uptake of childhood vaccination, address incomplete vaccination, further strengthen routine immunization programmes, and encourage the use of new and underused vaccines. Ideally, vaccination cost should complement and boost other immunization components, such as service provision, quality of care, capacity-building, communication and the skills of health personnel, and disease notification and surveillance [30].

## Conclusion

Some mothers at Oworoshoki health centre and General hospital Gbagada did not believe that there is COVID – 19 and were not taking proper safety measures as seen at R Jolad hospital, where most mothers were so cautious, wore nose masks, maintained social distancing, were seen with sanitizers which they were often using for themselves and children. Level of education plays an important role in the level of knowledge and attitude towards epidemics and vaccination. Income and Cost of vaccine affect vaccination uptake because of the present economic situation in Nigeria. Media plays a key role in vaccination campaigns, awareness and intervention and should be promoted more to achieve the goal of ensuring all children are vaccinated properly. Doctor's and Public Health Nurse have a major role to play in terms of influencing parents/guardians. Vaccination uptake.

## Recommendations

Based on the major conclusions, the following recommendations for improving the knowledge of epidemics and vaccination are very important.

1. Information on epidemics and vaccination must be made available to parents/guardians through mass media.
2. Government should make some vaccines like Rotavirus, cholera, and chickenpox vaccine free.
3. There is a need the for Nigerian primary health care development agency (NPHCDA). The Ministry of Health, NCDC, NAFDAC, Public Health specialists, WHO, UNICEF, Non-Governmental Organizations and other agencies related to epidemics and vaccination to be directly or indirectly involved in the training of parents/guardians on knowledge of epidemics, vaccination and healthy practices especially regular Dental and Doctor's checkups. This training should involve use of posters, drama, songs, campaign and increasing frequency of calls /SMS and social media (Twitter, Facebook, Instagram, Whatsapp, Youtube, Linkedin etc.) to notify parents/guardians on epidemics and vaccination.
4. Various stakeholders like Community leaders, Church leaders, health workers like Doctors, and Public Health Nurse needs to promote vaccination uptake by leading by example in their various communities.
5. Schools/Daycares in Lagos must ensure that requirement of a vaccination/Immunization card is mandatory before admission is finalized.
6. Health insurance companies should cover for secondary vaccines so as to enable children enrolled under their insurance package to be properly vaccinated.

**Contribution to Knowledge**

1. The dilemma as regards to MMR vaccination.
2. Absence of Chicken pox, cholera and rotavirus vaccine in government hospitals and health centres.
3. Attitude of parents towards children's vaccine-preventable diseases and Covid – 19.
4. The perception of parents as regards to COVID – 19 vaccination acceptance and hesitancy for their children.

### Limitation of Study

The study only focused on approved vaccines available at the time of the study. Therefore, Malaria vaccines was not included in the questionnaire given to the respondents.

### Suggestion for Future Research

This research didn't focus on Malaria vaccination therefore, I suggest that research should be conducted to forecast the proposed malaria vaccination Dilemma.

### Strength of the Research

The survey tool (Questionnaire) was well designed to study the epidemics and vaccination dilemma properly.

### Weakness of the Study

It was a health facility-based research, and most of our respondents were females.

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## Conflicts of Interest

The author declares no conflict of interest.

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# Predictors of Family Size Among Men in Urban Slums of Enugu, Southeast Nigeria: A Cross Sectional Study

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***Abstract***

*A rapidly increasing population is a threat to national development, family stability and social security. This study aimed at assessing family size preferences and its predictors among married men in urban slums in Enugu, Nigeria. A descriptive cross-sectional study that involved household survey of 381 married men living in urban slums of Enugu, Nigeria was carried out. Data was collected using pre-tested, interviewer-administered questionnaires. Data aanalysis was done with IBM Statistical Package for the Social Sciences (SPSS). The average actual family size was 6 people, with an average of 4 children. 62.5% had their children mixed, 27% had all males, while 10.5% had all girls. However, over 50% of respondents desired to have a family size of 8 or more, with 52.8% of them preferring to have at least 3 sons and 3 daughters. The predictors of family size were: age of respondent (AOR 2.951; CI=1.343-3.314), sex distribution (AOR 2.905; CI= 1.960-4.306), number of twins (AOR 4.720 CI= 1.821-12.231), desired number of children (AOR 7.566; CI=2.334-24.522), desire to continue childbirth (AOR 0.202; CI=0.084-0.482) and desire to have more children if income is increased (AOR 0.403; CI= 0.176-0.919). Actual and desired family size, as well as male sex preference, were high among married men in Enugu urban slums. Family size was predicted by the age of respondent, sex distribution, number of twins, the desired number of children and desire to have more children. Health education programs on population control should target urban slum dwellers to enhance human and economic development.*

***Keywords:*** *Predictors, Enugu, Family size, Nigeria, Urban Slum.*

## Introduction

Nigeria is one of the most densely populated countries in Africa, with an approximate population of about 200 million people in an area of 920,000 $km^2$ the seventh-largest populated country in the world [1]. Family is the basic unit of every society and refers to a group of people who are related by birth, marriage or adoption, usually consisting of parents and their children. Family size refers is the number of persons in the family. Interchangeably, it may also mean the number of children that are in a nuclear family.

Family size preference is the number of children a married couple desires which could be considered large or small, ideal or actual. A large family may consist of a minimum of 4 children and above, while a small family size would be defined by a maximum of 3 children [2]. A woman's family size is said to be the number of children she has at the end of her child-bearing years. This is also known as her total fertility capacity. The number of children a

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woman actually does have could be different from the desired number that she would like to have, but for predictive information, this desired number could give a piece of information about the actual number she might finally have.[3] The size of the family could be one of the important determinants of the welfare and health of the individual, the family and the community as well as the country (Nigeria) at large [4].

The twentieth century has witnessed substantial changes in family size in Nigeria. These changes in family sizes are attributed to numerous factors/determinants. These determinants could either positively or negatively affect the overall well-being of the family and possibly the community as a result of the effects of large population size in a rural community. Such determinants need to be taken care of as possible control of such will lead to an overall increase in the community well-being. These determinants could be socio-cultural or economic in nature [5].

A large family size poses a big problem in our society at large. In Africa, most couples desire to have more children, probably as a source of honour, wealth, and prestige [5]. In Nigeria, marital fulfilment has a lot to do with childbearing. A study has shown that marital satisfaction and childbearing have a mutually reinforcing linkage [6]. The country's total fertility rate (TFR), which measures the number of children a woman is likely to have during her childbearing years, is 5.3 births [7]. A large family leads to different health-related and non-health-related challenges to especially the mother and the children.

These challenges include but are not limited to maternal morbidity and mortality, inadequate provision of shelter, food, education of the children, and inability to provide the family members with good health care. This would lead to a decrease in the standard of living, childhood nutritional deficiency and subsequent malnutrition, lack of education, overcrowding, prostitution, street hawking, increased poverty levels, and increased under 5 morbidity and mortality [8]. Large family size has a negative effect on the health of the mothers as well [9].

In terms of children's access to quality basic life-sustaining goods like food, shelter, clothing, healthcare, and education, among others, family size is largely a determinant factor [10]. It has been noted with a disturbing concern that large family size preference and status connect to poverty, deviance and illiteracy [11]. The larger a family is, the more resources it would need for the proper upkeep of its members. In other words, having a large family can have negative effects on the health and well-being of both parents and children [12]. Grossly, large family size desirability among a significant number of people has the potency to increase population growth [13].

Furthermore, parents have limited resources to distribute among their children such that the ones available to each child are reduced as family size increases.[13] For example, parents may invest less in a child's education when they have an unmanageable large family size [14]. Additionally, larger families may "reduce parental emotional investment" in each child, which can impede social and emotional growth and development [15]. These negative consequences are likely if one or more of the births are unintended [16].

The situation of the 'Almajiris' practiced in Northern Nigeria shows us another example of how a large family size can have a negative impact on society. Northern families usually have a large family size. The resources are not enough to cater for them all, so most of them are sent to Islamic schools that take full responsibility for training them. In this system of Islamic education, these young children migrate from their homes to Islamic schools, where they are educated about Islam and the Quran.

The desirability of large family size is not without the interplay of some underlying key socioeconomic factors. Worthy of attention and curiosity is the need to investigate some of

these socioeconomic determinants of family size preference among married couples. A couple of scholars have noted the impact of income, occupation, and religious affiliations on rising family size preferences, while others have linked the phenomenon to parental influence [17-20]. Notably, there is a variation in the family size preference among urban and rural dwellers [21]. Also, among many determinant factors influencing family size preference is the educational status of couples which has a lot to do with women's empowerment towards the use of family planning techniques and family size predisposition [21-22], [7]. The implication is that highly educated women have a smaller family size than uneducated ones [23]. Socio-culturally, religious beliefs and doctrinal practices influence the choice of family size preference among some people [24]. Other factors that jointly or independently influence family size preference among couples include the age of husband, age of women at marriage, work status of women and fertility, son preference, geographical location, place of residence, consanguineous marriages, fertility intention (ideal family size), child mortality, polygyny, husband/wife's desire for more children, wealth index and marital duration [25].

Factors influencing family size have been investigated across several societies all over the world. Some studies have been carried out on family size determinants in Nigeria, but just a few of these studies were done on urban or semi-urban populations; therefore, little is known about the determinants of desired family size in populations such as Urban Slums. There also seems to be no single study of such in an urban slum in Enugu State, Nigeria. This study was, therefore, designed to determine the actual and the desired family size among married men in Ngenevu Urban Slum and to assess the socio-cultural and economic determinants of family size among them. This study can generate the evidence needed by the government in making policies and programs targeted at child welfare, such as those that can promote their health and education. The knowledge of the family size and its preferences would enable better health planning for the Enugu people. It would also expose the urgent need for health interventions that would focus on contraceptive use.

## Methods

### Study Design

This research study was a descriptive, cross-sectional study that involved a household survey of married men in Ngenevu, Urban slum of Enugu State, Nigeria.

### Study Setting

This study was carried out at Ngenevu; an urban slum in Enugu North Local Government Area (LGA) of Enugu State. Enugu state is in the southeastern part of Nigeria and is located within the subtropical rainforest belt at coordinates (6.6N, 7.5E). Enugu state has 17 Local Government Areas. It is dominated by Igbo speaking ethnic groups with other minorities. As of 2006, the state had 3,267,837 inhabitants with a population density of 460 per $km^2$[26]. Females made up 52.1% of the population. The state is predominantly rural and agrarian, with most of its working population engaged in farming, although trading and services (public services, banking, and tourism) are significant in the area. The predominant religion is Christianity. Enugu Metropolis is made up of Enugu North, Enugu South and Enugu East LGAs [27].

Ngenevu shares boundaries with the Coal Camp and the University of Nigeria Teaching hospital, Enugu (old site). It is located on top of the Onyeama Coal Mine. The occupations of residents of Ngenevu are mainly artisans, petty trading with few civil/public servants. There were 3 primary schools and no primary health facility in the area. The houses were scattered without clear cut streets or zones. Their major refuse disposal method are open dumping with

burning. Water supply for drinking and cooking were by water tankers and satchet water, and water for household chores is supplemented by hand-dug well water.

### Study Population

The study population were married men resident in Ngenevu, Urban slum.

### Inclusion/Exclusion Criteria

Men who have been in marriage for at least one year in Ngenevu Urban Slum were included in the study. Men who were acutely ill, absent on the day of the survey, separated, or divorced were excluded from the study.

### Sampling Methods

A random cluster sampling method was used. House numbering of eligible households was done as the initial step. The number of eligible houses was divided by the sample size to determine the sampling interval. A random start was made using a random sampling method. After sampling the household that formed the random start, sampling continued systematically according to the sampling interval until the last household was sampled.

### Sample Size Estimation

The sample size was calculated using the statistical formula: $N = [Z2P(1-P)/ D^2]$**,** Where N is the minimum sample size**,** Z is the standard score at 95% confidence level, which is 1.96**,** P is the p-value from previous studies which is 0.67 [29] and D is margin of error tolerated (5%). Using a prevalence of the desire for more children in which a prevalence of 0.67 was obtained, and an additional 10% of the minimum sample size added to make for non-response, a total of 381 households was utilized as the sample size.

### Data Collection

A pre-tested semi-structured interviewer-administered questionnaire was used for the study. Pretesting was done in another urban slum (Obiagu) different from Ngenevu being studied. It was done using 10% of the sample size (33 married men). The structured questionnaires used for the study were designed by members of the project group, and a copy is included in the appendix. This questionnaire was guided by previous studies and pretested on a different group not resident in Ngenevu. Consent forms were developed and given to the respondents, and only those who gave their consent were sampled. The consent form was written in clear English language and translated during the interview to the local Igbo language and pidgin English to respondents. It was able to explain the essence and objective of the study. It also explained the confidentiality and the voluntary nature of participation.

### Data Analysis

Collected data were pooled and analyzed using Statistical Package for the Social Sciences (SPSS version 26). Frequencies and proportions were calculated for categorical variables, while means and standard deviations were calculated for numeric variables. Statistical associations were tested using Pearson's chi-square. A p-value of $<0.05$ was set as a criterion for establishing statistical significance. Predictors were assessed using a Regression model.

### Ethical Consideration

Ethical clearance was obtained from the Ethical Committee of the University of Nigeria Teaching Hospital (ETNTH), Ituku Ozalla. Participation was voluntary and based on written informed consent from all the participants. Only consented respondents were recruited for the study. Confidentiality and anonymity of the respondents were ensured, and this was clearly explained in the consent form.

## Results

### Baseline Information

A total of 381 married male respondents from Ngenevu, an urban slum within the

Enugu-North local government area, Enugu state, were interviewed, and the data extracted from them were analysed. All the data collected were analysed.

## Socio-demographic Characteristics of the Respondents

The mean age of the respondents was 49 ±12 years. The majority (50.4%) of the respondents (192) married at ages less than 30 years, and about 46.5% (177) of the respondents had their first child between the ages of 30 to 34 years. The majority (99.0%) of respondents were from the Igbo tribe, and all the respondents (100%) are Christians. All respondents (100%) were of the monogamous family type and had a Christian pattern of marriage. The other details of the socio-demographic characteristics of the respondents were shown in Table 1. Table 2 shows the respondents' educational level, occupation, and that of their wives' monthly income, and socio-economic status according to the international wealth index (IWI) score.

**Table 1.** Socio-demographic Characteristics of the respondents

| Variable | Frequency (N=381) | Percentage (%) |
|---|---|---|
| **Age (years)** | | |
| <45 | 156 | 40.9 |
| 45-54 | 103 | 27.0 |
| > 54 | 122 | 32.0 |
| Mean age ± (SD): **49 ± (12)** | | |
| **Age at marriage (years)** | | |
| <30 | 192 | 50.4 |
| 30-34 | 148 | 38.8 |
| >34 | 41 | 10.8 |
| Mean age ± (SD): **29 ± (4)** | | |
| **Age at birth of first child (years)** | | |
| <30 | 128 | 33.6 |
| 30-34 | 177 | 46.5 |
| >34 | 76 | 19.9 |
| Mean age ± (SD): 3**1 ± (4)** | | |
| **Major Tribe** | | |
| Igbo | 377 | 99.0 |
| Yoruba | 1 | 0.3 |
| Others | 3 | 0.8 |
| **Religion** | | |
| Christianity | 381 | 100.0 |
| **Denomination** | | |
| Catholic | 203 | 53.3 |
| Anglican | 101 | 26.5 |
| Pentecostal | 77 | 20.2 |
| **Traditional title** | | |
| Yes | 22 | 5.8 |
| No | 359 | 94.2 |
| **Pattern of marriage** | | |
| Christian | 381 | 100.0 |
| **Type of marriage** | | |

| | | |
|---|---|---|
| Monogamous | 381 | 100.0 |
| **Place of upbringing** | | |
| Urban | 55 | 14.4 |
| Rural | 146 | 38.3 |
| Semi-Urban | 180 | 47.2 |

**Table 2.** Socio-demographic Characteristics of the Respondents

| **Variable** | **Frequency (N=381)** | **Percentage (%)** |
|---|---|---|
| **Occupation of respondent** | | |
| Civil servant | 90 | 23.6 |
| Trader | 177 | 46.5 |
| Artisan | 78 | 20.5 |
| Farmer | 4 | 1.0 |
| Unemployed | 10 | 2.6 |
| Others (Bus drivers) | 22 | 5.8 |
| **Occupation of Wife** | | |
| Civil servant | 56 | 14.7 |
| Trader | 241 | 63.3 |
| Artisan | 39 | 10.2 |
| Farmer | 11 | 2.9 |
| Unemployed | 15 | 3.9 |
| Others (Cleaner) | 19 | 5.0 |
| **Level of education** | | |
| None | 21 | 5.5 |
| Primary | 128 | 33.6 |
| Secondary | 124 | 32.5 |
| Tertiary and above | 108 | 28.3 |
| **Level of education of Wife** | | |
| None | 21 | 5.5 |
| Primary | 140 | 36.7 |
| Secondary | 142 | 37.3 |
| Tertiary and above | 77 | 20.2 |
| **Monthly income** | | |
| 0 | 1 | 0.3 |
| < 30,000 | 26 | 6.8 |
| 30-50,000 | 172 | 45.1 |
| 50-100,000 | 88 | 23.1 |
| > 100,000 | 94 | 24.7 |
| **Socioeconomic status** | | |
| Poorest 20 | 1 | 0.5 |
| Second 20 | 28 | 7.3 |
| Middle 20 | 109 | 28.6 |
| Fourth 20 | 129 | 33.9 |
| Best off 20 | 114 | 29.9 |
| **Average IWI score: 68.74%, Std. dev: 18.70%** | | |

## The Mean Family Size and Actual Family Size of the Respondents

The mean family size of the respondents was 6 people, of which 56.4% (215) of the respondents had a family size of 6 or more people while 43.6% (166) of respondents had a family size less than 6 people.

Furthermore, 61.2 % (233) of participants had 4 children or less, while 38.8% (61.2) of them had more than 5 children. The average number of children the participants had was 4 children. The sex distribution of the children recorded showed that 31.5% had more females than males while 31.0% had more males than females. Further details showed that 14.4% had all males, 12.6% one male-only and 10.5% of the respondents had all females. The number of respondents with singleton deliveries were commoner (84.3%) than those respondents with multiple births (15.7%).

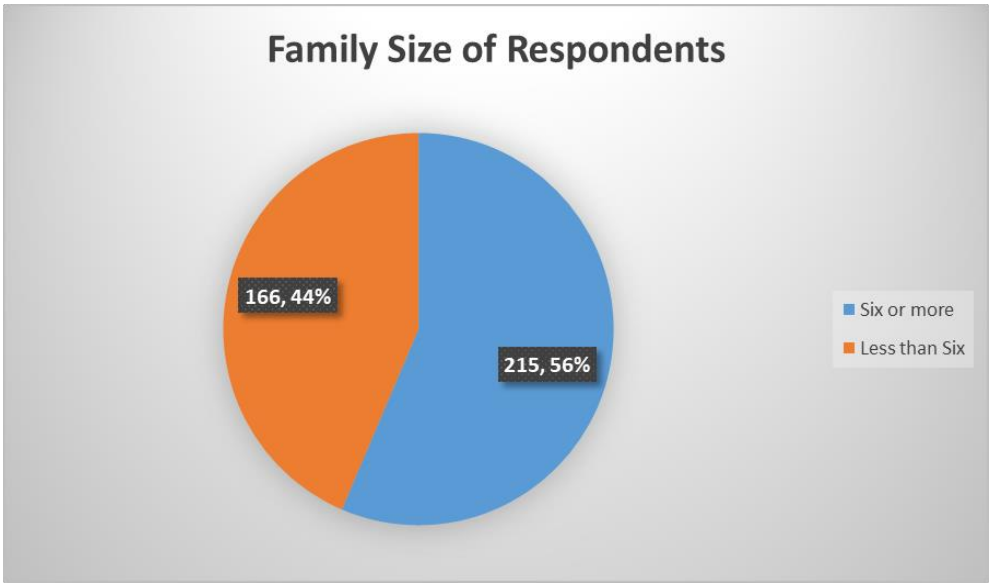


**Figure 1.** Family Size of the Respondents

## Desired Number of Children among the Participants

A total of 206 (54.1%) of the respondents desired for more than 4 children, while 45.9% (175) of the respondents desired for 4 children or less. The average desired family size was 5 children. Table 3 shows the desired family size and sex distribution of the participants. Furthermore, when the participants were asked about their future to get to their desired family size and sex distribution, we found that a minority of respondents (31.8%, 121) affirmed that they will continue to have children till their desired gender is gotten but the majority (68.2%, 260) indicated that they won't continue to have children till their desired gender is conceived. Those who positively affirmed that their current income status could support their family size and those that indicated that it couldn't support their family size were 55.9% (213) and 44.1% (168), respectively. Those who underwent premarital counselling on family size preferences were the minority of the population studied with just 30.2% (115), while those that didn't undergo pre-marriage counselling were the large majority of the population studied at 69.5% (265).

Furthermore, the data shows that a minority of the respondents, 30.4% (116), wanted to bear more children if their income status increased. On the other hand, more than half of the respondents, 69.3% (264), indicated maintaining their current family size even if their income level was improved.

## Factors Associated with Family Size of the Participants

As shown in Table 4, the family size of the participants was significantly associated with the age of the respondent (p <0.001), age at marriage (p <0.001), age at first birth (p = 0.003), sex distribution (p <0.001), number of twins (p <0.001), and place of upbringing (p <0.001).

Furthermore, table 5 showed that family size was also significantly associated with the wife's occupation (p = 0.027), education of respondents (p = 0.002), education of wife (p = 0.015), desired number of children (p <0.001), desired number of sons (p <0.001), desired number of daughters (p <0.001), desire to have children till desired gender is gotten (p <0.001), and desire to continue childbirth (p <0.001). As shown in table 6, there was a significant association between family size and the desire to have more children if income is increased (p <0.001).

**Table 3.** Desired Family size of the respondents

| Variable | Frequency (N=381) | Percentage (%) |
|---|---|---|
| **Desired Number of Sons** | | |
| <3 | 180 | 47.2 |
| >3 | 201 | 52.8 |
| Average: 3 sons | - | - |
| **Desired Number of Daughters** | | |
| <3 | 133 | 34.9 |
| >3 | 248 | 65.1 |
| Average: 3 daughters | - | - |
| **Reason for Desired number of Children** | | |
| Prestige | 75 | 19.7 |
| Affordability | 211 | 55.4 |
| Cultural belief | 81 | 21.3 |
| Religious belief | 14 | 3.7 |

**Table 4.** Socio-demographic Factors associated with Family Size of the Participants

| Variables | Family Size | | $\chi 2$ | p-value |
|---|---|---|---|---|
| | <6 | >6 or more | | |
| **Age of the respondents (years)** | | | | |
| <45 | 103 (66.0) | 53(34.0) | 64.948 | **<0.001** |
| 45-54 | 41(39.8) | 62(60.2) | | |
| >54 | 22(18.0) | 100(82.0) | | |
| **Age at marriage (years)** | | | | |
| <30 | 65 (33.9) | 127(66.1) | 15.321 | **<0.001** |
| 30-34 | 81(54.7) | 67(45.3) | | |
| >34 | 20(48.8) | 21(51.2) | | |
| **Age at first birth (years)** | | | | |
| <30 | 44 (34.4) | 84 (65.6) | 8.819[a] | **0.003** |
| 30-34 | 80 (45.2) | 97 (54.8) | | |
| >34 | 42 (55.3) | 34 (44.7) | | |
| **Denomination** | | | | |
| Catholic | 93 (45.8) | 110 (54.2) | 0.889 | 0.346 |

| | | | | |
|---|---|---|---|---|
| Non- catholic | 73 (41.0) | 105 (59.0) | | |
| **Traditional title** | | | | |
| No | 157(43.7) | 202 (56.3) | 0.067 | 0.795 |
| Yes | 9 (40.9) | 13 (59.1) | | |
| **Sex distribution of children** | | | | |
| All males | 78 (75.7) | 25 (24.3) | 124.067 | **<0.001** |
| All females | 36 (90.0) | 4 (10.0) | | |
| Mixed | 52(21.8) | 186 (78.2) | | |
| **Number of twins** | | | | |
| None | 154(48.0) | 167 (52.0) | 16.091 | **<0.001** |
| One or more | 12 (20.0) | 48 (80.0) | | |
| **Place of upbringing** | | | | |
| Urban | 118 (50.2) | 117 (49.8) | 11.008 | **<0.001** |
| Rural | 48 (32.9) | 98 (67.1) | | |

**Table 5.** Socio-demographic Variables associated with a Family size

| **Variables** | **Family Size** | | $\chi 2$ | **p-value** |
|---|---|---|---|---|
| | **<6** | **>6 or more** | | |
| **Respondent Occupation** | | | | |
| Employed | 46 (5E1) | 44 (48.9) | 2.726 | 0.099 |
| Self-employed | 120(4E2) | 171 (58.8) | | |
| **Wife Occupation** | | | | |
| Employed | 32(57.1) | 24 (42.9) | 4.919 | **0.027** |
| Self-employed | 134(4E2) | 191 (58.8) | | |
| **Respondent education** | | | | |
| < Primary | 50 (33.6) | 99 (66.4) | 5.860 | **0.015** |
| > Secondary | 116(50.0) | 116 (50.0) | | |
| **Socioeconomic status** | | | | |
| Low class | 57 (44.2) | 72 (55.8) | 0.216 | 0.897 |
| Middle class | 51 (44.7) | 63 (55.3) | | |
| High class | 166(43.6) | 215 (56.4) | | |
| **Desired number of children** | | | | |
| 0 to 4 | 113 (64.6) | 62 (35.4) | 58.065 | **<0.001** |
| More than 4 | 53 (25.7) | 153 (74.3) | | |
| **Desired number of Sons** | | | | |
| 1 to 2 | 110(61.1) | 70 (38.9) | 42.701 | **<0.001** |
| 3 or more | 56 (27.9) | 145 (72.1) | | |
| **Desired number of daughters** | | | | |
| 1 to 2 | 134 (54.0) | 114 (46.0) | 31.631 | **<0.001** |
| 3 or more | 32(24.1) | 101 (75.9) | | |
| **Reasons for desired number of children** | | | | |
| Prestige, culture, and belief | 68 (40.0) | 102 (60.0) | 1.591 | 0.207 |
| I can afford it | 98 (46.4) | 113 (53.6) | | |
| **Desire to have children till desired gender is gotten** | | | | |
| No | 92 (35.4) | 168 (64.6) | 22.307 | **<0.001** |
| Yes | 74 (61.2) | 47 (38.8) | | |
| **Desire to continue childbirth** | | | | |
| No | 67 (26.6) | 185 (73.4) | 87.303 | **<0.001** |
| Yes | 99 (76.7) | 30 (23.3) | | |

**Table 6.** Socio-economic Factors associated with a Family Size

| Variables | Family Size | | $\chi 2$ | p-value |
|---|---|---|---|---|
| | *<6* | >6 or more | | |
| **Monthly income** | | | | |
| < 50,000 | 77 (38.9) | 121 (61.1) | 3.673 | 0.055 |
| > 50,000 | 89 (48.6) | *94* (51.4) | | |
| **Income can support family** | | | | |
| No | 65 (38.7) | 103 (61.3) | 2.910 | 0.172 |
| Yes | 101 (47.4) | 112 (52.6) | | |
| **Desire to have more children if income is increased** | | | | |
| No | 97 (36.6) | 168 (63.4) | 17.177 | **<0.001** |
| Yes | 69 (59.5) | 47 (40.5) | | |
| **Had pre-marriage counseling** | | | | |
| No | 114(42.9) | 152 (57.1) | | 0.690 |
| Yes | 52 (45.2) | 63 (54.8) | 0.182 | |

**Table 7.** Socio-demographic Predictors of the Family Size of the Respondents

| Variables | Category | AOR | p-value | 95% Confidence Interval | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| **Age of respondents (years)** | <45 | 2.951 | **<0.001** | 1.343 | 3.314 |
| | 45-54 | | | | |
| | >54 | | | | |
| **Age at marriage (years)** | <30 | 1.029 | 0.938 | 0.499 | 2.125 |
| | 30-34 | | | | |
| | >34 | | | | |
| **Age at first birth (years)** | <30 | 0.707 | 0.304 | 0.364 | 1.370 |
| | 30-34 | | | | |
| | >34 | | | | |
| **Sex distribution of children** | All males | 2.905 | **<0.001** | 1.960 | 4.306 |
| | All females | | | | |
| | Mixed | | | | |
| **Number of twins** | None | 4.720 | **<0.001** | 1.821 | 12.231 |
| | One or more | | | | |
| **Wife Occupation** | Employed | 0.535 | 0.217 | 0.198 | 1.444 |
| | Self-employed | | | | |
| **Respondent education** | < Primary | 0.901 | 0.798 | 0.407 | 1.998 |
| | > Secondary | | | | |
| **Wife education** | < Primary | 1.160 | 0.710 | 0.531 | 2.536 |
| | > Secondary | | | | |
| **Desired number of Children** | <4 | 7.566 | **<0.001** | 2.334 | 24.522 |
| | >4 | | | | |
| **Desired number of son** | <3 | 0.834 | 0.713 | 0.318 | 2.192 |
| | >3 | | | | |
| **Desired number of** | <3 | 0.640 | 0.321 | 0.265 | 1.545 |

| | | | | | |
|---|---|---|---|---|---|
| **daughters** | >3 | | | | |
| **Desire to have children till desired gender is gotten** | No | 0.587 | 0.314 | 0.646 | 3.902 |
| | Yes | | | | |
| **Desire to continue childbirth** | No | 0.202 | **<0.001** | 0.084 | 0.482 |
| | Yes | | | | |
| **Desire to have more children if income is increased** | No | 0.403 | 0.031 | 0.176 | 0.919 |
| | Yes | | | | |

### Predictors of Family Size among the Respondents

As shown in Table 7 above, the predictors of large family size were the age of the respondent (AOR 2.951; CI=1.343-3.314), sex distribution (AOR 2.905; CI= 1.960-4.306), number of twins (AOR 4.720 CI= 1.821-12.231), the desired number of children (AOR 7.566; CI=2.334-24.522), desire to continue childbirth (AOR 0.202; CI=0.084-0.482), and desire to have more children if income is increased (AOR 0.403; CI= 0.176-0.919).

## Discussion

The socio-demographic, socio-economic and socio-cultural characteristics in this study portray a lot of significances, similarities, and differences in comparison to previous studies. The age of a man at various stages is quite significant to family size [19]. The mean number of children reported in our study was 4 and it was quite lower than the Nigerian national fertility rate of 5 according to NDHS 2018 report [1]. It was discovered that respondents <45 years had a family size of < 6 while those >54 years had a predominant family size of 6 or more individuals, which shows a trend that with increasing age, family size tends to increase. This could be due to desire to want to keep having more children as one goes older [12]. The older a couple is the more the chances that they have a larger family than that of a young couple, but this was the opposite with regards to desire for a larger family size, which is like the study by [7]. Similarly, the age at marriage affects the family size, with a large family size being associated with a younger age at marriage and in contrast, respondents aged 30-34 chose to have a large family size, but the reverse is the case among men aged >34 as the majority of them chose a large family size. This is in keeping with studies that indicate that younger age at marriage increases the reproductive life of a couple and, therefore, the chances that they will have more children [1, 7]. The shorter a couple's reproductive window, the smaller their family size [24].

The relationship between age at first birth and family size displayed an inverse relationship, as men of younger age groups as at when they had their first children had a large family size (84; 65.6%) while men of older age groups as at when they had their first children had a smaller family size (42; 55. 3%). This has a logical pattern and explanation as it buttresses the point of the length of the reproductive cycle being inversely proportional to the family size seen in various studies [24].

Also, sex distribution was a factor that affected the family size as individuals with more children of the male sex had smaller family sizes (78; 75.7%) while individuals with mixed-sex distribution had larger family sizes (186; 78.2%). This was in keeping with a study that showed that families with females only had a larger family size [11]. The desired number of children by respondents predicted a large family size. Most of the respondents wanted more females than males, with about 65% desiring more females. However, affordability, cultural belief and prestige are quite significant, with about 211 respondents indicating affordability as their reason for the desired number of children. The sex distribution of children is a significant factor and predictor of family size as shown in the research study.

Majority of respondents who have all males presented with family sizes less than six in contrast to respondents who presented a mixed-sex distribution of children; family size above six. This shows that the desire to keep having children increases with the failure to achieve the desired sex preferences and vice versa [9].

Another influencing factor on family size was the number of twins born to a respondent. Respondents with at least 1 set of twins had a large family size (48; 80.0%). The reason behind this is that having a set of twins increases family size by 2 compared to a couple that has one offspring per pregnancy, which just increases the family size by 1. Therefore, a family with a set of twins would have a larger family size than that of a family without any set of twins.

Among the significant factors was the place of upbringing. Respondents who were raised in rural settings had larger family sizes (98; 67.1%). This would have to do with the attainment of education at the rural setting being lower than in the urban areas, the low rate of education about contraception contributes majorly. The occupation of the spouse influenced the family size, with more self-employed persons having a large family size and those not self-employed having a small family size (171;58.8%). This could be because of them having enough time for their spouses, which would ultimately lead to more attempts at conception and hence a large family size.

Education was a factor, with respondents with educational status of primary and below, having large family sizes (99; 66.4%) and families with secondary education and above having an equal distribution between large and small family sizes (116; 50.0%). A majority of the respondents had attained a primary level of education and could not favor small families. One concludes that large family size preference decreases with the rise in education due to the fact that the individuals concerned are affected socially and economically by the new ideas acquired through formal education. A similar pattern was seen with the spouse education and family size as individuals with at most a primary level of education had large family sizes (103; 63.6%) and those with at least a secondary education (112; 51.1%) do not have a family size as high as the former. The desire for a large family size can be seen to decrease with increasing education level. This corresponds with the findings of Osili & Long [28], who opined that the higher the level of education of the spouse, the smaller the family size though the influence in this study is only slight.

A desire of at most four children encouraged individuals to have small family sizes (113; 64.6%), and individuals who desired a family size of >4 had large family sizes (153; 74.3%), it could therefore be inferred that the desire of fewer children tends to cause a smaller family size. This is in line with results obtained from NDHS (2008) [1], where it was discovered that the more children a respondent desired, the greater their family size would be, while the fewer children a respondent wanted, the smaller their family size would be. Therefore, the desired number of children a family desires influences the family size.

An increased desire for more sons was associated with an increased family size (145; 72.1%), while a desire for at most 2 sons was linked with smaller family size (110; 61.1%), with Nigeria being a patriarchal country, the gender of the desired child can influence the family size with more individuals desiring sons causing an increase in the family size until the preferred gender is gotten. Studies have shown that the desire for a male child has the potential of increasing household sizes [29]. The desired gender of offspring plays a role in determining the desired family size. A desire for daughters had a proportional relationship, as the more daughters a respondent wanted, the larger the family size (101; 75.9%) and less daughters a respondent wanted, the smaller the family size (134; 54.0%). Significantly higher proportion of respondents with only females desired to have

more children than their counterparts with males only. This is in line with the findings of Obembe [12], where similar findings were discovered. The above findings were in contrast to another factor which was the desire to have children till the desired gender is gotten which showed a large family size associated with individuals with no desire to have a specific gender (168; 64.6%) while the reverse was the case as individuals who wanted a particular gender had small family sizes74; 61.2%). It can therefore be deduced that although the desire for a specific gender affects the family size, individuals who wanted to keep having children of particular genders ended up having smaller family sizes. Another significant factor was the desire to continue childbirth, as individuals who had a continued desire for childbirth, according to the calculations above, ended up having a small family size (99;76.7%), while individuals with no desire to continue childbirth usually had a large family size (185;73.4%). This can be explained by the experience gotten from having a large family size as individuals who have already experienced the economic burdens of a large family chose not to want more children in the future, while those with small family sizes at the time of the interview had a desire to have more children.

Worthy of note as a factor influencing the family size is the dependency of the desire for more children on increased income. Individuals who wanted more children if their income was increased had a small family size (69; 59.5%), while those who didn't want more children even with an increased income had large family sizes (168; 63.4%). This can be explained by the fact that the larger the family size, the less chances of the respondent wanting more children as the economic impact of the family size discourages him from having more children and vice versa.

The study revealed that the predictors of the family size include: the age of respondents (AOR =2.951; CI = 1.343 -3.314), sex distribution (AOR= 2.905; CI =1.960-4.306), number of twins (AOR = 4.720; CI = 1.821-12.231), desired number of children (AOR = 7.566; CI = 2.334 - 24.512), desire for another child (AOR= 0.0202; CI = 0.084 - 0.482), desire to have more children if income is increased (AOR = 0.403; CI = 0.176 - 0.919). Whereas some of these predictors may influence the family size independently, some of them may be considered as relative predictors of family size because they do not completely affect the family size independently. Respondents below 45 years are three times more likely to have a family size of more than 6 people (more than 4 children). The current age of the respondents helps to give a probable insight to the family size of the respondent, and the study showed that majority of the respondents aged > 54 years had a family size of > 6 individuals. These findings suggest that there is a trend whereby the increase in age is proportional to an increase in family size. According to the study, respondents with all-male sex distribution in the household are three times more likely to have a family size > 6 individuals. There is an association between family size and sex distribution, whereby 186 respondents (78.2%) with a mixed-sex distribution tend to have a larger family size than those respondents with a homogenous sex distribution.

It was also noted that the majority of the respondent with no set of twins are five times more likely to have a family size of > 6 individuals. The number of twins had a predictive influence on the family size, wherein the study shows that respondents with a set of twins or more tended to have a large family size (≥ 6 individuals). This shows that the number of twins is not only a factor but also a predictor of family size, according to the study carried out. Respondents who desired < 4 number of children were eight times more likely to have a family size of < 6 individuals. Whereas those respondents who had a desire for > 4 children, according to the study, were fifty times less like to have a family size of < 6 individuals.

Respondents who answered 'YES' as a response to the question, 'do you desire to continue childbirth?' had a family size of >6. It was also noted from the study that respondents whose the desired number of children was >4 had a family size of> 6 individuals.

Also, respondents who desire to have more children if their income is increased were twenty-five times less likely to have a family size of< 6 individuals. Those with a family size of >6 individuals did not want to increase their family size even if their income was increased, which shows that despite the income being a factor that determines the family size, those with an already large family size showed reduced interest in increasing their family size. It was also noted that the majority of the respondents with a family size <6 chose to give birth to more children if their income is increase. This simply shows that despite the income of the respondents being a predictor of the family size, it has a limit to its predictive power and may be considered as a relative predictor of family size.

It is also important to note that the level of education, according to the study carried out, had no impact on the family size. This finding is in concurrence with the findings of Osili & Long [28] who opined that the educational level of a man might not as so much impact on the household size as that of a female. This may also be due to the fact that the majority of the population studied had their highest level of education between primary and secondary levels; hence an almost homogenous result was obtained. This study was limited by lack of comparison with other slums in the same study setting, however, future studies should focus on this new area of study.

## Conclusion

The mean number of children per family of the participants was 4.23, while the average desired family size was 5 children. There was a significant association between large family size and age of respondent, age at marriage, age at first birth, sex distribution, number of twins, place of up bringing, spouse occupation, education of respondent, education of spouse, desired number of children, desired number of sons, desired number of daughters, desire to have children till the desired gender is gotten, desire to continue childbirth and the desire to have more children if income is increased. The study also showed that the predictors of the large family size were the age of respondents, sex distribution, number of twins, the desired number of children, desire for another child, and desire to have more children if income is increased.

We recommend that efforts should be made by the government and other relevant stakeholders to enlighten men and women, especially those residing in the urban slums on the availability and use of appropriate family planning services and counselling on desired family size and how to achieve them. Incentives such as subsidized healthcare services through the National Health Insurance Scheme (NHIS) should be sustained and made available to all couples with moderate family size. This could be reinforced by health education, enlightenment programmes, knowledge-based seminars, and outreach in urban slums by the state and local governments to promote the culture of standard family size maintenance. Religious organization and their leaders should intensify health education in their various programmes on the need to maintain moderate, standard, and manageable family size regardless of gender preference in the family.

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Nil.

## Conflicts of Interest

There are no conflicts of interest.

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# Knowledge, Attitude and Practices of Infant and Young Child Feeding Practices Among Caregivers in Ekiti State (A South-Western State) in Nigeria

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***Abstract***

*The knowledge of caregivers is an important factor when it comes to the maintenance of both the nutritional status of children and protection of their nutritional needs to ensure a sound foundation and secure future of any healthy society. This research thus aimed at investigating the trends in Infant and Young Child Feeding practices for children aged 0 to 23 months to evaluate how the nutrition education and counselling received during contact with health workers have contributed to the Knowledge, Attitudes and Practices of the caregivers regarding appropriate nutrition in Ekiti State. The assessment was done using a cross-sectional survey method, and FAO's guideline for assessing nutrition related KAP5 was adopted and used. Cochran's equation was used to calculate the sample size, and three households were randomly picked in each political ward. Data was collected and analysed using EPI Info 7. 94.3% of the respondents breastfeed their children on demand, and 47.2% of the mothers had skin contact with their babies after delivery. 78.2% believed that exclusive breastfeeding is very good. 68.2% believed that their children could get diarrhoea from the use of a feeding bottle. 88.3% are aware that 5-9 months are the appropriate age for the introduction of semi-solid and solid food. There is a high level of knowledge, attitude and practice among the caregivers and an improvement was observed in most of the infant and young child feeding practices in Ekiti State.*

***Keywords****: Breastfeeding, Caregivers, Complementary Feeding, Malnutrition, Optimum feeding, Under-five.*

## Introduction

Nutrition has been described as an important factor that affects health and development. Improved nutrition is related to optimum infant growth, child and maternal health, stronger immune systems, safer pregnancy, and childbirth, and lowers the risk of non-communicable diseases and longevity. When children are healthy, they have improved and better cognition and learn better. Adequate nutrition results in better productivity and creates more opportunities which break the cycles of poverty and hunger. Optimum nutrition is important to a child's health well-being which leads to future human capital development, and this has since been well-recognized, but unfortunately, child undernutrition has consistently been one of the cogs in the wheel of progress of public health, and these has been identifies as a problem in economic disadvantaged countries [1, 2].

Whereas malnutrition in children results from poor infant and child feeding practices, and this has been confirmed by several studies that suboptimal feeding practice is associated with stunting and poor nutritional status of children under five [3, 4]. The growth and development of children under five is determined by the important roles played by optimum feeding

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practice. It has been reported that children with poor growth contribute to high rates of morbidity and mortality, and they can encounter a delay in motor and mental development [5]. Undernutrition has been identified as one of the most common causes of morbidity and mortality among children in developing countries [6]. Studies have shown that more than 1/3 of the under-five mortality in developing countries are dying because of under nutrition-related diseases [7,8]. Poor complementary feeding practices by caregivers due to their lack of adequate nutrition knowledge and information eventually contribute to the scourge of malnutrition [9, 10].

Infant and Young Child Feeding plays important role in the determination of the nutritional status of children, maximizing the growth rate of a child during their first 1000 days [11, 12], and it can reduce under-five undernutrition and hence positively affects child mortality rates. Findings have shown the crucial importance of improved Infant and Young Child Feeding to their health and development, most especially in poorly resourced communities [13]. Adequate and optimum supply of nutrients and calories is, therefore, necessary to mitigate against malnutrition [14], which has been reported to have devastating effects on the health and development of children, impairs their intelligence, educability, and productivity at adulthood. Malnutrition has been implicated as the heightened risk of chronic non-communicable diet-related diseases in later life [14, 15]. Therefore, knowledge, attitude, and practice (KAP) of mothers/caregivers on infant and young child feeding in this curtailed time are very important for the child's health, growth, and development [16-20].

The outcome of a complementary feeding regime administered to children are critical elements that are determined by the nutritional knowledge, attitude, and practices of caregivers [22, 23]. It has been revealed by research that good knowledge would be related to good attitude and proper nutritional practices [24, 25]. Good knowledge and attitude in some situations do not necessarily translate into good practices [26]. However, the proper outcome of complementary feeding can be achieved through adequate and appropriate nutritional knowledge, attitude, and practices.

Mothers' and caregiver's knowledge and attitude on complementary feeding have important roles to play for the maintenances of nutritional status of the children and the protection of their nutritional needs to ensure a sound foundation and secure future of any healthy society [27]. The promotion of optimal complementary feeding practices has long been recommended globally and has been a health priority aimed at improving child feeding practices, particularly in economically disadvantaged countries [28]. The capability of caregivers in the application of the recommended complementary feeding practices could be linked with their knowledge and attitude regarding adequate and optimal complementary feeding [29]. Hence, factors such as the knowledge, attitude, and practice (KAP) of mothers/caregivers on infant and young child feeding in this critical time are very important for the child's health, growth, and development [12, 16, 30, 31].

## Methods

Three-stage sampling technique was employed. The first stage being the purposively selection of 177 wards followed by lottery system to select one Primary Health Care Facility per Local Government Area with a catchment area where the survey was conducted and finally the respective households was randomly selected.

Before the commencement of the actual data collection, the facility nutrition liaison officers (a designated health worker station in each PHC facility to handle nutrition activities) were tasked to enlist those households living in the catchment of their facility. The list was compiled and put into a roaster where 3 household in each ward were selected using a simple random sampling method. Ethical approval was taken

from Ekiti State Primary Health Care Development. Agency. Before the respondents were included in the study, verbal and written consent was obtained. The assessment was a cross-sectional survey utilizing quantitative and qualitative methods of data collection. The primary source was household surveys using a structured questionnaire for mothers/caregivers of infants and children aged 0-23 months old. The principal tool to understand or define previous and current KAP towards recommended nutrition practice was adopted from the FAO's guideline for assessing nutrition related KAP5. The state was grouped into two (eight LGAs each). Each enumerator worked in two LGAs with each Local Government Nutrition Focal Persons (designated nutrition manager in each LGA) and one Facility Nutrition Liaison Officer per facility/ward who facilitated the groundwork and assigned the 3 households that was interviewed per ward. The household questionnaire, adopted from the FAO manual for assessing nutrition related KAP9, was used for the collection of quantitative data from mothers/caregivers of infants and young children aged 0-23 months old.

Household survey data was entered in EPI info 7 software and transferred to MS-Excel for cleaning. The entries for the three variables for all the questionnaires was re-checked and cleaned again. Post data cleaning was done by randomly sampling five questionnaires from each of the LGA's visited. All data entries from these questionnaires were compared with the data on the physical/hard copy of the questionnaires. Perfect matching between the physical copy and data entries was confirmed. The differences in the wards were statistically compared using Phi and Cramer's V Statistics (for categorical variables) and Analysis of Variance (ANOVA) (for the numerical variables), where the number of counts is not less than 20%. P-values of less than 0.05 depict a significant statistical difference of the estimates by background characteristics. Multivariate regression analyses for binary variables depict the associations between the background characteristics and the KAP variables through the generation of adjusted Odds Ratio (aOR) and the attendant p-values. aOR of lower values of more than 1 or/and P-values of less than 0.05 depict statistical significance in the specific estimate by the binary variable.

## Results

**Table 1.** Schedule of Breastfeeding

| **Variables** | **Responses** | |
|---|---|---|
| | **Frequency** | **Percentage** |
| According to schedule | 16 | 3.0% |
| Whenever the baby wants | 511 | 94.3% |
| Whenever the mother wants | 6 | 1.1% |
| Don't know | 9 | 1.7% |
| Total | 542 | 100% |

Source: Survey, 2021

Table 1 shows the schedule in which the mother follows in feeding the baby. From the total of 542 respondents, 16 (3.0%) breastfeed their babies according to schedule, 511 (94.3%) mothers breastfeed their babies on demand (whenever the baby wanted), 6 (1.1%) breastfeed their babies at the convenience of the mother. However, 9 (1.7%) don't know the frequency at which they breastfeed their children.

**Table 2.** Skin Contact with the baby after Delivery

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 256 | 47.2% |
| No | 232 | 42.8% |
| Don't know | 5 | 0.9% |
| No response | 49 | 9.0% |
| Total | 542 | 100% |

Source: Survey, 2021

Table 2 shows the response of the mothers when asked if they had skin to skin contact with the baby after delivery. 256(47.2%) said they had skin to skin contact with the baby by placing them on their chest, while 232(42.8%) said they totally do not have skin to skin contact with the baby immediately after delivery, while only 5 (0.9%) do not know if they really had skin to skin contact with their babies.

**Table 3.** First Breastfeeding after Delivery

| Variables | Responses | |
|---|---|---|
| | Frequency | Percentage |
| Immediately | 353 | 65.1% |
| Within the first day | 117 | 21.6% |
| More than 24 hours | 3 | 0.6% |
| When the baby is ready | 23 | 4.2% |
| Don't remember | 8 | 1.5% |
| No response | 38 | 7.0% |
| Total | 542 | 100% |

Source: Survey, 2021

The Table above shows how long it takes before the baby was breastfed after delivery. Out of the 542 respondents, 353 (65.1%) breastfed their baby immediately after delivery, 117 (21.6%) claimed that their children were within the first day, while 3 (0.6%) said they breastfed their babies after 24 hours of delivery and 23 (4.2%) said their babies were breastfed when the babies were ready while the remaining 8 (1.5%) do not remember when they breastfed their babies.

**Table 4.** Baby's First Meal

| Variables | Responses | |
|---|---|---|
| | Frequency | Percentage |
| Colostrum | 447 | 80.5% |
| Breastmilk that comes after colostrum | 63 | 11.4% |
| Milk (not breastmilk) | 1 | 0.2% |
| Infant formula | 3 | 0.5% |
| Plain Water | 13 | 2.3% |
| Water with Glucose | 21 | 3.8% |
| Pap | 5 | 0.9% |
| Tea/ Infusion | 1 | 0.2% |
| Traditional Medicine | 1 | 0.2% |
| Total | 555 | 100% |

Source: Survey, 2021

Table 4 above shows the multiple responses gotten from the respondents when asked what the new-born baby's first food or liquid should be, 447 (80.5%) said the baby's first food should be colostrum, 63(11.4%) felt the baby's first food should be breastmilk while 13 (2.3%) believed the child's first food should be plain water and 21 (3.8%) said the new-born first food should be glucose and water. 1 (0.2%) each suggested that baby's first food should be either Milk (not breastmilk), tea or traditional medicine, while 5 (0.9%) suggested pap and the remaining three suggested infant formulas as the new-born first food or liquid.

**Table 5.** Did you Squeeze out and Throw Away the First Milk

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 51 | 9.4% |
| No | 413 | 88.8% |
| Missing response | 78 | 14.4% |
| **Total** | 542 | 100% |

Source: Survey, 2021

Table 5 above shows the response of the mothers when asked if they squeezed out and throw away the first milk. Out of the 542 mothers interviewed, 413(88.8%) do not squeeze out, while only 51(9.4%) squeezed out the colostrum.

**Table 6.** Exclusive Breastfeeding

| Reasons | Frequency | Percentage |
|---|---|---|
| Very good | 424 | 78.2% |
| Okay | 21 | 3.9% |
| Not Good | 4 | 0.7% |
| Don't know | 5 | 0.9% |
| No response | 88 | 16.2% |
| **Total** | 542 | 100% |

Source: Survey, 2021

Table 6 shows mother's idea about exclusive breastfeeding and how good it is for the child's health. 424(78.2%) of the mothers believed that exclusive breastfeeding is very good for the child's health, while 21(3.9%) believed exclusive breastfeeding is okay for the child's health while 4 (0.7%) said exclusive breastfeeding is not good for the child's health.

**Table 7.** Do you think your child could get Diarrhea from using a bottle?

| Answers | Frequency | Percentage |
|---|---|---|
| Yes | 234 | 68.2% |
| No | 46 | 13.4% |
| Maybe | 31 | 9.0% |
| Don't know | 32 | 9.3% |
| **Total** | 343 | 100% |

Source: Survey, 2021

Table 7 above shows the response of mothers when asked if they think drinking from a bottle with a nipple can cause diarrhea for the child. 234(68.2%) said yes that it can, while 46(13.4%) said no, 31(9%) of the respondents said maybe and the remaining 32(9.3%) do not know maybe drinking anything from a bottle with a nipple.

**Table 8.** Appropriate age for Semi-solid and Solid food introduction

| Semi-solid/solid food introduction | Frequency | Percentage |
|---|---|---|
| 1-4 | 5 | 1.6% |
| 5-9 | 243 | 88.3% |
| 10-14 | 14 | 5.3% |
| 15-19 | 1 | 0.4% |
| 20-24 | 3 | 1.1% |
| **Total** | 266 | 100% |

Source: Survey 2021

This Table shows the ages mothers think they should introduce either semi-solid food or solid food to the babies. 5 (1.6%) of the mothers believe that it should be introduced between 1-4 months of age. 88.3% (243) of the mothers believed semi-solid or solid food intro should be between 5-9months. 14 (5.3%) said the food should be introduced to the babies between 10-14 months and, 3(1.1%) believe the mother should wait till the baby is between 20-24 months, and only 1 mother believes the food should be introduced between 15-19 months.

## Discussion

### Schedule of Breastfeeding

The result of this study testifies to the fact that 96% of the caregivers know that it is important to breastfeed their children on demand. Study have shown that new-borns stomachs are small and because breastmilk is easily digested. Hence, they eat frequently every 2 to 3 hours and about 8-12 times in a 24 hours' period [32]. It has been reported that frequent feedings, most especially during the first few weeks after putting to bed, leads to high milk intake and weight gain in new-born [33]. Breastfeeding on demand also delivers more important non-nutritive benefits, for example, during breastfeeding, there is skin-to-skin contact between the mother and the new-born, which definitely helps the new-born to regulate their body temperature and blood glucose level [34]. Apart from helping babies to cope with pain, skin-to-skin contact during breastfeeding has shown to reduce a new-born's levels of the stress (cortisol) hormone [35,36]. Researchers have reported that mothers that feed their new-born on a schedule are more likely to say they were getting enough sleep during the early months [37]. But when the long-term outcomes on infants was considered, they found that newborns fed on a schedule showed modest lags in cognitive development. And by the time they are 8 years old, children who have been fed on a schedule as young infants scored an average of 4.5 points lower on an IQ test [38].

### Skin – to – Skin Contact

Evidences from several decades of research by the World Health Organization and United Nations Children's Fund [39] recommended that regardless of feeding preference and methods at birth, healthy mothers and babies should have uninterrupted skin-to-skin care right immediately after birth, for at least one hour and after the first feeding for breastfeeding women. According to some findings, skin–to–skin care increases oxytocin significantly. This in turn promotes maternal/newborn attachment, assists the newbon transits to be postnatal, and reduces maternal and newborn stress [40, 41]. It has also been reported that the basic biological need is met, neuroprotective mechanisms are activated, self-regulatory neurobehavioural are enabled early when new-born is placed skin-to-skin with the mother [40, 42]. The result from this study indicated that less than 50% of the respondents had skin-to-skin contact with their babies after delivery, and this implies that fast numbers of new-born are prevented from enjoying the opportunities accrued from skin-to-skin contacts such as crying less, enhanced cardio-respiratory

stability, oxygen saturation level, stable blood glucose levels and enhanced thermal regulation [41]. National Demographic Health Survey [43] showed that only 9.6% of children had skin-to-skin contact immediately after delivery, but the findings from this research revealed that 47.2% of children had skin-to-skin, which is an improvement. Therefore, there is a need for more education and sensitization of mothers because of the many advantages they will be missing out [40, 42].

## First Breastfeeding after Delivery

Sustainable optimal breastfeeding and exclusive breastfeeding practices are attained through timely initiation of breastfeeding [44]. The largest percentage (65.1%) of the respondent in this study introduced their new-born to the breast immediately after birth which implies that they are attached to the mother's breast early, and hence the infant thermal care will be promoted and their risk of hypothermia immediately after birth would have been reduced [45]. Findings have shown when the initiation of breastfeeding is delayed, and there is a biological plausibility that could lead to chronic illness because of the importance of breastfeeding in the enhancement of immune functions during the early stage of life [44]. Multiple Indicator Cluster Survey (MICS) [46] revealed that 27.6% % of children in Ekiti State were introduced to the breast within one hour of birth, while 80.2% were breastfed within one day of birth, whereas from this study, it was shown that 65.1% introduced their babies to the breast immediately after birth while 21.6% were breastfed within the first day. The result of this study is an improvement over the report of MICS [46]. The importance of early initiation of breastfeeding cannot be over emphasized because the delay has been reported to further compounded early exposure to pre-lacteal feeding [47,48]. This adverse effect could be detrimental to the immune system and hence lead to infections and suspected sepsis [49]. Intake of colostrum is enhanced by exposure to breastmilk and this milk contains high concentration of lactoferrin, immunoglobulin A (lgA), leukocytes and specific developmental factors [50, 51].

## Baby's First Meal

Colostrum plays important role in making new-born healthy, part of the role includes helping babies fight infection because about two-thirds of the cells in colostrum are white blood cells that guard against infections [52]. SlgA is an important and crucial antibody that is present in colostrum, it protects babies against disease by lining the gastrointestinal tract, and the prebiotics present in colostrum feeds and helps to build up beneficial bacteria in the baby's gut [53,54]. Above 80% of the respondents affirmed that the first food given to their new-born was the first milk (colostrum) which implies that they know the importance of colostrum and do not discard it contrary to the believe in many developing countries where mothers throw away colostrum because of their traditional belief [55-60]. The result of this study is also contrary to studies that showed that between 15 -65% of mothers in different regions of the world had not given colostrum to their babies [61-63].

## Squeezing Out and Throwing away the First Milk

Colostrum is a thick and bright yellowish milk secreted in the first three to six days after birth [57]. There are different beliefs and understanding about colostrum. Contrary to some findings, the result of this research showed that only 9.4% of the mothers discard their colostrum unlike in India, where between 30-40% of their mothers engage in the same practice [64, 65]. The result of these findings shows that the prevalence of colostrum avoidance is higher than the studies done in Aksum town (6.4%) in Ethiopia [66] but lower than the findings from Shire Endaslassie town 14% [67] and Raya Kobo district 13.5% [68]. The difference in the results could be linked to the following: socio-economic, cultural, ethnic and levels of

education of the caregivers [69]. Colostrum is viewed or perceived negatively as religiously forbidden milk as revealed by a study conducted in Turkey in 2001 [70]. It could therefore be deduced from this result that the majority of the new-born in Ekiti State accessed colostrum and hence would have taken the opportunities provided in terms of nutrients and immunity build up.

### Exclusive Breastfeeding

Findings from this research showed that the perception of mothers about exclusive breastfeeding is good among women whose children are less than two years. More than 78% of the respondents believed exclusive breastfeeding is good for their children, and this is higher than 55% has been reported [71]. This result is in line with a previous study conducted by [72] in Southern Nigeria. Although none of the three national surveys (National Demographic Health Survey, Multiple Indicator Cluster Survey and National Nutrition and Health Survey) disaggregated their data on Exclusive Breastfeeding on a State basis but the result from this research showed that mothers in Ekiti State have good knowledge of the importance of exclusive breastfeeding.

### Do you Think your Child could get Diarrhoea from Using a Bottle?

Conventional bottle-feeding methods has been identified and hence becoming an important topic because it can be a source of problem for both the breastfeed and bottled fed babies. Part of the disadvantages of using a feeding bottle is the risk of gastrointestinal infections and diarrhoea, and according to WHO [73], babies who are bottled fed are 2.8 times more likely to develop a gastrointestinal infection than those who are exclusively breastfed. The result of this research showed that 68.2% are aware that bottle-feeding can cause diarrhoea, and this is in tandem with previous studies that continued breastfeeding at 1 year and bottle feeding were associated with an increased likelihood of diarrhoea episodes [74, 75]. Bottle feeding has been considered as a breastfeeding indicator because of the association between increased diarrhoea morbidity, mortality, and breastfeeding [76,77].

### Introduction of Semi-Solid and Solid Food

An appropriate and timely transition to complementary feeding is of significant importance for the growth and development of an infant. World Health Organization recommended that exclusive breastfeeding should be practiced for the baby's first six months of life and continued till 2 years, while complementary foods are to be introduced at 6 months [78]. The report from this research showed that 88.3% of the mothers are aware of when to introduce complementary feeding while only 1.6% did earlier (between 1-4 months), which is lower than 31.9% in U.S reported by Centre for Disease Control and Prevention [79]. Various evidence has indicted the timing of the commencement of complementary food, among other factors, including the type of complementary food and the timing of the health outcome assessment [80-84]. Findings have revealed that the time of the commencement of complementary food was affected by maternal age [81], the difference in socio-economic status [81], maternal education [81-83], frequent antenatal care visits [81], duration of breastfeeding [80], birth order [81] and cultural characteristics [81].

## Conclusions

Two main conclusions could be drawn from the assessment of the survey. First there is a high level of knowledge among the caregivers. This implies that awareness was significant and hence the high level of knowledge. Secondly there was a substantial improvement in some of the infant and young child feeding practices such as, schedule of breastfeeding, skin contact with baby after delivery, baby's first meal, squeezing out colostrum, EBF to six months, and timely

introduction of complementary feeding knowledge and practices.

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## Conflict of Interest

The author declares no conflict of interest.

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# Investigating the Effectiveness of Case Management among Orphans and Vulnerable Children at Household Level in Enugu State, Nigeria

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***Abstract***

*In sub-Saharan Africa, a large proportion of children lack basic necessity and support for optimum development. In Nigeria, the estimated number of children who are orphans and vulnerable and in need of essential care is 17.5 million as of 2008. Major causes of orphaning and vulnerability include poverty, conflicts, HIV/AIDS, road accidents, communicable and non-communicable diseases, and harmful cultural practices. Hence, the Case management approach has been adopted as a community service delivery strategy for addressing the needs of orphans and vulnerable children at the household level. This study investigated vulnerable households in Enugu State who have been ever enrolled into Orphans and Vulnerable Children (OVC) donor-funded programs and received services that are geared toward enhancing their socio-economic stability. The standard OVC custom indicators were used in measuring the results and outcomes of services provided to OVC and their caregivers. The results show significant effect and impact of the case management approach in OVC program service delivery as over 50,000 beneficiaries from over 14,000 households were served from four domains of Healthy, Safe, Schooled and Stable. Households received these services after enrolment and were moved from a state of vulnerability to self-resiliency. Also, results show strong collaboration between OVC implementing NGOs and government stakeholders in terms of capacity building and systems strengthening in addressing the need of OVC and their caregivers. Conversely, results indicated a week synergy between local and state government OVC officials – hampering on their oversight capabilities of OVC programs. This can be improved with increased funding and coordination.*

***Keywords:*** *Case Management, Caregiver, Household, HIV/AIDS, Non-Governmental Organization, Orphans Programs, Services, Vulnerable Children.*

## Introduction

Nigeria is facing an unprecedented increase in the number of Orphans and Vulnerable. In Nigeria, 17.5 million children were estimated to be orphans and vulnerable in 2008 [1] and in dire need of social services and essential care. In the context of this research, Orphans, and Vulnerable Children, OVC, and Vulnerable children shall be used interchangeably. Apart from poverty, road accidents, conflict, and diseases - HIV/AIDs has been identified as a major cause of orphaning and vulnerability. Stigma and discrimination have been reported from HIV/AIDS affected households in all aspects of their lives [2]. They are socially ostracized within their communities and stripped off their rights and dignity. They are required to work the extra harder and surpass the social hurdles to provide for basic household needs such as food, school fees and basic health care. The Objective of orphans and vulnerable children (OVC) programming is to build the resiliency of families and children affected by HIV and AIDS so that they can meet their health, economic, education, and

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social development needs. With regards to Lantos-Hyde Act, 10% of PEPFAR funding is to be allocated to children affected by HIV and AIDS [3]. Over time, case management has been adopted as a strategic approach of addressing the needs of vulnerable children and their households, especially those infected or affected by HIV/AIDS [4]. Case Management is a process adopted by social service delivery providers usually targeted at vulnerable children and families. The goal of case management is to enable children and households to achieve a state of well-being in which they are stable and secure enough to meet their needs which includes social, financial, protection, emotional, health and education needs. This will make them resilient to withstand modest shocks [4]. This research examines the services provided to identified vulnerable households enrolled into OVC programs using a case management approach as well as investigating the impact and effectiveness of the OVC Program in Enugu State.

## Problem Statement

It cannot be overemphasized that children and families in Nigeria and sub-Saharan Africa, by extension, lack basic necessities and support for optimum development. The estimated number of children in Nigeria who are orphans, vulnerable and in need of essential care was 17.5 million [1]. Major causes of orphaning and vulnerability include poverty, conflicts, HIV/AIDS, road accidents, communicable and non-communicable diseases, harmful cultural practices etc. Hence, the need to adopt best practices and a cost-effective approach to addressing the basic need of orphans & vulnerable children and households affected or infected by HIV/AIDS. In recent times, international donors, especially The US President's Emergency Plan for AIDS Relief (PEPFAR), have adopted case management as the most productive approach to addressing the basic needs of vulnerable children and their caregivers while achieving the HIV epidemic control and enabling beneficiaries to attain self-resiliency. It is therefore imperative to investigate the effectiveness of the case management approach, highlighting challenges, bottles necks and appropriate solutions while identifying valuable lessons in achieving the sustainable development goals.

## General Objective

To investigate the effectiveness of the case management approach of Orphans and Vulnerable Children (OVC) Programs.

## Specific Objectives

1. To investigate the effectiveness of OVC case management.
2. To Evaluate the outcomes of OVC Case management interventions.
3. To ascertain the limitations of case management in OVC programs.

## Research Question

1. How effective is the OVC case management approach?
2. What are the outcomes of OVC case management interventions?
3. What are the limitations of case management processes?

### Justification

Due to the is challenges of OVC and their households, donor agencies such as United States Agency for International Development (USAID) and the Center for Disease Control and Prevention (CDC), through Non-Governmental Organizations (NGOs) such as Catholic Relief Services, Catholic Caritas Foundation of Nigeria and Pro-Health International came on board to help mitigate/management the challenges faced by the OVC in the country, though projects such as Global Action for the Control of HIV/AIDS Epidemics in Sub National Units (4GATES).

In recent times, the case management approach has been adopted as a viable strategy for identifying and addressing the basic needs

of vulnerable children and their caregivers. It is therefore pertinent to investigate the effectiveness of this approach using data have driven and evidence base methods.

### Definition of Concepts

AIDS- Acquired Immune Deficiency Syndrome.

HIV- Human Immunodeficiency Virus.

UNAID- 95:95:95, this is a United Nations goal that states that 95% of the population should know their HIV status and 95% of those who are HIV positive should be on ARVs, and 95% of those on ARVs should be virally suppressed. This is the goal to achieve HIV epidemic control.

Vulnerability is the degree to which the child is exposed to danger, abuse, exploitation, or deprivation of Rights.

A vulnerable child is defined as a child less than 18 years of age living in high-risk circumstances and whose prospects for continued growth and development are seriously impaired.

A vulnerable child is exposed to abuse and too young to fight for his/her Rights (e.g., dis-inheritance, education).

## Orphans and Vulnerable Children (OVC)

The term *orphans and vulnerable children* refer to children under the age of eighteen who are affected by and made vulnerable to HIV/AIDS. This includes both orphans and non-orphans whose well-being or development is threatened because they live in HIV-affected households and communities. This includes children under the age of 18 years who have lost one or both parents due to HIV/AIDS.

## Review of Literature

### Synopsis of Orphan and Vulnerable Children Program in Nigeria

An orphan is defined as a child under the age of 18 years whose mother (maternal orphan), father (paternal orphan), or both (double orphan) are dead [5]. A vulnerable child is defined as a child less than 18 years of age living in high-risk circumstances and whose prospects for continued growth and development are seriously impaired. A vulnerable child is exposed to abuse and too young to fight for his/her Rights (e.g., dis-inheritance, education). A child is defined as a boy or girl under the age of 18 years, according to the National Plan of Action on Orphans and Vulnerable Children in Nigeria (2007). Conversely, an orphan is a child (below the age of 18) who has lost one or both parents, regardless of the cause of death. Those who lost both parents are commonly referred to as "double orphaned". The definition of vulnerability differs from society to society; therefore, definitions are community-specific. However, the Federal Ministry of Women Affairs (2007) provides some key indicators defining children's vulnerability including children that are:

1. Children from broken homes.
2. Neglected children.
3. Child beggars, destitute children, and scavengers.
4. Children with physical and material disabilities.
5. Internally displaced children.
6. Abandoned children.
7. School-age children that are out of school

These characteristics form the category of children who require care and support services even though the list is not exhaustive. A major criteria of defining and conceptualizing child vulnerability and orphanhood as utilized in this study, considers children that fit into the above categories whose household are receiving OVC care and supported services via the 4GATES OVC project [5].

As defined in the National Guidelines and Standard of Practice on OVC (2007), OVC care and support services include tangible and non-support to meet basic physical, cognitive and psychological needs of OVC, their care-givers and communities on a sustainable long term

base, including services such as household economic strengthening(HES), clothing, shelter, emotional and psycho-social support, water sanitation and hygiene(WASH), recreation as well as life building skills which from some of the basic needs of OVC [2].

More so, the objective of orphans and vulnerable children (OVC) programming is to build the resiliency of families and children affected by HIV and AIDS so that they can meet their health, economic, education, and social development needs. With regards to Lantos-Hyde Act, 10% of President's Emergency Plan for AIDS Relief (PEPFAR) funding is allocated to children affected by HIV/AIDS [3]. Globally and especially in sub-Saharan Africa, a large proportion of children lack basic necessities and support for optimum development. In Nigeria, the estimated number of children who are orphans, vulnerable and in need of essential care was 17.5 million [1]. Major causes of orphaning and vulnerability include poverty, conflicts, HIV/AIDS, road accidents, communicable and non-communicable diseases, and harmful cultural practices. Over time, case management has been adopted as a strategic approach to addressing the needs of vulnerable children and their households, especially those infected or affected by HIV/AIDS (4Children, 2017). Case Management is a process adopted by social service delivery providers usually targeted at vulnerable children and families. The goal of case management is to ensure that children and their caregivers achieve a state of well-being in which they are stable and secure enough to meet their needs, including social, financial, protection, emotional, health, and education needs. This will make them resilient to withstand modest shocks [4]. Due to limited resources, the goal of case management in the context of OVC programming differs slightly depending on the unique parameters and resources of each program. More so, the needs of children and households differ.

## Case Management Processes in OVC Programs

In OVC intervention, case management is referred to as the process of identifying vulnerable children and families; assessing their needs and resources; working together to establish definite, realistic objectives and goals; actionable plans to achieve set objectives and goals; implementing plans through completing specific actions and receiving services; monitoring both the completion of actions (individualized, context sensitive, in a timely and family-centered manner) and progress toward achievement of objectives/goals (e.g., child protection and well-being, including HIV prevention, treatment, and adherence). Implementing agencies and organizations usually recruit and train case workers sometimes called community volunteers or case managers to execute the implementation of OVC Program interventions [6].

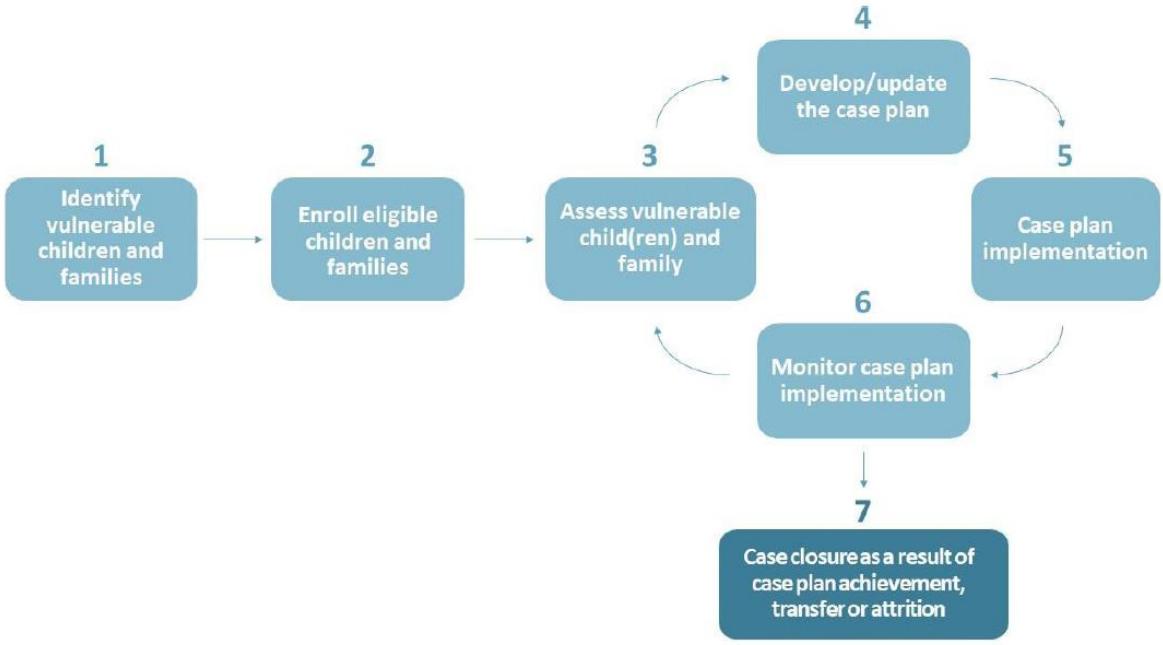


**Figure1.** Case Management Critical Steps

There are seven steps in the case management process which are highlighted in Figure 1.

## Critical Steps of Case Management

There are seven steps in the case management process which are highlighted in Figure 1.

Source: Graphic informed by Center for International Social Work at Rutgers University's School of Social Work and International Social Service-USA for USAID (2014).

## Identification of Eligible Households

This is a process of identifying children orphaned, affected, or made vulnerable by HIV/AIDS and other adversities and their caregivers, and referring them for further eligibility verification and assessment. Community Based Organizations establish and document procedures for identifying orphans and vulnerable children through multiple entry points and referring them for screening and program enrolment [7]. Potential and eligible beneficiaries usually exceed those who can receive OVC services based on the availability of resources. PEPFAR anticipate its programs to reach "children who have lost a parent to HIV/AIDS, who are otherwise directly affected by the disease, or who live in high HIV prevalence areas and may be vulnerable to the disease or its socio-economic effects" [8]. Thus table 1 below shows entry points of OVC subpopulations that are eligible for program enrolment following needs assessment. These processes of identification and referrals of children and their caregivers to OVC programs through these entry points are usually documented through fair, transparent and functional processes understood and agreed by all involved, including other key stakeholders in the identification and referral processes and followed consistently. A standard procedure, intake tools and forms will ensure fair and unbiased criteria are adopted to identify appropriate clients, rapidly assess their vulnerabilities, and determine their eligibility to benefit from enrolment in an OVC program [9].

## Screening and Enrolment of Eligible Households

Eligibility criteria for screening and prioritizing children and caregivers for

enrolment into OVC programs are usually HIV bias, based on contextual appropriate and available data or information identifying children who are most vulnerable, empirically verifiable, and infected or affected by HIV as agreed upon by stakeholders. These may include community members, program implementers and government officials [10]. It is important to use a standardized tool to establish eligibility criteria, expectations and thresholds for well-being and protection (e.g., HIV exposed Infants (HEI) or a Child living with HIV) and screen to prioritize children and families who meet the threshold or eligibility criteria. These thresholds may elicit emergency procedures intended to provide quick response and enrolment into the OVC program (e.g., children living in abusive situations or experiencing life-threatening health conditions). Criteria for enrolment into the OVC program mostly includes children living with HIV, children living with and HIV positive adult, adolescent female at risk of transactional sex, children at heightened risk of HIV infection, children made orphans by AIDS and children who experience any form of violence or abuse [11]. Eligibility criteria may also include child-headed households, a household where child has gone an entire day without eating or household with a child of school age who is not enrolled in school [12]. Additional criteria may include other vulnerability criteria such as, chronic illness, loss one or both parents, living in a household with poor nutritional status or someone with chronic illness, irregular school attendance, poor psycho-social well-being, poor shelter, or lack of access to safe drinking water or lack of economic strengthen activities [13].

## Household Assessment

This step of case management involves the identification of specific needs and resources required by children and their respective households. Tools are usually developed to guide the assessment of the priority needs of enrolled children and their families and the resources available to address these needs. Comprehensive assessments are executed for children and households that have been screened and enrolled in the OVC program. The assessment typically involves issues related to social and economic status, health, nutrition, HIV status, shelter, psycho-social well-being, education, and protection (gender-based violence and domestic violence) that affect children and caregivers in the communities where OVC program aims to improve household vulnerability status [11].

It is quintessential to assess children, including conditions affecting the family, and the ability of the family to care for children. Assessment should involve discrete, measurable indicators such as weight, height, and upper arm circumference. Also, qualitative information should be collected from a range of sources, including individual interviews with children with children (where appropriate), caregivers, extended family and friends, health service providers, teachers or others educational staff, and other service providers (e.g., Women affairs and social development ministry, the police and judiciary). Sources may also consist of reviews of medical records, education records, police, and court records, as well as observation during home visits [14].

## Household Care/Case Plan Development

This is a process of identifying goals for a child and family and specific actions to achieve those goals. Priority action would involve developing a written plan, including goals, actions, responsibilities for actions, timeframe for executing actions and indicators for measuring accomplishments of actions [15].

Within the context of the President's Emergency Plan for AIDS Relief (PEPFAR) OVC programs, a case plan tends to focus on an entire family (sometimes referred to as a household but recognized as including the primary caregiver(s) and all children); however, the family care plan can include individual sub-plans focusing on individual child and

caregivers.

## Household Care Plan Implementation

This is a process of completing the developed care plan actions in an appropriate and timely fashion. The priority actions involve direct specific service provision or support to children and caregivers to carry out action by themselves. It also involves referring a child or caregiver to a specific service to assist in completing actions outlined in the care plan.

Priority actions could be completed by children and caregivers themselves, such as regularly attending school or taking the medication without missing doses. Actions may also be accomplished with assistance from the caseworker/manager and/or through receipt of specific services, such as nutrition assessment, parenting skills training, financial skills training, or enrollment in a savings group [16]. Services may be provided by the case worker organization or provided by another organization to which children and caregivers are referred by the caseworker, such as statutory services provided by government bodies or HIV testing and health services provided by clinics. Programs do not naturally have the resources or expertise to provide all services that a client might require. Making referrals to other organizations can ensure that clients receive high-quality services that are not available within the case manager's organization but require additional coordination and follow-up to ensure that services are received, are of utmost quality, and have the desired outcome [17].

## Monitoring of Household Care Plan Implementation

This Process of case management involves routing meetings with the child and caregiver, including other members of the household, service providers, others who regularly interact with the child or caregiver to determine progress of how the case plan is been implemented to determine the likelihood of achieving set goals and objectives [7].The Priority action at this stage involves conducting regular home visits with the child and caregiver and other critical relevant stakeholders to ascertain progress or challenges in care plan implementation.

## Household Care Plan Achievement and Case Closure

This is the final step of the case management processes, and it involves the closing of case files within digital and/or physical file storage systems as a result of exiting of a child or household from the OVC program through case/care plan achievement, transfer, or the loss of a child or household to attrition. The priority action would include documenting the process through which a child and caregiver exits the OVC program. Normally, children and their households exit OVC programs through three main pathways – case plan achievement, transfer, and attrition. Programs should normally have standard procedures for facilitating the exit of children and families via pathways [4].

## Case plan achievement

In OVC programs, care plan achievement is commonly understood as the point at which all recommended activities/interventions within a case plan have been accomplished, and the household has achieved both the goals and objectives of the OVC program, as well as their own goals within the limits of the services provided under a particular program. Case or care plan achievement is at times be referred to as "graduation", a term usually utilized in poverty reduction programs to reflect a state of improved economic stability. Case plan achievement does not necessarily indicate that households no longer need support but rather that the OVC program and members of the household agree that caregivers in the household have exhibited the ability to meet the needs of children in their care (e.g., regular school attendance,adherence to HIV treatment, or good parent-child relationships) to a reasonable extent, or children are able to meet their own needs, and the

interventions/support offered by the OVC program are no longer required. Processes associated with this pathway may include assessing readiness for case plan achievement, planning for case plan achievement with the child and/ or household, routine monitoring for readiness, and conducting a final case review and case achievement ceremony for the child and/or household.

### Transfer

Sometimes it may not be possible for a child or household to achieve their case plans and graduate from an OVC program or accomplish the recommended interventions outlined in their case plan. In such cases, OVC programs would transfer children and/or households to another source of support. "Transfer" within the context of OVC programs is usually understood as the shift of responsibility for case management and services to a child and/or household from one program to another program (e.g., a program supported by the national or local government, community-supported programs, another PEPFAR-supported program, or a program supported by another donor). Transfer occurs at the case level and should not be confused with "transition," which is defined as the shift of responsibility for an overall OVC response within a community from donor support to local support and ownership.

**Attrition:** In OVC programs, attrition could be regarded as the premature termination of support or interventions to a child and/or household due to circumstances beyond the control of the program. Attrition could arise as a result of the death of a child, voluntary withdrawal of child or caregiver from the OVC program, or the child and/or caregiver's inability to abide by participation agreements. This also occurs when efforts to locate the child and/or household fail (lost to follow-up), and the project is no longer able to provide services or case management.

### OVC Service Areas

The core services provided using the case management approach include:

1. Health.
2. Nutrition.
3. Education.
4. Shelter and care.
5. Psycho-social Support.
6. Child Protection.
7. Household Economic Strengthening (HES).

In recent times, these core service areas have been divided into four domains such as:

1. Healthy – Known HIV Status, virally suppressed, Knowledgeable about HIV prevention and not malnourished.
2. Safe - No violence, not in a child-headed household.
3. Schooled - Children in school.
4. Stable - Improved financial stability.

### Indicators for measuring progress of OVC programs

Some indicators have been standardizing by the federal government and donor agencies for measuring the impact and progress of OVC programs in Nigeria.

Two of these indicators are called "Monitoring Evaluation and Reporting (MER) Indicators- OVC_SERV and OVC_HIV STAT -and the others are called Custom Indicators. These indicators have been reviewed and revised over time and there are elaborated with corresponding figures in the result section. (PEPFAR MER Indicator Reference Guide 2.6).

## Methodology

The study employs a mixed-method study design. Mixed methods research combines quantitative and qualitative research in other to answer research questions [18]. Tegan further purpose that the mixed methods were implied to help researchers gain more insight and a complete picture than a standalone quantitative or qualitative study. This enabled the integration of the benefits of both methods.

Quantitative research methodology underscore's objective measurement and mathematical, statistical, and numerical

analysis of data collected through questionnaires, polls, and survey or by manipulating pre-existing statistical data using computational techniques [19]. Quantitative research is deductive and focuses on collecting numerical data and generalizing it across groups of people or to explain a particular phenomenon [20]. For the quantitative aspect of this study, the researcher utilized pre-existing data, collected with National OVC Management Information System tools to evaluate real time progress of OVC Programs and to investigate the effectiveness of the case management approach used in the service delivery of OVC interventions. The researcher evaluated the 14 standard OVC indicators to measure the achievement and progress of OVC intervention across the state. [21].

Conversely, the researcher also adopted qualitative research design to provide a robust explanation for quantitative data. Usually, qualitative research designs are more flexible than quantitative ones as they promote a close relationship between the researcher and the respondents and are generally bottom-up and inductive [22]. Qualitative researchers collect data in the form of written or spoken language or observations that are recorded in language, and they analyze the data by identifying and categorizing themes [23].

Since this study investigates the OVC programme at household level, as well as how the programme affects OVC's family wellbeing, this research is naturalistic and holistic. This study thus investigates the effectiveness of the OVC programme at the household level by engaging various actors involved in the realization of its objectives using a semi-structured open-ended questionnaire. The investigation took the form of a case study, with seven Community Based Organization (CBOs) and NGOs dealing with HIV/AIDS implementing OVC programmes across Enugu state [24].

## Sampling Procedure and Data Analysis

The target population for this study was vulnerable households. The researcher utilized convenient quantitative sampling methods to aggregate data of vulnerable households who are enrolled and receiving OVC services between July 2020–September 2021. Community-Based Organizations' (CBOs) through community caseworkers/managers enrolled vulnerable children and their caregivers and provided need-based services using national tools and standards as approved by OVC donor Agencies and the government of Nigeria. The researcher being part of the OVC community worked with seven Community Based Organizations using case study approach to administer standard Household OVC questionnaires used in monitoring, evaluating, and reporting OVC program interventions. According to [25], "convenient sampling is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in the study". He further opines that; convenience sampling is a kind of sampling where the first available primary data source will be utilized for the research without additional requirements. In other words, this sampling method involves getting participants wherever they can be found and naturally wherever is convenient (https://lib-guides.letu.edu/quantresearch**)**. This research administered standard OVC questionnaires on vulnerable children and caregivers via case workers at the household level. Excel spreadsheet and Epi info software were used to analyze the quantitative data using 95% confidence interval and a p-value of 0.05. Advantages of convenience sampling include – uncomplicatedness of sampling and the ease of research, helpful for pilot studies and for generation of hypothesis, facilitation of data collection in a short period of time and cheap to implement as compared to other sampling methods [25].

Conversely, the researcher also adopted a qualitative research design to further explain quantitative data. The researcher utilized observation method and semi structured interviews to collect data on progress and challenges, including recommendations of OVC interventions. Data was collected via semi-structured interviewed from ten (10) respondents who are key stakeholders of OVC intervention ranging from program managers of community-based organizations (CBOs), OVC caseworkers, state, and local government OVC desk officers and caregivers.

## Ethical Consideration

Ethical approval would be sought from the Department of Ethics and planning, Enugu State Ministry of Gender and social affairs for the purpose of this study. Ethical approval would also be received from Texila American university's ethical committee. Consent would also be sought from Community Based Organization's conducting OVC Programs in the Enugu state who have hitherto received consent from their beneficiaries. Participant privacy would be protected. This study would respect human dignity in the cause of its activity and analysis and would endeavor to do no harm.

## Results

Evaluation of the outcomes of achievement of OVC Custom Indicators for services provided to vulnerable households in Enugu State between July 2021-September 2021.

**Table 1.** OVC_SERV - Number of Beneficiaries Served by PEPFAR OVC Programs for Children and Families Affected by HIV by LGAs in Enugu State

| Enugu | Vulnerable Children Served | Caregivers Served | Total Beneficiaries Served (OVC_SERV) |
|---|---|---|---|
| **Grand Total** | 38802 | 14037 | 52839 |

**Table 2.** OVC_HIV STAT- Percentage of Orphans and Vulnerable Children (<18 years old) with HIV Status Reported to Implementing Partner Disaggregated by Sex

| Enugu | HIV Status Reported | | | | Total |
|---|---|---|---|---|---|
| | Negative | Positive | Test not required | Unknown | |
| **Grand Total** | 36493 | 1564 | 235 | 510 | 38802 |

**Table3.** OVC_HIVRISKASS - #OVC <18 Years who were of Unknown HIV Status or HIV-Negative, Risk Assessed using a HIV Risk Assessment Tool

| Enugu | HIV Status/Sex | | | | | | Grand Total |
|---|---|---|---|---|---|---|---|
| | Negative | | Negative Total | Unknown | | Unknown Total | |
| | Female | Male | | Female | Male | | |
| **Grand Total** | 7994 | 6966 | 14960 | 66 | 66 | 132 | 15092 |

**Table 4.** OVC_HTSLINK- % (#) of OVC with Unknown or Negative HIV status Referred for Testing who got Tested and Received Result

| Enugu | Sex | | Total OVC Referred for HIV Testing Services |
|---|---|---|---|
| | Female | Male | |
| **Grand Total** | 4688 | 4130 | 8818 |

**Table 5.** OVC_ARTSUPP-'% self- or Caregiver-Reporting Adherent to Treatment for the Last Six Months within the Reporting Period

| Enugu | # Of OVC HIV+ beneficiaries (<18 years) on ART program currently served in the reporting period | # self- or caregiver-reporting adherent to treatment for the last six months within the reporting period | % self- or caregiver-reporting adherent to treatment for the last six months within the reporting period |
|---|---|---|---|
| **Grand Total** | 1564 | 1418 | 91% |

**Table 6.** OVC_OFFER- Number of Children and Adolescents on ART in PEPFAR Clinical Settings Offered Enrolment into the OVC Program

| Enugu | Sex | | Total |
|---|---|---|---|
| | Female | Male | |
| **Grand Total** | **775** | **789** | **1564** |

**Table 7.** OVC_ART_ENROLL- 'Number of HIV Positive Children and Adolescents on ART at a PEPFAR Clinical Setting who are Enrolled in the OVC Comprehensive Program after having been Offered Enrolment

| Enugu | Sex | | Total |
|---|---|---|---|
| | Female | Male | |
| **Grand Total** | 775 | 789 | 1564 |

**Table 8.** OVC_PREV - % OVC (aged 9-17) that Received Adolescent HIV Prevention and Sexual Reproductive Health Services

| Enugu | Female | Male | Grand Total | Total OVC (>9Years) | % Of Adolescent Female who received HIV Prevention messages | % Of Adolescent male who received HIV Prevention messages | % Of Adolescent enrolled who received HIV Prevention messages |
|---|---|---|---|---|---|---|---|
| **Grand Total** | 10400 | 9294 | 19694 | 21195 | 49% | 44% | 93% |

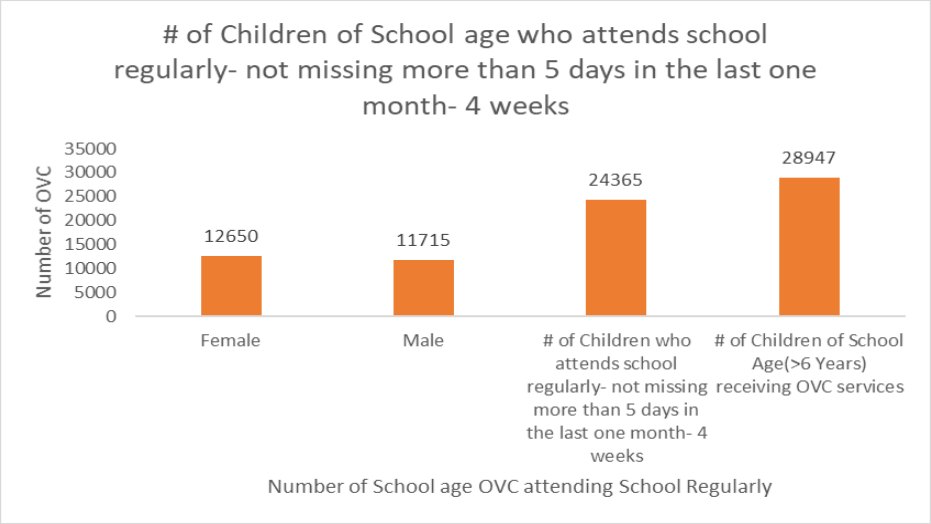


**Figure 2.** Number of Children of School age who attends school regularly- not missing more than 5 days in the last one month- 4 weeks

**Table 9.** OVC_EDU - %of School Aged Children Enrolled in the OVC Program who are Regularly (Defined as not Missing more than 2 days in a Month of Uninterrupted Academic or Vocational Training Session) Attending School or Vocational Training

| Enugu | Female | Male | # Of Children who attends school regularly- not missing more than 5 days in the last one month- 4 weeks | # Of Children of School Age (>6 Years) receiving OVC services | % Of Female Children of School Age who attends school regularly- not missing more than 5 days in the last one month- 4 weeks | % Of Male Children of School Age who attends school regularly- not missing more than 5 days in the last one month- 4 weeks | % Of Children of School Age who attends school regularly- not missing more than 5 days in the last one month- 4 weeks |
|---|---|---|---|---|---|---|---|
| **Grand Total** | **12650** | **11715** | **24365** | **28947** | **44%** | **40%** | **84%** |

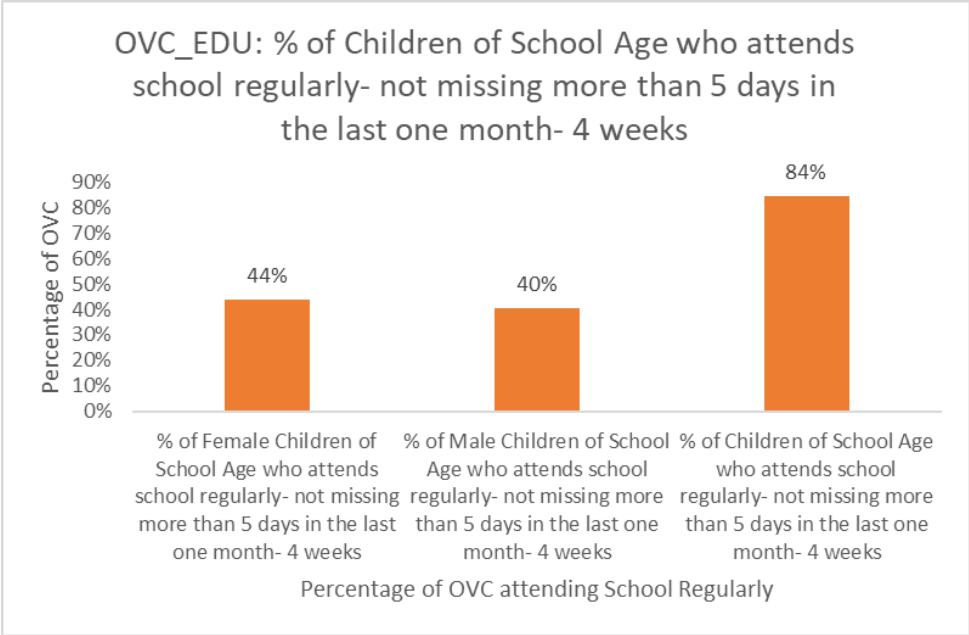


**Figure 3.** OVC_EDU - % of Children of School age who Attends School Regularly- not Missing more than 5 days in the Last one Month- 4 Weeks

**Table 10.** OVC_Nutrition - % of Malnourished OVC linked to Appropriate Nutrition Services (disaggregated by Type: Clinical; Counseling; Others)

| LGA | Female | Male | Total |
|---|---|---|---|
| Total | 336 | 334 | 670 |

**Table 11.** OVC_Birth Cert - % OVC (<18) with a Birth Certificate

| Enugu | Child Has Birth Certificate (Yes/No) | | Female Total | Child Has Birth Certificate (Yes/No) | | Male Total | Total OVC served | Number Of OVC with Birth Certificate | % Of OVC with Birth Certificate (OVC_BIRTH CERT) |
|---|---|---|---|---|---|---|---|---|---|
| | Female | | | Male | | | | | |
| | No | Yes | | No | Yes | | | | |
| Grand Total | 586 | 19479 | 20065 | 461 | 18276 | 18737 | 38802 | 37755 | 97% |

**Table 12.** OVC_ECONS - % of Active Beneficiary Households (HHs) who have access to at least one Source of Income (asset generating income, autonomous income, Remittances, etc.) and able to Meet all Households needs/expenses

| Enugu | Female | Male | Number Of active beneficiary households (HHs) who have access to at least one source of income and able to meet all households needs/expenses. | Total number of HH accessed | % Of active beneficiary households (HHs) who have access to at least one source of income and able to meet all households needs/expenses. |
|---|---|---|---|---|---|
| Grand Total | 878 | 146 | 1024 | 10341 | 10% |

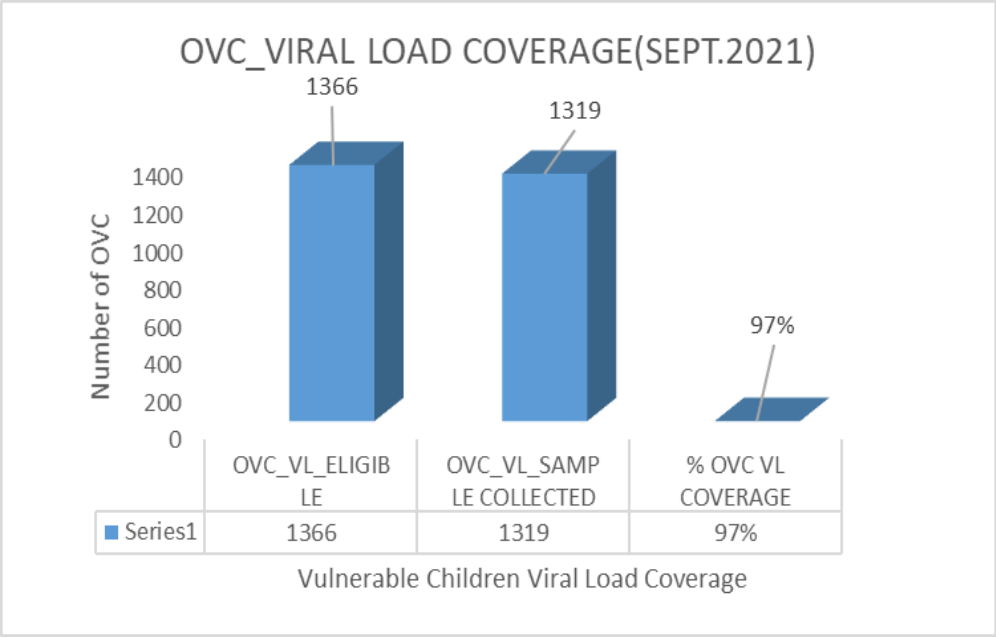


**Figure 4.** % OVC Viral Load Coverage as of September 2021

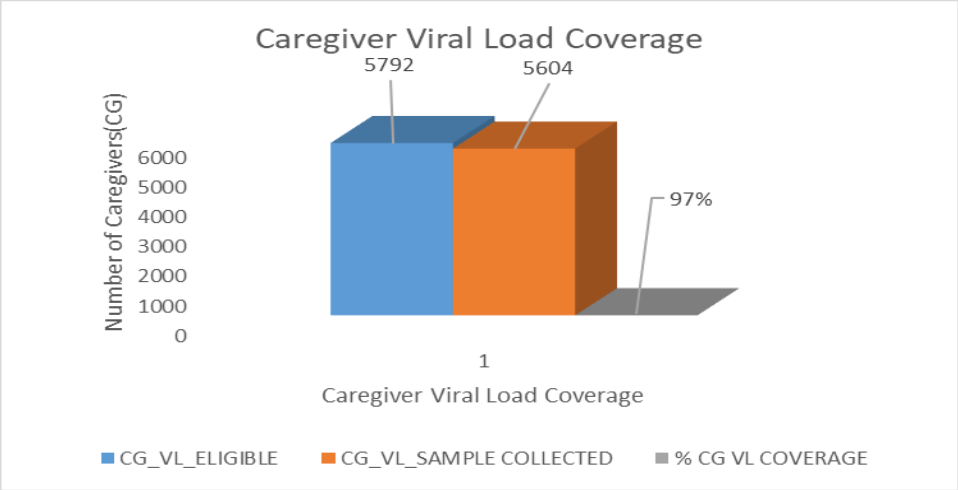


**Figure 5.** % Caregivers Viral Load Coverage as of September 2021

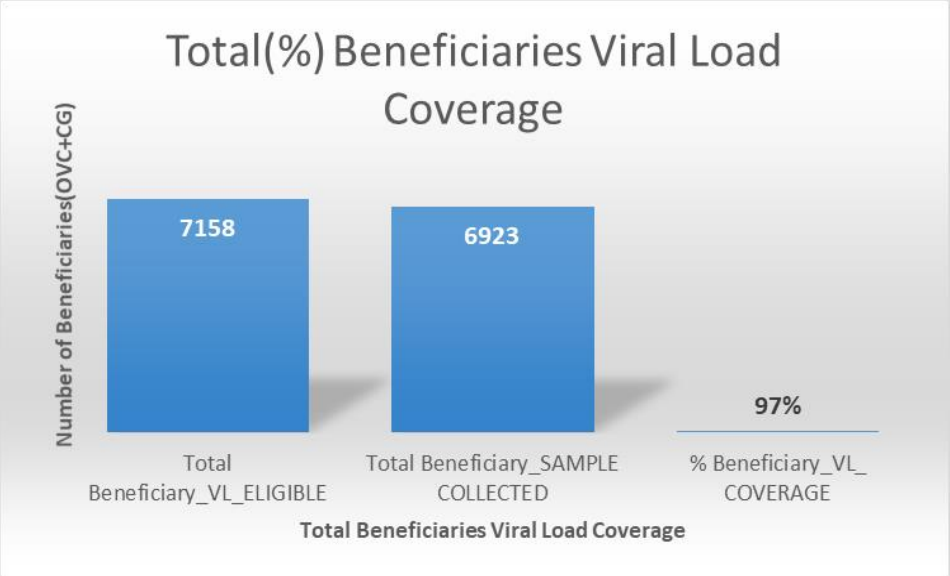


**Figure 6.** % Total OVC and Caregivers Viral Load Coverage as of September 2021

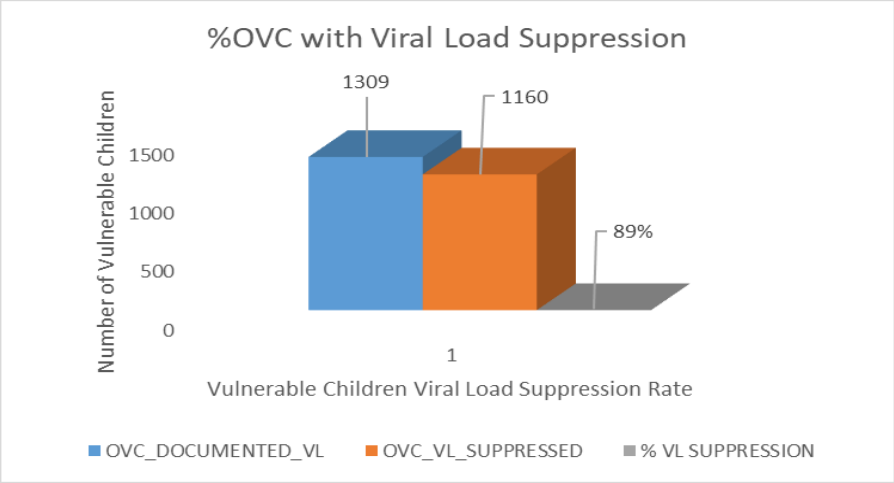


**Figure 7.** % Total OVC with Suppressed Viral Load as of September 2021.

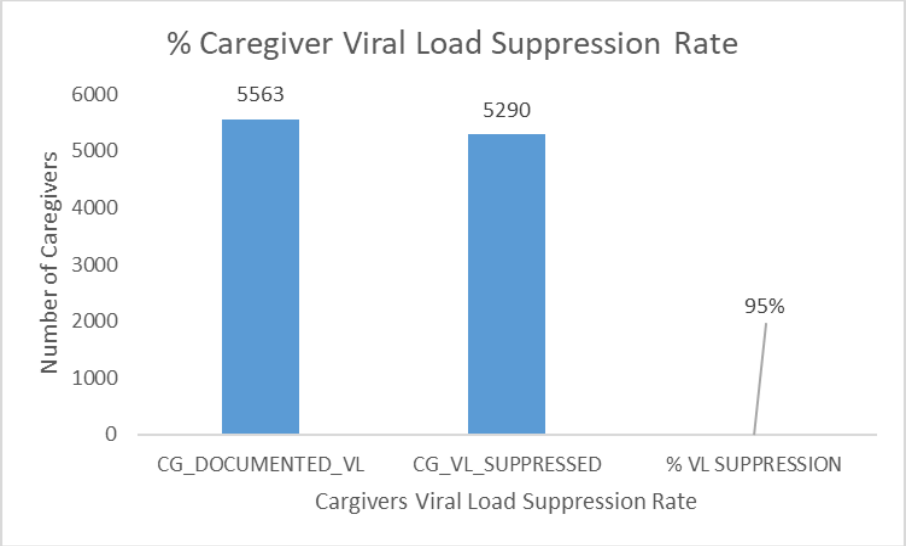


**Figure 8.** % Total Caregivers with Suppressed Viral Load as of September 2021.

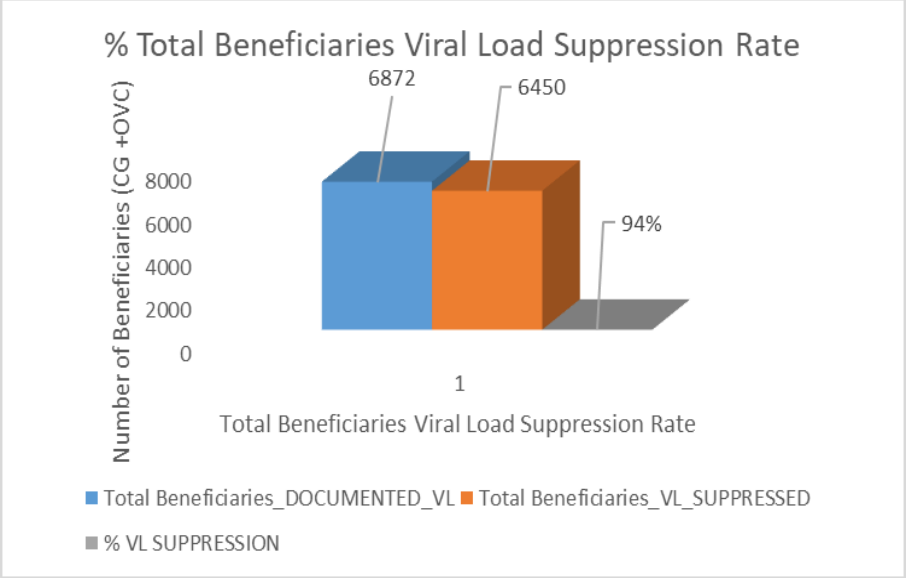


**Figure 9.** % Total Beneficiaries with Suppressed Viral Load as of September 2021.

## Discussions

The emphasis on Orphans and Vulnerable Children (OVC) programming as a strategy of addressing socio-economic issues of vulnerable households that are infected or affected by HIV/AIDS has been unambiguously elucidated in this research. This is in consonance with the research of Ngozi Esther Ibeh in Enugu (2011), where the issues of OVC in the state was highlighted and measures put in place by NGOs and the government to address them using the skills and expertise of social workers. Case management has been adopted in recent times as a formidable strategy of providing need-based services to vulnerable households. This study investigated the effectiveness of the case management approach of OVC programs in Enugu State. The processes of case management in OVC programs as highlighted, include identification, enrolment, assessment, care plan development, service provision, monitoring and evaluation and care plan achievement/graduation.

The research understudied vulnerable households enrolled in the 4GATES Project

(Global Action towards Elimination of HIV/AIDS in Sub-National Units) in Enugu State, Southeast Nigeria. This is understood to be the only donor-funded OVC Program, funded by the Centre for Disease Control and Prevention (CDC), presently executed in the state with oversight supervision of the State Ministry of Gender Affairs and Social Development. This study analysed the outcomes of services provided to Orphans and Vulnerable Children and their caregivers using the standard OVC custom indicators to measure achievements and impact. The result of the study shows that 52,839 beneficiaries (38,802 vulnerable children and 14,037 caregivers) have received need-based services July and September 2021. These services include but not limited to health, food and nutrition, psycho-social support (PSS), child and social protection services, education, and household economic strengthening (HES). These services are divided into four broader domains: Healthy, Safe, Schooled and Stable. Among the children enrolled into the OVC program in Enugu state, the implementing partner, through its sub-grantee CBOs have ensured that the HIV status of all enrolled OVC is known. This resulted to HIV prevalence rate of 4% among enrolled vulnerable children. These two indicators, the former OVC_SERV and the later OVC_HIVSTAT, are usually regarded as Monitoring, Evaluation and Reporting (MER) indicators reported to PEPFAR donors as impact indicators. Vulnerable Children with negative and unknown HIV status are routinely risk assessed to ascertain risk of HIV Exposure. Within the study period, 15,092 OVC were risk assessed for exposure to HIV and 8,818 (58%) turned out to be at risk of HIV. They were subsequently referred for HIV testing and got tested and received their results out of which one vulnerable child turned out positive. Under the healthy service provision domain, care and support services are usually rendered to HIV Positive OVC and their caregivers. These services include ARV support, adherence counselling, transport support for drug pick-up, food, and nutrition, etc. In this project, 1564 OVC were positive to HIV and provided with adequate care and support services. Analysis shows that 91% of OVC on ARVs self-reported adherence to treatment. This shows a 4% shortfall of the UNAID 95:95:95 goal, which requires 95% adherence to ARVs and 95% suppression rate. However, the OVC program has immensely contributed to HIV epidemic control through its care and support services to OVC and their caregivers. HIV positive Vulnerable Children are usually offered enrolment into the OVC program, and consent of caregiver is sought before eligible beneficiaries are enrolled. Part of the services provided to vulnerable children is HIV prevention messages as a means of contributing to epidemic control measures. In the project under review, 19, 694 adolescents between the ages of 9 – 18 years received HIV prevention messages, among whom 10,400 were females, and 9294 were adolescent males. This amounted to 93% of 21,195 adolescents receiving OVC services across the state.

Under the schooled domain of OVC Services, education performance assessment is part of the services provided to vulnerable children of school age. During the home visit, the case managers assess the school performance of OVC using the Child Education Performance assessment form to assess the child's psych-social and academic well-being. The case manager assesses the academic progression of the child from on level to another so as to provide the needed service for individual vulnerable children. During the study period of this research, 24,365 children (12,650 female and 11,715) of school-age were assessed for their educational performance, and 84% (44% female and 40%male) of them attended school regularly and progressed from one class to another. Block granting is usually used as a cost-effective strategy of getting out of school children into school.

### Challenges of OVC Programs in Enugu State

Covid-19 Pandemic: the Covid-19 pandemic seriously impacted OVC programs in Enugu State and Nigeria at large. Beneficiaries were not able to receive physical services due to lockdowns and Covid protocols. Virtual services replaced normal OVC services which affected the usual outcomes and results of the programs.

Beneficiaries' unmet expectations: some beneficiaries in the OVC program usually expect financial benefits. As vulnerable families enrolled into a program in that regard, it is not surprising for such people to expect some financial assistance in a developing African setting. Beneficiary's hopes are sometimes dashed as OVC project funds are limited and programs are not usually designed for money sharing purposes.

The paucity of Funds: developmental and humanitarian funds are limited as such not too many eligible beneficiaries are able to benefit from certain projects. International donors are major funders of OVC projects as the state and federal government contributes little or nothing to OVC projects. This has resulted to funding fatigue of OVC programs.

Stigma: some HIV positive individuals are unable to enroll into OVC programs due to fear of stigmatization. This in turn reduces the number of eligible vulnerable households who would ordinarily benefit from OVC services.

## Conclusion

The overall objective of this study was to investigate the effectiveness of the case management approach in Orphans and Vulnerable Children programs in Nigeria using Enugu state as a case study. Considering this approach in OVC programming, eligible beneficiaries are identified and screened before being enrolled into the OVC program. Upon enrolment, these vulnerable households are assessed based on four domains: healthy, schooled, safe and stable. The outcome of the assessments based on identified strengths and weaknesses of individual households leads to the development of case or care plan containing issues and action plans to be executed by the caregiver with support from the community case managers/workers. These developed care plan actions are judiciously completed in an appropriate, timely fashion. As shown in the study, the care plan implementation is monitored through conducting a regular home visit to the child and caregiver and other critical relevant stakeholders to ascertain progress or challenges in care plan implementation. If monitoring and evaluation of care plan implementation shows that households have been able to address all identified issues in the four domains and have become independently resilient, they are graduated from the OVC program, and all household files both digital and physical would be closed and archived for record purposes. The Global Action for the Eradication of HIV in Sub-National Units OVC project in Enugu state shows the effectiveness of the case management process as thousands of vulnerable households received need-based services and many were moved from a state of vulnerability to resiliency. Analysis of the OVC indicators used in this study shows that vulnerable children and their caregivers benefited from several services in the state ranging from care and support services, educational and psycho-social services, nutrition and health services, child protection and household economic strengthening services. The study also shows that some of the outcomes and successes recorded in the OVC program in Enugu state culminate from coordinated response amongst key stakeholders. OVC programs are usually successful as a result of Ngo's ability to collaborate with government agencies, community, and religious structures in rendering OVC services. Adequate funding and government commitment will improve the outcomes of OVC programs in Enugu state and Nigeria at large.

## Recommendations

1. Government should consciously increase budgetary allocation for OVC program in the state and make deliberate efforts to monitor the utilization of these funds during project implantation.
2. Periodic meeting of OVC stakeholders such as state technical working group and coalition of civil society representatives to discuss critical issues affecting OVC and come up with communiqué and workable action plan to address the plight of OVC at the state and National level.
3. A robust policy and legal framework should be adopted to strengthen OVC services delivery at all tiers of government to improve the expected outcomes of OVC programs.
4. Resource mobilization and advocacy strategies should be revamped to improve awareness of OVC programs in the states. Civil society and government should incorporate the media in disseminating OVC related messages.
5. The capacity of religious and community leadership structures should be strengthened to enable society take ownership of OVC programs for enhanced sustainability of program achievements.
6. International donors should review grant allocation for OVC programs. It is observed that the number of beneficiaries and services are limited due to the paucity of funds, and the timeframe of OVC projects should also be extended if funds are still available.

## Conflict of Interest

There was no conflict of interest in this study.


## Acknowledgements

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# Knowledge of Community Based Health Insurance among Residence of Katsina State, Nigeria; A Comparative Cross-Sectional Study

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***Abstract***

*Enrollment into any form of insurance is very low in Katsina State, with the majority of people paying out of pocket for health care. Knowledge of Community Health Insurance (CHI) has been found to influence enrolment into the scheme. To compare differences in Knowledge between community-based health insurance member households and non-member households and to identify factors associated with the knowledge. A comparative cross-sectional descriptive study was conducted among household heads in Katsina State, Nigeria. A sample size of 300 was determined, and respondents were selected using the multistage sampling technique, data was analyzed using SPSS. The mean age of respondents was 46.82±13 and 44±12.5 years for ensured and non-ensured groups, respectively. Heads of the households were predominantly males and currently married, with 97.3% and 93.3% for CBHI members compared to 82.7% and 99.3% in non-member households, respectively. A greater proportion of the sampled households had Quran education only. The majority of respondents in both groups have heard about CHI, and the source of information was from community leaders. There was no statistically significant difference in the level of knowledge of CBHI between insured (56. %7) and uninsured (47.3%) households (t Stat =4.642, p= 0.07). Knowledge of CHI is higher in an insured group than non-insured but there is still a knowledge gap in both groups. To ensure that health care is accessible to all, CHI should be promoted, and more people should be encouraged to join.*

***Keywords****: Community, Health Insurance, Knowledge.*

## Introduction

Universal Healthcare Coverage (UHC) has become elusive in most of developing countries, with the majority of the populace remaining over-reliant on direct out-of-pocket (OOP) expenses that include over-the-counter payments for medicines and fees for consultations and procedures [1]. The World Health Organization (WHO) regards medical fees as a significant barrier to accessing healthcare coverage and utilization and has stated that the only way to reduce reliance on direct payments is for governments to encourage the risk-pooling prepayment approach [1]. In this regard, community-based health insurance (CBHI) has emerged as a substitute to user fees.

CBHI is a form of Micro Health Insurance, which is a predominant term for health insurance targeted at low-income earners. The unique features of CBHIs are the community involvement in taking the lead in its setup and in its management. They are generally designed with the following features: Pooling of health risks and of funds which occurs within a community or a group of people who share common characteristics, such as geographical location or occupation. Membership premiums are most times flat rate and independent of individual health risks. The scheme operates on a nonprofit basis and is often voluntary [2].

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CBHI reduces out of pocket expenditure and improves cost recovery, and although its effect on the quality of health care and efficiency of health services are unclear, it appears to be the most appropriate insurance model for the informal sector and rural areas where incomes are unstable. Additional benefits of CBHI include- community-based health promotion and disease prevention activities, strengthening of the PHC system, and public-private partnerships in healthcare provision. [2].

Despite the above-mentioned benefits, studies have shown that only a small proportion of the nation's population are aware of CBHI, and the few schemes available are therefore under-utilized as even fewer are willing to pay or contribute to the scheme. [3].

Katsina State, with an estimated total population of over 8 million population growth rate of 3%, has high infant and under-5 mortality rates of 68/1000 and 135/1000 live births, respectively, and has recorded one of the poorest indices for vaccine and immunization coverage over time.[4].

The majority of residents (99.3%) of Katsina residents pay out of pocket for health care, and only about 0.5% have some form of health security (insurance or *retainer ship*) [5].

Information is lacking on the implementation of CBHIS in the State, the reason for the underutilization of the scheme, and whether people have the requisite knowledge. Findings from this study could help address gaps and help fashion out ways to improve uptake of the scheme. This study aims to compare the difference in knowledge of CBHI between Community-Based Health Insurance member households and non-member households. Materials and Methods.

## Study Area

Katsina state is located between latitude $11.7^0$ and $13.32^0$ N and between longitude $6.52^0$and $9.02^0$ E. The state shares border with Zamfara and Sokoto state in the west, Kano and Jigawa state in the east, Kaduna state in the south and Niger republic in the north. It has an area of 23,938 square kilometres and a projected population of 8,536,138.00 based on the 2006 census, with a projected growth rate of 3.0%per annum.

In Katsina, the health sector is financed through different sources and mechanisms, including but not limited to statutory allocation, tax revenue, out-of-pocket payments (OOPs), donor funding, and health insurance (social and community). The difference in the proportionate contribution from these stated sources determines the extent to which the health sector will go in achieving a successful health care financing system [5]. There are 12 Mutual Health Associations with 41,219 registered financial members as contributors.

## Study Design

The study was a cross-sectional comparative study.

## Study Population

The study populations were households in Katsina State. This is because CBHI coverage is modelled as the household head's coverage in the country. Household heads will be considered as the study unit.

## Inclusion Criteria

The inclusions criteria of the study were households heads that are 18 years old and above, who were engaged in the informal sector for the source of living, enrolled into the CBHIS and benefits for more than one year and were not covered by other insurance schemes for health (i.e., social health insurance and Private Health Insurance).

## Exclusion Criteria

The exclusion criteria were household heads that were employed in the formal sector for the source of living (including pension) and/or covered by other insurance schemes.

## Sample Size Determination

The sample was estimated using the study

design for comparisons of two groups population proportions formula with the following assumptions: 80% statistical power with a level of significance at 5%, insured to the uninsured ratio of 1:1, and the proportion of health service utilization was 35% for the insured household and 20% for the uninsured household (Mebratie, 2015).

$$n = k\ \frac{[P_1(1-P_1)\ +\ P_2(1-P_2)]}{(\ P_{1_}-P_2)^2}$$

Where:

| | | |
|---|---|---|
| n | = | Minimum sample size per group. |
| K | = | Constant, which is a function of α and β. |

The level of significance shall be set at 5% (α=0.05).

The power of the study shall be set at 80% (0.8) at α 0.05 and 1-β of 80% K = 7.8.

| | | |
|---|---|---|
| $P_1$ | = | Proportion of health service utilization was 35% for the insured =0.35 (Mebratie, 2015). |
| $P_2$ | = | Proportion for the uninsured household is 20% = 0.2 (Mebratie, 2015). |
| 1-$P_1$ ($q_1$) | = | complementary probability of $P_1$ = 1-0.35 =0.65. |
| 1-$P_2$ ($q_2$) | = | complementary probability of $P_2$ = 1-0.2=0.8. |

$$n = \frac{7.8[0.35\ x\ 0.65) + (0.2\ x\ 0.8)]}{(0.35-0.2)^2}$$

$$= \frac{7.8\ X\ 0.2275\ + 0.16)}{0.0225\ 0.225} = \frac{3.0225}{134}$$

Allowing for 90% response rate, the minimum sample size ($n_s$) is given as: $n_s = n/0.9$= 134/0.9 = 149 ≈ 150per group.

## Sampling Technique

The Mutual Health Association constitutes 12 Community (units) with 41,219 registered financial members (Sampling frame).

**Stage 1**

Selection of one community from each senatorial zone using Simple Random Sampling Technique.

Katsina zone: Dutsinma was selected with 2,995.

Daura zone: Mashi was selected with 3,390.

Funtua zone: Dabai was selected with 5,727.

Therefore**,** the proportionate allocation was used to select the study respondents (sample unit) from the sample frame that is:

$$= \frac{\text{Registered financial members in a community}}{\text{Total registered financial members in all the community}}\ X\ \text{Sample size}$$

| | | |
|---|---|---|
| **Dutsin-ma** | = | 2,995/12,112 × 150 = 37 |
| **Mashi** | = | 3,390/12,112 x 150 = 42 |
| **Dabai** | = | 5,727/12,112 x 150 = 71 |

These give the number of study respondents to be interviewed from each community.

**Stage 2**

Systematic sampling was used to select the study subject, using Dutsin-ma with 2,995 financial members and 37 study respondents as an example.

Sample interval= sample frame / Sample size

2,995/37 = 81.

Using simple random sampling, a number was selected from 1-81 by balloting to be the starting point for selecting the respondents and continue skipping every nth number till the desired number was enrolled.

## Study Instrument

The data was collected using a hard copy structured questionnaire and an Open data kit (ODK) pre-loaded on the android phone of the enumerators.

## Collection Technique

The data was collected from the selected CBHI member and non-member households using pre-tested interviewer-administered structured questionnaires adopted from the Katsina State Contributory Healthcare Management Agency Household Baseline Survey for implementation of the scheme in the State. Then the survey questionnaires were developed to elucidate information on the basic

demographic and socio-economic characteristics of the households, knowledge of CBHIS and healthcare utilization. The survey questionnaire was translated into Hausa, the State language in which most of the study area residents adequately listen and speak, and then back-translated into English to validate its consistency. Interviews were conducted in a location at the respondent's home where he/she felt comfortable. The survey time was estimated after piloting the survey tools. And was done using both the hard copy and ODK install application in the android phone.

### Pre-Testing of Instrument

The survey instrument was pre-tested in Batagarawa LGA (which is not one of the wards selected for the study) by the supervisors and the field enumerators, whereby 10% of the total sample size of households were enrolled into the pilot study. The pretest provided a means to review the validity, reliability, appropriateness, sufficiency, and relevance of the questions. The pretest also helped in validating the questions within the sections to have a logical flow and correct some skip instructions in the ODK.

### Data Management and Analysis

### Study Variables

The dependent variable of the study was knowledge of CBHIS.

Independent variables were CBHI scheme membership status of the households; demographic and socioeconomic characteristics of the individual head and the household (such as age, sex, marital status, education and occupation of the household head and monthly income and size of the household).

### Measurement of variables

For the assessment of the knowledge of respondents, each correct response was given a score of 1 and a wrong answer zero, and these were summed up to give a total score for each respondent. A score of 50% and above will be regarded as adequate knowledge, while a total score of less than 50% is regarded as inadequate knowledge. To ensure quality of household survey data, training was conducted for data collectors and field supervisors on the data collection tools, sampling of the study subjects, ethical issues, and data collection procedures.

### Data Analysis

The data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 25 software. Data were cleaned by running frequency before analysis and re-coded when necessary. Descriptive statistics were computed using cross tab, percentage and mean. Chi-square tests were used to identify the various variables mentioned as the outcome measures, T-tests for comparing means of the quantitative variable which could be determinants for membership of the CBHI scheme and all relationships were evaluated at a 0.05 level of significance.

### Ethical Considerations

Ethical approval was sought and obtained from the Ethical and Scientific Committee of the Katsina state ministry of health Ethics and Research Committee (MOH/ADM/1152/1/491). Informed written consent from the participants was obtained before participating in the study. Permission was obtained from PHC departments as well as District Heads of the respective LGAs.

## Results

The study included a sample of 150 CBHI members and 150 non-member households, yielding a 100% response rate (Table 1). The mean age of respondents was 46.82 ±13 and 44 ± 12.5years for ensured and non-ensured groups, respectively. Heads of the sample households were predominantly males and currently married, with 97.3% and 93.3% for CBHI members compared to 82.7% and 99.3% in non-member households, respectively. The greater proportion of the sampled households had Qur'an education, of which 31.3% of the CBHI members and 24% of the non-member households had completed primary level

education.

Almost all respondents from the member group (95.3%) and 99.3% from the non-member group were Hausa by the tribe. With Estimated monthly income for the study, households ranged between 900 (Naira) and 300,000.00 (Naira). The mean monthly income was 21,751 (Naira) for CBHI members compared to 19,186 (Naira) for non-member households. Almost half of the member group (44.7%) had a Family size of 5-10, while over half (52%) of non-member group had a family size of 5-10. Almost all (99.3%) of the member group and the majority (76.6%) of the non-member group are aware of CBHI. The predominant source of information is through the community leaders, followed by friends/colleagues, then Health workers, while the Mass media was the least source of information (Table 3).

More than half 56.7% of the member group have adequate knowledge while 43.3% of the non-member group have adequate knowledge, although the difference is not statistically significant (p= 0.07) (Table 4).

Age and number of children in the household were found to be associated with Knowledge of CBHI. (Table 5).

**Table 1.** Socio-demographic Characteristics of the Respondents

| Variables | CBHIS Membership | | Total Sample N = 300 |
|---|---|---|---|
| | Member (%) | Non-Member (%) | |
| **Age in Years** | | | |
| 20-40 | 53(35.3) | 79(52.7) | 132(44) |
| 41-60 | 77(51.3) | 61(40.7) | 138(46) |
| >60 | 20(13.3) | 10(6.7) | 30(10) |
| **Gender** | | | |
| Male | 146(97.3) | 124(82.7) | 270(90) |
| Female | 4(2.7) | 26(17.3) | 30(10) |
| **Marital Status** | | | |
| Single | 8(5.3) | 1(0.7) | 9(3) |
| Married | 127(84.7) | 149(99.3) | 276(92) |
| Separeted | 15(10) | 0(0) | 15(5) |
| **Ethnicity** | | | |
| Hausa | 143(95.3) | 138(92) | 281(93.7) |
| Fulani | 7(4.7) | 12(8) | 19(6.3) |
| **Level of Education** | | | |
| primary | 47(31.3) | 36(24) | 83(27.7) |
| secondary | 17(11.3) | 16(10.7) | 33(11) |
| Tertiary | 12(8) | 19(12.7) | 31(10.3) |
| Quran only | 73(48.7) | 79(52.7) | 152(50.7) |
| Others | 1(0.7) | 0(0) | 1(0.3) |
| **Occupation** | | | |
| Farmer | 59(39.3) | 63(42) | 122(40.7) |
| Civil Servant | 1(0.7) | 0(0) | 1(0.3) |
| Business | 71(47.3) | 70(46.7) | 141(47) |
| Unemployed | 10(6.7) | 6(4) | 16(5.3) |
| Retired | 4(2.7) | 3(2) | 7(2.3) |
| Others | 5(3.3) | 8(5.3) | 13(4.3) |

| Number of Children in the Household | | | |
|---|---|---|---|
| <5 | 44(29.3) | 32(21.3) | 76(25.3) |
| 5-10 | 67(44.7) | 78(52) | 145(48.3) |
| >10 | 39(26) | 40(26.7) | 79(26.3) |

**Table 2.** Indices of Assessment of Knowledge of CBHIS

| Variable | Insured n (%) n = 150 | Uninsured n (%) n = 150 | Difference |
|---|---|---|---|
| **Health Contributions helps reduce out of pocket spending on healthcare** | | | |
| Correct response | 138(92) | 106(70.7) | 32(21.3) |
| Incorrect response | 12(8) | 44(29.) | |
| **There must be minimum of 1000 financial members in Mutual Health Association** | | | |
| Correct response | 50(33.3) | 8(5.3) | 42(28) |
| Incorrect response | 100(66.7) | 142(94.7) | |
| **There must be bye laws for Mutual Health Association** | | | |
| Correct response | 58(38.7) | 71(47.3) | -13(8.7) |
| Incorrect response | 92(61.3) | 79(52.7) | |
| **Health contributions help in achieving universal health coverage** | | | |
| Correct response | 127(84.7) | 83(55.3) | 44(29.3) |
| Incorrect response | 23(15.3) | 67(44.7) | |
| **Health Contributions is only for the rich and public/civil servant workers** | | | |
| Correct response | 122(81.3) | 144(96) | -22(14.7) |
| Incorrect response | 28(81.3) | 6(4) | |
| **People in the informal and private sector cannot be covered by health contributions** | | | |
| Correct response | 112(74.7) | 137(91.3) | -25(16.7) |
| Incorrect response | 38(25.3) | 13(8.7) | |
| **Health contributions covers all health problems** | | | |
| Correct response | 43(28.7) | 73(48.7) | -30(20) |
| Incorrect response | 107(71.3) | 77(51.3) | |
| **Health contributions is a business for community leaders** | | | |
| Correct response | 132(88) | 146(97.3) | -14(9.3) |
| Incorrect response | 18(12) | 4(2.7) | |
| **CBHIS chooses a hospital for you to access care** | | | |
| Correct response | 72(48) | 113(75.3) | -113(27.3) |
| Incorrect response | 78(52) | 37(24.7) | |
| **CBHIS services increase waiting time for patient consultation** | | | |
| Correct response | 109(72.7) | 133(88.7) | -24(16) |
| Incorrect response | 41(27.3) | 17(11.3) | |

**Table 3.** Awareness and source of information about CBHIS

| Variable | Insurance status of households | |
|---|---|---|
| | Insured n (%) | Uninsured n (%) |
| **Heard Information on CBHIS** | | |
| Yes | 149(99.3) | 115(76.7) |
| No | 1(0.7) | 35(23.3) |

| Source of Information on CBHIS | n = 149 | n = 115 |
|---|---|---|
| Community leaders | 73(48.9) | 43(37.4) |
| Friends/colleagues | 34(22.8) | 35(30.4) |
| Radio/ Television | 1(0.7) | 8(7) |
| Doctors/Healthcare worker | 41(27.5) | 29(25.2) |

**Table 4.** Overall, Knowledge score of Respondents

| Variables | Adequate Knowledge >50% score | | Inadequate Knowledge <50% score | |
|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent |
| CBHIS Members | 85 | 56.7 | 65 | 43.3 |
| CBHIS Non-Members | 71 | 47.3 | 79 | 52.7 |
| N= 150; t Stat = 4.642; P-value = 0.07 | | | | |

**Table 5.** Association between Socio demographic characteristics of respondents and level of knowledge of CBHI

| Variables | CBHIS Members | | CBHIS Non-Members | | |
|---|---|---|---|---|---|
| | % Adequate Knowledge (>50% score) | % Inadequate Knowledge (<50% score) | Adequate Knowledge (>50% score) | Inadequate Knowledge (<50% score) | P-value |
| **Age** | | | | | |
| 20-40 | 69.8 | 30.2 | 34.2 | 65.8 | |
| 41-60 | 54.5 | 45.5 | 59.0 | 41.0 | 0.02* |
| >60 | 30.0 | 70.0 | 80.0 | 20.0 | |
| **Gender** | | | | | |
| Male | 58.2 | 41.8 | 57.5 | 42.5 | 0.15 |
| Female | 0.0 | 100.0 | 6.7 | 93.3 | |
| **Marital Status** | | | | | |
| Single | 50.0 | 50.0 | 11.1 | 88.9 | |
| Married | 60.6 | 39.4 | 55.6 | 44.4 | 0.14 |
| Separeted | 26.7 | 73.3 | 0.0 | 100.0 | |
| **Etnicity** | | | | | |
| Hausa | 58.0 | 42.0 | 49.6 | 50.4 | 0.06 |
| Fulani | 28.6 | 71.4 | 31.6 | 68.4 | |
| **Level of Education** | | | | | |
| primary | 66.0 | 34.0 | 34.1 | 65.9 | |
| secondary | 58.8 | 41.2 | 43.8 | 56.3 | 0.14 |
| Tertiary | 75.0 | 25.0 | 37.5 | 62.5 | |
| Quran only | 46.6 | 53.4 | 55.3 | 44.7 | |
| Others | 100.0 | 0.0 | 0.0 | 0.0 | |
| **Occupation** | | | | | |
| Farmer | 76.3 | 23.7 | 67.2 | 32.8 | |
| Civil Servant | 100.0 | 0.0 | 100.0 | 0.0 | |
| Business | 45.1 | 54.9 | 41.4 | 58.6 | 0.09 |
| Unemployed | 20.0 | 80.0 | 0.0 | 100.0 | |
| Retired | 75.0 | 25.0 | 0.0 | 100.0 | |

| | | | | | |
|---|---|---|---|---|---|
| Others | 40.0 | 60.0 | 16.7 | 83.3 | |
| **Number of Children in the Hosehold** | | | | | |
| <5 | 47.7 | 52.3 | 28.9 | 71.1 | |
| 5-10 | 58.2 | 41.8 | 49.3 | 50.7 | 0.02* |
| >10 | 64.1 | 35.9 | 61.5 | 38.5 | |

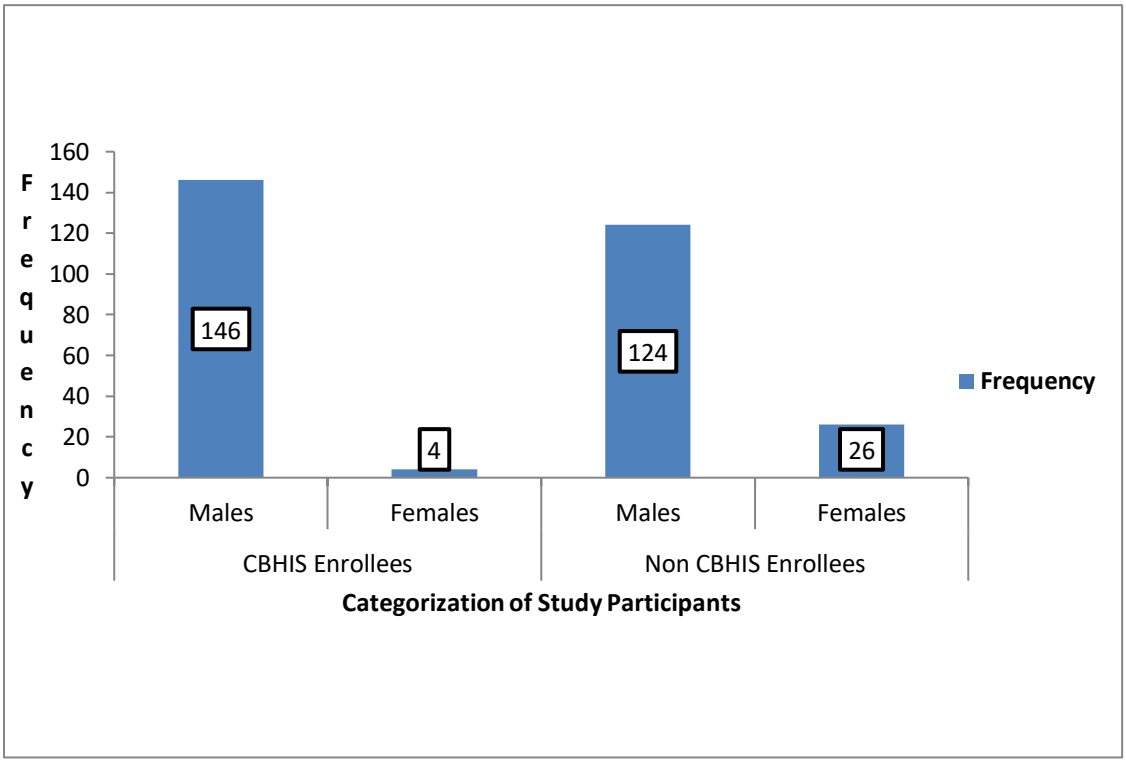


**Figure 1.** Sex Distribution of Respondents

## Discussion

Knowledge of Community Health Insurance (CHI) has been found to influence enrolment into the scheme. A study conducted in Nigerian Capital City realized that only 13% have a good understanding of the concept of the scheme [6].

This is in contrast to this study, whereby both member and non-member groups had a good awareness of the scheme (99.3% & 76.7%), respectively. This could be attributed to the close bonding among the communities and the fact the scheme has been long-standing, and a lot of sensitizations have taken place.

Another reason why awareness was high was that health workers usually inform non-member households about the scheme anytime they seek for medical consultations. Another study among the residence of a suburb in Lagos found that only 9% had good knowledge with significant association between knowledge and up-take (7). This contrast with our study which both CBHIS members and Non-Member group had relatively good knowledge.

The difference could be due to the fact that differences in Socio-demography characteristics. Lagos is mainly cosmopolitan city with diverse people while our study was carried out in predominantly rural communities with strong community ties and kinship. The study also establish relationship between knowledge and uptake of the scheme which our study also established.

A study in a rural community in North central Nigeria revealed that 71% of the respondents have good knowledge, 91% not members of any scheme, and 93.6% willing to pay. [8] This is

like our study. However, the study participants were mainly students from a tertiary institution, so their level of education could contribute to their high knowledge of CHI. For our study, it is mainly in rural communities with a higher proportion of participants having only Quranic education, but because of high community involvement during the planning and implementation, the knowledge of the scheme was high.

The predominant source of information about the scheme is from Community leaders. This has led to more awareness about the scheme in both groups. This finding is like in the suburb of Lagos [7] even though the level of awareness is more in our study mainly due to the establishment of the scheme for a long time.

The Member groups have a higher level of knowledge compared to the non-member group, although the difference is not statistically significant. This is not unexpected because the people who are not enrolled interact with the enrolled group. Being a rural area, information sharing is easy and close and personal interaction is common. Age and number of people in a household are found to be significantly associated with knowledge of CBHI. This is in tandem with a study that suggested that enrolments in CBHI were positively associated with household income, age of the household head and household size, among other factors [9].

## Conclusion

Knowledge of CHI is higher in an insured group than non-insured but there is still a knowledge gap in both groups. To ensure that health care is accessible to all, CHI should be promoted, and more people should be encouraged to join.


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## Conflict of Interest

The authors wish to declare unequivocally that there is no conflict of interest in conducting and presenting this paper.

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# An Analysis of Factors that Affect Food Choices of University of Zambia Students

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***Abstract***

*The purpose of the study was to analyse factors that affect food choices of accommodated female students at the university of Zambia. The sample for the study was 249 female students selected using the proportional stratified simple random sampling technique. A questionnaire was used in collecting data. The data collected were analysed using descriptive statistics, t- test and factor analysis. The factor analysis showed that food choices could be grouped into six groups accounting for 58.765% of the variance. The average mean of 2.0180 indicated that respondents have limited Nutrition Knowledge. It was also noted that; there was no difference in Nutrition Knowledge between the young ones and the older ones. The non-vegetarians ate more food groups than the vegetarians. The vegetarians spent more time on exercise and drank more water per day. Respondents also differed in their food choices and cooking methods according to their socio-economic status. The main recommendation that emerged from the study was that Food Science and Nutrition should be added to one of the first-year core courses at the University of Zambia. In addition, outsourcing experts such as dieticians and nutritionists to address students on importance of safe clean water and good food hygiene practices would be invaluable in ensuring healthy lifestyles and enhanced academic productivity.*

***Keywords:*** *Body Mass Index (BMI), Discretionary calories, Diet, Food Choices, Nutrition, Overweight, Recommended Dietary Allowance (RDA), Students, Underweight.*

## Introduction

Food choices are an important public health issue that has significant health and economic implications. People establish many of their food preferences early in life, and because they make more and more independent eating decisions as they move through adolescence, the transition to the independent living during the university days is an important event [1]. Lack of purchasing power makes some students to consume a lot of carbohydrates which increases their intake of Calories. For some, skipping meals and taking bulky food increase the storage of fat in the body [2]. This also leads them to becoming overweight or obese. However, even when the purchasing power is there, various forms of imbalances in dietary intake occur due to a lack of knowledge and the time to prepare the meals. On the other hand, some students starve themselves to maintain their shapes and wanting to appear younger. This subsequently can lead to underweight [3]. Affordability is the ability to

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bear a cost. If someone does not have the money or other resources to acquire an item, it is clearly unaffordable. Equally, if the money is available, but other things take priority in the students' budget, viewing the item as expensive, in this case, food, it may still be unaffordable [4].

The foods that we eat are important to our long-term health and well-being. This link is of particular importance to students because bad choices can lead to overweight and obese or under nutrition, which can present various health problems. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in metres). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight. An ideal body weight range is between 18.6 and 24.9. Underweight is less than 18.5 [5]. Once considered a problem only in high-income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings [1].

Malnutrition, overweight and obesity can negatively affect the immune system, but nutritional interventions can act as immunostimulatory and help in the prevention of both communicable and non-communicable diseases [6]. Hippocrates 2, 500 yrs ago. Let food be thy medicine and medicine be thy food'', meaning that in food we can find medicine, and in the food we can find poison [7]. Therapeutic nutrition emphasis is on proper nutrient intake. Food choices can influence the nutrition status of both developed and developing countries. Covid 19 pandemic affected a lot of people seriously who had underlying factors [8]. There is a need for positive changes in dietary patterns as the world anticipates new viruses and other pathogenic micro-orgs due to human activities. Metabolism of food can be efficient if a diet is balanced because of the requirement of all nutrients in that process. With a routine of good nutrition, the body can fight pathogen causing microbes, and its appearance will also be improved.

Determinants can affect food choices. Biological determinants include hunger and appetite, which can make one to want to eat the foods available without making a proper choice. Palatability is the pleasure that someone experiences when eating a particular food. The sensory aspects include the smell, appearance, and texture of food. [9]. The social determinants are culture, family, and peers. Psychological determinants are mood and stress. Attitudes include beliefs and knowledge about food [10]. Economic determinants can result into a lack of proper choice of food. People in low-income brackets may eat carbohydrates in excess. Those in the higher Socio-economic brackets may gain weight due to eating fatty foods and carbohydrates [4]. More time is often allocated for schoolwork and less time for other activities, including eating. Lack of time to prepare meals can restrict students to unhealthy methods of cooking, such as frying, which increases the consumption of fat [10].

A high-sugar diet coupled with a sedentary lifestyle is the perfect breeding ground for non-communicable diseases. The body needs an adequate amount of water every day. Low-fat milk, soya milk is better than high-fat milk [1]. Stress can affect all body systems due to the secretion of cortisol. This secretion increases energy availability via gluconeogenesis, where glycogen is changed to glucose. The presence of cortisol also results into lower protein stores in the body, meaning that the protein in nature activities will not function well [11]. Skipping meals can lead to hunger, increasing vulnerability to eating high calorie, high fat, or sugary foods. Frequent meals of four to five times per day can help in maintaining ideal body weight. In between, snacks can consist of fruits and water [5].

According to a study published in the December 2010 issue of the Baltic Journal of Health and Physical Activity [12], underweight people have lower bone mass density. This can

lead to Osteoporosis which is characterised by bone loss, brittle bones, and increased fractures before menopause. It is also important that vegans complement incomplete proteins from the plant kingdom to make proteins of high biological value (HBV), such as the combination of legumes and cereals [13]. Research shows that, those who exercise are more likely to have less of a stress reaction to adverse situations [14].

Healthy eating beginning from childhood is the cornerstone of optimal growth and development for infants, children, adolescents and adults [15]. Whatever parents teach their children to be good food even when it is not is often taken on to adulthood if nutrition knowledge does not intervene [16] (Shaffer, 2002). Every human being should desire to be healthy. Unless health is good, no one can enjoy to the full all that life has to offer, especially in the academic sphere [17]. However, although food occupies the first position in the hierarchical needs of humans, ignorance of many basic facts relating to food and nutrition is still widespread. MyPlate food guide system was published by the Department of Agriculture in the United States (USDA) to give guidance to people, young and old on the importance of diet and its link to health and nutrition [18].

## Methodology

### Descriptive of the Study Area

The University of Zambia (UNZA) is a public university located in Lusaka, Zambia. It is Zambia's largest learning institution. The university was established in 1965 and officially opened to the public on 12 July 1966. It is the oldest public university in Zambia. The population of students include students coming from different socio-economic status, high, medium, and low. The institution at the time of the study had different eating places which were cooking and selling a variety of cooked foods to students. On the other hand, students have facilities in their rooms that enable them to cook and eat from their rooms.

The university consisted of nine faculties at the time of study. Eight located at the main campus, while one, the School of Medicine, at Ridge Way campus near University Teaching Hospital (UTH). University of Zambia students cook in their rooms or eat from other food outlets available on campus. A study carried out by the School of Medicine at the University of Zambia by Goma revealed that in 2011, 20.6% of male and 46.6% of female students were overweight [19]. Weight gain occurs when the intake of energy exceeds the expenditure of combined costs of basal (resting) metabolism, activity, and thermal effect of food [20]. However, if the energy intake becomes less than what is required, a person can become underweight.

### Sampling

The study focused on the population of female students who resided at the institution. The entire population consisted of 1,342 female students. Out of the population of 1,342 female students residing at the main and ridgeway campuses, 20% of the students were sampled from each school using proportional stratified simple random sampling. This method ensures that all members of the population have essentially the same probability of being selected [21].

**Table 1.** Population and Sample of the Study

| **Name** | **Population** | **Sample 20%** | **Sample Distribution** | |
|---|---|---|---|---|
| | | | **Level of Study** | **No of Sample** |
| School of Agriculture | 48 | 10 | Year 1 | 1 |
| | | | 2 | 2 |
| | | | 3 | 3 |
| | | | 4 | 2 |
| | | | 5 | 2 |
| School of Engineering | 7 | 2 | Year 1 | 0 |
| | | | 2 | 1 |
| | | | 3 | 0 |
| | | | 4 | 0 |
| | | | 5 | 1 |
| School of Law | 31 | 6 | Year 1 | 1 |
| | | | 2 | 1 |
| | | | 3 | 2 |
| | | | 4 | 2 |
| School of Mines | 8 | 2 | Year 1 | 0 |
| | | | 2 | 0 |
| | | | 3 | 1 |
| | | | 4 | 0 |
| | | | 5 | 1 |
| School of Natural Sciences | 127 | 25 | Year 1 | 7 |
| | | | 2 | 6 |
| | | | 3 | 7 |
| | | | 4 | 5 |
| School of Medicine | 176 | 35 | Year 3 | 8 |
| | | | Year 4 | 6 |
| | | | 5 | 9 |
| | | | 6 | 6 |
| | | | 7 | 6 |
| School of Veterinary | 18 | 4 | Year 1 | 0 |
| | | | 2 | 1 |
| | | | 3 | 0 |
| | | | 4 | 1 |
| | | | 5 | 1 |
| | | | 6 | 1 |
| School of Humanities and Social Sciences | 360 | 72 | Year 1 | 17 |
| | | | 2 | 20 |
| | | | 3 | 20 |
| | | | 4 | 15 |
| School of Education | 567 | 113 | Year 1 | 27 |
| | | | 2 | 26 |
| | | | 3 | 34 |
| | | | 4 | 26 |
| Grand Total | 1,342 | 269 | | |

## Data Collection

Data collected for this research included primary data and field observations. A questionnaire was used to collect primary data from the 169 participants that were sampled to take part in this study. The Likert format was used because the respondents in this study have a busy schedule.

## Data Analysis

A descriptive research design was used in this study. This method simply tests a group of persons to ascertain the prevailing condition in descriptive and analytical surveys (Cohen, 2000). Primary data was analysed qualitatively and quantitatively. The data was organised and coded. Then the statistical package for Social Sciences (SPSS), a package for Social Sciences, was used in the analysis of data according to the experts' advice. Descriptive statistics, factor analysis and t-test, were employed. Descriptive statistics was used for questions 1, 2 and 4, and factor analysis was used for question 3 and t- test was used for question 5.

# Results

## Demographic Characteristics

From Table 2, 227 (84.4%) of the respondents were between the ages of 17 and 30 years, while 42 (15.6%) of the respondents were above 30 years, showing that most of the respondents were young. This, therefore, meant that most of the students living at the main campus and Ridgeway campus were relatively young.

**Table 2.** Frequency Distributions according to Age

| Age | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Valid | 17-30 years | 227 | 84.4 | 84.4 |
| | 31 years and above | 42 | 15.6 | 15.6 |
| | Total | 269 | 100.0 | 100.0 |

Table 3 indicates that 113 (42.0%) were from the School of Education, 72 (26.8%) were from the School of Humanities and Social Sciences, 35 (13%) were from the School of Medicine, 25 (9.3%) were from the School of Natural Sciences. The rest of the respondents from other faculties were 10 or less, indicating that most of the respondents were from the School of Education.

**Table 3.** Frequency Distributions according to Faculty

| | Schools | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | School of Agriculture | 10 | 3.7 | 3.7 | 3.7 |
| | School of Engineering | 2 | .7 | .7 | 4.5 |
| | School of Law | 6 | 2.2 | 2.2 | 6.7 |
| | School of Mines | 2 | .7 | .7 | 7.4 |
| | School of Natural Sciences | 25 | 9.3 | 9.3 | 16.7 |
| | School of Medicine | 35 | 13.0 | 13.0 | 29.7 |
| | School of Veterinary | 4 | 1.5 | 1.5 | 31.2 |
| | School of Humanities and Social Sciences | 72 | 26.8 | 26.8 | 58.0 |
| | School of Education | 113 | 42.0 | 42.0 | 100.0 |
| | Total | 269 | 100.0 | 100.0 | |

**Table 4.** Frequency Distributions according to Level of Study

| | Years | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | 1st Year | 51 | 19.0 | 19.0 | 19.0 |
| | 2nd Year | 57 | 21.2 | 21.2 | 40.1 |
| | 3rd Year | 75 | 27.9 | 27.9 | 68.0 |
| | 4th Year | 58 | 21.6 | 21.6 | 89.6 |
| | 5th Year | 15 | 5.6 | 5.6 | 95.2 |
| | 6th Year | 7 | 2.6 | 2.6 | 97.8 |
| | 7th Year | 6 | 2.2 | 2.2 | 100.0 |
| | Total | 269 | 100.0 | 100.0 | - |

Table 5 indicates that 238 (88.5 %) are non-vegetarians whilst the vegetarians are 31 with (11. 5%). Most of the respondents were, therefore non-vegetarians. However, most of the respondents were Lacto vegetarians (they take meat products), and others were Lacto- ovo polo-vegetarians (they eat chicken) or Pesco Vegetarians (they eat fish), which is recommended.

**Table 6.** Frequency Distributions according to Religion

| | Religion | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | Christian | 269 | 100.0 | 100.0 | 100.0 |

All the respondents that were captured were Christians. The reason would be that Zambia is a Christian nation, and as a result, the institution might have register very few people from other religions at the time of this study.

**Table 7.** Distribution of Respondents by Effect of Religion on Diet

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | No | 245 | 91.1 | 91.1 | 91.1 |
| | Yes | 24 | 8.9 100.0 | 8.9 100.0 | 100.0 |
| | Total | 269 | 91.1 | | |

Table 7 indicates that 245 (9.1%) of the respondent's decision of being non-vegetarians is not affected by religion, while 24 (8.9%) respondents' decision of being vegetarian is affected by their religion. The majority are, therefore, those whose decisions are independent from religion.

**Table 8.** Frequency Distributions according to Allergies

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | No | 196 | 72.9 | 72.9 | 72.9 |
| | Yes | 73 | 27.1 | 27.1 | 100.0 |
| | Total | 269 | 100.0 | 100.0 | |

Table 8 indicates that 196 (72.9%) did not have food allergies, while 73 (27.1%) had food allergies. Most of the respondents were, therefore, those without any food allergies.

**Table 9.** Frequency Distributions based on Income of Respondents, Parents or Guardians

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | K 1 000 000<K2 000 000 | 86 | 32.0 | 32.0 | 32.0 |
| | K 2 000 000 <K 3 000 000 | 90 | 33.5 | 33.5 | 65.4 |
| | K 3 000 000 <K 4 000 000 | 39 | 14.5 | 14.5 | 79.9 |
| | K 4 000 000 <K 5 000 000 | 19 | 7.1 | 7.1 | 87.0 |
| | Above K 5 000 000 | 35 | 13.0 | 13.0 | 100.0 |
| | Total | 269 | 100.0 | 100.0 | |

Table 9 shows that the highest number of 90 (33.5%) had an income of K2, 000 or less and the lowest number had an income above K5, 000. The indication is that majority of the respondents that lived at the University of Zambia campuses were in the category of low income.

**Table 10.** Frequency Distributions based on the Money Allocated to Food Purchase

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | K250 000 < K400 | 114 | 42.4 | 42.4 | 42.4 |
| | K400 000 < K600 | 109 | 40.5 | 40.5 | 82.9 |
| | K600 000 < K800 | 39 | 14.5 | 14.5 | 97.4 |
| | K800 000 < K1 000 | 5 | 1.9 | 1.9 | 99.3 |
| | K1 000 000 < K1 200 | 2 | .7 | .7 | 100.0 |
| | Total | 269 | 100.0 | 100.0 | |

Table 10 shows the amount of money allocated to food purchases by respondents. It revealed that 141 (42.4%) allocated K250 or less than K400,000 for food; 109 (40.5%) allocated K400 or less than K600, 39 (14.5%) allocated K600 or less than K800 while only 5 (1.9%) and 2 (.7%) allocated K800 or less than K1 000 and K1,000 or less than K1,200 respectively. It was therefore evident that most of the respondents allocated less money for their purchase of food per month which is also reflected in their income in the previous Table.

Table 11 shows the time spent by respondents in food preparations. It shows that 95 (35.3%) spent 30 minutes in food preparation, 75 (27.9%) spent 40 minutes while only 10 (3.7%) spent more than an hour in food preparation. It is evident from the Table that 73.3% of the respondents spent 40 minutes or less in their food preparations, meaning that they did not have enough time to prepare their own meals.

**Table 11.** Frequency Distributions based on the Time Allocated to Food Preparations

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| **Valid** | 20 | 28 | 10.4 | 10.4 | 10.4 |
| | 30 | 95 | 35.3 | 35.3 | 45.7 |
| | 40 | 75 | 27.9 | 27.9 | 73.6 |
| | 50 | 30 | 11.2 | 11.2 | 84.8 |
| | 60 | 31 | 11.5 | 11.5 | 96.3 |
| | 80 | 10 | 3.7 | 3.7 | 100.0 |

## Nutrition Knowledge of Respondents

**Table 12.** Nutrition Knowledge, according to the Respondents

| Items | Mean | Std. Deviation |
|---|---|---|
| How many foods from the groups (proteins, carbohydrates, vitamins) do you often eat at each meal? | 2.4610 | .71976 |
| How many methods of cooking do you use in a week? | 2.2119 | .85283 |
| How many times do you eat in a day? | 2.9814 .8848 | .78917 |
| How many times do you exercise in a week? | .9033 | 1.23902 |
| How much time do you spend exercising in minutes? | 2.6654 | 1.10543 1.11283 |
| How many glasses of water, 250 ml do you usually drink in a day? | 2.0180 | .52684 |
| Nutritional Knowledge Average | 2.4610 | .71976 |

The descriptive statistics above shows respondents' Nutritional Knowledge measured in terms of how many food groups they ate per meal, how many methods of cooking they used, how many times they exercised in a week, how much time they spent exercising (in minutes), how many glasses of water they drank per day and the number of times they ate in a day. From the Table 12, it was evident that respondents on average, ate only 2 groups of food per meal, used 2 methods of cooking, ate 3 times in a day, exercise only about once in a week, spent only 10 minutes exercising and took about 3 glasses of water per day. The average mean of 2.0180 indicated that respondents either had limited Nutrition Knowledge or did not have enough time to utilise their Nutrition Knowledge. Moreover, most of the respondents were in the low-income brackets.

## Choices of Food by Respondents

The choice of food by respondents was analysed using factor analysis. Tables 13- 19 show the results of the factor analysis.

**Table 13.** KMO and Barlett's Test

| **Kaiser-Meyer-Olkin Measure of Sampling** | | |
|---|---|---|
| Adequacy | | .614 |
| Bartlett's Test of | Approx. Chi-Square | 854.247 |
| Sphericity | Df | 153 |
| Sig. | | .000 |

Table 13 shows the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Barlett's test of Sphericity. The KMO of .614 shows that the sample used for the study was adequate. The Bartlett's Test of Sphericity was found to be significant, indicating that the items were capable of grouping themselves into factors. The communalities of all the items ranged from .410 to .725 which is an indication that all the items in the questionnaire were valid and reliable. Factor analysis showed that the food choices by the respondents could be categorised into six groups accounting for 58.765% of variance in their food choices. The six groups are discussed below.

**Table 14.** Group 1 – Protein

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| Meat (size of a deck card is one piece) how many pieces per meal? | 791 | 1.6766 | 88280 |
| Chicken (pieces) how many do you eat per meal? | .782 | 1.2974 | .69166 |
| Fish (size of a check book is a serving) how many do you take in a day? | .661 | 1.2602 | .77696 |

**Variance Accounted for =13.734**

Table 14 above shows that protein accounted for 13.734% of the variance in the choice of food by respondents. The factor loading for all the three items was found to be high, an indication that all three items belonged to this group.

**Table 15.** Group 2–Starch and Protein

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| Whole grain nshima (size of a serving spoon) per meal? | .788 | 1.0818 | 1.27285 |
| Brown Bread (how many slices per meal)? | .786 | 1.6097 | 1.64817 |
| Beans and similar grains (half cup are a serving) many half cups per meal? | .535 | 1.1413 | .80259 |

**Variance Accounted for = 12.902**

Table 15 above shows that starch and protein accounted for 12.902% of the variance in the choice of food by respondents. The factor loading for all three items were found to be high, an indication that all the items belonged to this group.

**Table 16.** Group 3 – Fats and Protein

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| Milk, tick the one often used (250 ml per serving) how many cups do you drink? Low fat Full fat as above | .839 | .4572 | .83478 |
| Non-fat as above | .712 | .6952 | .82635 |
| Total | .431 | .4535 | .68204 |

**Variance Accounted for =11.109**

Table 16 shows that fats and protein accounted for 11.109% of the variance in the choice of food by respondents. The factor loading for all three items were found to be high, an indication that all the items belonged to this group.

**Table 17.** Group 4 – Starch and Protein

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| White bread (how many slices per meal)? | .832 | 3.0297 | 1.25449 |
| Grains (refined) Nshima, how many lumps per meal? (Size of a serving spoon) | .616 | 2.3680 | .82986 |
| Peanut Butter, how many teaspoons full do you use per meal? | .477 | 1.6245 | 1.01680 |
| Fruits (half cup is size of a baseball, how much do you eat per day)? | -.427 | .9554 | .99526 |

**Variance Accounted for = 7.877**

Table 17 shows that fats and protein accounted for 7.877% of the variance in the choice of food by respondents. The factor loading for the two items were found high, an indication that they belonged to this group. Fruits revealed a negative factor loading of -.427, showing that they were not directly related to this group.

**Table 18.** Group 5 – Eggs (Protein)

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| Eggs, tick the size often eaten (small) how many per meal? | .679 | 1.4126 | .82678 |
| Medium as above? | .594 | 1.3866 | .74260 |
| Large as above? | .786 | .7918 | .59957 |

**Variance Accounted for =7.004**

Table 18 above shows that the protein group accounted for 7.004% of the variance in the choice of food by respondents. The factor loading for all three items were found to be high, an indication that all the items belonged to this group.

**Table 19.** Group 6 – Fats and Vitamins

| Items | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|
| Margarine (teaspoon levelled) how many do you use per meal? | .798 | 1.2305 | .92581 |
| Vegetables (half cup is half of a baseball) how much do you eat per day? | -.455 | 1.5204 | .65545 |

**Variance Accounted for = 6.139**

Table 19 shows that the fats and vitamins group accounted for 6.139% of variance in the choice of food by respondents. However, -.455 shows that the vegetable group was not directly related to this group.

## Factors affecting Respondents' Choices of Food

The factors that affected food choices of respondents were age, vegetarianism, and Socio-economic status. Tables 20- 24 is showing the t-

test analysis for the differences in respondents' Nutrition Knowledge and food choices according to age, vegetarianism, and Socioeconomic status.

**Table 20.** t- test Analysis for Differences in the Choice of Food among Age Groups

| Item | Groups (Age) | Mean | Mean difference | t-value | Sig. |
|---|---|---|---|---|---|
| White bread (how many slices) per meal | 17 – 30 years | 2.9625 | -.43381 | -2.240 | .028 |
| | Above 30 years | 3.3953 | | | |
| Chicken (pieces) how many do you eat per meal? | 17 – 30 years | 1.3205 | .52982 | 5.029 | .000 |
| | Above 30 years | .7907 | | | |
| Fish (size of a check book) how many do you eat per meal? | 17 – 30 years | 1.3526 | .30605 | 2.168 | .034 |
| | Above 30 years | 1.0465 | | | |
| Margarine (teaspoon levelled) how many do you use per meal? | 17 – 30 years | 1.4423 | .48882 | 3.343 | .001 |
| | Above 30 years | .9535 | | | |
| Non-fat milk | 17 – 30 years | .5385 | .28265 | 2.983 | .004 |
| | Above 30 years | .2558 | | | |
| Large eggs | 17 – 30 years | .8526 | .27117 | 2.671 | .009 |
| | Above 30 years | .5814 | | | |

Table 20 above is showing significant differences in food choices by respondents according to age in the items listed. It was evident from the Table that older respondents ate more white bread than the younger ones, while the younger ones ate more of other food items which were essentially protein in nature. This might have been due to the fact that younger people needed more bodybuilding foods. The other reason may have been because younger ones always wanted foods that were palatable to their tongues- in this case, protein foods.

**Vegetarianism**

Table 21 is showing the differences in Nutrition Knowledge of respondents according to whether they were non-vegetarians or vegetarians. The three items on Nutritional Knowledge showed a significant difference between non-vegetarians and vegetarians. The Table revealed that the non-Vegetarians ate more food groups than the vegetarians. The vegetarians spent more time on exercise and drank more water per day.

**Table 21.** t- test Analysis for Differences in Nutritional Knowledge according to Vegetarianism

| Item | Groups | Mean | Mean difference | t-value | Sig. |
|---|---|---|---|---|---|
| How many foods from the groups (proteins, carbohydrates, vitamins) do you often eat at each meal? | Non-Vegetarian | 2.4874 | .22933 | 2.016 | .050 |
| | Vegetarian | 2.2581 | | | |
| How much time do you spend exercising in minutes? | Non-Vegetarian | .8361 | -.58322 | -2.514 | .017 |
| | Vegetarian | 1.4194 | | | |
| How many glasses of water, 250ml do you usually drink in a day? | Non-Vegetarian | 2.6134 | -.45107 | -2.157 | .037 |
| | Vegetarian | 3.0645 | | | |

Table 22 is showing the differences in food choices of respondents according to whether they were non-vegetarian or vegetarians. The t values were all found to be significant. The Table revealed that Vegetarians ate more whole grain nshima, brown bread, cereals, beans, peanut butter, and vegetables. They also exercised more and drank more water. The Non-Vegetarians on the other hand ate more meat, chicken, and fish than their counterparts.

**Table 22.** t- test Analysis for Differences in Food Choice according to Vegetarianism

| Item | Groups | Mean | Mean difference | t-value | Sig. |
|---|---|---|---|---|---|
| Whole grain nshima | Non-Vegetarian | 1.0000 | -.70968 | -3.238 | .002 |
| | Vegetarian | 1.7097 | | | |
| Brown Bread (how many slices) per meal | Non-Vegetarian | 1.4706 | -1.20683 | -4.248 | .000 |
| | Vegetarian | 2.6774 | | | |
| Vegetables (half cup is half of a baseball) how much do you eat per day? | Non-Vegetarian | 1.4538 | -.57848 | -3.576 | .001 |
| | Vegetarian | 2.0323 | | | |
| Meat (size of a deck card is one piece) how many pieces per meal? | Non-Vegetarian | 1.8319 | 1.34806 | 7.067 | .000 |
| | Vegetarian | .4839 | | | |
| Chicken (pieces) how many do you eat per meal? | Non-Vegetarian | 1.4244 | 1.10179 | 8.375 | .000 |
| | Vegetarian | .3226 | | | |
| Fish (size of a check book) how many do you eat per meal? | Non-Vegetarian | 1.3613 | .87747 | 5.740 | .000 |
| | Vegetarian | .4839 | | | |
| Beans and similar grains (half cup are a serving) how many half cups per meal? | Non-Vegetarian | 1.0672 | -.64245 | -3.244 | .003 |
| | Vegetarian | 1.7097 | | | |
| Peanut butter, how many teaspoons full do you use per meal? | Non-Vegetarian | 1.5420 | -.71605 | -3.384 | .002 |
| | Vegetarian | 2.2581 | | | |
| Cereals (half cup a serving) how many half cups per meal? | Non-Vegetarian | 1.5924 | -.79466 | -3.406 | .002 |
| | Vegetarian | 2.3871 | | | |

Table 23 is showing the differences in Nutrition Knowledge of respondents according to their Socio-economic status. The t value shows that all the four items are significant. Socio-economic status was grouped as low and high. Respondents in the high economic brackets take more food groups, use more cooking methods, eat more than three times in a day and drink more water. It means that this group spreads their food in a day and takes more water for the proper functioning of the body.

**Table 23.** t- test Analysis for Differences in Nutritional Knowledge according to Socio- economic Status

| Item | Groups | Mean | Mean difference | t-value | Sig. |
|---|---|---|---|---|---|
| Food from the groups (proteins, carbohydrates, vitamins) | Low | 2.3097 | -.26078 | -3.152 | .002 |
| | High | 2.5705 | | | |
| Methods of cooking used each week? | Low | 2.0000 | -.36538 | -3.506 | .001 |
| | High | 2.3654 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Eating times per day? | Low | 2.8673 | -.19685 | -2.155 | .032 |
| | High | 3.0641 | | | |
| Glasses of water per day (250 ml) | Low | 2.3894 | -.47600 | -3.710 | .000 |
| | High | 2.8654 | | | |

**Table 24.** t- test analysis for Differences in Food Choice according to Socio economic Status

| Item | Groups | Mean | Mean difference | t-value | Sig. |
|---|---|---|---|---|---|
| Grains (refined) Lumps of nshima (size of a serving spoon) per meal | Low | 2.2389 | -.22260 | -2.251 | .025 |
| | High | 2.4615 | | | |
| Whole grain nshima as above | Low | .7434 | -.58356 | -3.902 | .000 |
| | High | 1.3269 | | | |
| Brown Bread (how many slices) per meal? | Low | 1.2301 | -.65453 | -3.313 | .001 |
| | High | 1.8846 | | | |
| Fruits (half cup is half of a baseball, how much do you eat per day? | Low | .6814 | -.47243 | -4.002 | .000 |
| | High | 1.1538 | | | |
| Vegetables (half cup is half of a baseball) how much do you eat per day? | Low | 1.3805 | -.24126 | -3.007 | .003 |
| | High | 1.6218 | | | |
| Beans and similar grains (half cup are a serving) how many half cups per meal? | Low | .9469 | -.33515 | -3.639 | .000 |
| | High | 1.2821 | | | |
| Low fat milk, how many 250ml per day? | Low | .3451 | -.19333 | -1.993 | .047 |
| | High | .5385 | | | |
| Alcohol | Low | .3274 | -.19180 | -2.050 | .041 |
| | High | .5192 | | | |
| Cereals (half cup a serving) how many half cups per meal? | Low | 1.4602 | -.38598 | -3.319 | .001 |
| | High | 1.8462 | | | |
| Medium eggs, how many per meal? | Low | 1.2743 | -.19361 | -2.136 | .034 |
| | High | 1.4679 | | | |

Table 24 is showing the differences in food choices of respondents according to their Socio-economic status. The Table shows that the t values were significant.

The Table also revealed that the respondents from the high Socio-economic brackets chose all the food items, including alcohol, more than their counter parts from the low Socio-economic brackets. This could have been because money can buy more food and a variety of cooking equipment, thus increasing the number of cooking methods for those in the high Socio-economic brackets.

## Discussion

The study revealed that there was no difference in Nutrition Knowledge between the young ones and the older ones, although in terms of food choices, younger people took more protein than the older ones. Older respondents ate more white bread than the younger ones. The Non-Vegetarians ate more food groups than the vegetarians. The vegetarians spent more time on exercising and drink more water per day. They also ate more whole grain nshima, brown bread, cereals, beans, peanut butter, and vegetables. The Non-Vegetarians, on the other hand, ate

more meat, chicken, and fish. Respondents in the high economic brackets ate more food groups, used more cooking methods, ate more than three times in a day and drank more water. It meant that this group spread their food in a day and drank more water for the proper functioning of their bodies. Respondents from the high Socio-economic brackets chose all the food items, including alcohol, more than their counter parts from the low Socio-economic brackets.

The students' food choices were not in line with My Pate food guide under the United States Department of Agriculture, which encouraged everyone to eat more vegetables as compared to protein and starch to meet the dairy nutritional needs. Non-fat milk and low-fat milk were to be preferred in order to maximise the benefit of calcium. Oils such as margarine were to be taken in moderation, which is one level teaspoon per day. The study revealed that more protein and starch were eaten than fruits, vegetables and whole-grain cereals, roller meal and brown bread. The time that was commonly used for preparation was not enough to cook food using boiling or stewing methods. Stress and bad mood made most of the respondents that were captured to skip meals and later ate a lot of food at once. The exercise was found to be rare among the respondents, and those that exercised did it once in a week and spent an average of 10 minutes at each session which was below the standard of exercising.

The average mean of 2.0180 indicated that respondents either had limited Nutrition Knowledge or did not have enough time to utilise their Nutrition Knowledge. Moreover, most of the respondents were in the low-income brackets. Nutrition knowledge is related to food choices, and therefore Food Science and Nutrition should be added to one of the first-year core courses at the University of Zambia. The other alternative can be that of inviting dieticians and nutritionists to address students in their schools on healthy living, which includes regular exercises, the importance of water as well as sanitation and hygiene.

## Conclusion

Overweight or obesity and underweight both have detrimental effects. There is no need to wait for a major breakthrough in order to reduce the epidemic of especially being overweight and obese. Many preventable diseases have affected a lot of people around the world. Students at the University of Zambia are not an exception. The many years that students are exposed to bad eating habits and poor choices of food can expose them to such diseases. Food has therefore been identified as one of the major killers if not well utilized. A balanced diet can help students to increase their energy levels, promote a functioning immune system and improve their ability to cope with stress as well as increase concentration and performance in class.

## Recommendations

1. A nutrition course can be included in the first year of study in universities in order to guide students on food.
2. Consuming unsaturated fats (found in avocado, fish, nuts, soy, olive oil) rather than saturated fats (found in butter, fatty meat, and high-fat snacks).
3. Drinking 6–10 glasses of water every day for the benefit of transporting nutrients in the blood, getting rid of waste, and regulating the body temperature.
4. Avoiding fizzy and carbonated drinks which contain too much sugar.
5. Eating a variety of fruit, fresh vegetables, 2.5 cups of vegetables (5 servings) legumes. Avoiding salty, fatty, and high sugar foods (Whitney & Rolfe, 2005).
6. Eating whole grains and nuts, 180 g of grains (unprocessed maize, oats, wheat, millet, brown rice, or roots such as yam, potato, taro, or cassava) depending on where they are coming from.
7. Eating more of white meat than red meat.
8. Using right methods of cooking for different foods to maximise nutrient intake.
9. Maintaining a healthy lifestyle of exercise, meditation, and regular sleep.

10. Avoiding too much alcohol consumption which contributes to becoming overweight.
11. More research can be done in different countries, which should be based on the local foods that can be classified in different categories in order to provide guidance on Food Choices. Food-Based Dietary Guidelines, and Technical Recommendations through the MOA was launched last year in Zambia through the support of FAO and co-funded by The European Union.

## Conflict of Interest

We declare that we do not have any conflict of interest.


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# Characteristics of the Low Vision Population in South-East Nigeria

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***Abstract***

*The increasing attention on the indices around low vision and blindness globally is worth noting. With strategic interventions aimed at preventing avoidable blindness and reducing the burden of low vision, research is being carried out to reveal the magnitude, characteristics, and available interventions for low vision. This study was aimed at characterizing low vision among populations in the South-East geopolitical zone of Nigeria. A total of 1473 persons were screened in outreaches across the zone. Clinical assessments, including external examination, refraction and ophthalmoscopy, were carried out, and 239 persons (16.2%) were identified with vision impairment with the various categories established. Data were analyzed using the IBM Statistical Package for the Social Sciences (version 24.0) and presented using frequencies, percentages, and tables. Statistical significance was based on $p<0.05$. The prevalence of moderate and severe vision impairment was 8.6% and 3.7%, respectively, while blindness was 3.9%. Cataracts (32.6%) and glaucoma (22.2%) were the most common causes of vision impairment and blindness. There was no positive relationship between age, sex and occupation of individuals and level of vision impairment with P values of 0.52, 0.21 and 0.11, respectively. Living in a rural area was not significantly associated with a higher degree of visual impairment than living in an urban area with P=0.81.*

***Keywords:*** *Acuity, Low Vision, Southeast, Visual Impairment.*

## Introduction

Vision plays an important role in our day-to-day life as activities of daily living are greatly affected by vision impairments. Visual impairment is a major health concern all over the world, with about 90% of the world's visually impaired living in developing countries [1]. Interestingly, most cases of visual impairment are preventable. Vision loss has far-reaching socio-economic implications on society as individuals with vision impairment are often alienated from the mainstream of society, especially in developing parts of the world [2]. However, with strategic interventions in vision rehabilitation, eye care professionals have a chance to reduce the implications of irreversible vision loss while they continue the fight towards keeping our society away from avoidable blindness through effective eye care services [1, 2].

Global estimates of visual impairment (VI) have been on the increase over the years. In 1990, it was estimated that about 148 million people had VI with 38 million blinds. By 2002, the estimate of the VI increased to 161 million with 37 million blinds [1]. The most recent World Health Organization (WHO) statistics in 2014 show that 285 million people are visually impaired worldwide, of which 39 million are blind, and 246 million have a low vision [2, 5].

The Global report on visual impairment by the World Health Organization (2007) [3], individuals in moderate and severe visual impairment categories have been described as having low vision, while those with profound

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visual impairment, near-total blindness, and total blindness are described as blindness. A person with low vision has impairment of visual functioning even after treatment and/or standard refractive correction and has a visual acuity of less than 6/18 to light perception or a visual field of less than $10^0$ from the point of fixation, but who uses or is potentially able to use vision for the planning and/or execution of a task [3].

The causes of visual impairment are numerous, including not only congenital and acquired ocular conditions but systemic diseases with ocular complications and neurological issues and trauma [4]. Globally the causes of visual impairment and blindness, in particular, have been compiled from data across 39 countries from six regions of the world, including Africa, America, Europe, the Eastern Mediterranean region, South-East Asia, and the Western Pacific region, reveal that the principal causes of visual impairment are uncorrected refractive errors (URE) and cataract (43% and 33%, respectively), glaucoma (2%), age-related macular degeneration (AMD), diabetic retinopathy (DR), trachoma and corneal opacities (CO), all about 1%, respectively, with a large proportion of causes (18%) undetermined [5, 16].

The Nigeria National Blindness and Visual Impairment Survey was undertaken between 2005 and 2007. Prior to that, there were no accurate and comprehensive population-based data available to guide policymakers and plan eye care services bearing in mind the extent to which the country is diverse economically, geographically, ethnically, and culturally [10]. The Clinical and epidemiological research on the prevalence of blindness and visual impairment in Nigerians 40 years and above, published by [5], found that approximately.

1. 1.13 million Nigerians are blind (profound, near-total and total visual impairments).
2. 2.7 million adults have a moderate visual impairment.
3. And an additional 400 thousand have a severe visual impairment.

This study determined the prevalence of low vision in South-East Nigeria and categorized low vision in the region. The study also identified the causes of low vision/blindness in Southeast Nigeria and associated the prevalence of low vision with the socio-demographic features of respondents.

## Material and Methods

### Research Design

This study was a cross-sectional descriptive study with a retrospective data collection procedure from different states in South-East Nigeria.

### Study Setting

The study was carried out in the five states that make up the South-East geopolitical zone of Nigeria, which are Abia, Anambra, Ebonyi, Enugu and the Imo States. Data were collected in outreaches carried out in rural and urban areas in each of the states. Eye care professionals who were regularly involved in community eye care interventions were contacted and partnered with for data collection. The locations where outreaches were conducted and data obtained include.

Urban- Abia: Umuahia and Aba towns; Anambra: Awka and Onitsha; Ebonyi: Abakiliki town; Enugu: Enugu town; Imo: Owerri.

Rural- Abia: Umuobiala, Umuopara and Nchara Akanu; Anambra: Amaeyi and Umudioka; Ebonyi: Igbeagu and Ndiaboishiagu; Enugu Ogu and Oji; Imo: Ihite-Uboma and Umukaram.

### Research Instruments/data Collection Procedure

Data were collected from direct clinical investigation during some eye care outreaches in the region done between February 2020 and February 2021. With the COVID-19 pandemic and the consequent lockdown, no data were

collected from April to October 2020. Outreaches done from November 2020 were in line with local and international guidelines on safety protocols, including the use of nose masks and social distancing. Demographic data, including age, sex, and location of residence of all respondents in the outreaches, were taken. Visual acuity charts like Snellen's chart and the Tumbling E charts were used to screen both literate and illiterate subjects in the outreaches. Visual acuity was taken with individuals wearing their distant lens correction (where available).

Objective and subjective refraction were done using retinoscopy and trial lens cases respectively - Individuals with visual acuity worse than 6/18 with the best refractive correction in the better eye were identified as low vision subjects (WHO, 2007). Ophthalmoscopes and penlight were used to establish the cause of low vision. Structured questionnaires were also administered by the clinicians to all the low vision subjects to get socio-demographic information from them. Communication in the respective outreaches was done in Igbo and English languages, according to what the subjects could understand – those in Igbo language were translated back to the English Language

### Statistical Methods Used

Data collected were cleaned and analyzed by IBM Statistical Package for the Social Sciences (version 24.0) and presented using frequencies, percentages, and tables. Statistical significance was based on $p<0.05$.

## Results

A total of 1473 individuals were screened during the outreaches across the 5 states in South-East Nigeria. Abia, Imo, Ebonyi, Enugu and the Anambra States had 307, 399, 220, 249 and 298 persons respectively screened in the outreaches from both rural and urban areas. Subjects were between the age of 8 and 88 years, with age ranges 55-54 and 45-54, the highest with 78 and 66 persons, respectively and the mean age of the study population was 53.25±14.28. The ratio of female to male participants in the study was 1:1.30 (Table 1).

Out of the 1473 individuals who were screened during the outreaches across the 5 states, two hundred and thirty-nine (239) persons- representing 16.2% of the total population screened, were identified as low vision patients- with visual acuity of worse than 6/18 in the better eye while having best refractive corrections (Figure 1).

Of the various kinds of visual impairments recorded in the study, moderate Vision Impairment (VI) occurred most (53.1%) among the classes of vision impairment. This was followed by severe VI (23%), profound VI (13.4%) and near-total blindness (10.5%), respectively (Figure 2). The study recorded various causes of Visual Impairment among respondents, of which Cataracts (32.6%), glaucoma (22.2%) and corneal ulcer/scar (9.6%) were the highest causes of vision impairment in the study, with cone dystrophy and myopia occurring least (Table 2).

Table 3 shows the Findings from the study that revealed no statistically significant relationship between the location of respondents (rural vs urban) and the prevalence of visual impairment ($X^2=0.986$, $P=0.805$). Also, as shown in Table 4 below, the age, sex and occupation of respondents were not statistically associated with the prevalence of low vision among them ($P=0.525$, 0.206 and 0.109, respectively).

**Table 1.** Socio-demographic Characteristics of Respondents

| Variables | Frequency (n=239) | Percentage (%) |
|---|---|---|
| **Age(years)** | | |
| 5-14 | 2 | 0.8 |
| 15-24 | 12 | 5.0 |
| 25-34 | 13 | 5.4 |
| 35-44 | 26 | 10.9 |
| 45-54 | 66 | 27.6 |
| 55-64 | 78 | 32.6 |
| 65-74 | 26 | 10.9 |
| 75-84 | 13 | 5.4 |
| 85-94 | 3 | 1.3 |
| **Sex** | | |
| Male | 135 | 56.5 |
| Female | 104 | 43.5 |
| **Occupation** | | |
| Business | 95 | 9.7 |
| Civil service | 102 | 42.7 |
| Farming | 26 | 10.9 |
| Student | 16 | 6.7 |
| **State/location** | | |
| Rural | 104 | 43.5 |
| Urban | 135 | 56.5 |

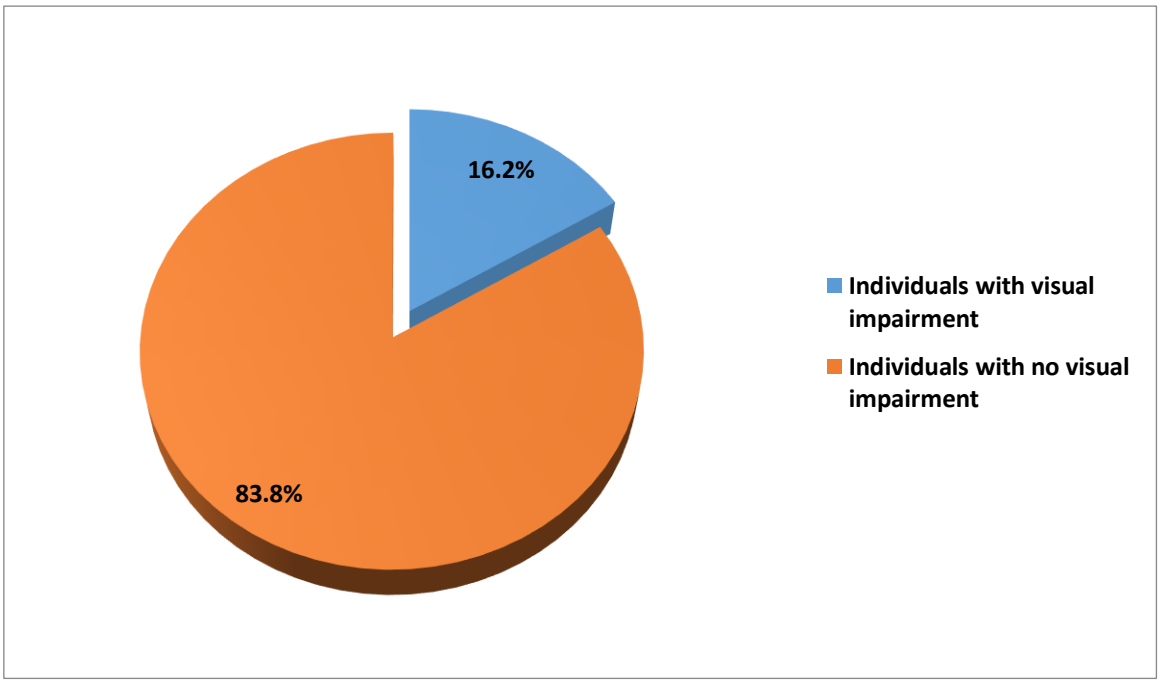


**Figure 1.** Prevalence of Visual Impairment among Respondents

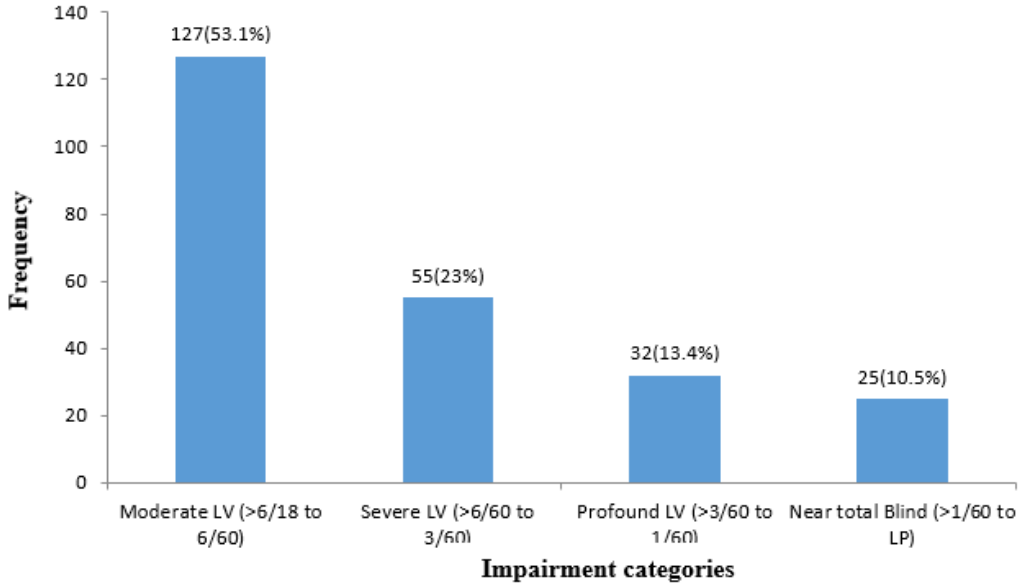


**Figure 2.** Categories of Visual Impairment among Respondents

**Table 2.** Causes of Visual Impairment among Respondents

| **Eye disorders*** | **Visual impairment (%)** | **Blindness (%)** |
|---|---|---|
| Cataract | 78 (32.6) | 30 (51.7) |
| Glaucoma | 53 (22.2) | 10 (17.2) |
| Cornea ulcer/scar | 23 (9.6) | 9 (15.5) |
| Retinal pigmentosa | 16 (6.7) | 1 (1.7) |
| Albinism | 14 (5.9) | - |
| Hypertensive retinopathy | 11 (4.6) | 3 (5.2) |
| Myopia | 10 (0.4) | - |
| Optic atrophy | 9 (3.8) | - |
| Microphthalmia | 8 (3.3) | 1 (1.7) |
| Diabetic retinopathy | 5 (2.1) | - |
| Aphakia | 4 (1.7) | 2 (3.4) |
| Pterygium | 3 (1.3) | 1 (1.7) |
| Macular degeneration | 3 (1.3) | - |
| Cone dystrophy | 2 (0.8) | - |

*Multiple responses were allowed

**Table 3.** Prevalence of visual impairment among respondents based on location

| **Test variable** | **Location** | **Urban** | **df** | **($X^2$)** | **P –value** |
|---|---|---|---|---|---|
| **Level of vision loss** | **Rural** | | | | |
| Moderate LV | 53(48.4) | 74 | | | |
| Severe LV | 27(20.9) | 28 | 3 | 0.986 | 0.805 |
| Profound LV | 14(12.2) | 18 | | | |
| Near total blind | 10(9.5) | 15 | | | |

Critical value: 7.815

**Table 4.** Association between Prevalence of Visual Impairment and Select Socio-demographic Characteristics of Respondents

| Test variable | Moderate | Level of vision Severe | Profound | NTB | df | ($X^2$) | P –value |
|---|---|---|---|---|---|---|---|
| **Age** | | | | | | | |
| 5-14 | 1(1.1) | 1(0.5) | 0(0.3) | 0(0.2) | | | |
| 15-24 | 6(6.4) | 4(2.8) | 2(1.6) | 0(1.3) | | | |
| 25-34 | 10(6.9) | 1(3.0) | 2(1.7) | 0(1.4) | | | |
| 35-44 | 16(13.8) | 6(5.9) | 1(3.5) | 3(2.7) | | | |
| 45-54 | 32(35.1) | 16(15.2) | 7(8.8) | 11(6.9) | 24 | 22.914 | 0.525 |
| 55-64 | 39(41.4) | 20(17.9) | 12(10.4) | 7(8.2) | | | |
| 65-74 | 14(13.8) | 5(5.9) | 5(3.5) | 2(2.7) | | | |
| 75-84 | 8(6.9) | 2(3.0) | 1(1.7) | 2(1.4) | | | |
| 85-94 | 1(1.6) | 0(0.7) | 2(0.4) | 0(0.3) | | | |
| **Sex** | | | | | | | |
| Male | 78(71.8) | 31(31.1) | 16(18.1) | 10(14.1) | 3 | 4.569 | 0.206 |
| Female | 49(55.3) | 24(23.9) | 16(13.9) | 15(10.9) | | | |
| **Occupation** | | | | | | | |
| Business | 51(50.5) | 22(21.9) | 11(12.7) | 11(9.9) | | | |
| Civil service | 60(54.2) | 22(23.5) | 14(13.7) | 6(10.7) | 9 | 14.389 | 0.109 |
| Farming | 7(13.8) | 7(6.0) | 5(3.5) | 7(2.7) | | | |
| Student | 9(8.5) | 4(3.7) | 2(2.2) | 1(1.7) | | | |

Critical values for age, sex, and occupation: 36.415, 7.815, 16.919, respectively

## Discussion

This study showed more males with vision impairment than females in a ratio of 1.30:1. Nevertheless, with a total of 839 screened males compared to 634 females, the relative proportion of males with vision impairment is 16.0%. Females had a higher prevalence of vision impairment with 16.4%. Most of the respondents were aged 45 to 64 years (60.2%), with the mean age of the study population being 53.25±14.28 years. Most ocular morbidities which lead to vision impairment set in and progress in this age bracket [6]. Similar findings have been reported in some studies [7, 8, 17]. There are more persons with vision impairments in this study who live in urban areas (56.5%) compared to the 43.5% that live in rural areas. This must have been because a greater number of those screened in the outreaches across the 5 states were residents in urban areas (932) compared to rural areas (541). This is also reflected in the occupation of our study population, with civil servants accounting for the highest percentage (42.7%), followed by those in business (39.7%). Farmers often reported as being more in rural areas of South-East Nigeria were 10.9%, while students were 6.7%.

According to the WHO [3] classification of low vision and blindness and the presenting visual acuity in the better eye of the respondents, the prevalence of vision impairment in this study was 16.2% as 239 persons out of the 1473 persons screened had visual acuity of at least worse than 6/18 in the better eye. The prevalence of moderate and severe vision impairment was 8.6% and 3.7%, respectively. This is like findings from The National Blindness Survey, which reported 13.12% and 2.05% prevalence of moderate and severe visual impairment respectively, in the South-East Zone for ages 40 years and above [9]. Also comparable are the findings of [7] in

Imo state with a prevalence of 24.4% and 2.4% for moderately and severely visually impaired individuals. The perceived differences in the findings may result from a broader age range compared to that of The National Blindness Survey and a broader range of states compared to the work of [7] in Imo state.

Meanwhile, the findings of this study corroborate the very high prevalence of severe vision impairment relative to other geopolitical zones of Nigeria as obtainable in the data from The National Blindness Survey, which showed a prevalence of 1.8% and 1.7% in the South-South and North-Central zones respectively, with other zones showing even lower prevalence [10, 16, 19].

According to the WHO [3] definition of blindness, there was a 3.9% prevalence of blindness in this study (comprising profound VI and near-total blindness). This is very similar to the blindness noted as 4.63% in adults 40 years and above in SE Nigeria from the National Blindness Survey report [10]. Data from the report also showed that the prevalence of blindness in the South-East was only better than that of the Northeast and Northwest zones. The prevalence of blindness in this study supports that stance. A community-based study in Imo State and a hospital-based study in Benin reported a slightly higher prevalence of 6.4% and 7.5%, respectively [7]. The high value reported in the hospital-based study in Benin is not surprising as patients with reduced vision are more likely to present to the clinic. The lower value in Anambra State also in South-East Nigeria may be attributed to the fact that the study was limited to only one local Government Area, unlike the present study. In addition, the Anambra State study was done over 20 years ago.

Seeing that moderate vision impairment represents more than half of the entire population with VI in this study (53.1%), there is a chance that the burden of VI can be largely tackled. Lorenzini and Wittich [11] had highlighted visual acuity as a possible factor that affects the use of low vision aids, with individuals with worse visual acuity less likely to find low vision devices useful. While this may be debatable when considering how statistically significant this could be, it is only logical to expect an individual with visual acuity of 6/60 and better to find low vision devices more helpful. With better awareness and availability of low vision services in the South-East region, we stand a great chance at increasing the number of an effective workforce of the society that may have been depleted by vision loss.

Cataracts (32.6%) and glaucoma (22.2%) were the most common causes of vision impairment in this study. They were also the highest cause of blindness in the study. In a similar outreach-based study in Imo State, cataract was found to be the major cause of all classes of vision impairment [7]. A cataract is still the leading cause of blindness in middle and low-income countries [5, 20, 21], Nigeria inclusive. Adamu and Muhammad [12] identified glaucoma and retinitis pigmentosa as the major causes of low vision in Sokoto state. Similarly, glaucoma, cataract and retinal dystrophies were reported as the major causes in Calabar [13]. While they are quite like the findings of this study, cataracts- not being the major cause, may be linked to the fact that both studies were hospital-based, where the cataract is extracted and its input to the burden of low vision greatly reduced. With cataracts- a reversible cause of blindness, contributing largely to the causes of vision impairment, we have a great chance at reducing the burden of vision impairment by implementing the right strategies in vision intervention in communities. In contrast, age-related macular degeneration is the leading cause of vision impairment in high-income countries [14, 18, 20].

There was no statistically significant relationship between age, sex and occupation of individuals and level of vision impairment with P values of 0.52, 0.21 and 0.11, respectively. Similarly, in the work of [7], the gender and

occupation of the respondents were also not positively associated with visual impairment and blindness at P=0.12 and P=0.16, respectively. Meanwhile, it is known that age is one of the risk factors for many eye diseases, especially cataracts, glaucoma, and some retinal degenerations [15]. Also, the National Blindness survey in Nigeria [10] revealed a positive relationship between females and blindness. The ratio of screened urban residents to rural residents was 1.72:1. This led to more persons with vision impairment in urban than rural areas. With P=0.81, living in a rural area was not significantly associated with a higher degree of visual impairment and blindness than living in an urban area. This is different from the findings of [7] where dwelling in rural areas was positively related to vision impairment and blindness.

## Conclusion

Based on the findings of analyzed data, the following conclusions were drawn; a 16.2% prevalence of visual impairment was recorded with moderate Vision Impairment (VI) being the most occurring (53.1%) among the classes of vision impairment. Cataracts (32.6%) and glaucoma (22.2%) were the most identified causes of visual impairment in the study area. The level of vision loss is not dependent on the Age, Sex or Occupation of individuals. The degree of vision impairment is not defined by where an individual resides, whether rural or urban.

## Conflict of Interest

The authors declare no conflict of interest.

## Authors' Contribution

Dr Ndukuba conceptualized the work, wrote the manuscript and as well as the majority of the writing. Mr Azubuike analyzed the data and contributed to the conceptualization, writing, and editing.

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# The Effect of Cultural Beliefs on Effective Utilization of Immunization on Childhood Killer Diseases in Kuje

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***Abstract***

*This article evaluates the effect of cultural beliefs on the effective utilization of immunization on childhood killer diseases among parents living in some remote areas in Kuje Area Council in FCT. Relevant cultural factors hindering effective utilization of immunization were discovered; likewise, Universal immunization of children against six preventable diseases (tuberculosis, diphtheria, pertussis, tetanus, polio, and measles) is crucial to diminish childhood mortality and morbidity across the world. Improving access to and utilization of routine immunization services are the best option for the prevention and control of vaccine-preventable diseases (VPD). The expanded program on immunization (EPI) was launched in 1994 as a global program for controlling and reducing death from vaccine-preventable diseases. A recent report from the world health organisation (WHO) revealed that the number of children under one year of age who did not receive the diphtheria-tetanus-pertussis vaccine (DTP3) worldwide was estimated to be 21.8 million in 2013 compared to 22.8 million in 2012. Three hundred and eighty-four (384) questionnaires were administered to parents using the house to house strategy in the Kuje community. Of those surveyed, (30.2%) had basic education, and the level of illiteracy could have contributed greatly to noncompliance. (80.2%) believed that only immunization can protect children against childhood killer diseases, while (19.8%) disagreed. (32.0%) believed that immunization could lead to HIV infection, (30.5%) of the respondents assumed that immunization causes a child to be sterile and (20.6%) agreed that immunization is forbidden by God, while (16.9%) believed that it causes some mental, spiritual, and physical deformity in children.*

***Keywords:*** *Childhood killer diseases, Expanded program on immunization (EPI), HIV Infection, Immunization, Kuje Community, Six preventable diseases (Tuberculosis, diphtheria, pertussis, tetanus, polio, and measles), Vaccine-preventable diseases (VPD).*

## Introduction

Immunization refers to the method or the techniques of controlling and eliminating life-threatening infectious diseases and is estimated to avert between 2 and 3 million deaths each year across the globe and Nigeria inclusive. It is also one of the most cost-effective health investments, with proven strategies that make it accessible to even the most hard-to-reach and vulnerable populations. It has clearly defined target groups; it can be delivered effectively through outreach activities, and vaccination does not require any major lifestyle change [1].

### Purpose of the Study

1. To examine the roles of parents in the success of the effective utilization of immunization.
2. To promote awareness and the importance of Immunization.
3. To identify vaccine-preventable diseases and ways of prevention.

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## Problem to be Solved

1. It is established that vaccine-preventable diseases are the major causes of childhood mortality, having been recognized due to the high infant mortality rate in various parts of the world. Certain parts have recorded child mortality rates as 157 deaths per 1000 live births whereby vaccine-preventable diseases are of the major causes of such [2] Childhood killer diseases damage the body system which eventually lead to the deformity of some parts of the body or may, as a result, lead to death in most cases under one year old. It has been reported that infectious diseases are the world's leading cause of death, for instance, smallpox, which erupted in the past without warning, killing many people each year and leaving others disabled and blind today [3].
2. Tuberculosis (TB) is caused by the bacterium Mycobacterium tuberculosis, which usually attacks the lungs but can also affect other parts of the body, including the bones, joints, and brain.
3. Diphtheria a bacterial infection caused by Corynebacterium diphtheria, transmitted from person to person through close physical and respiratory contact, can cause infection of the nasopharynx, which may lead to breathing difficulties and death.
4. Yellow fever caused by the Yellow Fever virus, is endemic in 33 countries in Africa and 11 countries in South America can be transmitted by mosquitoes that feed on infected animals in forests; infection is passed when the same mosquitoes feed on humans travelling through the forest. The greatest risk of an epidemic occurs when infected humans return to urban areas and are fed on by the domestic vector mosquito Aedus aegypti, which then transmits the virus to other humans.
5. Hepatitis B is caused by a virus that affects the liver. Adults who get hepatitis B usually recover. However, most infants infected at birth become chronic carriers i.e., they carry the virus for many years and can spread the infection to others. The virus is carried in the blood and other body fluids. It is usually spread by contact with blood.
6. Measles is a highly contagious vaccine-preventable disease caused by the Measles virus, a member of the genus Morbillivirus in the family paramyxoviridae. It is spread by droplets or direct contact with nasal or throat secretions of infected persons; less commonly by airborne spread or by articles freshly soiled with secretions of the nose and throat. Measles is one of the most readily transmitted communicable diseases and probably the best known and most deadly of all childhood rash/fever illnesses.
7. Meningococcal Meningitis is an infection of the brain and spinal cord caused by the bacterium Neisseria meningitidis (the meningococcus). The disease is divided into several types: Types A, B, C, Y and W135 cause most cases of meningoccal meningitis. More recently, types Y and W135 are gaining importance. Transmission of bacteria is from person to person through airborne droplets from the nose and throat of infected people.
8. Tetanus is acquired through exposure to the spores of the bacterium Clostridium tetani which are universally present in the soil. The disease is caused by the action of a potent neurotoxin produced during the growth of the bacteria in dead tissues, e.g., in dirty wounds or in the umblicus following non-sterile delivery. People of all ages can get tetanus. But the disease is particularly common and serious in new-born babies. This is called neonatal tetanus. Most infants who get the disease die. Neonatal tetanus is particularly common in rural areas where most deliveries are at home without adequate sterile procedures.
9. Pertussis, or whooping cough, is a disease of the respiratory tract caused by bacteria that live in the mouth, nose, and throat. Many children who contact pertussis have

coughing spells that last for four to eight weeks. The disease is most dangerous in infants. Pertussis spreads very easily from child to child in droplets produced by coughing or sneezing.

10. Tetanus is acquired through exposure to the spores of the bacterium Clostridium tetani which are universally present in the soil. The disease is caused by the action of a potent neurotoxin produced during the growth of the bacteria in dead tissues, e.g., in dirty wounds or in the umbilicus following non-sterile delivery. Tetanus is not transmitted from person to person. A person usually becomes infected with tetanus when dirt enters a wound or is cut. Tetanus germs are likely to grow in deep puncture wounds caused by dirty nails, knives, tools, wood splinters, and animal bites.
11. Poliomyelitis, or polio, is a crippling disease caused by any one of these three related viruses, poliovirus types 1, 2 or 3. The only way to spread poliovirus is through the faecal/oral route. The virus enters the body through the mouth when people eat food or drink water that is contaminated with faeces. The virus then multiplies in the intestine, enters the bloodstream, and may invade certain types of nerve cells, which it can damage or destroy. Polioviruses spread very easily in areas with poor hygiene.

## Existing solutions

Immunization stimulates the body's immune system which then produces substances (antibodies) which attack or fight any foreign substances introduced to the body. It prepares the immune system to wade off diseases by weakening or killing them [4]. The good news is that there are available vaccines for these diseases which are readily available and administered free to all eligible children at virtually no cost to their parents. This has contributed to the highly avoidable mortality rate being recorded [4].

1. Immunization of infants with Bacilli Calmette-Guerin vaccine (BCG) can protect against TB meningitis and other severe forms of TB in children less than five years old. BCG vaccine is administered at birth is not recommended after 12 months of age because the protection provided is variable and less certain.
2. Diptheria on the other hand, can be treated when administered with toxoids as DPT, DT or Td - at least three primary doses given by the intramuscular route. Recombinant DNA or plasma-derived hepatitis B vaccine - three doses are given by the intramuscular route into the upper thigh of infant and deltoid muscle of adult. Live attenuated viral measles vaccine - one dose given by the intramuscular or subcutaneous route, with the opportunity for a second dose at least one month after the first dose. Purified bacterial capsular polysaccharide (AC, AC/W135, Y) - one dose or purified bacterial capsular polysaccharide conjugated to a protein (only serogroup C available) [5].
3. Toxoid as DPT, DT, TT or Td - at least three primary doses given by the intramuscular route. Inactivated whole cell or acellular - at least 3 primary doses, given by the intramuscular route, combined with diphtheria and tetanus toxoid.
4. Life oral polio vaccine (OPV) - four doses in endemic countries or Inactivated polio vaccine (IPV) given by injection - two-three doses. Toxoid as DTP, DT, TT or Td - at least three primary doses given by the intramuscular route. Life viral yellow fever vaccine - one dose of 0.5 ml subcutaneously [4].

## Effective Utilization of Immunization

For a child to utilize immunization effectively, he/she has to visit the health centre minimum of six (6) times from birth till the child reaches the age one. Subsequent vaccination continues up to age 59 months (5years), any child that takes immunization for lesser times is

said to be under immunized and the child can be prone to childhood killer diseases because his/her immune system has not being built to the required standard to fight any infection or diseases that child may likely be exposed to in life [6].

## Limitations

Early childhood killer diseases are one of the greatest challenges in this part of our world, of which one of the major causes are vaccine-preventable diseases. This in decades, has led to infant mortality and deformity. A child not immunized against any of the childhood killer disease is very likely to face either of these before the age of five or later in life which may result to terminal diseases, which is a great concern to the world. Efforts have been put in place to ensure the reduction to its barest minimum by ensuring that all children from birth to age one (0-12mounths) have at least utilized effective immunization, which will protect them from the early childhood killer diseases in our Society.

The research is confirmed on parents' cultural beliefs on effective utilization of immunization on childhood killer diseases in some selected households and persons in Kuje Area Council in FCT. The write up is based on facts, data, and materials gathered from questionnaires. The limitations were also seen as finance, illiteracy of some households, time, and lack of existing literature. However, the poor attitude of respondents was one of the contributing factors.

## Achievements

Having known that vaccine preventable diseases can prevent childhood killer diseases, efforts were thereby gingered towards ensuring that every child from 0-59 months (under five) are immunized against all these diseases by vaccinating them with some specific volume of antigens as they develop along the line before reaching the age five. Most of these vaccines protect the children for life against the diseases and some need to be administered again in life as boosters to keep them protected throughout their lifetime [7].

Many decades ago, infectious diseases were the world's leading cause of death, for instance, smallpox would erupt without warning, killing many people each year and leaving others disabled and blind. Today, immunization is a global health success story that has contributed immensely to the eradication of smallpox which was declared on May 8, 1980. It has saved millions of lives and enabled others to live longer, healthy lives [4].

The closing years of the 19th century and early years of the 20th century were marked by the achievement of great vaccine scientists such as Pasteur. Since the introduction of the vaccine by Jenner 200 years ago, nine major diseases of man have been controlled to a greater or lesser extent through the use of vaccines. However, attempt to use the vaccine dated as far back as 600 BC in China, when Smallpox materials were introduced into the nostrils [1].

The International World leaders came together at the United Nations in September 2000 to create a blueprint for global development with a target date of 2015, producing eight Millennium Development Goals (MDGs). These goals range from halving extreme poverty to providing universal education. According to UNICEF, in order to reach the 2015 goal, the number of child deaths must be cut in half - to less than 13,000 child deaths per day and fewer than five million per year. Additionally, the majority of the efforts will have to be focused upon the poorest, most isolated and marginalized communities in order to make an impact. UNICEF underscored the fact that "business as usual will be grossly insufficient to meet the health-related Millennium Development Goals for Children. The World Health Organization (WHO) recommends that the first polio vaccine be given at birth, along with the vaccine for childhood tuberculosis; Bacillus Calmette Guerin (BCG). In countries where transmission of hepatitis B from mother to child is common, these infants

should be immunized against the disease at birth [8].

The remaining doses of polio vaccine and the combination diphtheria, pertussis, and Tetanus Vaccine (DPT) should be given three times before the age of one: at six weeks, 10 weeks, and 14 weeks. Due to inherited immunity, measles vaccines are typically given at nine months. Yellow fever is also given at this time for children in high-risk regions [9].

During the 1720s, Diphtheria and Tetanus Toxoids, whole-cell Pertussis Vaccines and BCG were introduced, and a yellow fever vaccine was available by the year 1935. This has been in place for the prevention of yellow fever in children. Once a child is immunized with the vaccine, the child is said to be prevented for a live period. The booster can be repeated later in life to further fortify the existing one in the system [10].

## Methods

### Method Of Data Analysis

Statistical Package for the Social Sciences *(SPSS)* was employed for data analysis. This is because the package has the benefits of reproducibility, simplifying repetitive tasks, and handling complex data manipulations and analyses. In SPSS, descriptive statistical tools such as simple percentages and frequency distribution and other relevant tools were used for the analysis and presentation. In addition, a non-parametric tool, the chi-square method, was also employed for the testing of hypotheses statements.

### Research Design

A cross-sectional survey study was conducted. The choice of this design was informed by the fact that it gave the researcher the opportunity to further investigate into the incidence of cultural beliefs, which may, in turn, affect the effective utilization of immunization in Nigeria with Kuje as a case study as well as contributing factors, the effects that this trend is likely to have on the nation's healthcare delivery and responses of mothers and caregivers. Quantitative data were collected through Questionnaires, Individual interviews and focus group interviews were conducted to obtain qualitative data.

### Study Population

The research setting of this study is the kuje Area council in FCT. Kuje is one of the area councils in FCT; it is approximately Twenty-Eight kilometres away from Abuja, the Federal Capital City. It is viewed as one of the high-risk areas of Poliomyelitis, where several cases have been discovered over the years. The area council has a total number of ten (10) political wards with a total population of 9,438 persons, this population was obtained from the National population commission, and the sample size was drawn from this population.

### Sampling Method and Size

The stratified random sampling was used to get the respondents to generate the data needed for the study. This choice was made because of its propensity to represent not only the overall population but also key subgroups of the study population. It was ensured that children within the study population had an equal probability of being included in the survey. From the total population of within 18-50 years of age within the area council (Kuje), which amounts to 4,719 persons, 10% of the population as the sample size for the study which amounted to 472. (4,719 x 10/100) representatives. The sample size for the vital population for the wards was 472 of parents of under year children.

### Research Tools

In-depth interviews, as well as questionnaires were used to collect both quantitative and qualitative data for the study. Before the fieldwork was embarked upon, the questionnaire for the study was designed to ensure that it can provide an answer to all the research questions and the hypothesis in the study. The questionnaire was then reviewed by experts for clarity before use.

## Method of Data Collection

Two basic sources of data collection were used to get the data needed. These are the primary data and the secondary data.

## The Primary Data

The primary data for this study was gathered through the use of both questionnaire and face to face interviews with respondents from the sample size. The prepared questionnaire was administered after the explanation of the aim of the study has been given to each respondent with the assurance that the research was confidential, and that any information disclosed could not be used against them in any way. The Questionnaire contains a list of questions that sought to get the opinions of the respondents on the effect of Cultural beliefs in the effective utilization of immunization in childhood killer diseases from the population studied. Qualitative data was collected through in-depth interviews, with audiotape recording with permission. Most of the individual interviews were conducted at the participant's homes and settlements around the sample area.

For the quantitative data, the researcher used House to house strategy to obtain information from a selected sample of 472 parents of childbearing age group and caregivers through the questionnaire administration. Four hundred and seventy-Two (472) copies of Questionnaires were distributed, and three hundred and eighty-four (384) Questionnaires were retrieved.

## The Secondary Data

The other source from which the data used by the researcher was obtained was through the review of related literature from books authored by various writers, journals, magazines, newspapers, and Web Pages. These were obtained through different libraries and the Internet.

## Reliability And Validity of Research Instrument

In this study, the method of triangulation was used to validate the reliability of the data obtained; this was tested using multiple techniques such as observation, interviews, and Questionnaires to compare the responses of the respondents. Also, a pilot study was conducted to pre-test the study schedule, which was subsequently validated in the process.

## Results

This result focused on the Effect of Cultural Beliefs on the Effective Utilization of Immunization on Childhood killer Diseases, using Kuje as a case study. A total number of 472 Respondents were interviewed using a structured questionnaire considering the target group who have little or no basic education through direct interviews and some of the questionnaires were distributed to the respondents to fill. Data collection lasted for 4 weeks; random sampling was done in order to obtain information about their opinions on immunization.

In summary, 472 questionnaires were administered, 384 were retrieved, and analysis was based on these 384 respondents using the SPSS software package. Analysis was done and represented in tables and charts for clarifications, and the statement of hypotheses were tested using chi-square.

## Analysis and Findings

### Socio-Demographic Characteristic of the Sample

**Table 1.** The Demographic Characteristics of the Respondents

| Age | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|
| Valid 18-20 | 4.7 | 4.7 | **4.7** |
| 21-25 | 13.3 | 13.3 | **18.0** |
| 26-30 | 27.1 | 27.1 | **45.1** |
| 31-35 | 29.9 | 29.9 | **75.0** |
| 36-40 | 15.6 | 15.6 | **90.0** |
| 41and above | 9.4 | 9.4 | **100** |
| Total | 100 | 100 | **-** |

From Table 1, distributions of the socio-demographic characteristic of the various components shows that (4.7%) are of 18-20 years of age, (13.3%) were between 21-25 years, (27.1%) were 26-30years. Also (29.9%) represents 31-33 years of the respondents, which is the highest of the respondents, (15.6%) is 36-40 years, and finally, the last group of the respondents was of age 41 and above (9.4%) which is the least of the respondent's age group.

**Table 2.** No of Children Completely Immunized?

| | | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| **Valid** | None | 21.4 | 21.4 | 21.4 |
| | All | 14.6 | 14.6 | 35.9 |
| | 3 | 21.4 | 21.4 | 57.3 |
| | 4 | 35.7 | 35.7 | 93.0 |
| | 5 | 7.0 | 7.0 | 100 |
| | **Total** | 100 | 100 | |

In Table 2, it was observed that (21.4%) of none of the respondents' children completed their immunization, only (14.6%) said they completed their children's immunization. Some respondents (21.4%) took 3 of their children for immunization, (35.7%) took 4, while (7.0%) took 5 of their children for immunization.

**Table 3.** Does your Child (ren) have a Certificate Received at the Completion of Immunization?

| Does your child (ren) have a certificate received at the completion of immunization? | | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| **Valid** | Yes | 6.2 | 6.2 | 6.2 |
| | No | 93.8 | 93.8 | 100 |
| | Total | 100 | 100 | |

Normally a child that has effectively utilized immunization receives a certificate from the health facility that was concluded.

From this study, it was observed that not all that are aware of immunization and begin same complete it before the child reaches an age (one)1. Some dropped out along the line, which

may invariably mean that people at the grass-root hardly utilize immunization services. Findings from this study show that 93.8% do not have a certificate of completion for their children's immunization, while others had.

## Discussion

This research has been able to achieve its set objectives, the first of which was to identify the roles of parents in the success of the effective utilization of immunization, Most importantly, this study will enhance Government organizations dealing with Health, Agencies, NGOs, and other related Parastatals to be informed on how cultural beliefs in some part of the country still serve as one of the factors that hinder Effective Utilization of Immunization in the reduction of Child Mortality. This will in turn promote awareness and the importance of Immunization from the analysis, it was observed that there is a great awareness of immunization among parents (92.4%), only (7.6%) said they have not heard of immunization before. It was also observed that (85.7%) of the respondents take their children for immunization while (14.3%) do not. Also, in the findings (69%) take their children for immunization in the health facility while 16.4% still said they immunize their children in the house when the house-to-house teams for Immunization Plus Days (IPDs) come around for campaigns. In the analysis, it was discovered that only (6.7%) of the parents who responded stated that their children have a certificate of completeness of immunization.

In the findings, it was generally observed that not all the people were aware of immunization effectively utilizes it for their children, some take their children for immunization in the facilities and do not go back to complete all the antigens that is required for children to be fully immunized.

Based on the reactions to this question, the study sought respondent's beliefs on unimmunized children if they are protected against childhood killer diseases or not.

(67.2%) the belief that unimmunized child is not protected and can be infected by childhood killer diseases, (19.0%) belief otherwise, and 13% do not know if they are protected or not, likewise (7.3%) do not agree unimmunized child cannot die or be incapacitated.

Finally, (59.1%) indicated a lack of the knowledge of the importance of immunization as a barrier to effective utilization of immunization. They then believed that the creation of awareness to every nook and crannies of this country, most especially the northern and the middle belt states of Nigeria, would be of great impact to effective utilization of immunization thus protecting numerous Children from childhood killer diseases.

## Conclusion

Vaccine-Preventable Disease is one of the diseases that can be prevented in Nigeria if an only parents can oblige to play their roles in ensuring that the children be immunized effectively as at when due, this will go a long way in preventing and completely eradicating the childhood killer disease in children in Nigeria as a whole.

This research was carried out to enlighten environmentalists, public health officers and other scientists on how to go about cancelling parent that comes their way. This message should be passed to parents at the grass root to be aware of and effectiveness of immunization, mostly parent in the north and at the middle belt.

### Based on the Finding of this Research, the Following are Recommendations Made

It is recommended that parents should be enlightened towards Effective Utilization of immunization of their children irrespective of their status, educational level, religion, their daily of monthly income. It is the primary responsibility of every parent to ensure that their children/wards are fully immunized for them to be protected against childhood killer diseases.

This research proved to some extent that some parent still belief that their children are not

protected with the vaccine, they believe that diseases comes from God and sin, and some percentage of the parents belief that immunization leads to HIV infection of their children, some indicated that it causes sterility in future for their children, and it is forbidden by God, finally some indicated that it causes mental, spiritual and physical deformity. Government should ensure that parent is educated and sensitized on the importance immunization service in this area and how it can reduce the number of incapacitated people in Nigeria due to Vaccine Preventable Diseases.

Government should ensure that more Health Facilities are created in rural areas that offer Immunization services to encourage parent to take their children for Immunization.

Finally, it is recommended that Government should put a policy in place which will ensure every parent to be forced to take their children for Immunization services irrespective of their Religion, Ethnic group, Culture and Educational status, and the services should be cost-effective.

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## Conflict of Interest

None declared.

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# Higher Readability Levels and Suboptimal Design of Medicine Information Leaflets in Artemisinin-based Combination Therapy Antimalarial Packages: A Consequence for Over-the-Counter-Medicines Use

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***Abstract***

*The study aimed to determine the readability level and assess the design layout of medicine information leaflets in packages of Artemisinin-based Combination (ACT) antimalarials used as over-the-counter medicines in Nigeria where malaria is endemic with higher adverse events in under-five children and pregnant women. A cross-sectional study design was adopted to evaluate thirty-two medicine information leaflets of ACTs obtained from community pharmacies. Texts in selected passages of the leaflets were subjected to the Flesch-Kincaid (F-K) formula to determine the F-K score and the corresponding reading-grade level. The Baker Able Leaflet Design (BALD) assessment tool was employed to assess the medicine information leaflets design layout. The mean Flesch-Kincaid score for the MILs was 14.22 ±5.06. A proportion of 15.63% of the MILs were readable at the postgraduate level, 28.13% at the undergraduate level, 37.5% at the senior secondary school level and 18.76% at the junior secondary school level. This represented the total proportion of leaflets readable at the junior secondary school level which is the average level of education in Nigeria. On the BALD tool, 46.28% of the MILs were rated 'above standard' and 53.72% were 'poor' in design. The dimension of the longest MIL was 80cm by 36cm. A large proportion of the MILs were written above the reading level of average Nigerians and were poorly designed. Most Nigerians are not likely to be able to read these leaflets for reference purposes and to serve as reminder for instructions obtained during medication counselling.*

***Keywords:*** *Medicine information leaflets, Readability, Average level of education, Artemisinin-Combination Therapy antimalarials, Leaflet design layout.*

## Introduction

Information from a professional class using the associated technical language can often be misconstrued or incomprehensible by readers with low and intermediate literacy skills and by those with little expertise on the subject [1]. Medicine information leaflets (MILs) in packages of medicines supplement and reinforce the information received from prescribers and dispensers [2, 3]. They convey information about risks and benefits of individual medicines maximising the medicine's effectiveness and reducing risk of adverse reactions [4]. The literacy level and the average level of education of persons to which the leaflets are targeted is important in guiding the language and design of the leaflets so that the information is readable to most of them for effective delivery of the intended messages [5-8].

Readability is defined as the level of ease or difficulty with which text material can be understood by a particular reader who is reading that text for a specific purpose, and it is concerned with the problem of matching between text and reader [9]. Also, readability is

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concerned with document design where design elements such as type size, line spacing, margins, contrast and colour, and illustrations or graphics are the visual and structural elements of a text that function to enhance and interact to affect the readability of a text [10, 11]. Although the speed of reading is a factor for readability, however, it can be argued that transmitting meaning and keeping the reader engaged till the end of a text are the more relevant features. The style of writing being a high correlate of textual difficulty, information design is pertinent for maintaining readers' interest and promoting understanding of the text [12].

Several texts and authors prescribe the appropriate features of textual characters for documents, labels and package leaflet of consumer goods and pharmaceuticals [13-15]. As opined by Raynor and Dickinson [15], medicine information leaflets should be designed such that headings stand out, typeface are as large as possible, with ample white space, bullets used for lists, statements are conversational with the active voice used, text is non-justified and bold lower case used for emphasis. These text design characteristics make the text more visible, attractive, and easy for readers to find particular information [16-18].

This research presents a novel assessment of medicine information leaflets of antimalarials of the artemisinin-based combination therapies usually supplied as over-the-counter medicines in most malaria-endemic countries including sub-Saharan Africa. Inappropriate readability levels have been globally recognized in texts of materials placed in the public purview [11, 19-21]. The ease of comprehension of the information in medicine information leaflets and the design is important to guarantee that intended benefits are achieved and unnecessary risks in medicines use are avoided. Establishing the reading grade level of texts is usually conducted in advanced countries with the aim of redesigning the text material for easier comprehension of the larger percentage of the society [22].

According to the UNESCO Institute of Statistics, Nigeria's literacy rate was 62% in 2018 [23, 24]. The universal basic education structure consists of nine years of schooling comprising six years primary school education and three years junior secondary school education [25, 26]. Therefore, reading texts put in the Nigeria public domain should not be above the 9$^{th}$ grade readability level. This is pertinent for medicines like the WHO-recommended artemisinin-combination therapies (ACTs) for the treatment of malaria which are available over the counter for the treatment of malaria and are one of the medicines used in self-medication [27]. According to the World Health Organisation [28], the mode of communication of information provided for medicines is key to responsible self-medication.

**Readability Formulas**

A readability formula is a simple method to predict the score and reading grade level required to comprehend written materials and documents. Studies on developing readability rating of English Language texts have been around since the 1920's but was given popularity by Flesch [29], Dale-Chall, and Gunning in the 1940's in their publications on readability formulas [16] stimulating new consumer demands for documents in plain language. The readability test formulas are based on the combination of the number of words per sentence and word length [30,31]. As further noted by Adepu and Swamy [7], readability tests are predictors of the reading difficulty or reading ease of a text. The Flesh-Kincaid formula involves three main variables which are the number of words, number of sentences and the number of syllables in a given passage.

### The Baker Able Leaflet Design Tool

The Baker Able Leaflet Design (BALD) tool is a summary of the features considered necessary to enhance readability and attractiveness of medicine information leaflets. The tool enumerates text characteristics such as number of colours used, font size of the typeface, use of pictures, tables and italics, the length of the lines and the separation between the lines. Other characteristic features of the leaflet design assessed on the tool are use of Arabic numerals, the percentage of white space and the paper quality. These characteristics are expected to be seen in a leaflet that is of good layout and design [32]. The tool assesses the layout and design of the leaflets using scores allotted to each of the enumerated features on the tool and summing up to yield the BALD score. A leaflet with a BALD score of 25 or more is considered to be of good layout and design [33].

The font size proposed on the BALD tool agrees with other authors' estimates of the acceptable font size which is that the text should be of sufficiently large type not more than 12 and not less than 10 to facilitate readability [34]. The assessment of the number of colours and use of distinctive text sizes reflects the importance of these features which aids navigation and usability of the text [35]. A clear listing of adverse effects, for example, distinguishable with a different colour or bold texts improves the ease of understanding of the message especially when the heading is in lower cases of letters. According to the European Commission Guideline [13] on the readability of the labelling and package leaflet of medicinal products for human use, letters in their lower cases give shape to words, make them easier to recognise and read better than capital letters.

The European Commission Guideline [13] prescribes that the space between one line and the next should be at least 1.5 times the space between words on a line, where practical as it is an important factor influencing the clarity of the text. The guideline also considered factors like paper weight, colour of the paper, size and weight of the type, colour of the type and the paper itself which are elements included in the BALD tool for assessment of leaflet design.

This study evaluated the readability of the artemisinin-based combination therapies used commonly for the treatment of malaria in Nigeria.

## Materials and Methods Materials

All the thirty-two MILs of diferent brands of ACTs were collected as publicly available secondary data during the course of four months assigned for collection. They were obtained directly from pharmacies in Oshogbo, Ibadan, Lagos and Ile-Ife and by post from pharmacists based on solicitation on a pharmacists' only WhatsApp group platform. They assisted in collecting and sending the leaflets from their shops across the country (Benin-City, Enugu, Ilorin, Jos and Okene).

An evaluation guide was developed to assess the MILs of the 32 ACTs collected. The first section explored independent variables about the leaflets such as the name, strength, whether it was an imported product or locally manufactured, the type of formulation (adult, paediatric or both) and the presentation of the formulation (as a suspension or as tablets). Another section calculated the readability grade level of the leaflet using the Flesch-Kincaid formula. The last section enumerated the 16-item BALD table and the scores for each item was summarized for each MIL.

## Methods

The study was a cross-sectional descriptive evaluation of medicine information leaflets of ACT antimalarials used in Nigeria. The Flesch-Kincaid formula was used to calculate the reading age score of the leaflets and the Baker Able Leaflet Design tool was used to assess the design of the medicine information leaflets.

## Calculation of the Readability Level of MILs using the Flesch-Kincaid Score

A section of the message of the leaflet that contained about 100 words was selected for calculation of the Flesch-Kincaid Score for each MIL. The layout of the information from one MIL to another is different therefore, passage selected was not dependent on the information type but rather, on the selection was based on any portion of the MIL which contains a rough estimate of 100 words in it. This does not pose any bias to the process since the style of writing is known to be consistent for writers so any passage used is expected to reflect the unique style of writing of each MIL. The number of words, number of sentences and the number of syllables in the selected section were each counted and imputed into the Flesch-Kincaid Readability formula.

Flesch-Kincaid readability formula

$$= 0.39(\text{ASL}) + 11.8(\text{ASW}) - 15.59$$

ASL=Average sentence length

$$= \frac{\text{Total number of words in a passage}}{\text{Total number of sentences}}$$

$$\text{ASW} = \text{Average syllable per word}$$

$$= \frac{\text{Total number of words in a passage}}{\text{Total number of sentences}}$$

The variables are used to compute the average sentence length (ASL) by dividing the total number of words in a passage by the total number of sentences; and the average syllable per word, calculated by dividing the number of syllables by the number of words in the passage.

The score obtained is equivalent to the reading level for the leaflet. Each leaflet was subjected to the Flesch Kincaid readability formular and the score recorded.

## BALD Evaluation of the MILs

Evaluation of the design of the medicine information leaflets using the BALD tool. For each of the MILs of antimalarial medicines sampled, evaluation of their design using the BALD tool involved the following steps:

The length of the MILs lines was measured in millimetres using a rule placed across the length of the lines of words. If it was between 50-89mm the MIL received a point. If it was less or more, it scored a zero.

1. The separation between the lines was measured also in millimetres. Measurement less than 2.2mm scored a zero, measures between 2.2-2.8mm got 2 points and separations between lines that were more than 2.8mm got 3 points. On this item, there was no indication for scoring one point.
2. The third item on the tool was the justification of the first line. One point was awarded if the first line was unjustified zero to MILs with justified lines.

**Table 1.** Baker Able Leaflet Design (BALD) assessment tool

| Design Characteristics | 3 points | 2 points | 1 point | 0 point | Point scored |
|---|---|---|---|---|---|
| Lines 50-89 mm long | | | Yes | No | - |
| Separation between lines | > 2.8mm | 2.2-2.8mm | | <2.2mm | - |
| Lines unjustified | | | Yes | No | - |
| Serif typeface | | Yes | | No | - |
| Type size | 12 points | 10-11 point | 9 points | < 9 points | - |
| First Line indented | | | Yes | No | - |
| Titles lower case | | | Yes | No | - |
| Italics | | 0 words | 1-3 words | ≥ 4 words | - |
| Positive advice | | Positive | | Negative | - |
| Headings standout | | Yes | | No | - |

| | | | | | |
|---|---|---|---|---|---|
| Numbers all Arabic | | | Yes | No | - |
| Boxed text | | | 0-1Box | > 1 Box | - |
| Pictures | Words count not replace | In between | In between | None or superfluous | - |
| Number of colours | 4 | 3 | 2 | 1 | - |
| White space | >40% | 30-39% | 20-29% | <20% | - |
| Paper quality | > 90gsm | 75-90gsm | | < 75gsm | - |
| - | - | - | **Total** | - | - |

3. The serif typeface which is almost similar to the Times New Romans font style was assessed next. The MIL got a score of two points if the font style was in serif and a zero if it does not.
4. To evaluate the type size, comparison was made with a printed document with texts of different sizes. This enabled the direct assessment of how large or small the text size was. Font size of 12 received 3 points, font sizes of 10-11 received two points, a font size 9 got one point, and text less than 9 received a zero mark.
5. Indentation of the first line was scored one point and zero if indentation was absent.
6. Lower title cases were scored 1 point and zero for capital letters.
7. Words in italics were counted. If no italics were used, the MIL scored 2 points; if between 1-3, one mark was assigned and zero if up to or more than four words were italicised on that item.
8. The text for each MIL were assessed for use of positive words. If positive statements were used, 2 points was awarded. Negatively rendered statements scored zero.
9. If the heading stood out in an obvious way such as with colours or bold text, the MIL received a score of 2 points and if it does not, it receives no score.
10. All numbers are expected to be in the Arabic form in which case the MIL scored one point and if they are not all rendered in Arabic then the MIL scored a zero.
11. If there were boxed text in the leaflet, they were counted. MILs that have 0-1 box scored one point and those containing more than one box scored a zero.
12. The use of pictures without replacing the text scored 3 points and if the picture appeared in between the text, it scored a 2. If no picture was used or the picture was unnecessary the MIL scored a zero.
13. The number of colours used was assessed by the number of colours used in the MIL. If it was up to four colours the MIL was given a score of 3 points, 2 points if there were 3 colours and one point was awarded an MIL designed with two colours. An MIL designed with only one colour scored a zero.
14. The amount of white space was subjectively judged by the assessor.
15. The Paper quality was judged by making comparisons with different weights of A4 print paper. The researcher obtained papers of different qualities and compared their thickness with that of each MIL.

The total points obtainable is 32. The cut-off point for leaflets of good design is 25 according to the BALD tool estimate.

## Results

The MILs Flesch-Kincaid scores.

The average Flesch-Kincaid score for all the MILs was computed to be 14.22 ±5.06. The highest score was recorded for ACTs 30 and 25 (F-K Score= 24.15) and the lowest score for ACT20 (F-K Score = 6.07) giving a range of 18.08 scores. The MILs Flesch-Kincaid scores and the corresponding ages and readability grade levels with respect to their scores are presented in Table 2. A proportion of 15.63% of the MILs are readable at the college graduate

level, 28.13% are readable at the college or undergraduate level, 37.5% of the MILs are readable at the senior secondary school level while the proportion of the MILs readable at the Junior Secondary school and primary school level were 9.38% each.

An ANOVA test of difference between the means of the F-K reading age scores (Table 3) show that there was no significant difference between the MILs of adult and paediatric formulations (F = 0.95, df = 31 and p= 0.399). The mean weighted averages of the F-K scores of MILs of both imported and locally manufactured products was 24.16. There was no significant difference between the F-K scores of the MILs of locally manufactured products and those of imported ones using independent samples (t= -1.96, df = 30, $p$ = 0.06).

**Table 2.** MILs Flesch-Kincaid Scores and corresponding grade level

| **Brand name of Antimalarials** | **Flesch-Kincaid score** | **Reading Age/Grade Level** | **Proportion of MIL (%)** |
|---|---|---|---|
| ACT30 | 24.15 | **College graduate level (Postgraduate level)** | - |
| ACT25 | 24.15 | | - |
| ACT13 | 22.68 | | 15.63 |
| ACT32 | 22.65 | | - |
| ACT27 | 20.04 | | - |
| ACT16 | 18.85 | **College level (Bachelor's degree holder and HND level)** | - |
| ACT14 | 17.56 | | - |
| ACT10 | 17.25 | | - |
| ACT22 | 16.8 | | 28.13 |
| ACT11 | 16.75 | | - |
| ACT6 | 15.97 | | - |
| ACT1 | 15.78 | | - |
| ACT23 | 15.76 | | - |
| ACT18 | 15.14 | | - |
| ACT12 | 14.22 | **Senior Secondary School Level** | - |
| ACT4 | 14.6 | | - |
| ACT9 | 13.71 | | - |
| ACT8 | 13.28 | | - |
| ACT17 | 13.24 | | - |
| ACT5 | 13.12 | | - |
| ACT7 | 11.81 | | 37.5 |
| ACT15 | 11.15 | | - |
| ACT28 | 10.85 | | - |
| ACT19 | 10.01 | | - |
| ACT24 | 10 | | - |
| ACT29 | 10 | | - |
| ACT3 | 9.75 | **Junior secondary School level** | - |
| ACT21 | 8.56 | | 9.38 |
| ACT26 | 7.73 | | - |
| ACT31 | 6.88 | **6$^{th}$ Grade (Primary School level)** | - |
| ACT2 | 6.66 | | 9.38 |
| ACT20 | 6.07 | | - |

**Table 3.** Analysis of variance of means of Flesch-Kincaid scores across product formulation group

| | Sum of Squares | df | Mean Square | F | p |
|---|---|---|---|---|---|
| Between Groups | 48.71 | 2 | 24.35 | 0.95 | 0.39 |
| Within Groups | 743.53 | 29 | 25.64 | | |
| Total | 792.24 | 31 | | | |

**The Baker Able Leaflet Design assessment**

Figure 2 shows the BALD assessment scores of the MILs. The BALD assessment scores of all the MILs lie between 10.0 and 19.0 (Table IV). The highest score (19) was recorded for ACT 31 Dispersible tablets while the lowest score of 10 was for ACT27 and ACT11 giving a range of 9. The average BALD assessment score was computed to be 13.38. The modals core was 13(25%). The mean BALD assessment score for the MILs was significantly lower than the lowest allowable point of 25 (t= 3.77, df =31, $p$ = 0.001) (Table 5). Out of the thirty-two MILs 15.63% recorded above average scores on the BALD tool of 32 points while 84.38% of the MILs recorded less than average scores. They all fell under the category of "poorly designed" MILs as shown in Table V.

**Table 4.** BALD assessment scores of MILs grouped into levels of acceptability

| Brand name of Antimalarials | BALD score | Design and Layout |
|---|---|---|
| ACT31 | 19 | Poorly designed (above Average but below standard <25point) |
| ACT17 | 17 | |
| ACT32 | 17 | |
| ACT26 | 16 | |
| ACT4 | 16 | |
| ACT12 | 15 | Poorly designed (below average and below standard) |
| ACT1 | 15 | |
| ACT5 | 15 | |
| ACT3 | 15 | |
| ACT28 | 14 | |
| ACT20 | 14 | |
| ACT7 | 14 | |
| ACT10 | 13 | |
| ACT18 | 13 | |
| ACT15 | 13 | |
| ACT13 | 13 | |
| ACT2 | 13 | |
| ACT24 | 13 | |
| ACT29 | 13 | |
| ACT6 | 13 | |
| ACT23 | 12 | |
| ACT22 | 12 | |
| ACT8 | 12 | |
| ACT28 | 12 | |
| ACT21 | 12 | |
| ACT16 | 12 | |

| Brand name of Antimalarials | BALD score | Design and Layout |
|---|---|---|
| ACT14 | 12 | |
| ACT9 | 11 | |
| ACT30 | 11 | |
| ACT30 | 11 | |
| ACT27 | 10 | |
| ACT11 | 10 | |

**Table 5.** Inferential statistics of the BALD score for the MILs (One-Sample t-Test)

| | Sample test value | t | df | P | Mean Difference |
|---|---|---|---|---|---|
| Baker Able leaflet Design Scores of the MILs | 25 | 3.77 | 31 | 0.001 | 2.81 |

Significant at $p < 0.05$

## Discussion

The MILs Flesch-Kincaid scores showed that more than 80% of the MILs can only be read and understood by persons with a level of education higher than the average level of education in Nigeria. The results agree with previous studies that showed that some MILs were written at levels far above the average educational level of the general public. This is with implication according to [7] and [36] that many consumers who should benefit from the use of the information might not be able to understand it. They are faced with the choice of using the medicine with poor understanding of the written instructions. For the keen information seeker, essential time is expended in trying to find persons who can read and explain the information to them.

On the BALD tool, the MILs scored below the minimum 25-point benchmark for a leaflet of good design indicating that they all were poorly designed. This infers a serious defect in the design of the leaflets because they are not designed in a way that captures the attention of a reader. Studies such as those by [37-39] have shown that many readers would be put off reading the text or discouraged to read further when the document is poorly designed. For example, if the font sizes are too small for consumers to appreciate the letters or if pertinent information are not distinct from the rest of the text, many would not be able to navigate the leaflet to access the information [40].

Though it may be argued that some of the criteria in the BALD tool may be stringent to apply, for example, a score of 3-points for paper thickness of 100gsm might well be an idealistic criterion as papers of such thickness are often commonly used as formal letter head papers and might be difficult to fold into a medicine package. Economic considerations and packaging convenience could also preclude use of papers of such thickness in the printing of MILs and also inform the tight spacing of words to reduce the amount of paper used. This difficulty, and that posed by guidelines requiring ‘plenty of white space’, according to [41] seem subsumed in the bid to avoid too lengthy MILs. Economic considerations could also explain why different colours are not used in most of the MILs. However, as posited by proponents of readability like [42], when reading interest has to do with the design of a document text, readers are put off reading a text when the document is poorly designed. Thus, there is a hindrance in the communication process.

The consequence of this is that intended information is not being harvested though the reader has access to it. Furthermore, the benefits of using the information are lost to the consumer and a misuse of the medicine could result when no other means of transmission of

the necessary information is available. A graver impact for such misuse is precipitation of adverse reactions and toxicities which could otherwise have been prevented if the medicine information leaflet was well designed. The situation calls for an improvement in the design of these MILs.

## Conclusion

This study shows that the readability of the MILs of ACTs used in Nigeria in terms of reading grade level and the design of MILs are not adequate. The readability level was not adequate for the majority of readers as only highly literate individuals can read most of the MILs with ease. The design and layout of the MILs were also unacceptable based on the BALD assessment.

## Recommendations

From the outcome of this study, the following recommendations are suggestions for improvement of the MILs of ACT antimalarials in Nigeria.

1. Manufacturers and importers of ACT antimalarials to Nigeria should present the MILs in a shorter and more easily understood format for the consumers.
2. Developers of medicine information leaflets should consider using the BALD assessment to evaluate their design for a more acceptable MIL.
3. Developers of MILs should consider adopting the style of having two separate sections in the MILs, one for health professionals who prescribe, dispense, and administer medicines, and the second section presented in very simple language for lay medicine consumers.
4. The National Agency for Food and Drugs Administration and Control (NAFDAC) the drug and food regulatory body in Nigeria should institute readability tests for medicines available as OTCs before awarding approvals to marketers in which important safety and efficacy information in the MIL is found to be comprehensive by at least 80% of the participants.

### Limitations of the study

The study was limited to an evaluation of MILs of ACT antimalarial medicines. Further studies could evaluate the MILs of other classes of medicines.

### Ethical approval

There are no human subjects involved in this study and the medicine information leaflets were publicly available. Hence no ethics approval was sought for the conduct of the study.

## Conflict of interest

The authors have no conflicts of interest to declare.

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# Outcome of Community-Initiated Treatment of Drug-Resistant Tuberculosis Patients in Akwa Ibom State, Nigeria

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***Abstract***

*Drug-resistant Tuberculosis (DRTB) occurs when the drugs used to treat TB are misused or mismanaged by, WHO 2018 Examples of misuse or mismanagement include People who do not complete a full course of TB treatment, Health care providers prescribing the wrong treatment (the wrong dose or length of time), Drugs for proper treatment are not available, and poor quality of drugs. The study aimed at determining the treatment outcome of Community-Initiated Drug-Resistant Tuberculosis Patients registered between January 2017 and December 2020.in Akwa Ibom State, Nigeria. The study design was a retrospective cohort study; a total sampling technique was employed to review patients that were diagnosed and registered during the period of study. The demographic and clinical data of each patient were retrieved from the DR-TB patient treatment cards, DR-TB patient treatment progress notes from directly observed treatment short-course (DOTS) providers in the community, the state DR-TB central register, and treatment card. Data were analyzed using Statistical Package for Social Sciences (SPSS) Software (Version 23; SPSS, Chicago, IL, USA). The median age of clients that participated in the study was 34 years [27- 49.5]. Most of the participants were male (56.2%), and a greater proportion of the enrollees were all new cases (76.3%). The study determined some of the sociodemographic characteristics of patients that received treatment for drug-resistant tuberculosis using the Community-Initiated model, their health outcomes, and assessed the predictors of some of the health outcomes.*

***Keywords:*** *Outcome of Community- initiated Drug-resistant Tuberculosis Treatment. Nigeria.*

## Introduction

Tuberculosis is an infectious disease that has plagued humanity for centuries. It is caused by Mycobacterium tuberculosis, which primarily affects the lungs and various parts of the human body. Tuberculosis [1] has been identified as the 13th leading cause of mortality globally and the second leading cause of death second only to COVID-19 [2]. In 2020, the World Health Organization (WHO) reported that 1.5 million persons died of the disease across the world. In the same year, [2] 10 million people were diagnosed with TB, with 5.6 million men, 3.3 million women, and 1.1 million children affected globally. [2] Tuberculosis is a preventable and curable disease but is complicated by the occurrence of diseases like Human Immunodeficiency Virus (HIV), diabetes, etc. The advent of the COVID pandemic has resulted in poor access to TB treatment and other services and this has increased mortality from the disease which also includes patients with drug-resistant tuberculosis. [2] As the impact of several interventions to eliminate tuberculosis sets in, the global burden of tuberculosis is falling at 2% per year, and within the space of 5 years (2015-2020), the cumulative reduction has been 11%. [2] However, the rising cases of drug-resistant tuberculosis threaten the gains made on the control of tuberculosis.

Drug-resistant Tuberculosis (DRTB) occurs when the drugs used to treat TB are either misused or mismanaged. Drug-resistant

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tuberculosis [3] (DR-TB) has emerged as a significant public health problem globally and has threatened the progress made in tuberculosis (TB) control over the years. In 2017, the World Health Organization (WHO) estimated that 3.5% of new and 18% of previously treated TB cases have multidrug-resistant or rifampicin-resistant TB(DR/RR-TB), which translated to an estimated 558 000 new cases and 230 000 deaths. However, only 161 000 new cases were reported globally in 2017, while 131000 were enrolled in treatment, which is about a quarter of the estimated number of MDR/RR-TB cases. [4] In more recent years, the number of cases of DR-TB has been unstable, with over 60% of cases of DR-TB diagnosed from cases in 2019 and 50% in 2018. In 2020, [2] it was reported that there were 132,222 cases of MDR-TB and 25,681 cases of Pre-XDR TB cases. Nigeria is one of the 30 high MDR-TB burden countries, [2] with an estimated MDR/RR-TB proportion of 4.3% among new cases and 15% among previously treated TB cases in 2018.2 A total of 2275 cases were laboratory-confirmed, and 1895 (83.3%) patients were enrolled into treatment within the country [3].

## Problem

Tuberculosis has been identified as a leading cause of morbidity and mortality globally. In the 2020 World TB report, the World Health Organization (WHO) reported that 1.5 million persons died of the disease across the world. While tuberculosis remains a major public health challenge, with an estimated 10 million persons diagnosed in 2019 [5], its incidence is reducing. Drug-resistant tuberculosis (DR-TB) presents a present major challenge that cannot be ignored. Multiple drug-resistant TB, which is one of the commonest forms of drug resistance to Tuberculosis, was a major public health problem in Europe and the Americas in the late 20$^{th}$ twentieth century [6]. Since then, it has extended globally, causing significant morbidity and mortality. Since the turn of the new millennium, the prevalence of drug-resistant tuberculosis has continued to rise. In 2017, 3.6% of new cases of tuberculosis were diagnosed with MDR tuberculosis. [4] Despite the availability of free drug-resistant tuberculosis (DR-TB) care in Nigeria, the country continues to tackle low case notification and treatment rates. In 2018, 11% of an estimated 21,000 cases of DRTB were diagnosed, and 9% were placed on treatment. These low rates are nevertheless a marked improvement from 2015 when only 3.4% were diagnosed, and 2.3% were placed on treatment for an estimated 29,000 cases.

The community-based approach to the management of DR-TB has become a veritable strategy that could lead to increased case notification and treatment, as seen in populations where the intervention has been used. The predictors of the treatment outcomes following the employment of this intervention have been poorly studied in Nigeria and many parts of sub-Saharan Africa [7].

## Justification

This study is justified because it fills the knowledge gap of the importance of Community-based DR-TB intervention in health outcomes and evaluates the impact of the strategy in Akwa Ibom State, Nigeria. The study will enable policymakers and stakeholders who directly or indirectly play a critical role in the management of drug-resistant tuberculosis to identify the predictors of the outcomes of drug-resistant tuberculosis using a community-based approach and mitigate identified challenges where necessary. The study will also add to the body of knowledge and evidence of the impact of community-based DT-TB management.

## Limitations of the study

The study had the following limitations.

1. Some of the sociodemographic characteristics of the patients that would have been explored in the study were not clearly inputted in the records of the patients. There is a need to review the

registers used for community DR-TB to capture some aspects of the demography.

2. Some of the patients that met the inclusion criteria for the study were not clearly evaluated in the various groups, and this affected some of the results gotten from the study. However, the results may not be widely different from what was gotten in this study.

### Significant of study

This research will be important to the Akwa Ibom State Tuberculosis and Leprosy Control Program in general and, by extension, the National Tuberculosis and Leprosy Control Program in particular, as it will create awareness on the importance of community DR-TB management and its outcomes for further improvement of TB management as a whole. The findings of this study will also be meaningful to the society and country as it will help reduce the spread of Drugs-Resistant Tuberculosis.

## Methodology

The study was carried out in Akwa Ibom State [8], Nigeria. The study design was a retrospective cohort study, and the study population included all patients diagnosed with MDR-TB between January 2018 and December 2020 in the State. The total sampling technique was employed to review patients that were diagnosed and registered between 1 January 2018 to December 20.

The demographic and clinical data of each patient were retrieved from the DR-TB patient treatment cards, DR-TB patient treatment progress notes from directly observed treatment short-course (DOTS) providers in the community, and the state DR-TB central register, baseline, and routine investigation results cards. Data were be checked for correctness and duplicity. The patient's treatment outcomes recorded within the period of January 1$^{st,}$ 2018, to December 2020 were documented. The drug regimen for MDR-TB started initially for the patients and changes have been made, and the duration of the treatment was recorded.

The Statistical Package for Social Sciences (SPSS) Software (Version 23; SPSS, Chicago, IL USA) was used for the analysis of data. Descriptive statistics were computed, and this included mean and standard deviation, median and interquartile ranges as appropriate. Data was represented using bar charts, as appropriate. Chi-squared and Fisher's exact test were used for categorical data as appropriate. Univariate and multivariate logistic regression was computed to determine predictors of treatment outcome. For multivariate regression, variables with $p < 0.15$ were included in the model. Confidence intervals (CI) were computed at 95% CI, while the p-value was set at $<0.05$ for statistically significant data.

## Results

A total of two hundred and fifty-three (253) respondents were extracted from the registers and records from 2018 to 2020. However, only two hundred and thirty-three respondents met the inclusion criteria for the study. Some aspects of the sociodemographic data of respondents were not included in the results because they were not well presented in the registers. The majority of respondents were between the ages of 25-and 34 years (34.8%) and 35-44years (21.5%). Most of the participants were male (56.2%). A greater proportion of enrollees in the program were new cases (76.3%). Most of the cases were HIV negative (66.1%).

A greater proportion of the outcome among clients who received treatment (42.5%) were cured of the disease. While 9.9% of the total outcome of respondents died during the period under review. The proportion of clients that were declared cured after treatment was 42.5%. The odds of being cured of drug-resistant TB when a client was HIV positive increased two-fold relative to negative clients but was not statistically significant. [OR=2.130. 95% CI 0.853-5.319].

## Discussion

This study sought to identify the demographic and clinical characteristics of patients that enrolled in the community-based DR-TB program in Akwa Ibom State [8] between January 2018 to December 2020 and to determine the health-related outcomes of DR-TB patients' undergoing treatment within the same period in the community. The study sought to determine predictors associated with treatment outcomes of community-initiated DR-TB treatment in Akwa Ibom State.

The median age of clients that participated in the study was 34 years [27- 49.5]. This was similar to a study that was carried out in Zaria, North-Western Nigeria, to identify predictors of the intensive phase treatment outcomes among patients with multidrug-resistant tuberculosis. [9] The predominant age grouping in the study was those between the ages of 25 to 34 years, which was comparable to a study that was carried out in Northern Nigeria that showed similar age groups as the predominant group in the study [10]. The study showed that there were about an equal number of males and females in the study with a ratio of 1.3: 1, which was similar to a study done in Peru where an equal number of males and females participated in the study [11]. A study in Ethiopia, however, reported that most of the clients seen in their study were female. Getachew [12] newly diagnosed cases of drug resistance formed the larger group of participants that were enrolled in the community treatment program, and this goes to show that there is an increasing burden of patients with drug resistance in our population and increasing surveillance could help to identify these group of clients. The proportion of respondents that were positive for Human immunodeficiency virus (HIV) was 28.8% within the study period, and this was lower than findings in another study that showed a very high prevalence of HIV among patients with drug resistance tuberculosis [13].

The cure rate within the period of the study was 42.5%. This was lower than the report of findings from a study that was carried out in Zaria, which showed a cure rate of over 78.2%. [9] In a study in Kenya to assess treatment outcomes of drug-resistant tuberculosis patients, the researchers reported a higher cure rate (82.4%) than the index study. [14] The low reporting of cure rate in this study may result from the non-allocation of treatment outcomes to those who had completed treatment and the non-evaluation of some patients who participated in the study. The proportion of patients that were lost to follow-up within the period was lower compared to findings from other studies. In Kenya, in some studies, 9% of enrollees to the program were lost to follow up during treatment.

The study assessed the predictors of some of the outcomes experienced by the patients. All the patients used in the student utilized the short regimen for treatment of drug-resistant tuberculosis. The study showed that the odds of being declared cured were higher for those positive for HIV, which was statistically significant. This was similar to findings in Kenya, where the researchers reported similar findings [14]. This may be because those who were HIV positives were more able to adhere to treatment because they were already on long-term treatment for HIV.

**Table 1.** Characteristics of respondents and their health status

| **Variable** | **n=233** | **f(%)** |
|---|---|---|
| **Age(years)** | | |
| 15-24 | 36 | 15.5 |
| 25-34 | 81 | 34.8 |
| 35-44 | 50 | 21.5 |
| 45-54 | 30 | 12.9 |
| ≥55 | 36 | 15.5 |
| **Median [IQR] 34.0 [27-49.5]** | | |

| | | |
|---|---|---|
| **Sex** | | |
| Male | 131 | 56.2 |
| Female | 102 | 43.8 |
| Male: Female ratio | 1.3:1 | |
| **Enrollees** | | |
| New cases | 178 | 76.3 |
| Previous treatment | 24 | 10.3 |
| Treatment failure | 31 | 13.4 |
| **HIV status** | | |
| Negative | 154 | 66.1 |
| Positive | 67 | 28.8 |
| Not Known | 12 | 5.1 |

IQR=Interquartile range

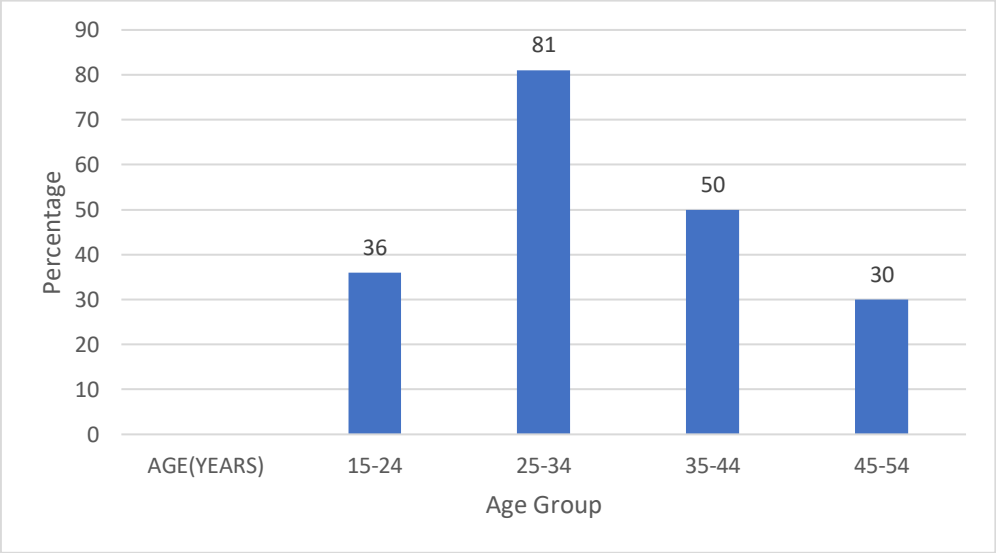


**Figure 1.** Percentage Distribution of Patients by Age

This chart show that majority of respondents were between the ages of 25-34 years (41%) and 35-44years (26%).)

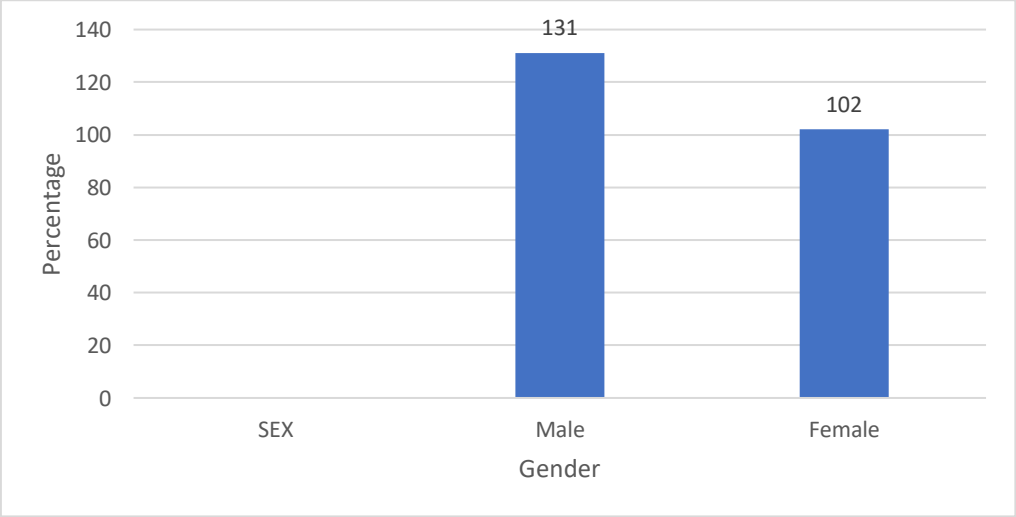


**Figure 2.** Percentage distribution of patients by sex

(Most of the participants were males (56.2%).)

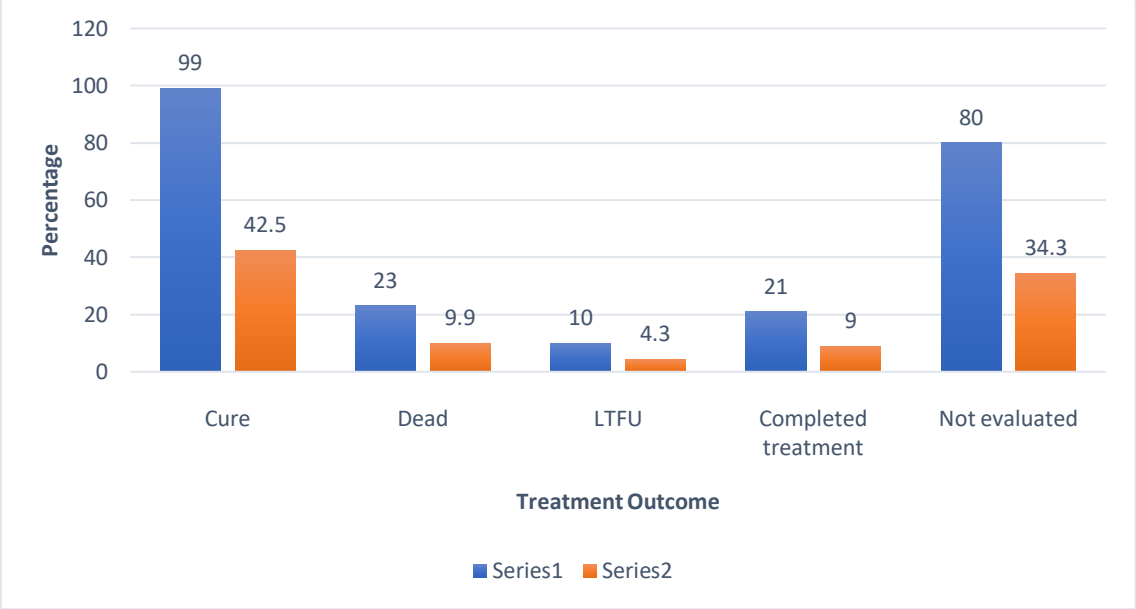


**Figure 3.** Treatment Outcome of Patients Enrolled

**Table 2.** Treatment Outcome of Drug Resistant Tuberculosis between 2018 to 2020

| **Variables** | **n=233** | **f (%)** |
|---|---|---|
| **Cure** | 99 | 42.5 |
| **Dead** | 23 | 9.9 |
| **LTFU** | 10 | 4.3 |
| **Completed treatment** | 21 | 9 |
| **Not evaluated** | 80 | 34.3 |

LTFU= Lost to follow-up; TC= Treatment completed

**Table 3.** Treatment Outcome (Cure rate)

| **Treatment outcome (Cure)** | **n=233** | **F (%)** |
|---|---|---|
| Cure | 99 | 42.5 |
| Not cure | 134 | 57.5 |
| | | |

Table 3 displays the cure rate for the period under study. The proportion of clients that were declared cured after treatment was 42.5.

**Table 5.** Univariate regression of treatment outcome (Cure) with some independent variables

| **Variables** | **Crude odds ratio** | **95% CI** | | **Tests/statistics** | |
|---|---|---|---|---|---|
| | | **Lower** | **High** | $\chi^2$ | **P** |
| **Age (Year)** | | | | | |
| 15-24 | 1 | | | 1.604 | 0.808 |
| 25-34 | 1.641 | 0.545 | 4.943 | | |
| 35-44 | 0.944 | 0.316 | 2.820 | | |
| 45-54 | 1.077 | 0.313 | 3.710 | | |
| ≥55 | 0.732 | 0.374 | 4.045 | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sex** | | | | | |
| Male | 1 | | | | |
| Female | 1.114 | 0.564 | 2.200 | 2.236 | 0.135 |
| **Status before starting care** | | | | | |
| New | 1 | | | 2.578 | 0.276 |
| Previous treatment of TB | 1.289 | 0.418 | 3.970 | | |
| Treatment failure | 2.489 | 0.784 | 7.904 | | |
| **HIV status** | | | | | |
| Negative | 1 | | | | |
| Positive | 1.897 | 0.813 | 4.427 | 2.236 | 0.135 |

Table 5 displays the univariate regression of some independent variables with the outcome variable (cure).

**Table 6.** Multivariate Regression of Treatment Outcome (cure) with Some Independent Variables

| **Variables** | **OR** | **Significance** | **95% CI** | |
|---|---|---|---|---|
| **HIV Status** | | | **Low** | **High** |
| Negative (Ref) | 1 | | | |
| Positive | 2.130 | 0.105 | 0.853 | 5.319 |
| **SEX** | | | | |
| Male (Ref) | 1 | | | |
| Female | 0.767 | 0.502 | 0.353 | 1.664 |

Table 6 displays the multivariate regression of treatment outcome (cure) and predictors that meet the criteria for the logistic model. The odds of being cured of drug-resistant TB when a client was HIV positive increased two-fold relative to negative clients but was not statistically significant. [OR=2.130. 95% CI 0.853-5.319].

## Conclusions

The study determined some of the sociodemographic characteristics of patients that received treatment for drug-resistant tuberculosis using the Community-Initiated model, their health outcomes and assessed the predictors of some of the health outcomes. The study found that the odds of being cured of drug-resistant tuberculosis increased in patients that were HIV positive. The study also found that the odds of mortality occurring during treatment were associated with the HIV status of the patients and the state in which they initiated treatment.

## Recommendations

The following are recommendations based on the findings of this study.

There is a need to strengthen and encourage the community model for the treatment of drug-resistant tuberculosis because of the reduced mortality and morbidity associated with the model. More communities need to be sited to ensure wider coverage and increase case detection.

Patients that have previously received treatment for TB and are undergoing treatment for DR-TB, need to be given more attention during care to reduce the risks of mortality.

The TB register should be updated and more information about the predictors of treatment outcome inputted.

There should be frequent training and retraining of DOT officers to build their capacity for inpatient care, adequate follow-up, and

proper documentation in both the DR-TB presumptive and treatment register.

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**Running Title**

Assessment of Predictors of Cure in Community-Initiated Treatment of Drug-Resistant Tuberculosis Patients in Akwa Ibom State. Nigeria.

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# The Benefits of Technological Developments on Businesses: A Survey Conducted among SMEs in Beni, Democratic Republic of Congo

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***Abstract***

*New technologies are considerably influencing companies for information system implementation every year. This trend has led many people, including business managers and researchers, to question the benefits of technology to business. While Small Medium Enterprises (SMEs) in developing countries, particularly those in the Democratic Republic of Congo (DRC), are gradually digitalizing their information systems, To our knowledge, very few studies to analyze the benefits of technologies on DRC SMEs have been conducted. This study, therefore, sought to place itself in the Congolese context to find out about the benefits of digitalized information system. 119 SMEs that have been using information system technologies for at least two years were selected for data collection. Descriptive statistics and Pearson's correlation were used for the data analysis. The findings from the study show that SMEs derive certain benefits from the use of technology and have improved organizational system performance that including an increase in profit, optimized time management, reduced paperwork, improved information quality, and improved financial reporting quality. The results also reveal that the more a company invests in technology, the more benefits it receives.*

***Keywords:*** *Business, ICT, Impact, Investment, Performance, SME.*

## Introduction

In recent years, SMEs played a significant role in an economy in opposition to the ideas established in the 19th century [1]. SMEs are becoming increasingly important in developing economies for their ease of adaptation to change, low capital requirements, and low management costs [2].

To play their role properly and thus remain competitive, more and more SMEs use technologies [3]. There are several reasons why SMEs tend to turn to computerized information systems. For [4], the availability of microcomputers is the main reason for reducing the cost of implementing computerized IS and making them accessible even to SMEs with limited resources. In addition, SMEs invest in technologies because of the multiple advantages they derive from them [5].

Studies have shown that technology provides multiple benefits to Small and Medium Enterprises (SMEs), including improved productivity, improved customer relations, efficient tracking of transactions with suppliers, and standardization of information related to human resources [6]. For [7-9], the practical information system increases the improvement and ability to strengthen customer relations, business efficiency, redesign of business processes, good utilization of human resources, and reduction of labour.

Computerized information systems have attracted several researchers [6], [10-14] who have demonstrated that the measurement of the success of technology is one of the most discussed topics in recent decades.

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Several models have been proposed by [3], [15-19] to test the performance of these systems in large [4], especially for developed countries [20]. While businesses in developing countries are gradually embarking on the computerization of information systems, the Democratic Republic of Congo (DRC), one of these countries, has only seen the digital revolution highlighted and prioritized by the government in 2019 [21]. The researchers observed that there might not be many studies that were based on the assessment of the success of technology of information systems and their impact on Small Medium Enterprises in the Democratic Republic of Congo. Therefore, this research is intended to study the success of technology systems in SMEs in the DRC.

## Literature Review

According to [22], ICTs refer to all instruments that carry immaterial messages (images, sounds, character strings). He subdivides ICTs into three categories: audiovisual, computer, and telecommunications. For [23], the term ICT encompasses the many technologies that allow us to receive information and communicate or exchange information with others. [24] described ICTs with three components: computer equipment (computers and related hardware), communication equipment, and software. ICTs are tools for technologies whose primary purpose is to transform and process data to transmit messages (information) from a source to a recipient.

Companies have relied on ICT to automate their information systems in the past few years. According to [25], different firms have different situations and therefore have different strategies for adopting, investing in, deploying, and using IT. To illustrate, these authors argue that some companies may focus on investing in expensive ERP, others in customer relationship management (CRM) software, while others have other priorities.

Regardless of the strategy adopted towards ICT, companies are investing in it to benefit from it from a performance perspective. Indeed, the CEO of Wal-Mart, quoted by [26], stated that technology has become integrated into every aspect of the business.

Companies are therefore increasingly investing in new information technologies. This situation is increasingly attracting authors trying to understand the motivations behind this craze. Some believe that these technologies bring many benefits to companies because of trends. But “despite the substantial investments in IT by companies”, the direct link between technology investment and increased productivity and performance has been extremely elusive [26].

For the same authors, “the benefits of technology investments include reduced costs”, improved quality, increased flexibility, improved customer satisfaction, higher productivity and, ultimately, higher financial performance”. Several studies found that there were benefits of information technology beyond those mentioned above.

[6] summarize the benefits of technology as follows: Improved performance, Cost reduction, increased profit, Reduced general administration costs, Optimized time management, reduced paperwork within the company, improving the quality of information, improving the use of human resources, Improving the use of other resources, Facilitate inventory of materials and stocks, Improve the quality of financial information, Improve productivity, Improve customer relations, Track supplier transactions efficiently, Standardized human resources information, Reduce staffing levels, Facilitate marketing, Integrate business activities, Strengthen teamwork, Improving worker morale, Human development, Improving the decision making process, easy adaptation.

## Materials and Methods

This study focuses on SMEs in the town of Beni, in the Democratic Republic of Congo. The study used descriptive and analytical approaches to analyze the data on the benefits of the technologies on SMEs. The convenience sampling method was applied to select 119 respondents from several SMEs that include the telecommunications, trade (sales and services), health, finance, transport and hospitality, and education sectors to respond to the survey. The data was collected by KoBoCollect and analyzed with SPSS software.

To identify the benefits of ICT and the barriers to ICT investment, descriptive statistics (percentage, frequency, mean and standard deviation) were used, and data were organized in Excel tables. And Pearson correlation test was used to analyze the relationship between the amount invested and the benefits for SMEs.

## Results

### Investment in Information Technology

In terms of investment in ICT, the companies surveyed invested in different ways in the technologies: 34.0% of SMEs reported that they had invested between $1,000 and $5,000 in the information system of the organization, 27.0% of them had invested less than $1,000, 23.0% of had invested more than $10,000, and 17.0% had invested in the range of $50,000 to $10,000 in information technologies.

### Benefits of Technologies according to SMEs in Beni

The findings in Table 2 indicate the advantages of ICT benefits. The advantaged benefits are performance improvement, increase in profit, reduced paperwork, optimized time management, improved quality of information, and improved financial reporting quality.

**Table 1.** Investment in ICT over the Last Two Years

| Amount of money invested | Numbers (%) |
|---|---|
| Less than 1000 | 32(27.0) |
| Between 1000 and 5000 | 40(34.0) |
| Between 5001 and 10000 | 20(17.0) |
| Over 10,000 | 27(23.0) |

**Table 2.** The Benefits of ICT Use by SMEs in Beni

| Items | M | SD | VI |
|---|---|---|---|
| Performance improvement | .723 | .4495 | A |
| Cost reduction | .487 | .5021 | NA |
| Increase in profit | .513 | .5019 | A |
| Reduction of general costs | .420 | .4957 | NA |
| Optimize time management | .639 | .4824 | A |
| Reduce paperwork within the company | .555 | .4991 | A |
| Improve the quality of information | .698 | .4613 | A |
| Improve the use of human resources | .496 | .5021 | NA |
| Improve the use of other resources | .353 | .4799 | NA |
| Facilitate the inventory of materials | .487 | .5021 | NA |
| Improve the quality of financial information | .529 | .5012 | A |
| Improve productivity | .371 | .4847 | NA |
| Improve customer relations | .445 | .4991 | NA |
| Effectively monitor transactions with suppliers | .361 | .4824 | NA |
| Standardize financial information | .336 | .4744 | NA |

| | | | |
|---|---|---|---|
| Staff reduction | .269 | ,4453 | NA |
| Facilitate marketing | .445 | .4991 | NA |
| An integrate the activities | .336 | .4744 | NA |
| strengthen teamwork | .412 | .4942 | NA |
| moral improvement | .319 | .4682 | NA |
| human development | .311 | .4648 | NA |
| improve the production process | .286 | .4536 | NA |
| Easy adaptation | .353 | .4799 | NA |
| Overall average | .441 | .3207 | NA |

Note: M=mean; SD=standard deviation; VI=verbal interpretation; A=Advantage when M≥0.5; NA=No advantage when M<0.5

## Barriers to Technology Investment in SMEs in the City of Beni

Regarding the barriers in table 3, results show that most of the factors are not indicated as barriers that include fees of IT specialists, quality of software, managerial, intellectual capacities of employees, and employee reluctance. It appears from the results in table 3 that the computerization of company information systems is held back by the high cost of hardware and software.

**Table 3.** Barriers to Technology Investment in SMEs in the City of Beni

| **Items** | **M** | **AND** | **IV** |
|---|---|---|---|
| High cost of software | .605 | .4909 | B |
| High cost of materials | .504 | .5021 | B |
| Fees of IT specialists | .235 | .4259 | NB |
| Quality of software | .361 | .4824 | NB |
| Managerial unwillingness | .261 | .4407 | NB |
| Intellectual capacities of employees | .269 | .4452 | NB |
| Employee reluctance | .244 | .4311 | NB |
| Overall average | .354 | .2616 | NB |

Note: M=mean; SD= standard deviation; VI= Verbal Interpretation; B=Barrier M≥0.5; NB= Not Barrier M<0.5

## Relationship between the Amounts Invested in ICT and the Benefits

The aim was to study the relationship between ICT investment and the benefits. Results in Table 4 reveal that there is a significant relationship between ICT investment and the derived benefits. The positive r coefficient implies that the more the firm invests in ICT, the more it will benefit from its services.

**Table 4.** Relationship between the Amount Invested in ICT and the Benefits

| **Variable** | ***r*** | **p** | **VI** |
|---|---|---|---|
| Advantage | 0.239 | 0.009 | ST |
| Amount invested | | | |

Note: r=Pearson correlation coefficient; p=significance level; VI=verbal interpretation; ST=significant test when p<0.05, NST=non-significant test when p >0.0

### Relationship between the Industry and the Benefits of ICTs

The results in Table 5 shows that there is no significant relationship between the business sector and the benefits of the technologies. Thus, regardless of the sector of activity, the benefits mentioned are the same for the SMEs in Beni.

**Table 5.** Relationship between the Industry and the Benefits of ICTs

| Variable | r | p | IV |
|---|---|---|---|
| Advantage | 0.021 | 0.824 | NTS |
| Industry | | | |

Note: r=Pearson correlation coefficient; p=significance level; VI=verbal interpretation; ST=significant test when $p<0.05$, NST=non-significant test when $p>0.0$

## Discussion

ICT has become an indispensable part of everyday business operations for information analysis. The companies in Beni identified six main advantages of ICTs as follows; improved performance, increased profit, optimized time management, reduced paperwork, improved information quality, and enhanced financial quality. The results of this study are supported by [6] and MEBARKI (2013) who reported ICTs to have significant benefits when applied in organizations. On the other hand, the companies in Beni have not recognized the other benefits mentioned. This can be justified by the low investment in ICT by the interviewed SMEs.

The results indicate that there is a positive relationship between investment in ICT and the benefits of ICT. This implies that the more a firm invests in technology, the more benefits it can derive. The results are related to Weill's (2003) findings which indicated that consistent investment in information technology was associated with better performance of the investing firm. This relationship can be explained by the more a firm invests in technology, the better technology it will have. A company that spends a small portion of its budget on technology will necessarily have access to worse technologies than those available to companies that are willing to sacrifice a large budget.

Businesses in all industries can benefit from the advantages of ICTs. Although, in Beni town, investment in new technology has not yet taken off to the extent that it should. Regarding barriers to investment in new technologies, the companies surveyed pointed to the high cost of computer hardware and software. French firms [27] identified these factors as barriers to technology investment.

## Conclusion

The study aimed to identify the benefits of ICTs for enterprises. The results show a low level of investment in technology by the businesses in the area under investigation. The benefits identified for ICTs in Beni include improved performance, increased profit, optimized time management, reduced paperwork, improved information quality, and enhanced financial quality. In terms of disincentives to investment in technology, the results of our investigations identified two. These are the cost of hardware and the cost of the software. The correlation test revealed a positive correlation regarding the relationship between ICT investment and ICT benefits.

Future research may look at the impact of technology on the performance of SMEs in Beni. It is also possible to extend the analysis to other towns in the provinces and the country to reach general conclusions. Researchers could propose a model for technology adoption by SMEs in developing countries such as the DRC.

## Conflict of Interest

There is no conflict of interest.

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# Cloud Computing in Healthcare Industry

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***Abstract***

*The advent of technology has become inevitable in today's world, and every industry is on the frontline of incorporating the technology. The healthcare industry has not been an exception, as it has also integrated the essential components of technology into its functioning. Patient records are no longer stored manually but are instead stored electronically, and this has benefited the industry by increasing the productivity of patient care. It has also assisted healthcare in having easy accessibility and usage. The current technological innovation that has occurred in the health care industry is the innovation of cloud computing. However, there are many fears and various security measures that have come up in the health industry concerning patient records being stored remotely. Therefore, a person needs to understand what benefits are attached to the application of cloud computing in the health industry and the fears associated with the same. Besides, one also needs to be aware of both the merits and the disadvantages that are come in because of the newly invented technology. After a lot of advancements and developments, the usage of cloud computing has been increasing steadily. Therefore, cloud computing is the right time to explore the use of this technology to improve on the healthcare industry's services to the public. Lastly, the main purpose of the paper is to evaluate the various factors that healthcare organizations should consider when implementing cloud computing technology.*

***Keywords:*** *Application, Benefits, Cloud computing, Service, Healthcare, Software, Security.*

## Introduction

Cloud computing has been termed as one of the most recent developments in technology. The areas of application of this technology have been increasing each day, and more and more industries are beginning to employ its usage. Today, cloud computing has grown so fast, and it has become widespread to the extent of being used in the healthcare industries. The rapid evolution of cloud computing in the health industry has seen most healthcare services moving to the cloud. Therefore, this has forced them to shift most of their attention to ensuring that they provide cost-effective health services that are also efficient to people worldwide [1]. So, what is cloud computing?

Cloud computing is the act of delivering various services via the internet. The resources are made up of tools and applications such as data storage and databases. Cloud computing is termed an infrastructure of "application-based software" that generally stores data over remote servers, and this data can be accessed from anywhere using the internet. Along with it delivers ample computing services such as servers, databases, networking, software, analytics, storage as well as intelligence on the internet. Overall, it offers flexible resources, fosters innovation, and economies of scale.

Cloud computing operates based on an electronic device having access to the web, which grants it access to the data and software programs [2]. Although there are beliefs that

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claim that some specific boundaries and security issues related to the cloud might offer some difficulty when an organization attempts to shift, the health industry has taken the initiative to move to the cloud platforms despite those set challenges. The implementation of cloud computing technology helps healthcare organizations meet most of the problems faced in the provision of healthcare services. They also offer the healthcare sector opportunities to improve on the services they offer to their patients. It also enhances the easy sharing of information and cuts costs [3].

## Key Issues

Cloud computing is revolutionizing the health care sector. It has created an environment where patients' information can be easily posted to the doctor through the cloud computing system where their information is sent to the doctors without much of paperwork and reduces the chances of errors. In a normal hospital, patients will have their health records written in forms that they carry around from one doctor's room to the other. At one point, they may lose just one page of their medical records, creating a loophole and an error occurring in the final stages of treatment [4]. It rarely occurs, but when it occurs, the consequences are fatal. Doctors can get to know the coming patient's condition even before the patient gets to the office for physical assessment and treatment. It has been one of the key achievements of the medical industry through the cloud computing system [5]. The exchange and transfer of data and information can be said to be effective since doctors, and other medical departments are in a position to access the patient's data and information earlier so that they can have a look and examine it even before the patient arrives in the doctors or any other medical practitioner's office. The faster transfer of data and information reduces the workload that later leads to congestion in the hospital [6]. There has been a key issue of the decongestion of the hospital via the new technology since taking an example like the pharmacy department through cloud computing. There is a lot of packaging of drugs and other appliances to be used by the patient for treatment and recovery systems. They need to be packed and be ready when the client or the patient when he or she comes picking their prescriptions. Patients may cause some congestion in the pharmacy department if the section is not supplied with enough human resources. Through cloud computing, even with fewer human resources, they will be able to decongest the section to enhance the smooth running of activities and reduce the chances of patients confusing their drugs and recovery tools [7].

## Benefits

Cloud computing allows for safe storage of data and information. Several patients may be having some chronic diseases which require frequent visits to the hospital. The patient information should then be stored in a safe and private section with minimum distortion and extortion of information. Therefore, the hospital needs to develop and establish systems that should ensure the safety of the patients' records [8]. Using cloud computing in healthcare offers a flexible solution that allows the hospitals and healthcare professionals to support a network based on "remotely accessible servers". As in hospitals, there is a need to store a huge amount of data and files, so cloud computing is perfect for storing large volumes of files and data securely, which IT professionals maintain.

Therefore, it reflects that cloud computing has the answer to the security and privacy aspect of medical records, information, and data. During the patient's next visit, the doctor will easily retrieve the patient's medical records for further treatment and assessment. The records will be stored electronically, and hence, there will be no chances of error in patient handling, assessment, and treatment process [9].

The benefits of using the patient's guardian or the hospital administrator can upload the prescription to the mail ID pharmacy resulting in less waiting time for the patient to receive the medicine. Along with the patient can avail of a discount or cashback in a wallet which can be later redeemed on the next purchase [10]. This helps in cost-cutting for the prescribed medicine with a hassle-free payment process. And if there is any conjunction in the server for which it is problematic to place the order, then one can easily place the order over the phone. The most perfect utilization over online is that the doctor over the internet can easily examine the patient. Though it's not that effective, the patient can still be advised by the doctor remotely. It allows the storage of sample data of patients with ease, including his/her past medical history records and along with these files would be safe that no others can get through it. On requiring the data, the user can easily retrieve it with zero loss. The cause of the disease can be easily figured out, and the patient's health status can be easily analyzed [11].

Cloud computing also has another key aspect and element of development and revolution in the health and medical industry. Software development is one of the vital roles played by cloud computing. The healthcare sector has developed through software development that can be used to scan and determine certain ailments and medical challenges in the body [12]. Through rubbing the skin surface with oil, and by the usage of such software, the doctor can determine the level of damage caused by a certain condition and, at the same time, analyze the recovery process or the progress being made by the patient. It is through such kind of software that doctors can predict and be able to handle any issue that may be arising from the situation [13]. They will also be able to administer a new prescription depending on the results indicated by the software. It should be noted that the scan is in the form of a video; hence one can decide to view the situation from various angles for one to be sure of the condition [14].

1. Push notification should be turned on, and SMS token code should be enabled.
2. OTP or the one-time password should be opted in.
3. secure the ID with a strong combination of numerals alphabets as well as with special characters) this method can help in cloud authentication storage.

All these methods ensure the user secure their storage from malware and various viruses attacks. Entering passwords to unlock is quite common nowadays, so scanning with fingerprints along with it makes it more secure than before. If anyone logs in to one's account, then it can easily be traced, including the location and IP address [15].

Through the software, doctors can determine the gender of the unborn child, which is a great milestone in the medical sector and helps the couple and the family prepare for the birth of the unborn. It has helped the family in other issues like child naming since it is now easier for the family to name the child earlier enough since they already understand and know the gender of the child. Cloud computing has helped the healthcare sector in lowering their costs. The work done by the cloud computing software can be handled by a huge human resources resource operating in the areas covered or substituted by the software [16].

On using cloud computing services, there is no need of maintaining patients' data physically using pen and paper. Instead, all the records are being stored in the cloud, which ensures security and is easily accessible remotely from anywhere. All the records can be maintained or modified online. Moreover, paperless records are possible through it. All the records and transactions would be seamless and virtually. No unauthorized person can access the files, and the authorized users would have access to them [17].

Hospitals will need to hire various professionals who should carry out activities

computerized in real life. The activities like accounting have been a challenge where the hospital will need a good number of accountants who will work at ease and with the required speed and workload to ensure the activities' efficiency in the finance section. But the cloud computing software would require two or three operation professionals to handle the payments, which are made electronically, which will help reduce the congestion in that department. With the development of cloud computing, patients need to deposit their payments, and the computer-generated program will automatically produce their receipts of payment [18].

Hence, the human resource task force will be reduced, saving a lot on the costs involved in the hospital or the healthcare operations. For example, a hospital would consist of three employees in every department. The introduction of the cloud computing will help reduce the human task force in the various sections to a minimum of two per section, hence cutting down a significant amount of costs. It would be easier to maintain the software than remunerating the employees every month until their contracts expire [19]. Several health care parameters are there (Reproductive outcomes, Identification of death causes for increasing life, determining the quality of life). Data related to one's health conditions, clinical metrics with the socioeconomic, environmental, and living standards are included here. The information that one's suffering regarding health consists within this section [20].

Through cloud computing, hospitals have been able to access high-powered analytics, which is used in the patients' treatment process. When a patient has been diagnosed with a certain condition, it automatically clicks that there is something wrong with their body organs and functions. Patients are sent to the laboratory sections in the healthcare sector, where samples of their blood, urine, stool, and cough matter are collected for further analysis. In the hospital laboratory, high-definition powered analytics software's are being used to get and help produce the best and correct prediction for the patient's situation [22]. The material that is being analyzed is subjected to high definition and algorithms that have been configured to produce such a prediction whenever a certain matter is realized from the samples. High powered analytics reduces the margin of error and gives the correct prediction concerning the patient's conditions. It has helped in overcoming some of chronic diseases like cancer and diabetes. The laboratory analysis can help in predicting the level of damage caused by the condition. It will also help the doctors come up with the right decision by getting to understand their chances of survival. It is one of the ways that have helped the industry and helped the family, friends, and relatives of the patient make a sober and right decision on behalf of their relatives [18].

Lastly, cloud computing has helped to increase telemedicine capabilities. Many patients may be strong and maybe in a position to recover from home. Through the telemedicine capabilities, the patient is receiving medical care and attention straight from his or her bedroom in the house. The doctor can rely on cloud computing software to handle different patients at a different location at the same time. The patients require to have access to the internet and the cloud computing software to follow the doctor's instructions wherever the location they are. They need not be in the same location as the doctor to access the medical attention they require. Most of the hospitals and healthcare sectors have applied the technological advancements in improving their services and operations, enhancing reliability and effectiveness hence a greater recovery of the patients [21].

## Challenges

Despite the cloud computing having all those achievements, there are a couple of challenges associated with the technological

advancements. Too much-developed technology can be good and worse at the same time. The biggest concern of cloud computing is the privacy and security of the healthcare industry [25]. Technology is a result of man, and hence there may be those individuals who are ill-minded. They can use the information for the wrong purpose if they bypass the program's security features [16]. Some individuals may wish to make money out of the system. This can be noted through accounting or any other department in the healthcare system. They may decide to interfere with the system and distort the running of the program. It is one of the security concerns that most of patients are usually worried off [24].

Data and information encryption is the other challenge bothering the patients and other individuals, almost everyone who uses cloud computing services. The encryption worries the patients that if a single doctor were not able to interpret correctly that which has been configured, it would be a disaster for the patient. Therefore, it is one of the challenges and fears that the patients should be made aware of for their lives. At the same point, there is the challenge of insecurity, which arises when such a cloud of computer-generated rays scan through the patient's body [17]. The patient may wonder what other forms of effects the rays may introduce to their bodies. Will the situation or the condition worsen due to the introduction of rays into their bodies? Some patients may fear for their lives when such matters are being used to assess their bodies.

Another challenge associated with the healthcare system's cloud computing services is the downtime of the systems. Anything that is operated via the machine can face some technical hiccups, which are normal. But the worst fear is being on a life-supporting machine controlled by cloud computing features, and the system experiences some downtime in the process [26]. It would be a challenge to the hospital since the failure of the cloud computing software would translate that the hospitals should deploy their human resource or their human workforce to assume the services which were being undertaken by the system. It would prove to be a challenge since the system may experience some downtime at a specific time. The required task force or the workforce may not be readily available to assume the system's roles and functions. It would lead to a state of confusion. The room for making an error would be very high since the experts would require quite a good time to familiarize themselves with the hospital system after a while since the cloud computing system earlier assumed their roles. Therefore, it would be a challenge for the healthcare sector to catch up with what the system helped the doctors and other medical players in the field [4].

## Protection Procedures on Cloud

Encryption ensures SP or service providers along with their administrators and third parties, do not have access to one's private information. What one does is opt-in for the after steps of a form. So, the user must be aware of reading each and every word or line thoroughly before signing or preceding through a form. The privacy settings must be re-configuring every month to avoid leakage of personal credentials. Two-Factor authentication is very vital to make the profile secure from fraud and unauthorized access. Moreover, an antivirus is quite the essential part of resolving these issues and getting rid of them

Passwords must always contain a mixture of alphabets, numerals, and special characters. If anyone tries to get access to a PC or someone's cloud storage, then it is advisable to check in for two-factor authentication. It helps a user to get the stranger's IP address and location. Personal information is always sensitive so the more one keeps it secret the more benefits one is supposed to achieve. Installing a genuine version of malware software or antivirus that can assists in unwanted files to enter into the system and corrupts one's personal data.

## Methodology, Summary, and Discussion

Healthcare is the backbone of any activity that is being undertaken by humans. It is easier to develop and innovate great things with proper health, which may even affect our lives and health positively. In various laboratories globally, artificial intelligence and machine learning have started to take course in the healthcare sector as they did in the manufacturing sector. Machines are fed with the required algorithms that are supposed to be used in a particular way and give results that have been trained effectively to ensure that they achieve what they are meant to achieve. Using the healthcare laboratories, some small amounts of matter and substance are required to give desired results. With the use of naked eyes, human beings are not able to measure and mix such matters and chemicals with efficiency. Therefore, it is the point where machine learning and artificial intelligence get in to help humans get the right proportions [19]. Across worldwide, there is a vast usage of AI (Artificial Intelligence) as well as machines that can diagnose patient disease along with its remedy and required medicine. Moreover, AI and other machines have learned the mixture of two or more compositions of medicine accurately, which is not exactly possible for humans to do. There are certain algorithms required to make these machines execute programs that are required and provide distinct reports. So, it has proven a huge positive impact in the medical sector.

In summary, the advantages brought about by cloud computing into the healthcare industry and the sector is far much ahead of the challenges experienced in the whole medical process. As we all know, machines are used to make work easier. Still, in the healthcare sector, they make work easier, but they also increase the level of accuracy of the intended results of a particular activity. The cloud computing software has also enabled the success of complex surgical operations like heart transplant, kidney transplant, among other successful operations that are being conducted [27].

## Results

Cloud computing is the act of delivering various services via the internet. Now, the resources are made up of tools and applications such as data storage and databases. After that, cloud computing provides more advantages to the healthcare industry, and the sector gets more experienced to use this type of technology. Using the healthcare laboratories, some small amounts of matter and substance are required to give desired results.

## Conclusion

In conclusion, technology is evolving and developing day by day. Therefore, it is important to note that technology should be used for our good and not for the worse. Almost every sector of life has been computerized, and hence the healthcare sector has not been left behind in terms of technological advancements in the sector. I would recommend for more extensive and expansive research be carried out in all the healthcare sections to ensure that every department has a technological backup that can function even better than the human workforce [6].

With every new day, technology is also improving hugely. It is giving society a new phase with its evolving innovations. The user must utilize it to the best and for good purpose. Nowadays, almost all sectors such as banking, offices, shops, etc. have been made computerized. So do the hospitals. It is also no longer manually operated. By doing so, there are noticeably fewer blunders.

There is no doubt that the technology or the online methodology is being applied all over the hospital sectors, but it shouldn’t pause over here. More research should be carried out to improvise the healthcare departments. Along with the development of technologies, it ensures technical backup functions better than

hospital staff and employees. Government should show interest and assist in working beside scientists and medical experts to modify more upgraded machines to save more people's lives. Training should be more extensive for the health care units resulting in minimizing any errors for the workers and staff.

Therefore, it is the role of various governments to collaborate with scientists and medical experts to help develop and innovate even more machines that can be used in the medical sector to help in saving and protecting life. Lastly, there needs to be a lot of training of the medical personnel entitled to the cloud computing software's management and operations. The machines' attendants should be well equipped with every bit of information involved with the medical software's hence increasing the chances of survival and hence improved life expectancy [9].

## Conflict of Interest

In the interest, cloud computing involves on the entity process, and machines of the healthcare system are involved in the cloud computing system. The privacy system of the machines has been provided through the technologies of software management. After that, the machine-learning program has included in medical products, and it helps to increase the efficiency of all products. The laboratory analysis can help in predicting the level of damage caused by the condition. The products are protected with artificial intelligence systems, and the human workforce system also gets advantages through cloud computing programs.


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# Private General Practitioners' Agreement on Skills and Competencies for Universal Health Coverage in Urban South Africa - A Descriptive Cross-Sectional Survey

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***Abstract***

*Globally, Sustainable Development Goals (SDGs) and Universal Health Coverage (UHC) are designed to ensure equity and quality health care. In South Africa, National Health Insurance (NHI) is the vehicle for it. Strategic purchasing and contracting private general practitioners (GPs) are key strategies. Skills training will prepare GPs for NHI. However, it is not clear as to which GP skills and competencies are currently implemented in practice. The study assessed GPs' agreement on skills and competencies in urban South Africa. A descriptive cross-sectional design and the online semi-structured survey was undertaken between 30 September to 14 October 2020. We targeted 5,212 private GPs registered on Medpages in Gauteng Province. Respondents who answered all questions were conveniently sampled. Data analysis was performed using SAS institute software, version 9.4. A four-point Likert scale was categorized as agree or disagree. A Wald Chi-square test evaluated associations between variables. Findings revealed that most had no government contract (84.3%, n=97) and were solo (53%, n=61). The majority were agreeable to the eye, ear, nose, and throat skills (93.3%, n=207). The least agreeable was the abdominal skill (32.7%, n=72). Logistic regression showed qualifications, work experience and type of practice were significant predictors. The GP contracts affected the skills range. Surveyed GPs did not agree on many listed skills. Significant predictors of an agreement to skills in the current practice were identified. The findings highlight the need to fast-track GP skills training in South Africa.*

***Keywords:*** *National health insurance, Private general practitioner, Skills, South Africa, Universal health coverage.*

## Introduction

Background: Globally, it is believed that primary health care (PHC) systems should optimally function for the UHC to be realized [1, 2]. Hence, the focus is changing in most African countries towards a single health service where public and private health are integrated to promote equity. South Africa responded by introducing of the NHI with the re-engineering of PHC [3, 4]. The White Paper on NHI indicated that private GPs were to be included as providers based on strategic purchasing and capitation payment for service rendered. However, the exact nature of contracting private GPs as service providers remains unclear [5, 6].

Problem: Private GPs appear to function sub-optimally in the private sector because the country faces a quadruple burden of disease, including high rates of the human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS) and tuberculosis (TB), high maternal and child mortality, non-communicable diseases, violence, and injuries that constitute the private and public mandate for care. In a study on GP's knowledge on Sexually Transmitted Infections

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(STI), it was demonstrated that doctors were not familiar with the management of STIs [7]. Despite the knowledge gap, there is currently no training pipeline adequate to meet the needs of the new health reforms. Hence, the NHI is a potential springboard to address that gap by accelerating skills acquisition.

Family medicine, as a discipline with postgraduate training, is about strengthening the capacity of PHC clinicians. In South Africa, family medicine became a recognized speciality in 2007. A national consensus on skills required of graduates styled a family physician as a specialist typically working from a rural district hospital. The findings of this study contributed to a list of skills and competencies which formed the basis for a four-year family medicine postgraduate training in South Africa [8]. As an innovative intervention to fast-track skills acquisition of primary care doctors in readiness for NHI, departments of family medicine in South Africa support a national postgraduate diploma [9, 10].

Innovation: As a prelude to the development of a new diploma in family medicine, a study was conducted to evaluate the self-reported learning needs of primary care doctors using 30 guidelines, 85 skills and 12 roles. A descriptive survey was conducted with a convenience sample of 170 private GPs and medical officers (MOs) from eight provinces in South Africa. Gauteng Province contributed 15 private GPs and 12 MOs. Broad roles, skills and competencies associated with learning outcomes for primary care doctors, including private GPs, were identified. The study had a mix of rural-urban and public-private general practitioners who were surveyed [10].

Concurrently, the learning needs survey and two national stakeholder workshops were conducted to strengthen PHC through primary care doctors and align all diplomas and design the national diploma for South Africa. Subsequently, roles and competencies for primary care doctors were conceptualized [11]. This reinforces the need to address findings by Moosa [12] regarding the lack of clarity on family physician roles in urban PHC clinics in Johannesburg, South Africa.

Rationale: It is envisaged that under the NHI, the majority of primary care doctors will be private GPs, especially in the urban environment [5]. Whilst rural needs are important, the urban settings will be increasingly greater and more of the norm. Private GPs may be disinclined to do a course that they perceive unsuited to the needs of an urban setting. There is a dearth of studies on private GPs agreeing to learning outcomes of the national diploma in family medicine. Understanding this could position private practice better by targeting and accelerating GP training. The research question was: What clinical skills and competencies listed in the learning outcomes of the SA diploma in family medicine do private GPs agree to in their current practice?

What we already knew about the topic included the fact that implementation of universal health coverage required strengthening of primary health care through GP skills, and there was consensus on core clinical skills and competencies as listed in the learning outcomes for the family medicine national diploma [10] and postgraduate training in South Africa. No studies had compared GP skills with learning outcomes of national diploma in family medicine for South Africa, and elsewhere.

Study purpose and objectives: The study assessed private GPs agreement to clinical skills and competencies, as listed in the learning outcomes of the SA diploma of family medicine. Objectives were to describe socio-demographics, the agreement on clinical skills and competencies among private GPs' current practice and to describe associations between clinical skills and social demographics. We hypothesized that the extent to which private GPs agreed or disagreed on the listed clinical skills and competencies provided a knowledge gap and learning need. Ideally, the diploma

qualification should be the minimum bridge between the trained and untrained GP.

## Materials and Methods

The study design was a descriptive cross-sectional online survey. Study setting: We recruited participants from Gauteng Province. It was the largest province by population, dense and highly urbanized. It had the highest concentration of private GPs in South Africa [13, 14].

Study population: Using Medpages, a database that supplied healthcare provider contact information across the African continent, we targeted 5,212 registered GPs and family medicine specialists [15]. Sampling: After simple randomization of 5,212 private GPs registered on the Medpages in Gauteng, we invited 2,780 private GPs to participate in the on-line survey from 30 September to 7 October 2020. The focus of our study was on private GPs as opposed to full-time public sector ones.

Inclusion and exclusion criteria: Those registered on Medpages at the time of the study and consented to participate in the study. Exclusion: General practitioners and trained family physicians in full-time public sector employment were excluded. The sample size was determined by conveniently including all 115 respondents who completed the online questionnaire in full. Incomplete questionnaires were not considered for analysis. We had pre-determined a response rate of at least 10% as acceptable as this was conducted at the height of the Covid-19 pandemic.

Data collection: Selected private GPs on the Medpages database were e-mailed the study information letter, consent form and the link to the survey monkey questionnaire to determine the degree of agreement on the listed skills and competencies derived from the learning outcomes of the national diploma in family medicine [10, 11]. The first question was about consent. Questions 2-8 were on socio-demographics, and questions 10-22 on the degree of agreement on clinical skills. Questions 23-25 addressed agreement on the listed competencies. Hence, respondents were surveyed over 86 questions on a four-point Likert scale, namely: “strongly agree, agree, disagree and strongly disagree”. Also, there was a question on the NHI. A pilot study was conducted with 10 pilot respondents within the researcher’s networks to identify the average time, which was needed to complete the questionnaire. Thus, researchers tested connectivity and other logistics. The pilot respondents were not added to the main study.

Data analysis was performed on the SAS (SAS Institute Inc, Carey, NC, USA), Release 9.4. Respondent demographic characteristics and options on a four-point Likert scale were key variables. The Likert scale assessment was further categorised broadly as agree or disagree. The categorical data were reported as frequencies, numbers, and ratios. Nominal and ordinal data were reported as scores in means, median, and interquartile range. Independent variables were socio-demographic characteristics such as age, race, gender, postgraduate qualifications, the nature of employment contract with the State and the type of private practice. The dependent variables used were the level of agreement on the listed core clinical skills and competencies as stated above. Differences between respondent socio-demographic characteristics and the degree of agreement on core clinical skills and competencies were analysed. A Wald Chi-square test evaluated the associations between categorical variables.

For multivariate logistic regression analyses the predictor variables were age, race, highest postgraduate qualification, years of work experience and the type of private practice. The logistic regression tested the strength of association between statistically significant skills, competencies, and predictor variables. Odd ratios (OR) with 95% CI and p-value $\leq$ 0.05 considered statistically significant were tabulated.

Ethical approval was obtained from the University of Witwatersrand Human Research Ethics Committee and four district research ethics committees in Gauteng. This study's approved protocol reference number was M1811115, and the National Health Research Database reference number was GP_201903_02(1).

Each respondent was availed of participant information and an option to consent and opt-out at any stage of the research. Information collected was anonymous, confidential, and secured by the lead researcher. Also, we acknowledged that respondents might have experienced discomfort and lost time when completing the questionnaire.

Publication of this manuscript is supported and consented for by both authors. Data and material availability: All data and material used for the analysis of this research findings can be obtained from the corresponding author at any given time and no cost.

## Results

Of the 2,702 (97.2%) messages sent to participants, 78 (2.8%) were undelivered, while 1,249 (46.2%) clicked through and 11 (1.4%) were unsubscribed. Consent was obtained from 162 participants, while 2 skipped the consent. of the participants who completed the questionnaire in full were 115. The response rate was 13.1% of the recipients.

### Socio-Demographic Characteristics of Private General Practitioners

The mean age of respondents was 49.5 years, between ages 27 and 79 years old. Many were male (53%) and white (49.7%). The most common additional qualification was a diploma or higher diploma.

The vast majority had no formal employment contract with the government, and over half of them were in solo practice (53%), summarized in Table 1.

### Clinical Skills agreed to as Needed in Current Practice by Private General Practitioners

The eye, ear, nose, and throat were the most agreed skill in the GP's current practice (93.3%, n=207 responses), followed by respiratory, general surgery and communication. The skills which were less agreed to were postpartum care (59.3%, n=192), antenatal (52.7%, n=117) and forensic medicine (43.5%, n=94). The least agreed to being the abdominal skill such as proctoscopy (32.7%, n=35) and summarized in Table 2.

### Clinical Competencies which Private General Practitioners agreed were Needed in their Practice

All listed competencies, except one, were agreed to by GPs practice with responses of more than 80%. The least agreed to was community advocacy (63.3%, n=136 responses) and summarized in Table 3.

Approval rating on NHI: Of all 115 respondents to the NHI question, there was a combined approval rating of 46.1% (n=65) with a disapproval rating of 53.9% (n=62). However, 13.9% of respondents (n=16) strongly approved NHI, while 24.3% (n=28) strongly disapproved it.

### Associations between Variables and Degree of Agreement

The dependent variable was the four (4) Likert scale: strongly disagree, disagree, agree, or strongly agree. These responses among GPs on the utilization of skills and competencies in practice were then combined as agree or disagree. Listed skills and competencies were matched against significant predictor variables, which were qualification (degree, diploma, and certificate), work experience in years (1-10, 11-20, 21-40, 40+) and the type of private practice (solo, group or contracted). Age was not a significant predictor for agreeing on any skill.

**Associations between agreed Skills and Respondent Qualification**

Doctors with a postgraduate diploma were more than two-fold more likely to agree with communication and consultation skills compared to those with certificates. Also, GPs had 1.38 times more likely to agree with an emergency than paediatric care.

**Associations between Orthopaedic Skill and Work Experience**

Work experience was the most significant predictor of association with using orthopaedic skills. General practitioners with 40+ years of experience had six-fold more likely to agree with orthopaedic skills compared to doctors with 1-10 years experience. There was an inverse relationship between years of experience and agreeing with orthopaedic skills.

The type of private practice had the most clinically significant association with emergence care, although the general medicine skill had the highest likelihood to agreeing. Group practice doctors were almost four-fold more likely to agree to general medicine skills compared to contracted doctors. As summarized in Table 4, this was followed by general surgery, where group practice doctors were also almost four-fold more likely to agree to the skill compared to contracted doctors.

In summary, respondents were on average, 49.5 years old, male, and white. The most common additional qualification was a diploma. A vast majority had no formal employment contract with the State. Over half were in solo practice. Most GPs agreed to the eye, ear, nose, and throat skills (93.3%, n=207). Generally, respiratory, general surgery and communication were other skills agreed to by GPs (Table 2). The least agreed was the abdominal skill like proctoscopy (32.7%, n=72). Also, GPs agreed to all competencies, except community advocacy (63.3%, n=136) as summarized in Table 3.

Table 1 shows the mean age of respondents was 49.5 years, between ages 27 and 79 years old. Many were male and white. The most common additional qualification was a diploma or higher diploma. The majority had no formal employment contract with the government, and over half of them were in solo practice.

**Table 1.** Socio-demographic Characteristics of Private General Practitioners (N=115)

| **Characteristic** | |
|---|---|
| **Age in years (N=115)** | |
| Mean (±SD) | 49.5 (±11.91) |
| Median (IQR) | 49 (40 – 57) |
| Minimum / maximum | 27 / 79 |
| **Gender (N=115)** | |
| Male | 61 (53%) |
| Female | 54 (47%) |
| **Race (N=115)** | |
| Asian | 22 (19.1%) |
| Black | 32 (27.8%) |
| Coloured | 2 (1.7%) |
| White | 57 (49.7%) |
| Other | 2 (1.7%) |
| **Qualifications (N=115)** | |
| Master's degree | 28 (24.3%) |
| Diploma / higher diploma | 34 (29.6%) |
| Diploma / higher diploma + master's degree | 4 (3.5%) |
| Certificate | 27 (23.5%) |
| Certificate + diploma / higher diploma | 4 (3.5%) |

| | |
|---|---|
| Certificate + diploma / higher diploma + master's | 4 (3.5%) |
| Certificate + diploma + master's + doctorate | 1 (0.9%) |
| None | 13 (11.2%) |
| **Employment contract with the State (N=115)** | |
| Contract part-time or sessions | 3 (2.6%) |
| Permanent part-time or sessions | 1 (0.9%) |
| Permanent full-time | 14 (12.2%) |
| None | 97 (84.3%) |
| **Type of private practice (N=115)** | |
| Contracted to a private company | 6 (5.2%) |
| Contracted to another individual | 11 (9.6%) |
| Group practice | 37 (32.2%) |
| Solo independent practice | 61 (53.0%) |

Table 2 shows overall, the eye, ear, nose, and throat skill was the most agreeable to in the current GP practice (93.3%, n=207). The least agreeable skill was the abdomen skill, for example, proctoscopy (32.7%, n=35).

Agreeable skill meant combined agreeable and strongly agreeable responses from above.

#Total responses differed with each skill and added up to 100% of respondents.

**Table 2.** Agreeable skills and Responses in the Current Practice by Private General Practitioners (N=115 General Practitioners; 7117 Responses)

| **Skill** | **Number (%)** | | | | **Total (Responses differed per skill) #** |
|---|---|---|---|---|---|
| | **Strongly Disagree** | **Disagree** | **Agree** | **Strongly Agree** | |
| General medicine | 44 (10.1) | 48 (11.0) | 153 (35.0) | 192 (43.9) | 437 (100) |
| Abdomen/ gastrointestinal | 37 (34.6) | 35 (32.7) | 25 (23.4) | 10 (9.3) | 107 (100) |
| Chest/ respiratory | 22 (4.1) | 49 (9.3) | 167 (31.8) | 288 (54.8) | 526 (100) |
| Antenatal care | 67 (30.2) | 38 (17.1) | 72 (32.4) | 45 (20.3) | 222 (100) |
| Intra-partum care | 228 (41.6) | 132 (24.1) | 118 (21.5) | 70 (12.8) | 548 (100) |
| Post-partum care | 74 (22.8) | 58 (17.9) | 123 (38.0) | 69 (21.3) | 324 (100) |
| Women's health | 23 (7.1) | 57 (17.7) | 111 (34.5) | 131 (40.7) | 322 (100) |
| Pediatric | 86 (15.9) | 82 (15.1) | 206 (38.0) | 168 (31.0) | 542 (100) |
| General surgery adult | 66 (7.7) | 99 (11.5) | 261 (30.4) | 433 (50.4) | 859 (100) |
| Orthopedic | 68 (12.5) | 109 (20.0) | 194 (35.7) | 173 (31.8) | 544 (100) |
| Emergency care | 131 (12.2) | 216 (20.0) | 364 (33.8) | 367 (34.0) | 1078 (100) |
| Eye, ear, nose, and throat | 3 (1.3) | 12 (5.4) | 128 (57.7) | 79 (35.6) | 222 (100) |
| Skin health | 39 (11.8) | 65 (19.7) | 143 (43.3) | 83 (25.2) | 330 (100) |
| Forensic medicine | 58 (26.9) | 64 (29.6) | 49 (22.7) | 45 (20.8) | 216 (100) |
| Clinical administration | 25 (7.8) | 43 (13.4) | 145 (45.2) | 108 (33.6) | 321 (100) |
| Communication and consultation | 40 (7.7) | 53 (10.2) | 230 (44.3) | 196 (37.8) | 519 (100) |
| Total responses | 1011 (14.2) | 1160 (16.3) | 2489 (35.0) | 2457 (34.5) | 7117 (100) |

Table 3 shows overall, GPs agreed to all listed competencies in the current practice of at least 80% responses across. The least agreeable skill was community advocacy (63.3%, n=136).

Table 4 shows the type of private practice had the most clinically significant association with emergence care. General medicine skills had the highest likelihood to the agreement. The group practice doctors were almost four-fold more likely to agree to general medicine skills compared to contracted doctors.

**Table 3.** List of agreeable competencies in the current practice by private general practitioners (N=115 general practitioners ; N=1067 responses)

| Competence | Number (%) | | | | Total (Responses differed per skill)# |
|---|---|---|---|---|---|
| | Strongly Disagree | Disagree | Agree | Strongly Agree | |
| Competent clinician | - | 2 (0.9) | 60 (28.3) | 150 (70.8) | 212 (100) |
| Change agent | 4 (1.9) | 16 (7.5) | 75 (35.2) | 118 (55.4) | 213 (100) |
| Critical thinker | 3 (2.8) | 14 (13.1) | 51 (47.7) | 39 (36.4) | 107 (100) |
| Capacity builder | 1 (0.9) | 4 (3.8) | 55 (51.9) | 46 (43.4) | 106 (100) |
| Collaborator | 3 (1.4) | 7 (3.3) | 107 (50.0) | 97 (45.3) | 214 (100) |
| Community advocate | 28 (13.0) | 51 (23.7) | 87 (40.5) | 49 (22.8) | 215 (100) |
| Total | 39 (3.6) | 94 (8.8) | 435 (40.8) | 499 (46.8) | 1067 (100) |

**Table 4.** Associations between agreeable skills and type of private practice

| Skill | Type of practice | Odd Ratio | Wald Chi-Square | P-value | 95% CI |
|---|---|---|---|---|---|
| General medicine | Solo vs contract | 3.28 | 9.76 | 0.008 | 1.41-7.61 |
| | Group vs contract | 3.63 | | 0.008 | 10.50-18.54 |
| General surgery | Solo vs contract | 2.48 | 18.63 | 0.001 | 1.41-4.34 |
| | Group vs contract | 3.56 | | 0.001 | 1.98-6.38 |
| Orthopaedic | Solo vs contract | 1.86 | 8.13 | 0.017 | 0.99-3.50 |
| | Group vs contract | 2.56 | | 0.017 | 1.34-4.87 |
| Emergency care | Solo vs contract | 1.68 | 15.15 | <0.001 | 1.07-2.62 |
| | Group vs contract | 2.54 | | <0.001 | 1.59-4.06 |

## Discussion

This study described skills and competencies agreed to by private GPs as currently practiced and needed to function optimally under NHI. Most GPs agreed with the eye, ear, nose, and throat skills because they were probably the most challenging clinical disciplines in which to refer patients. Generally, respiratory, general surgery and communication skills were agreed to because they may be common clinical presentations in private practice. Also, GPs agreed less with postpartum care, antenatal, and forensic medicine, probably because these skills may frequently be prone to medico-legal risks. The least agreeable was the abdominal skill such as proctoscopy followed by intrapartum care, which may be attributed to both needing special preparations and environments to perform.

A diploma was the most significant predictor for GPs agreeing to the orthopaedics skill. Private GPs who possessed a postgraduate diploma were more likely to agree to the orthopaedic skill compared to certificate holders. However, the finding should be considered with caution because our study did not specify the type of diploma. Under NHI, GPs will need to be appropriately skilled, accessible, and function optimally [10, 11]. This means training should be enhanced, targeted, and based on skills and competencies agreeable by general practitioners. Also, there was no difference between family physicians and private GPs in fee for service at the time of the study in South Africa. This observation underscores the need for fee recognition based on additional qualifications. Importantly, the performance of PHC systems in developing countries, particularly in Africa, and the impact of family medicine in the South African district

health services needed much improvement [16-20] Nevertheless, the national diploma in family medicine was a good start, though advocacy and synergy among stakeholders were needed even more.

Distinctly, there was a skill chasm between public and private GPs in South Africa [7] and probably beyond its borders. The private GPs were often untrained in the discipline of family medicine and entered private practice soon after medical degree graduation. The NHI demands GPs who are clinically skilled and competent to build trust and confidence in the service provided [21]. Hence, the training of most GPs should be facilitated to meet a pre-determined accreditation level and tracking improvements. This reinforces findings globally, which indicated that measuring changes in communication skills among primary care physicians before and after a part-time diploma in family medicine showed that the skills could be taught and improved upon [22].

Although age was not a significant predictor of agreeing to any skill, work experience was inversely related to agreeing to the orthopaedic skill. The GPs with 40+ years of experience were six-fold more likely to agree to the skill compared to those with 1-10 years experience. This may be due to the fact that opportunities to work in the clinical domain of orthopaedics were not guaranteed in the private sector. The finding suggests that more attention is needed to expose orthopaedic skills to less experienced doctors in the post medical internship years.

The type of private practice was the most significant predictor for agreeing to the general medicine skill compared to others. The group of private practitioners were almost fourfold more likely to agree to this skill compared to contracted ones. Additionally, group practice doctors were fourfold more likely to agree to general surgery skills compared to the contracted ones (Table 4). The reason in both instances may be attributed to contracted private practitioners who worked under controlled conditions and may not have been in a position to explore their skills to full potential.

The approval rating for the NHI nearly split participants into half, which reinforces the work by Mathew and Mash [23]. They conducted a qualitative study in Cape Town and showed anxieties by GPs relating to the government's strategy and impact on private practice. The finding emphasises the government's need to provide sustained conversations with private GPs and to explain this needed strategy to strengthen primary healthcare in South Africa.

## Study Limitations and Biases

The study had some limitations. However, the design was appropriate in this context to describe the clinical skills and competencies of a large private GP population which was surveyed online during the Covid-19 pandemic. The selection of participants and findings were confined to Gauteng Province and may not be generalizable to other provinces in South Africa or the continent. Nevertheless, researchers believe findings will provide leadership, policymakers and academics with information for targeted GP training which is a keystone to preparedness and implementation of NHI in South Africa.

Selection bias led to participation bias and non-response. The later occurred because some GPs were excluded from the survey. Hence, the absence of randomisation introduced confounding bias and compromised the internal validity of the study. Further, the self-reporting of skills by GPs could be influenced by social desirability, recall and rumination biases. Reliability may be affected by a small sample size, which leads to higher variability and bias.

However, the large number of responses from the questionnaire mitigated that assertion because 115 respondents were surveyed over 86 questions which represented 9,890 responses. Notwithstanding, statistical adjustments were used to further reduce the risk of confounding bias. The multivariate logistic regression was chosen for this purpose. Further, we had pre-

determined the response rate of at least 10% as acceptable, considering the COVID-19 pandemic at the time and its effect on the GPs' social, economic, and psychological well-being. Nonetheless, individual respondents' interest in the subject may influence their willingness to participate in the study.

## Conclusion

Private GPs did not use many of the clinical skills and competencies listed in the learning outcomes for the SA diploma in family medicine. This finding may suggest a re-think on the existing consensus of listed learning outcomes of the national diploma in family medicine, South Africa.

What this study adds is that qualifications, work experience, and type of practice were significant predictors of agreeing to a skill. Identified predictors of agreement may be considered in future as necessary ingredients in broadening the GP's skills and competencies which could improve service delivery at primary health care under new health reforms sweeping South Africa in particular and the African continent in general. Age was not a significant predictor of agreeing with any skill. Hence, an opportunity exists for a qualitative study to explore reasons for private GP's disagreement with listed skills. Further, the need for dialogue between private GPs and the government on various aspects of the NHI has been highlighted. We reinforce the need to focus on accelerated GP training and readiness for the NHI in South Africa.

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# Patient Satisfaction with Non-Pharmacological Pain Management during Labour at a Midwife Obstetric Unit in a Peri-Urban South Africa - A Descriptive Cross-Sectional Study

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***Abstract***

*Patient's satisfaction with pain management is vital for quality care. Therefore, pharmacological and non-pharmacological interventions do contribute significantly to pain control. The aim was to determine patients' satisfaction with non-pharmacological pain management in labour. A descriptive, cross-sectional design was conducted from June 2017 to March 2019. Participants were conveniently sampled to include 311 women three days after normal delivery. The research tools were Pain Satisfaction and American Pain Society Outcome Questionnaires were used to collect data. Univariate logistic regression was used to test for associations between variables. Findings of the study revealed a mean age of the women was 26.9 years, and 90.4% were Black, IsiZulu speakers, having two children and had secondary education. Moderate pain was experienced in 49.2%, and herbs or prayer were used by 55.3%. To relieve pain, participants reported deep breathing (26.2%), walking (22%), massage (21%) and prayer (14%). Effective pain relief was in 53.1%, while satisfaction was by 56.3%. The only statistically significant predictor of dissatisfaction was the number of live births (p=0.003). One live birth compared to four live births was more likely to be dissatisfied (OR=11.5; 95% CI 1.4-97.2). Findings suggest that non-pharmacological interventions are effective. The moderate pain experienced by a significant proportion may signify the need for pharmacological treatments. The association between low parity and dissatisfaction warrants further research.*

***Keywords:*** *Midwife Obstetric Unit, Pregnancy, Pain Management, Patient Satisfaction, Parity.*

## Introduction

The Department of Health (DOH) in South Africa provides free medical services to all pregnant women at primary care levels and at hospitals, thus ensuring access to all pregnant women for safe delivery services [1]. The facilities that provide these services are community health centres (CHC) and are usually staffed by mid-wives and registered nurses with a doctor on-site if the need for their services should arise [1] The CHCs also have Midwife Obstetric Units (MOU), which means that they deliver basic obstetric services twenty-four hours a day and on average Phola Park CHC delivering 1623 babies annually. There are constant efforts to improve access and provision of maternity care, but little is done to address and improve the quality of maternity care in some countries [2].

Patient satisfaction has generally been measured using validated and reliable tools such as the Intrapartal Specific Quality from the Patient's Perspective Questionnaire and the Six Simple Questions (SSQ) or Perception of Care Adjective Checklist methods and so forth [3, 4, 5, 6]. Patient satisfaction is an important factor in a health system because it is also an indicator of the quality of health care provided by an institution [7]. In labour, pain is measured using

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the pain assessment scales, which are subjective measurements. These include the Visual Analogue Scale, the Numeric Rating Scale, Wong-Baker FACES Pain Rating Scale (and revised version), Brief Pain Inventory-Short Form, British Pain Society pain rating scale, Pain Quality Assessment Scale and McGill Pain Questionnaire Short Form [3-6].

Culture and ethnicity also played a role in the way people express pain or cope with it [8]. For example, women of Italian origin were found to be very vocally expressive of their pain, whilst Scandinavians were less vocal. African American patients were found to be more likely to verbally exaggerate their pain in comparison to their European American counterparts. A research project involving different ethnic groups measured how the groups responded to painful stimuli by measuring diffuse noxious inhibitory controls and found that African Americans had the least increase in noxious controls (suggesting a lower pain threshold [8]. A study done in Nigeria by [9] showed that women in labour in that country scored very low pain scores, which is contrary to the findings of the European studies.

Southeast Asian women managed very high levels of pain without even verbalising their discomfort and even declined analgesia when it was offered [2]. Different cultures also used different words to express their levels of pain, and this may be misinterpreted if the context is not understood. The pain of childbirth may be heightened by anxiety (due to the release of catecholamine and ultimately norepinephrine).[2] Excess amounts of these chemicals can lead to poor contractility of the uterus, which is why anxiety coping mechanisms must be encouraged for patients in labour. Studies show that emotional and physical support and advocacy (and the use of doulas) for the patient are instrumental in lowering anxiety levels. In some countries, religion also plays a role in pain management as spiritual belief positively affects the patient's ability to cope with anxiety and pain [2].

Analgesia should be offered to all women in labour unless they expressly refused it or the analgesia was contra-indicated for the mother or baby. However, researchers observed that the use of analgesia was not common practice in the centre and was hardly ever offered to patients in labour. Hence, it seems there existed provider-attitude problems with regards to pain relief in labour because there was no genuine reason why analgesia was not administered to their patients with regularity. Nevertheless, there were several forms of non-pharmacological methods that could have been offered to woman in labour. Judging by the way many patients were writhing in pain, it was assumed that either the women had forgotten about them or did not know about them. Researchers were particularly interested in knowing how women coped and managed with birthing pains as most of them appeared to suffer excruciating pains.

The purpose was to evaluate coping and managing of labour pain using non-pharmacological methods among women who presented to the MOU in labour. The aim was to assess patient satisfaction with labour pain management treatment options in the midwife obstetric unit at Phola Park CHC. Objectives were to describe the socio-demographics, the severity of pain experienced, the proportion of patients who were satisfied, and associations between socio-demographic characteristics and patient satisfaction with non-pharmacological pain management during labour.

## Materials and Methods

### Study Design

A descriptive cross-sectional design and review of patient delivery notes were utilized.

### Study Site

The research was conducted in Ekurhuleni, South Africa, with a population of approximately four million. It is one of the three metropolitan municipalities in Gauteng [1]. The survey took place between June 2017

and March 2019. The study site was Phola Park Community Health Centre (CHC), which was a primary health care facility that provided free health care to children and pregnant women. Among other services, the CHC had a Midwife Obstetric Unit (MOU) that provided basic obstetric care at all hours. It had nine post-delivery beds, three delivery beds in the assessment room and a staff compliment of four doctors and twenty midwives that worked shifts. On average, the MOU delivered 1,623 babies annually [1].

## Study Population

All women of reproductive age who delivered by normal vaginal delivery and utilised the obstetric services provided at Phola Park MOU over the period of the study.

## Sample Size

On average, Phola Park CHC delivered 1,623 babies per annum. Using 95% confidence interval with a margin of error of 5% and 50% response rate, a minimal sample size of 311 was needed. This sample size was calculated using Raosoft formula, an online software application [10].

## Selection of Participants

Patients aged at least 18 years, who had at least one live birth, were of any nationality, had delivered by normal vaginal delivery at Phola Park CHC and were attending their three-day post-partum check-up at the clinic were invited to participate in the study on that day. Complicated and high-risk patients who were successfully delivered at Phola Park CHC before they could be referred to the hospital were also selected for the study.

## Inclusion and Exclusion Criteria

All mothers who delivered live babies by normal vaginal delivery at Phola Park CHC during the period of the study agreed to be a part of the study and signed the consent form were included. Those excluded were those who refused to participate, and were unable, by law, to sign consent forms, like those that needed a guardian's consent or had an intellectual disability. Also excluded were mothers who delivered soon after arrival at the MOU and whose progression was not monitored by MOU staff.

## Sampling Technique

Patients were given information about the study, including study information, while in the post-natal waiting room. Women were invited to participate in the study and informed that participation was voluntary and would not harm them or their babies in any way. Patients were informed that should they decline to participate in the study, and then their refusal would not in any way influence the quality of care that they would get. Once a patient had completed answering the questions, they were thanked and asked to leave the room and another patient was invited to enter the room, and the same process was repeated. The researchers used a convenience sampling technique until we reached 311 participants.

## Data Collection Tool

A validated questionnaire used in previous studies was adapted from the American Pain Society Patient Outcome Questionnaire and the universal pain assessment tool [54, 55]. The socio-demographic information on the questionnaire was modified, and this was done to add value to the questionnaire. The questionnaire was administered to the participants by the researcher. The first part of the questionnaire collected demographic information: patient reference number, date; gender; age; race; marital status, number of live births; the highest level of education, and home language. Information pertaining to the use of pain medication, traditional medication (or prayer water) and support during labour was also collected.

The second part of the questionnaire used the eleven-point rating scale to further enquire about: least and worst pain; pain over twenty-

four hours; how pain interfered with activities in and out of bed; how pain affected the sleep; how pain affected the mood and emotions; side effects from pain treatment; pain relief received; participation in pain treatment; satisfaction with results of treatment and information about treatment options. The last two sections of the questionnaire asked about the use of non-medical methods of pain relief (self-administered by the parturient) and how often patients were encouraged to use them. For those patients who did not speak English, the researcher sourced the assistance of a proficient interpreter to formulate the questions into local languages and back into English. All the respondents answered the same questionnaire which was in English. A pilot study was conducted involving 10 patients to adjust the questions and determine the average time to complete one questionnaire. These were not included in the final sample selected.

## Data Collection

Parturient who presented to the clinic for their third day postpartum visit were asked where they had delivered and only those who had delivered at Phola Park were invited to be part of the study. Patients were seen in the post-natal department of the clinic and interviewed individually in a side ward for privacy and confidentiality. Interviewing the patients separately also allowed patients to feel comfortable so that they could answer truthfully and without knowing how other patients answered. We started with gathering of the patient's demographic data, personal details, age and parity and mode of delivery. They were also given an information form to sign as well as a global consent form. The patients then answered questions from the structured questionnaire that was administered by the researcher. Pain is a subjective feeling, and some patients may struggle to rate it, that's why a Universal Pain Assessment Chart with a numeric scale and Wong-Baker faces was used in assisting patients to rate their pain [11]. Participants were asked to verbally describe their pain experience, then to rate it using the pain scale.

Once a patient had completed answering the questions they were thanked and asked to leave the room and another patient was invited to enter the room and the same process was repeated. The patient's delivery notes were also reviewed during the third day of the antenatal check-up to see if they were given any medication during labour. The answered questionnaires were kept safely by the researcher in a locked office after the interviews had been conducted. The electronic copies of the raw data, collected daily from the questionnaires, were saved using a code only accessed by the researchers.

## Data Analysis

We analyzed data using SAS (SAS Institute Inc, Carey, NC, USA), Release 9.4. A four-point Likert scale was categorized as satisfied or dissatisfied and the data was assigned to frequency tables. The categorical data was reported in terms of percentages, whereas the whereas the numerical data was reported as means and standard deviations. To test for significant relationships between demographic characteristics and satisfaction with pain management, a logistic regression analysis was performed with pain satisfaction (dissatisfied/satisfied) as a dependent variable and age, race, marital status, number of live births, education, and home language as independent as predictor variables. The p values of the Wald Chi-squared test were summarised in a table and statistical significance set at $p<0.05$.

## Ethical Consideration

Approval was obtained from the University of Witwatersrand. Reference number was M 170608. and National Health Research Database number was GP_201711_002. Participation of patients in the research was voluntary. Patients were supplied with

information sheets that were also explained to them and a voluntary, signed consent was obtained before any of the participants could proceed with answering the questionnaire. All the participants were assured of confidentiality and anonymity of their responses and the questionnaires were answered with each patient individually and the results kept safely by the researcher.

## Results

**Table 1.** Socio-demographic Characteristics

| Characteristic | Frequency % (n=311) |
|---|---|
| **Age (years)** | |
| Mean (±SD) | 26.9 (±6.04) |
| Median (IQR) | 27 (21 – 31) |
| Minimum / Maximum | 16 / 44 |
| **Race** | |
| Black | 281 (90.4%) |
| Coloured | 30 (9.6%) |
| **Marital status** | |
| Married | 116 (37.3%) |
| Single | 118 (37.9%) |
| Separated | 6 (1.9%) |
| Cohabiting | 71 (22.8%) |
| **Education** | |
| Primary education | 65 (20.9%) |
| Secondary education | 188 (60.5%) |
| Post-secondary education | 48 (15.4%) |
| University | 10 (3.2%) |
| **Home language** | |
| IsiZulu | 121 (38.9%) |
| South Sotho | 78 (25.1%) |
| IsiXhosa | 49 (15.8%) |
| Afrikaans | 15 (4.8% |
| English | 12 (3.9%) |
| Other (<4.0% each) * | 36(11.5%) |
| Total | 311 (100%) |

*Other includes Xitsonga (8), North Sotho (6), Setswana (5), Tshi Venda (5), Shona (5), Chichewa (2), IsiNdebele (2), Siswati (1), Kalanga (1)

The above table shows a mean age of 26.9; the majority of participants were Black; equal number of married and single participants; most had secondary education and mainly spoke local language IsiZulu.

**Table 2.** Severity of Pain Experienced by Patients in Labour

| Least pain experienced | Frequency % (n=311) | Worst pain experienced | Frequency % (n=311) |
|---|---|---|---|
| No pain | 3 (1.0) | Moderate pain | 1 (0.3) |
| Mild pain | 71 (22.8) | Severe pain | 45 (14.5) |
| Moderate pain | 153 (49.2) | Very severe pain | 136 (43.7) |

| | | | |
|---|---|---|---|
| Severe pain | 73 (23.5) | Worst possible pain | 129 (41.5) |
| Very severe pain | 9 (2.9) | - | - |
| Worst possible pain | 2 (0.6) | - | - |
| Total | 311 (100) | Total | 311 (100) |

The above table shows that almost half of the patients felt that the least pain they experienced was nonetheless moderate in nature, whereas the worst pain experienced by less than half was very severe.

**Table 3.** Satisfaction with non-pharmacological Pain Management Treatment Options

| **Satisfaction** | **Frequency % (n=311)** |
|---|---|
| Extremely dissatisfied | 7 (2.2) |
| Very dissatisfied | 13 (4.2) |
| Dissatisfied | 41 (13.2) |
| Satisfied | 70 (22.5) |
| Very satisfied | 175 (56.3) |
| Extremely satisfied | 5 (1.6) |
| Total | 311 (100) |

The above table shows 80.4% (n=250) of the patients were satisfied and 61% (n=19.6) dissatisfied with their pain management in the MOU.

**Table 4.** Non-pharmacological Pain Relief Options used by Participants

| **Pain relief option** | **Frequency % (n= 311)** |
|---|---|
| Deep breathing | 291 (26.2) |
| Walking | 244 (22.0) |
| Massage | 233 (21.0) |
| Prayer | 157 (14.1) |
| Heat | 111 (10.0) |
| Listen to music | 32 (2.9) |
| Relaxation | 19 (1.7) |
| Distraction (e.g., watching TV, reading) | 13 (1.2) |
| Cold pack | 8 (0.7) |
| Imagery or visualisation | 2 (0.2) |
| Total number of times methods were reported | 1110 (100%) |

The above Table depicts the most frequently used non-medical pain relief options were deep breathing (26.2%), walking (22.0%) and massage (21.0%) in that order.

**Table 5.** Odds Ratio (OR) and Confidence Interval (CI) as a Significant Predictor of Dissatisfaction

| **Number of live births** | **OR** | **CI (95%)** |
|---|---|---|
| 1 | 11.5 | 1.4 – 97.2 |
| 2 | 3.8 | 0.5 – 30.4 |
| 3 | 2.4 | 0.3 – 17.3 |

The above table shows that the less the parity, the more likely the dissatisfaction amongst the participants.

1. Patients with 1 live birth were 11.5 times more likely dissatisfied compared those with 4 live births.
2. Patients with 2 live births were 3.8 times more likely dissatisfied compared to those with 4 live births.
3. Patients with 3 live births were 2.4 times more likely dissatisfied compared to those with 4 live births.

4. Number of live births delivered by participants.

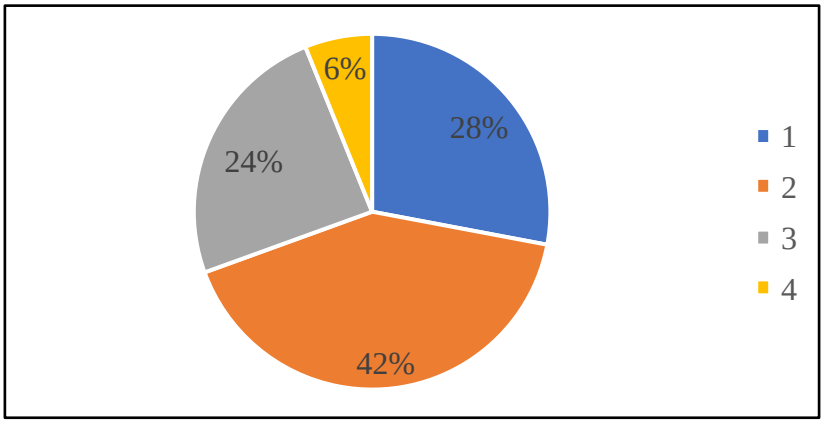


**Figure 1.** Number of live births

The above figure shows most participants had two live births and a minority had four or more births. The number of live births was the only statistically significant predictor of dissatisfaction (p=0.003).

## Discussion

### Sociodemographic Characteristics

The World Health Organization refers to all females between the ages of 15-49 as women of reproductive age [12]. Age is a relevant factor in our study because women between the age groups of 19 to 24 are more likely to have greater control of pain than women over the age of 30. This ability to manage pain amongst the younger age groups is due to their physical endurance and their general physique [13]. A study by Kigenyi did not find age to be a statistically significant finding in relation to how patients rated their pain satisfaction outcomes [14]. Our study, also, did not find age to be a statistically significant factor with respect to satisfaction with pain management (p=0.311). The findings could be explained on the basis that the body is programmed to feel pain as a response to an unwanted stimulus. Hence, being young or old is irrelevant, as pain will elicit a response at any age.

Studies conducted in Nigeria and Ghana reported that participants felt pain was the path that every woman endured as a rite of passage [15, 16]. They corroborated the belief amongst Nigerians that using analgesia for labour pain was a sign of weakness as labour pain was meant to be endured without any form of pharmacological pain relief [16, 17]. Such approaches to managing labour pains maybe be attributed to ethnicity, cultural beliefs, and ignorance about the available pain relief methods in birth setting [17]. Our study showed that race was not a significant factor in patient satisfaction (Table 1).

Home language was not a statistical predictor of dissatisfaction in our study (Table 1). Although languages may be different, South African culture and beliefs were intertwined and shared many major similarities which may explain the insignificance of language as a predictor of dissatisfaction. A study by Olayemi showed different results compared to our study, by suggesting that ethnicity may have had a bearing on how patients perceived and dealt with labour pain [9]. Our findings, however, did not concur with previous studies by Emelonye and Steel who reported that married women were more likely to report positive experience [18, 19]. Despite being married and sometimes willing to take active part in the delivery process, the African male may still be hindered by societal norms and prejudices about a man's role during labour.

Further, evidence shows that although multiparous women were less likely to request the use of pharmacological pain management in labour, they were more likely to report better satisfaction rates with pain management [15,

20]. This may be attributed to parturient who experienced labour before and knew what to expect. Multiparous parturient may have also witnessed resuscitations of babies whose mothers had received pharmacological pain relief. This might also explain the reluctance of these mothers to accept pharmacological pain relief. These findings align with our study which showed that the number of live births was a statistically significant predictor of dissatisfaction (Figure. 1). The less the parity, the more likely they were to be dissatisfied with their pain management. Despite the finding, the confidence interval was quite wide, meaning the finding must be taken with caution.

The level of education was not a statistical predictor of dissatisfaction (Table 1) in the current study. However, [19, 21] showed respondents with a higher education level were less likely to request or use pharmacological pain relief whilst in labour, despite not using any form of medical relief option. Also, they were more likely to be satisfied with their overall management of pain in labour. These studies found that a higher education may also be associated higher pain perception levels than those patients who were less educated.

### Severity of Pain Experienced by Patients in Labour

Pain intensity is a major factor with regards to pain management in labour [22]. When questioned about pain intensity, namely, the least pain they had experienced, almost half of the participants felt the pains were at best, still moderate (Table 2). Hence, it may be prudent to introduce combinations of non-pharmacological and pharmacological pain management plans at clinic level to those parturient who are willing to try out both methods. Another alternative would be to introduce a combination measure, such as non-opioids, deep breathing, massage, and heat together. These measures would, however, require the presence of Doulas or additional staff in the MOU. Our study findings are in keeping with findings by Akadri who showed that most of the participants rated their labour pains as moderate or severe [21].

### Satisfaction with pain treatment during labour

The pharmacological options available in clinics, as per the South African maternal guidelines, provided for the administration of pethidine, phenergan, or entonox for pain relief in labour [19]. In our centre, pethidine and phenergan were available for the patients. Pethidine remains one of the most used opioids in the management of pain and is used in most countries throughout the world. It is relatively inexpensive and is easy to administer and can be prescribed and administered by a midwife, which makes its use widespread in obstetric units [23]. Smith found that satisfaction with pain relief from pethidine in labouring mothers was moderate and it caused side effects such as itching, vomiting or nausea [23].

Under half of the participants reported to have taken prayer water or traditional medicine (Table 3). This was quite a substantial, which shows patients' propensity to believing in the use of non-conventional pain relief options. This might be because parturient may be from households where traditional medicine was used regularly. The use of prayer water might stem from predominantly Christian nature of patients and substances such as prayer water may be considered as harmless to the mother and child. It may therefore be prudent to improve parturient knowledge on the available pain management options and risks associated with traditional medicine. Our study findings are like those by [24, 25] which showed that religion was an integral part of the labour process.

## Non-pharmacological Pain Relief Options

### Deep Breathing

Our participants favoured the breathing technique which was indicative of the effectiveness of the method (Table 4). This was

backed by Yuksel's study which showed that breathing exercises was an effective way to reduce labour pains and significantly minimized the duration of labour. [26]. A reason for the increased popularity of breathing techniques could be due to its ease of use. A study by Nattah corroborated our findings well. The study recorded women's pain scores using the visual analogue scale against breathing techniques in labour and showed those who used the breathing technique correctly recorded the lowest pain scores [27].

**Walking**

The usefulness of walking around when in labour was a common and popular feature of our participants. They may have used walking as a way of distracting themselves from the labour pains and to move away from other parturient who are moaning in pain. Walking is also believed to give the patient a sense of control over her labour pains and works as way of distracting her from the labour pains and decreasing the needs for pharmacological interventions [28]. Ondeck supported the need to walk around whilst in labour and concurs with the findings of by Melzak and Lawrence that demonstrated that walking resulted in shorter labour periods and increased satisfaction with the labour process [28, 29, 30]. The walking in labour at our centre could be higher but might have been hampered by institutional routines that don't always encourage labouring patients to walk, lest they delivered out of sight of medical personnel.

**Massage**

This was a popular form of pain relief in our study. Participants reported it was a way of easing the pain whilst in labour. This method may have proved popular with our participants due to its ease of application and possible effectiveness in reducing the perception of labour pains. Levett wrote that massage could assist with pain relief if done gently in between contractions (for release of endorphins and relaxation) or by applying stronger pressure on the buttocks (which is believed to interrupt the transfer of pain during contractions and to relieve the actual pain [31].

**Prayer**

Participants reported to praying for themselves to help them through the labour pains, which confirms the findings of previous studies. Prayer and artefacts associated with God were commonly encountered amongst a lot of patients in labour. Studies by [15, 25] showed that patients had the belief of being under the protection of a higher being that it could assist in easing the labour pain and resulting in an uneventful delivery.

**Heat**

Participants attributed the easing of labour pains to the use of heat, which aligned to previous studies on the effectiveness of heat on labour pain. The use of heat on the lower back, abdomen and perineum was a cost effective, low risk and easy to use method of reducing labour pains as demonstrated in one study. Women who used heat packs in labour had much lower pain scores, shorter labour period and better labour satisfaction outcomes [32]. Our study findings agree with [32, 33] who showed that many patients in labour found self-application of heat packs on the lower back effectively decreased the intensity of labour pains [32, 33]. A study by Ganji went further to assess the effect of intermittent heat and cold on the labour process and found that the method also led to decreased labour times and pains, leading to increased satisfaction [34].

**Association between Sociodemographic Features and Patient Satisfaction**

Our study did not reveal any significant relationship between the demographic features (age, race, marital status, education, and home language) except for number of live births. Hence, these variables were less likely significant predictors of dissatisfaction. The number of live births was the only significant finding as a predictor of dissatisfaction (Figure.

1). Our results show that the less the parity of our participants, the more likely they were to be dissatisfied with their pain management. However, for those participants with one live birth, a wide confidence interval suggests results should be considered with caution. For participants with three live births, the confidence interval was narrower, which gives more confidence in the findings.

**Bias and Limitations**

The study may have been affected by social desirability bias because participants might have answered in a manner that over-estimated or under-estimated their satisfaction with pain management to conform to what could be considered more socially acceptable [74]. Therefore, the researchers explained to the respondents to answer truthfully, without fear as their answers would be anonymous and in no way affect the manner in which they would be helped. They were informed that truthful answers would assist in improving management for all patients in labour. Although mothers were asked to answer truthfully to these questions, the researchers were non-judgemental.

Convenience sampling was used, and our study population was selected from only one geographical location, which may make findings not truly representative of the rest of the country. Those parturient who delivered at the clinic but did not come back for their postpartum review were excluded, more especially if they were dissatisfied with the care that they had received. This exclusion may result in overestimation of satisfaction or underestimation of dissatisfaction. The rating of pain perceptions in individuals is a limitation because of the subjectivity and absence of a better and more objective pain perception tool. However, the current tool is still the best-known way of rating.

## Conclusion and Recommendations

Our research findings suggest that non-pharmacological pain management interventions are effective and have a role to play in labour. However, a significant proportion of participants still experienced at least moderate pain may signify the need for additional pharmacological treatments. While sociodemographic characteristics appear not to influence parturient satisfaction, the finding that women with lower parity were more likely to be dissatisfied with their pain management during labour warrants further studies.

Additional recommendations should have the buy-in of the MOU staff, which should be upskilled in the ordering, use and knowledge of appropriate doses of pethidine for patients in labour. Heat packs, birthing balls and calming music should be made available at the centre. At the patient level, interventions should include teaching and advising patients on negotiated delivery plans, and educating patients on the available pharmacological methods in the clinic. When patients arrive in labour, they should be given information on available medical pain relief options. Pethidine is not being offered to patients, and this should be done. Community-level interventions should aim at the use of radio, television, print and social media and to create awareness on the different methods of pain relief available.

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# Combating the Terrorism of Boko Haram in Nigeria: Political and Military Approach

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***Abstract***

*In the history of the human race, power has more often been wielded through terror and inciting fear. The use of terror began at the very birth of organized society as a means of discretion or punishment. Terrorism has become a song to be sung in Nigeria with the emergence of dreaded Boko Haram terrorising old and young, male and female, rich and poor, spearing nobody in the area of their operation, most especially in Northern Nigeria; hence collateral killing is their watchword. The study examines the efficacy of the political and military approach in combatting the menace. It employs a mixed approach, which mostly relies on both primary and secondary data collection to elicit information. To meet the security challenges posed by this dreaded sect, the researcher advocates the use of intelligence-led policing, counter-insurgency and trust-building strategies between the government and citizenry.*

***Keywords:*** *Boko Haram,* Guerilla**,** *Intelligence, Insurgency, Political, Military and Terrorism.*

## Introduction

Nigeria, which is a key strategically for the U.S has come under attack by a radical Islamic sect known as Boko Haram (Western education is forbidden). It is officially called itself "Jama'atul Alhul Sunnah Lidda'irati wal jihad" which is literally interpreted as "people committed to the propagation of the prophet's teachings and jihad" or "Ahl-as-sunnh wa al-jama'a ala minhaj as-salaf", which means "people of the way of the prophet Muhanmed, in line with the earliest generation of Muslims [1].

There is evidence of the set of different factions within the movement who disagree about tactics and strategic direction; in some cases, they compete against each other for attention and followers. One faction of the group may be focused on the domestic issue while another on violent international extremism [2]. Another noticeable piece of evidence indicated that the group are of three different factions, one remains moderate and welcomes an end to the violence, another wants a peace agreement, and a third refuses to negotiate but implements strict sharia law across Nigeria [3]. Since 2009, the group has attacked politicians, religious leaders (both Christian and Muslim), private and public buildings and individuals whom they deem to be engaged in unislamic activities. The group emerged from an attempt to stop the spread of western religion, governance, development, natural science, psychology, media studies, and law, to mention but a few, which the group claimed were disrespect to their God (Allah) and then should not be permissible [4]. Boko Haram has also carried out several mass casualties attacks, and it has been on record to be the first militant group in Nigeria to embrace the use of suicide bombings [5].

### Statement of the Problem

Combating terrorists has become a household discussion after the popular attacked

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of the world trade centre by Osama Bin Laden led Al-Qaeda on September 11, 2001, popularly called 9/11. In a conference on "Roots of Evil" with the theme "Fighting Terrorism for Humanity, the then Sectary General of United Nations Kofi Annan stressed that there is a need to address the root causes of terrorism in order to be able to fight it. There is a need to understand this deadly phenomenon and carefully examine what works and what does not work in fighting it. The outbreak of the Boko Haram uprising in Nigeria marked yet another phase in the recurring pattern of violent uprisings, riots, and disturbance in Nigeria. Given the heterogeneous nature of Nigeria society, the religious sensitivity of Nigeria and the wave of terrorist's insurgents all over the world, the situation could not have been different.

Boko Haram terrorism has continued to pose a clear thread to the Nigerian economic, social, and political section. There in a need for joint efforts of our leaders and the people to rise to the challenges Boko Haram posed to the country. Nigeria, with the help of allies, need to engage in the strategy of deterrence by preventing Boko Haram form attacking the nation. The war of terrorist will be worn by engage in both defensive and offensive means and as well exploit all avenues to put an end to their operation in Nigeria.

### Aims and Objectives of the Study

The primary aim of this study is to explore the workable strategies to combat Boko Haram insurgency in Nigeria, while the objectives will be to

1. investigate the possible causes of Boko Haram insurgency in Nigeria.
2. identify the possible approaches to combat Boko Haram insurgency in Nigeria.

### Statement of the Hypothesis

$H_o$: Intelligence-led policing and deterrence are not the best strategies to combat the menace of Boko Haram.

$H_i$: Intelligence-led policing and deterrence are not the best strategies to combat the menace of Boko Haram.

## Methodology

The research design employed to carry out the study is survey method, which will simply be descriptive in nature. Primary and secondary data sources were chosen to for data collection. Chibok local government of Borno state, Nigeria was chosen as the population of the study. Two hundred people living in the selected community were randomly selected among the whole population and subsequently administered the questionnaires. Inferential Statistics version of the Statistical Package for Social Sciences (SPSS), which is chi-square, was chosen to analyze the data collected through questionnaires. The responses from questionnaires were presented in a table using absolute figures and comparative percentages capable of self-explanation and further analysis. The earlier stated hypothesis was therefore tested towards proving or disproving it.

## Literature Review

### Conceptualise Terrorism

Terrorism has become merely another derogatory word rather than a description of a specific type of activity. Terminology is a matter of agreement for the purpose of common understanding. The word terror from terrorism means great fear, a condition in which one fears for one's life. The person or group who carries out an aggressive act or creates a condition of great fear is seen as a terrorist. Thus, the term terrorist refers to a group of individuals involved in creating a state of great fear, which give rise to the essence of terrorism [6].

United States Vice president in 1986 task force defined terrorism as the unlawful use of threat or violence against persons or property to further political or social objectives [7]. It is generally intended to intimidate or coerce a government, individuals, or groups to modify their behaviour or policies" The office for the

protection of the constitution of the Federal Republic of Germany defined "terrorism as enduringly conducted struggle for political goals, which is intended to be achieved by means of assault on the life and property of other persons, especially by means severe crimes as detailed in art [8].

Terrorism is the systematic use of terror or unpredictable violence against governments, the public or individuals to attain political objectives [9]. One of the definitions of terrorism by the United States army in the 1980s is that terrorism is unlawful violence, or any other unlawful, harmful act committed (or threatened) against civilians by a group or persons for political or other ideological goals [10]. There are five common elements in the above definitions: the use of violence or aggression, terror or threat, assaults, the intention of sowing fear in a target population and political objectives or goals.

However, the above definitions did not provide the ground to distinguish between terrorism and other forms of violent conflicts, such as guerrilla or even conventional war. Clearly, both conventional and guerrilla warfare constitutes the use of violence for political ends. Systematic large-scale bombing of civilian populations in modern wars was explicitly intended to spread fear among the targeted populations.

Despite the ambiguities and disagreements discussed above, the concept of terrorism in modern usage is most commonly associated with certain kinds of violent actions carried out by individuals and groups rather than by states and with events that take place in peacetime rather than as part of a conventional war. However, the original usage of the term in a political context referred to state violence and repression as the "Reign of Terror" [11].

**Terrorism in Nigeria**

The phenomenon of terrorism is not recent in Nigeria; it has been in existence since the entity called Nigeria exists separately on a tribal level. The king then employed terrorist acts to capture villages for emancipation purposes, the village annexed became the King's subject, thereby paying taxes and homage to the King (reference). Guerilla warfare has also been using for annexation purposes. The recruiting of followers for religion purposes also witnesses forms of terrorism in the 18$^{th}$ century. Islamist Jihadists employ terrorist activities to capture the Northern part of Nigeria, which is dominated by Muslims [12].

Nigeria terrorism is defined as terrorism who seeds were sown in Nigeria and which germinated and is now flourishing in Nigeria [13]. Focusing on the working definition of terrorism as an act of inciting fear or causing terror to get the attention of the target, one may conclude and agree with Madumagu as he mentioned five possible terrorist groups in Nigerian that stand out: the Niger Delta Militant; the Boko Haram Insurgency; the Middle Belt (Jos killings); kidnapping for ransom and Armed Robbery. To this group, he added what he called "low intensity" ones like Oodua People's Congress (OPC) and The Movement for the Advancement of Sovereign State of Biafra (MASSOP) [14].

Faleti claimed that the activities of some groups such as the Ijaw dominated Movement for the Emancipation of the Niger Delta (MEND); The Odua People's Congress; The Tiv Militia, The Movement for the Advancement of Sovereign State of Biafra (MASSOB); and the Agbekoya are interpreted as ethnic insurgencies which are also terrorist groups in Nigeria [15]. The terrorist group in Nigeria has a long history, dating back to the decade preceding Nigeria's independence or immediately after independence [16]. However, Nigeria's terrorism has been modified or transformed by development in Nigeria, but their roots and trajectories are clear.

Kidnapping has several forms; to some, ransom is their objective, while for others, their objective is political, blackmail, intimidation, and pressure on the opponents. There are also

corporate and highly organized armed robbery as well as fraudulence and individual. There are other forms of terrorist in Nigeria, those with popular democratic protests and strikes which may turn violent or terrorist and which the so-called hoodlums often hijack. Nigeria students have been known to kidnap armed security agents in uniform and cease their weapons. Unemployed youth have also infiltrated democratic protests to terrorize the public. Part of the struggle to actualize the mandate of the acclaimed winner of the June 12, 1993, presidential election (Abiola) in Nigeria involved several acts that can be classified as terrorist. The only publicized act was the hijack of an Abuja-bound airplane to Niamey, Niger Republic in October 1993 [17].

## Activities of Boko Haram in Northern Part of Nigeria

The ongoing crisis of Boko Haram in some part of Northern Nigeria, especially the Northwest and North-East states, federal capital territory inclusive, has been a source of concern to many. This has made the nation to be wrecked by periodic violence. The insurgency of Boko Haram has put the country into a state of dilemma, and people are becoming more anxious about this current existential situation in our dear country (Nigeria) and what the future can possibly hold for them.

The outbreak of Boko Haram in Nigeria in July 2009 marked yet another phase in the recurring pattern that violent uprisings, riots and disturbances have become in Nigeria. The Boko Haram uprising was not the first forceful attempt to impose a religious ideology on a secular Nigerian society, but like the first major attempt and subsequent small-scale attempts, it widened the scope of the efforts at Islamic revivalism [18]. The then governor of Borno state, Ali Modu Sherif, started Boko Haram as a small terrorist group known as "ECOMOG" for political reasons. The government did not take cognizance of the group, possibly because of their small and weak in nature.

The small group later metamorphosis into Boko haram, which began to appear in 2002 and quickly acquired the moniker of "Nigeria Taliban" with initial leadership under Mohammed Yusuf [19] and with a stated goal of a Sharia state in Nigeria [20]. Boko Haram, who is a contemporary terrorist group, has a compelling ideology that play a central role in religion. Religion can be a powerful motivator for all kinds of human action. As Douglas and Michael noted, "religion deals with spiritual or ultimate human concerns such as life or death, our highest value and selves, the root of evils, the existence of God. Religious assumptions shape our minds from childhood, and for these reasons, religious systems and institutions have had and continue to have extraordinary power to affect the course of human history [21].

Boko Haram's ideology portrays the world in terms of an epic struggle between good and evil, and they are convinced in their own revealed truth from God and that they are true followers of Mohammed, hence they are guaranteed salvation and victory. It is necessary to establish that Boko Haram did not give room for other person or group's points of view because they believe their cause is just, even crime committed by them is justified as they believe God (Allah) is on their side [22]. This superiority intent may likely be the major reason while the group want to impose the Sharia Penal code on Nigeria's secular society.

In their belief, the superiority of Allah's rule provides them with a feeling of justification for violating man-made rules with violent atrocities. Doing the bidding of a higher power demands sacrifice but also means fewer limits on violence. It's easier to kill if you think you're doing God's will; violence is seen as necessary in order to save oneself, one's family or even the world, which is one of their objectives [23]. They claimed that Nigeria is their land and that it was European colonial powers that demarcated it arbitrarily, thereby embracing Christians to govern the state. They portray the situation in terms of a Muslim

population oppressed by non-Muslim rulers, infidels and apostates backed by sinister forces that intend to keep the local Muslim Communities subservient. Its followers are reportedly influenced by the Koranic phrase "anyone who is not governed by what has revealed is among the transgressors" [24].

In essence, Boko Haram as a group came to be called by locals and eventually by the government because of its anti-Western focus sought to create a 'better' Nigeria through strict adherence to Islam. Given of this appellation to the sect is a securitization process; an attempt by the government to make people see them as evil to hate and to kill. Over time, the group's members saw themselves increasingly at odds with the secular authorities, whom they came to view as representatives of a corrupt, illegitimate, Christian-dominated federal government. Their disappointment in local government leaders was worsened in the summer of 2009 when authorities in Bauchi refused to allow them to preach and recruit publicly [25].

Boko Haram's attacks have also spread geographically, at the initial stage, the attack is limited to a handful of states in the northeast of Bauchi, Borno, Yobe, Plateau, and Kaduna and mostly in and around the towns of Maiduguri, Damaturu, the attacks had spread to the west and south of their original areas of operation, to include the towns of Kano, Katsina, Jos, Gombe, and the nation's capital, Abuja. However, it is also equally likely that Boko Haram's increasing operational capabilities may have been derived from interactions with weapons traffickers and other criminal networks already indigenous to the northern regions of Nigeria. There is an indication that expansion in Boko Haram's tactics, lethality, and geographic reach have a link with al-Qaeda or one of its affiliates. Al Qaeda was quoted saying to Boko Haram:

"We are ready to train your children to use weapons and will supply them with all we can, including support and men, weapons, ammunition and equipment, in order to defend our people in Nigeria and respond against the aggression of the Christian minority," [26].

Szrom and Harnisch identified the following common traits in all al Qaeda haven: "underdevelopment, incompetent governance, and a citizenry disenfranchised by or disillusioned with the central government, an environment conducive to al Qaeda's presence and operations must also have a history of radical Islamism that al Qaeda operatives can exploit [27]. Nigeria fits squarely into Szrom and Harnisch's pattern of Al Qaeda operating environments, excepting the history of radical Islam, although there is a profound level of conservative Islam and a history of Shariah law. In Nigeria, Islam is generally conservative in nature, but it is small groups within the larger community that are Salafi. In these regards, Nigeria qualifies as a "Distressed Zone" which is defined as an area where "a terrorist group is threatened by government-sponsored military action, often supported by regional or Western powers. Groups in such an environment may retain some safe territory and leadership, and limited training, fundraising, and operational capabilities" [28]. This is an area that is conducive to al Qaeda but not necessarily ideal.

Boko Haram's initial stated goal of the abolition of secular apostate governments and a return of Shariah fits into the al Qaeda strategy. Al Qaeda has succinctly stated its goals for Africa to include the removal of apostate regimes in Muslim nations, targeting Nigeria's petroleum infrastructure to damage the international system, and striking governments that are allied with the West [29]. Given that those goals dovetail with Boko Haram's stated goals, and with Boko Haram having since adopted an international outlook [30], potential synergy is present.

Strictly speaking, up until 2009, the group's tactics were generally more guerrilla in nature, striking en masse on police, security, and government facilities before dissipating. After the death of their leader Mohamed Yusuf, they

spent a brief period of time reconstituting. It is around 2011, that the tactics shifted to terrorism, favouring civilian targets [31]. Excepting al Shabaab and AQIM, Boko Haram is the only group in Africa to utilize suicide attacks and release martyrdom videos [32]. While Mohamed Yusuf had a preference for massed guerrilla attacks, his successor, Abu Muhammad Abu Bakr bin Muhammad (Shekau), had a preference for cellular terrorist raids [33]. Shekau was reported captured and killed by Islamic State West Africa Province (ISWAP) [34].

## Factors Responsible for Boko Haram Insurgency in Nigeria

In order to understand the emergence of Boko Haram, one must look for reasons why its ideology has found resonance among a capable group of young men in Nigeria. Some of the identified factors are enumerated below:

One of the major factors that lead to the uprising of Boko Haram is an attempt to impose an Islamic Religious Ideology (Sharia) on a secular independent Nigeria. According to Isichei, this attempt is not the first of its kind, and it is a precedent laid by the same Islamic religious sect called Maritatsine [35]. This is against the law of the land. Part II section 10 of the 1999 constitution states expressly that "the government of the federation or of a state shall not adopt any religion as a state religion" [36].

Rampant corruption among political and wealthy elite that is heavily invested in the status quo. Corruption is so rampant that the wealthy and the connected are perceived as able to get away with virtually any kind of injustices. As John Campbell notes, Boko Haram's ideology "draws on a long-standing local tradition of radical Islamic reform that emphasis the pursuit of justice for the poor. There are specific political and socio-economic frustrations found predominantly in northern Nigeria. Poverty, unemployment, and lack of education are much higher than in the rest of the country. Socio-economic grievances include the huge gap between the aspirations of Nigeria's youth and the opportunities provided by the system for achieving a better life. A swelling population amid economic despair creates an environment in which radical extremist ideologies can thrive, and the new elites are seen by many as protecting and benefiting from a system of corruption and injustice. Boko Haram is a symptom of decades of failed government and elite delinquency finally ripening into social chaos [37].

As Boko Haram's founding leader Yusuf preached, "Our land was an Islamic state before the colonial masters turned it to a kafir land. The current system is contrary to true Islamic beliefs." [38]. Throughout the Muslim communities of northern Nigeria, there is a sense of unease and insecurity about the spiritual and moral future of their children and concern about the fading influence of religious leaders like the Sultan of Sokoto. [39]. In 1903, Sokoto caliphate was rapidly replaced by a Western European, Christian power with very different ideas about the relationship between governance and religion.

Furthermore, the wrong interpretation of the scripture by those who claim authority to the interpretation of holy books, as it is a serious disease for an ignorant to claim authority to knowledge. Many of the so-called Boko Haram leaders use their shallow knowledge to interpret the scripture to suit their selfish end, banking on the ignorance of their followers. Adebayo identified some factors responsible for using religion as an instrument of polarization amongst leadership tussle, sectarian jingoism as well as excessive patriotism to one's religious sect, which consequently transformed to fanaticism [40].

The issue of schooling is particularly salient to understanding the ideology of Boko Haram. The Hausa word 'boko' is derived from the English word which means the ability to read and write, especially in the Western-styled educational system, as distinct from the Islamic educational system that existed in northern

Nigeria before being colonialism [41]. As Isa observes, the term implies a sense of rejection and "resistance to the imposition of Western education and its system of colonial social organization, which replaced and degraded the earlier Islamic order of the jihadist state" [42]. Further, Islamic scholars and clerics who once held sway in the caliphate state and courts assigned the name boko to northern elites who spoke, acted, ruled, and operated the state like their Western colonial masters. Consequently, poverty and collapsed governance was blamed on the failures and corrupt attitudes of modern elites who have acquired a Western education and are currently in positions of power. As such, western system represented is unjust, secular and has no divine origin. It is, therefore un-Islamic, which in turn accounts for its ineptitude and corruptness [43].

There is ethnic and political colouration in the Boko Haram insurgency, as observed by [44]. Ethno-political competition for control of the state has been brought mostly due to ethnic groups' pursuit of superiority. The Boko Haram crises had ethnic connotations, and this is largely due to the multiethnic nature of the country. The emergence of Boko Haram in northern part of Nigeria is a clear indication that northerners who lose power to the southerners are behind the insurgency. After the end of Obasanjo tenure and the subsequent short stay of Late President Umaru Musa Yaradua in power due to death. Average northerners prevented Jonathan from assuming the presidency after the death of Yaradua, but to no avail. Even his election into office in 2011 witnessed the same pressure from the northerners. It can be assumed that Boko Haram is northerners' weapon or instrument of war against the southerners' presidency, which they assumed to be their turn. Unfortunately, the monster has grown beyond ethnic cleavage and the sect is getting tougher even as reputable northerners head the nation.

The proliferation of small arms and light weapons can also be assumed to aid the activities of Boko Haram in Nigeria. Proliferation has been a trouble to most national, regional, and international organization. "Nearly 40% of trade in small arms is carried out through illicit mean" [45]. Nigeria as at present, has no organized system of arms control. However, the difficulty is not much on curbing illicit arms trade but in restricting its availability on the black market.

The arms given to the sect to defend politician for their selfish interest has now been used against the state. The group also alleged buying weapons from security outfit which are made easy as a result of security privatisation, government armory or local manufacturer with a low price. They also get weapons from most of the military stations attacked, some from demobilized soldiers and so on. Availability and excess of small arms and light weapons have helped Boko Haram to carry out their evil acts against the nation.

One other major factor in the recurrence of the Boko Haram attack in Nigeria is the government's inability or perhaps reluctance to deal decisively with past occurrences and the dramatis personae, including their backers, implicitly. It would appear that once a culprit or a sect member avoids being killed during the suppression of their insurrection, it is all but sure that he will participate in the next one, all other things being equal. This non-deterrence has arguably encouraged a culture of impunity and promotes a circle of violence.

Albert (2005) considers the international conspiracy as part of the factor. He observed that some external forces used the loosely security measure of the country to foment violence [46]. Many of those arrested in connection to the Boko Haram issue were traced to other Muslim countries. The late dictator of Lybia, Mamur Ghadafi was also fingered as one of the possible sponsor of the deadly act. There is also link with jihadist movement outside Nigeria. The modus operandi of the sect, fashioned after the Taliban in Afghanistan, has generated some suspect. It

was also speculated of having a link with the Salafist Group for preaching and combat (GSPC) in Algeria.

## Findings through Data Analysis

The broad objective of the paper is to examine the efficacy of the political and military approach in combating the terrorism of Boko Haram in Nigeria. This section, therefore, presents the analysis and interpretation of the data collected through questionnaires. Two hundred (200) copies of the questionnaires were distributed to the selected respondents. The table below shows administered questionnaires.

Table 1 revealed that 90% of the questionnaires were filled and returned while 10% were not returned. Thus, the percentage will be based on the one hundred and ninety (90%) questionnaires returned.

**Table 1.** Questionnaires Distributed

| Variable | Frequency | Percentage |
|---|---|---|
| Returned | 180 | 90 |
| Un-Returned | 20 | 10 |
| **Total** | **200** | **100** |

**Source:** Field Survey, 2022

### Demographic Profile of the Respondents

The main assignment in this section is to present the demographic profile of the respondents of the work using five demographic characteristics of Sex, Age, Marital Status, Educational Attainment and Employment Status.

According to Table 2, 64.4% of the respondents were male, while 35.6% were female. On the age group, 22.2% are between age brackets 18-30, 28.9% are under 31-45, 32.2% fall within age brackets 46-60, while 16.7% fall under age 61 and above. The breakdown of marital status shows that 50% were married, 11.1% were single, 22.2% were divorcees and 16.7% were either widow or widowers. Similarly, as depicted above, 22.2% of the respondents had secondary education, 55.6% had tertiary education, while the remaining 22.2% had post-graduate education. In addition, on employment status, 25% of the respondents were students, 38.9% were Civil Servants, 22.2% were in business-related occupation, and 13.9% were the applicant.

**Table 2.** Demographic Information of Respondents

| Sex | Frequency | Percentage |
|---|---|---|
| Male | 116 | 64.4 |
| Female | 64 | 35.6 |
| **Total** | **180** | **100** |
| **Age Group** | | |
| 18-30 | 40 | 22.2 |
| 31-45 | 52 | 28.9 |
| 46-60 | 58 | 32.2 |
| 60 and above | 30 | 16.7 |
| **Total** | **180** | **100** |
| **Marital Status** | | |
| Married | 90 | 50 |
| Single | 20 | 11.1 |
| Divorced | 40 | 22.2 |
| Widow/Widower | 30 | 16.7 |
| **Total** | **180** | **100** |

| | | |
|---|---|---|
| **Academic Qualification** | | |
| Secondary Education | 40 | 22.2 |
| Tertiary Education | 100 | 55.6 |
| Post Graduate Education | 40 | 22.2 |
| **Total** | **180** | **100** |
| **Employment Status** | | |
| Student | 45 | 25 |
| Civil Servant | 70 | 38.9 |
| Business | 40 | 22.2 |
| Applicant | 25 | 13.9 |
| **Total** | **180** | **100** |

Source: Field Survey, 2022

**Presentation of Data according to Variables**

This section presents the major core of the study. it investigates the efficacy of the political and military approach in combating the terrorism of Boko Haram in Nigeria. The scale will be used to analyse Table 3 and 4.

**Causes of Boko Haram Insurgency in Nigeria**

This subsection highlights the causes of the Boko Haram insurgency in Nigeria. Four (4) relevant statements were posed to respondents, and the responses are presented in the following Tables.

**Table 3.** Causes of Boko Haram Insurgency in Nigeria

| S.No | Causes of Boko Haram Insurgency in Nigeria | SA | A | U (%) | SD | D |
|---|---|---|---|---|---|---|
| 1 | Emergence of Boko Haram was as a result of failure of institution of government in Nigeria | 16.7 | 22.2 | 22.2 | 22.2 | 16.7 |
| 2 | Politics of ethnicity cannot be separated from Boko Haram insurgency in Nigeria | 22.2 | 30.6 | 8.3 | 17.8 | 21.1 |
| 3 | Nigeria porous border aids the smuggling of sophisticated weapons used by Boko Haram into the country | 34.4 | 38.9 | 4.4 | 13.9 | 8.3 |
| 4 | There is an international dimension to the Boko Haram insurgency in Nigeria | 43.3 | 26.7 | 6.7 | 12.2 | 11.1 |

Source: Researcher Field Survey, 2022

As shown in Table 3, 16.7% and 22.2% strongly agreed and agreed, respectively, that emergence of Boko Haram was as a result of the failure of the institution of government in Nigeria, 22.2% and 16.7% strongly disagreed and disagreed, respectively to the assertion while the remaining 22.2% was undecided. The table also indicates that 52.8% of the respondents affirmed that politics of ethnicity could not be separated from the Boko Haram insurgency in Nigeria; 8.3% were neutral, while 38.9% did not support the assertion. As depicted above, 34.4% of the respondents strongly agreed that Nigeria's porous border aids the smuggling of sophisticated weapons used by Boko Haram into the country, 38.9% agreed, 13.9% strongly disagreed, 8.3% disagreed while 4.4% were undecided. In addition, 43.3% and 26.7% of respondents strongly agreed and agreed respectively that there is an international dimension to the Boko Haram insurgency in Nigeria, 12.2% and 11.1% strongly disagreed and disagreed respectively while 6.7% were of no opinion to the above claim.

**Approaches to Combat Boko Haram Insurgency in Nigeria**

In subsection, the focus was to examine the approaches to combat the Boko Haram insurgency in Nigeria. The analysis of the results is presented below.

**Table 4.** Approaches to Combat Boko Haram Insurgency in Nigeria

| SN | Approaches to Combat Boko Haram Insurgency in Nigeria | SA | A | U (%) | SD | D |
|---|---|---|---|---|---|---|
| 5 | Military option can unilaterally curb the insurgency of Boko Haram in Nigeria | 22.2 | 17.2 | 5 | 33.3 | 22.2 |
| 6 | Combination of both Military and Political approaches will eradicate the activities of Boko Haram insurgency in Nigeria | 55.5 | 27.8 | 2.8 | 7.8 | 6.1 |
| 7 | Intelligence led policing with deterrence is the best strategy to combat the menace of Boko Haram insurgency in Nigeria | 27.8 | 38.9 | 5.6 | 11.1 | 16.7 |
| 8 | Nigeria needs the help of external powers to combat Boko Haram insurgency | 25 | 55.6 | 2.8 | 5.6 | 11.1 |

Source: Researcher Field Survey, 2022

According to Table 4, 39.4% of the respondents were in line with the opinion that military option to Boko Haram insurgency can unilaterally curb the insurgent, 55.5% were not in line with the opinion, while 5% did not decided. Also, 55.6% and 27.8% of the respondents strongly agreed and agreed respectively to the statement that a combination of both military and political approaches will eradicate the activities of Boko Haram insurgency in Nigeria, 7.8% and 6.1% strongly disagreed and disagreed respectively to the claim while 2.8% were of no opinion. Similarly, 66.7% of the respondents take side with the statement that intelligence-led policing and deterrence is the best strategy to combat the menace of Boko Haram insurgency in Nigeria, 27.6% oppose the statement and the remaining 5.6% were did neither support nor disagree. In addition, 25% of the respondents strongly agreed, 55.6% agreed that Nigeria need the help of external powers to combat the Boko Haram insurgency, 5.6% strongly disagreed, 11.1% disagreed, and 2.8% were undecided.

**Testing of the Hypothesis**

The hypothesis stated earlier is tested in this section using the chi-square ($X^2$) method. The statistical method to be used for testing the hypothesis is chi-square,

$$where: X^2 = \frac{\sum (O - E)^2}{E}$$

Where:

$X^2$ – Chi-Square

$\sum$= Summation

O = Observed frequency

E = Expected frequency

In proofing the hypothesis, $H_o$ represents the null hypothesis while $H_i$ will stand for the alternative hypothesis.

**Hypothesis Based on Statement 7**

$H_o$: Intelligence-led policing and deterrence are not the best strategies to combat the menace of Boko Haram.

$H_i$: Intelligence-led policing and deterrence are not the best strategies to combat the menace of Boko Haram.

**Table 5.** Analysis of Respondents on Research Hypothesis

| Variables | Frequency | Percentage |
|---|---|---|
| Strongly Agree | 50 | 27.8 |
| Agree | 70 | 38.9 |
| Undecided | 10 | 5.6 |
| Strongly Disagree | 20 | 11.1 |
| Disagree | 30 | 16.7 |
| Total | 180 | 100 |

$$\text{Expected frequency} = \frac{\text{No of Observed Frequency}}{\text{No of Variable}}$$

180/5 =36

**Table 6.** Analysis of chi-square (X2)

| Variables | O | E | O-E | $(O-E)^2$ | $(O-E)^2/E$ |
|---|---|---|---|---|---|
| Strongly Agree | 50 | 36 | 14 | 196 | 5.44 |
| Agree | 70 | 36 | 34 | 1156 | 32.11 |
| Undecided | 10 | 36 | -26 | 676 | 18.77 |
| Strongly Disagree | 20 | 36 | -16 | 256 | 7.11 |
| Disagree | 30 | 36 | -6 | 36 | 1 |
| Total | 180 | | | | 64.43 |

Formula for degree of freedom = r – 1
= 5 – 1 = 4

**Decision Rule**

If the calculated $X^2$ is less than the critical (i.e., value of $X^2$ from the table), the alternative hypothesis is accepted while the null hypothesis is rejected.

**Decision**

Since the calculated value (64.43) is greater than the Table value (9.448), we reject the null hypothesis ($H_o$) and accept the alternative hypothesis ($H_i$), which states that Intelligence-led policing and deterrence are the best strategies to combat the menace of Boko Haram.

## Results of the Finding

### Strategies to Combat Terrorism (Boko Haram) in Nigeria

The foregoing decision has clearly revealed the challenges of terrorism and the security in the country. It is equally obvious that terrorism in the country, especially since the return to civil rule in 1999, has constituted a serious threat to peace and national security. The findings revealed some policies and strategies to combat the menace. The strategies are grouped into two parts, namely political and military approaches as no single approach can unilaterally curb the insurgency. The combination of the duos will complement each other.

### Political Approaches to Combat Boko Haram Insurgency

In his analysis of extremist groups in Nigeria, Chris Nwodo noted that it was Boko Haram opposition to the social injustice that lead them to insurgency [47]. Government must address the myriad socio-economic demands like poverty, health, unemployment, infrastructure and so forth. The link between many kinds of grievances and the rise of violent extremists is particularly prominent in the north, where the people have a higher level of poverty, unemployment, health problems and

overall insecurity than elsewhere in Nigeria. The government should be pluralistic, representative, and just in their treatment of the Nigerian citizens.

**Economic Isolation**

Successfully isolating Boko Haram from funding can severely undermine their operations. Economic isolation requires both physical and informational interruption of financial, business, and criminal enterprises. Attempting to economically isolate Boko Haram from the population must be narrowly focused on the insurgents and minimize the effect on the population, by offering viable replacement sources of employment and revenue. Applying economic isolation on Boko Haram must be planned and implemented in coordination with civilian agency specialize in the local economy and culture and individuals representing significant knowledge of the local business and financial sectors.

Thanks to the immediate past government for revamping the educational policy of the country in such a way that the traditional Al-Manjiri education was integrated into the mainstream of education. Experience has shown that the products of the schools have largely been involved in many of the ethno-religious crises in the northern part of the country because they have been grossly neglected and not recognised. Those who pursue the program take to begging, roaming aimlessly the streets, and indulging in petty crimes and other deviant behaviours. To find a permanent solution to the social scourge of the Al-Manjiri, it is pertinent that the federal government takes a drastic step by giving due attention to this age-long system of education by given their product due recognition just as it does to the western system of education.

There should be a significant reform in the legal sector, the appeal among many Muslims of Sharia law is that secular laws are seen as serving only the elites of Nigeria. Corruption is so rampant that the wealthy and the connected are perceived as a sacred cow who is able to get away with virtually any kind of injustice. As Campbell notes, Boko Haram's ideology "draw on a long-standing local tradition of radical Islamic reform that emphasis the pursuit of justice for the poor through the imposition of Sharia [48].

The government of Nigeria should employ a counter-ideology strategy by the emphasis that positive changes for Muslim communities in the North can come without the need for violence, but violence can undermine it. Those who find resonance in the group's ideology must be convinced that they are not the vanguard of a movement toward positive change but murderers of positive change and what the founding father of Sokoto Caliphate, Usman Dan Fodio stood for.

**Military Approach to Combat Boko Haram Insurgency**

Nigeria should develop her counter-terrorism capabilities by providing non-lethal equipment and training and helping security forces to be more precise in their use of force. This could happen by welcoming experts in counter-terrorism discipline from countries like US, UK, and Spain who have once witnessed terrorism; they also need to be trained by these countries in special skills to combat terrorism apart from the direct involvement of the experts. The monitoring and surveillance capabilities of Nigeria should be improved. In fact, the monitoring and surveillance units of other countries may be particularly useful here.

Quality intelligence in support of counterterrorism effort is needed; this can only be possible by training security officer in the science and skills of intelligence. Effort of the Institute of Security, Nigeria in collaboration with the Human Resource Development Centre, University of Lagos is commendable by running a specialist course on Intelligence and Security Investigation. Military leaders in collaboration with Nigeria Government should embrace this effort and promote it as this will

help the fight against terrorism. Gathering intelligence in Nigeria is deficient as observed by former Inspector General of Police Alhaji Ibrahim Coomassie in July 2011 [49]. Police and military should try as much as possible to rebuild the already damaged relationship between them and the civilian populace.

Another means to combat the Boko Haram insurgency is what is called penetration. Penetration is a clandestine activity involving the use of a trained agent to infiltrate target establishments and installations for the purpose of obtaining information. A trained agent can be sent to the midst of Boko Haram pretending to be a sympathizer to their ideology whereby leaking their secret to the government, will help the security men to be at alert and work against their evil intention.

Electronic Devices will also be added advantage in monitoring and identification of any terrorists most especially Boko Haram. Mounting of Closed-Circuit Television (CCTV) device in all the strategic locations in the Northern part and extend it to the Southern part of Nigeria as well. This derives has done wonder in the Western world, and it is believed that if Nigeria can adopt the device, the wave of criminality will be reduced to a minimum level [50]. Videotape, miracode and computer sketch are other modern technology in aiding checking of the menace of Boko Haram if adopted. This device with satellite wave was used by Americans during the killing of Osama Bin Laden. That is the beauty of technology, and we must join the league of technological advance nations if the war on terrorism would be won.

Government should establish ground forces within the security unit like America did. The purpose of this is to win all wars of terrorism. The rate at which Boko Haram is going, if not checked, will find a sympathizer in the South, incase this happens, the ground forces will be used to counter them. Counter in surgency requires soldiers and marines to be ready to fight and to build depending on the situation and a variety of other factors [51].

Airpower tactics should also be developed in Nigeria: Airpower can contribute significant support to land forces conducting counter in surgency operations. Aircrafts can strike the insurgents; it can respond quickly with precision fires to conventional assembly of insurgents. Apart from the split fire on the terrorist group, it will aid transport systems during the action by transporting troops, equipment, and supplies, and move the land forces to where they are needed in a short possible time. It will also perform intelligence, surveillance, and reconnaissance missions [52].

Community policing will be another vital means of combating Boko Haram activities. This comprises of enforcement, preventive and community service work aimed toward crime prevention. The emphasis is to encourage police and residents to work together. It enables residents to learn critical skills in detecting and reporting crime. Since Boko Haram is not angels or spirits, they live within one community or the other. Working together of Police and Community will help in the notice any suspect or even strange person and guide against any attempt for crime to be committed. Community policing is a modern approach to bring the police and residents together and ensuring security and safety.

There is a need to employ the use of forensic science to investigate terrorist crime; this field of study interacts with the legal system. According to Ogundipe, “forensic science in security operations functions for both offensive and defensive intelligence in areas such as detection of espionage, economic sabotage, terrorist, arsonist and robbery activities” [53]. If Nigeria can develop the field of forensic science in our universities and research institutes by financing them, it will be useful and aid the investigation process of the suspected Boko Haram in detection that is linked with one crime or the other.

**Controlling the Flow of Firearms**

Efforts at mopping up all illegally acquired small arms in the country will help in combating the insurgency and other related crises in the nation. The federal government could also encourage a situation whereby the arms are given close monitoring and vigilance by the Customs and the Police. This could be achieved through professionalizing the security agencies. Regular raid of known gunrunners, locally weapons producers and criminal hideouts is also key. The use of this mop-up strategy will go a long way in weakening this terrorist group.

National Joint Task Force (JTF), which is a federal unit, did excellent and commendable work in Niger Delta. JTF comprises of Army, Police and Customs officers, they should also be dispatched to the Northern part of Nigeria to secure the area and act as counter terrorism agents. They should be well trained, be objective in discharging their duty and protect the civilians and as well deter Boko Haram operations. The dedication of this group will pose a great threat to the camp of Boko Haram.

**Unity of Command**

Unity of command is the preferred doctrinal method for achieving unity of effort by military forces. Where possible, JTF leaders achieve unity of command by establishing and maintaining formal command or support relationships. Unity of command should extend to all military forces supporting the task of eliminating Boko Haram. The ultimate objective of this arrangement is for the forces to establish effective control while attaining a monopoly on the legitimate use of violence within the society. Command and control of all the forces (JTF) engaged in the mission should be exercised by a single leader through a formal command and control system.

## Conclusion

As a relatively young democracy with a very large and diverse population, Nigeria should anticipate the emergence of politically violent groups from time to time. All countries, even advanced Western democracies, have to deal with such challenges. The study has shown that the Nigerian governments (past and present) have failed to tackle this problem through articulated and well-organized policy actions. There is no doubt that a nation that focuses on developmental projects without addressing the issue of security is only planting corn on the rock. There is need for courage and determination contributions toward that shared goal. The end of Boko Haram, like all terrorist groups, will be a matter of time. It will require the joint efforts of both the leaders and the people of Nigeria to eradicate Boko Haram insurgency from Nigeria.

## Recommendations

Based on the findings in this study, the following recommendations are put forward:

1. Government should try to seek for the assistance of experienced foreign countries. The battle against Boko Haram is not a battle that can be fought alone and win without the assistance of experienced nations.
2. Federal government and NSA should find out exactly the demands of Boko Haram, and if these are achievable demands, the government should work on it.
3. There is a need to advocate for religious tolerance and the call to forget the differences of the religious affiliation of Nigerians, the need for a better understanding of the differences for the purpose of building a unified nation. Through proper education and knowledge of the plight of each religious group, the amicable settlement of the differences could be facilitated.
4. The government at all levels should jointly move from conflict resolution to the stage of conflict prevention through the provision of adequate and effective security in each

state for prompt respond to insurgence of Boko Haram crisis anywhere at any time.

5. Security apparatus should be provided with adequate and modern security facilities and training that will enhance their quick response to any attack or intending attack.
6. Federal Government needs to enforce moral codes on the citizens of the nation by bringing to book moral violators and those who foment trouble or crisis in any society.
7. Civil society organizations, religion and traditional leaders can provide those essential services which the government has been unable to take care of, such as security; run a range of religious and social programmes that have the effects on preventing men, women, and children from turning to radical factions of Islam; take the lead of debating the need for peace, offer a means for local individuals to pursue justice and providing alternative to violent.
8. Above all, the government should reduce poverty among Nigerians, especially northern part, where poverty is so endemic so that the reservoir of recruits for Boko Haram crises will be punctured.

## Conflict of Interest

This work was done with an open mind and objectivity of judgment without any interest to influence my view, but to give the reader reality of things. All arguments raised were of the author and not of the publisher. The author, therefore, takes responsibility of the view raised in the paper.

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# Changing Cultural Values and Grassroots Transformation in Nigeria

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***Abstract***

*The issue of changing cultural values and grassroots transformation is the concern of every Nigerian, and as such, grassroots communities should embrace change. Some people refuse to embrace change for so many reasons. This could be due to the complexity of values and beliefs which are prevailing in a society. This forms the basis for justifying people's actions which are termed ideologies. Ideology is a crucial device for the sustenance of the community as it has the capacity to shape how community people perceive and interact with society about grassroots transformation. Hence a society without a clear-cut development ideology or agenda risks stagnation. It is on this assumption that this article suggests that Nigeria should embrace cultural change for transformation at the grassroots for national and global benefits. Against this background, the article examines the cultural value and the transformation of people at the grassroots with a view to understanding how changes in cultural values will affect transformation at the grassroots in Nigerian communities. Based on this, the article believes that there is a connection between changing cultural values and grassroots transformation capable of avoiding stagnation and enhancing innovation; increasing understanding, improve productivity, community services and socio-economic activities. The article recommends the provision of acculturation to keep up with emerging global demands and survive future uncertainties. We need to change what is termed "normal and acceptable" and educate people to master our environments and acquire new skills from other societies for innovation to enhance a higher standard of living and growth at the grassroots.*

***Keywords****: Changing Cultural Values, Grassroots, Nigeria, Transformation.*

## Introduction

Change is one of the concepts that human beings find it difficult to accept, but the universe cannot run away from it because it is inevitable. No matter the severity of challenges societies face, they still must pass through it. Recently, Covid-19 pandemic caged the whole world, bringing changes to every sphere of life. But all nations sought solutions to forge ahead by way of renovation and creativity. For instance, changes took place in Churches, Mosques, and other religious centers where face masks, social distances and washing of hands were created to protect the masses from the deadly Covid-19 infection. In educational sectors, many innovations took place in the learning process to continue. Even at the grassroots, people changed their ways of life and adjusted to Covid-19 protocols. It could be seen how most crises always lead to a breakthrough for the benefit of all. In the past, societies have benefited from massive changes in all fields, such as, education, health, and technology but changes in cultural values have often been resisted. Globalization has brought in new changes, and more discoveries are taking place daily. This paper is proposing a change in cultural values and technological content so cultural values will not go into extinction. It is a known fact that value stands for worth, and those standards are considered to be important and beneficial to members of the

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community. What this paper is saying is that Nigerians cannot continue with obsolete cultural values because some traditional norms are causing stagnation and need modifications from time to time for grassroots to meet global demands. It is pertinent to add value to traditional norms and customs to open access to a new culture and trending ideas and innovations. Experience has shown that grassroots is becoming stagnant, and people are becoming dissatisfied with Nigeria's cultural system. Unfortunately, resistance to change in cultural values has blocked ways to innovation and creativity and a high standard of living at the grassroots.

In rural communities, daily lives are shaped by cultural values constructed with traditional norms and customs. The Prospect of growth is impeded by an obsolete culture where our ancestors hold on to complex ideologies. Based on this, under-developed, impoverished, malnourished lifestyle, stagnation, under-developed, fear of the unknown and malnourished lifestyles is the order of the day. The reason is that digital technology is not yet inculcated into traditional values. And this could result in an impediment to grassroots transformation. But the world is transforming, and grassroots must transform. There are challenges of growth all over due to the fact that the leaders are not ready to embrace change.

Transformation can be achieved by digitizing the cultural value's contents at the grassroots. Awareness of harmful cultural values and benefits of the new traits of cultural values could be created through the conventional, traditional, and new media. A cultural transformation will also change the way the community people think, act, and deliver community services and socio-cultural activities.

Another relevant issue in this paper is cultural transmutation which is seen as a blend of old and new cultures. Relevant cultures could be retained while new ones would be adopted as a strategy. This is awareness the media must create at the grassroots. Therefore, cultural values must be re-examined to sieve irrelevant and obsolete values from the new ones and reposition them in line with the current trend to favor people at the grassroots. As mentioned earlier, if the invisible Covid-19 pandemic could bring change to everything worldwide then irrelevant cultural values could be changed and replaced with new and relevant one's order to bring transformation to the grassroots. Unfortunately, community people are still not averse to enlightenment due to ideological matters. As the world is embracing change, Nigeria should also embrace change with acculturation. As it is, the rapid grassroots transformation will depend completely on Nigeria's acceptance of new cultural values.

Although changes may affect traditional ways of doing things, especially where the cultural patterns of such communities are very strong, but a change will usher in a new mode of communication and ideas. Unfortunately, over the years, people have been conforming to the standard set up by their culture, and this has brought the grassroots to a standstill. With the global changes, irrelevant societal norms and ideology have no place again in Nigerian society. This article is an appeal for Nigerians to adapt to change, embrace changes in cultural values, norms, and traditions, and change their ideas or behaviors in other to deal with future challenges successfully. Although ideology is an essential means for the sustenance of the grassroots cultural values, an ideological mindset of the people also needs to undergo several changes for the liberation and growth of the grassroots.

## Culture

Culture is perceived as a system of values, beliefs and behaviors that shapes how the actual work gets done in different spheres. It is also the ideas, customs and social behavior of a particular people or society. To corroborate this assertion, [1] gave her own definition of

culture. According to her, "culture is the characteristics and knowledge of a particular group of people, encompassing language, religion, cuisine, social habits, music and arts". This means that culture covers our way of life, covering our modes of dressing, hairstyle, food, the way we speak, our songs, the marriage pattern, our modes of greetings and so on. In Nigeria, culture equally encompasses the above, and it grows in groups with identity tied around the social pattern and unique to the group. Baran, cited in [2], explained that culture is socially constructed and maintained through communication. Based on this, Nigerian culture must equally be maintained in the media, especially the new media. Changes must be gradual, foreign culture should not be copied, but through modification and innovation. Since culture is a continuous process, it must be assessed and upgraded to a global level, capable of connecting grassroots to the rest of the world. According to [3], culture is a collective mode of life, a repertoire of beliefs, styles, values, and symbols. Culture is subject to change and made global through the intervention of new media. Smith, cited in [2], asserted that "the idea of a global culture is practical impossibility except in interplanetary term. New media radically breaks the connection between the physical place and social place" In the same vein, Nigerian cultural value is likely to face stagnation if the country refuses to connect and upgrade cultural values with new media. In line with the global demands and changes, Nigeria needs to inculcate new technologies into its cultural system with a view to gaining new ideas, new attitudes, and behaviors to function in this age of globalization.

## Cultural Values

In the African system, cultural values are cherished by all communities as the bedrock of their existence, and these values should be uphold and cherish everywhere. Unfortunately, new media has influenced Nigerians, especially, children, negatively. A study by Lagos mums [4] found that people share whatever they want to on social media, thus exposing children to what they are not supposed to be exposed to. The women went further to warn against negative effects on cultural values among children. The covid-19 pandemic also affected African and Nigerian cultures negatively. According to [5], "cultural experts also believe that the global incursion of the Covid-19 pandemic has affected societies on a grand scale such that a new era appears to have risen after the surge." In Nigeria, obsolete cultural values abound, which require change for the new traits to emerge to face new societal changes. [6] stated that values are criteria for judging what is good or what is bad, desirable, undesirable, beautiful, ugly, and so on. In addition, [3] identified Nigeria's core values as age, greetings, dressing and so on. In the same vein, [3] also highlighted Nigerian cultural values such as, age, special greetings, language, dressing, marriage and so on. In Nigeria, there is a need to erode irreverent culture and give way to acculturation. It is the believe of this researcher that from cultural values, social system, education to religion, there should be a shift in cultural change for the better. Obsolete cultural practices such as relegating women to the background, high cost of marriage and complicated marriage process, female genital mutilation, Osu and Ohu caste system; denial of women inheritance; the grooms rolling on the ground to greet their parent in-laws, even in their white and immaculate linen apparel and a host of others should be eroded and give ways to values of love and acceptance. This is implementable because Covid -19 pandemic has given rise to cultural change, and Nigeria needs cultural changes in these areas.

Therefore, Nigerians should embrace changes in cultural values and acquire new traits to strengthen existing ones for grassroots transformation. However, the change must be gradual, foreign culture should not be copied, but our value system must be modified to give

way to innovation and creativity, just like other nations. The family system in African society involves norms and values for family members to imbibe. Our fathers left positive values for us, and those values must be re-awakened to strengthen the value system. Values should be developed from the family because values influence social behavior. To ensure grassroots transformation Nigeria must acquire new traits to improve the living standards of the people.

## Changing Cultural Values

Cultural change is referring to changes in material and non-material cultural elements.[5], lamented that the deteriorating nature of our values system has affected the cultural values, which means that it will be fruitless to continue with the old cultural system. Unfortunately, Nigeria is still nursing some obsolete values and holding them in high esteem. Some of the obsolete and irrelevant cultural values that Nigeria still holds in high esteem include female circumcision, Osu caste system, the killing of twins, placing of curses on someone, clans, and villages, degrading of women's status and discriminating against women; denial of women inheritance, discrimination against women; lack of respect for elders and parents; Marriage conflict and disagreement between families concerned. All these should undergo changes to give way to new traits powered by the new media. (globalization). The suggested new traits to emerge are as follows: Truth because man has truth as his nature; that is, man's behavior should reflex truth (sincerity). The man should act according to his thoughts, words and his actions should be consistent and complementary. Basically, all things in creation are subject to the law of change and human beings, too, are subject to this law. In essence, people should use traditional cultural values for progress and not for subjecting human beings to the level of animals. This means that female circumcision should not be done by force but be carried out in a non-violence manner and with the consent of the females concerned. Osu caste system should be abolished, and the value of love and acceptance should be applied. All twins should be accepted and respected. The placing of curses on someone should be replaced by counseling and conflict resolution. In addition, women must be valued as indispensable species in the world henceforth, the value of peace, love and acceptance should be applied to all women's issues. Obsolete values of conflict and disagreement between families should be replaced with new traits of values of peace, right conduct, and conflict resolution skills. Values of love, truth, peace, and non-violence be applied to respect for elders and parents.

Irrelevant traditional norms are not only applicable to Nigeria but are still practiced in other African countries. Cultural change must be sought for by both urban and rural population in Nigerian and African societies. Several benefits could be derived from new traits of cultural values, such as innovation and creativity in cultural values and a high standard of living at the grassroots. In the same vein, once there is a modification in cultural values, the grassroots will begin to experience transformation through innovation, invention, discovery and contact with other societies. [5] asserted that changing cultural values is nothing but shifting traditional values to the reflex foreign culture. But [6] argued that changing cultural values is emerging of new traits, which could be so complex as well because they appear in different forms. In Nigeria, the youths could be the main drivers of the traits of cultural values, and society will accept the new changes. Ironically, the new media has already initiated changes so many changes in Nigerian society. For instance, the use of foreign cosmetics as against Nigerian black soap, which the people were accustomed to; mini-skirts and short dresses; spargatti straps tops, short bumps even to the extent using to places of worship. Ekpenyong, cited in [6], explained that changes brought by the new media could be seen as new traits of fashion capable of replacing obsolete

ones which are no longer relevant in the scheme of things.

The new changes could be facilitated and enhanced by activities of the new ma media, such as Facebook, Twitter, YouTube, and so. The argument is that judging from the activities of new media, changes in cultural values will continue to undergo changes and innovations. The refusal to embrace change by the elderly in society could be due to the complexity of values and beliefs which are prevailing in a society. The youths and Nigeria in Diaspora are no longer impressed with the Nigerian cultural system. Sticking to obsolete cultural values or what is termed- "normal and acceptable "is no longer tenable because individuals are now controlled by social media and no longer by leaders. The Internet has shifted Nigerian culture to foreign culture, making modes of greetings, dressing, cooking, and eating habits. All inventions and technological changes have a broad impact on culture and have affected Nigerian culture and traditions. What Nigeria should be concerned is the adoption of cultural transmutation, which is a blend of old and new cultures. This is a strategy used by those who place importance on both maintaining their original culture and adopting the new culture. Some researchers in the field of traditional cultural values have discussed the relevant of intercultural adaptation, which involves ability to adapt to situations and surroundings and this could afford people greater opportunity to succeed and achieve their goals [7].

## Influence of social media on Changing Cultural Values

As [4] has observed, the advent of social media has both positive and negative sides, which has brought significant changes to Nigerian culture. The advent of new media came along with high impact connections between individuals and nations positively. It allows sharing of opinions, photos, and other stuffs online with stress. According to [8], new media improve creativity and social awareness for societies to interact with one another and in sharing new ideas and opinions. Therefore, we need creativity and a high sense of innovations in the new traits of cultural beliefs, attitudes, and behaviors. Social media has exerted a lot of influence on African beliefs, attitudes, and behaviors. And this influence is taking a new direction because human beings are adapting to various changes daily to belong, survive and move ahead. Nigerian communities have experienced changes with the advent of the social media, but the changes are not visible in the cultural values. This paper is appealing to the media to employ its channels like television, print media, radio, and traditional media to enlighten Nigerians on the new traits of cultural values could lead to grassroots transformation. The new traits of traditional norms are expected to be more friendly to sharing ideas and opinions with the outside world. The new media has already reshaped will also reshape the ways messages are now exchanged on cultural issues. Knowledge will be shared in the enlightened way as Nigerians interact across cultural divides irrespective of language and cultural differences.

Media intervention in cultural changes will promote understanding and increase their communication skills so as to meet the challenges of a new cultural environment. Nigerians will use social media to connect more with people in the society, interact and share opinions, and integrate into other's cultures while trying to adapt to changes in their new surroundings. However, while some people are extolling the importance of social media, [9] felt that unlimited access and flexibility of social media activities could be worrisome, that is, when it comes to preserving cultural values. With the new media, connections and relationships will be strengthened and serve as a bridge for people from different states and nation. In support of social media, [4] and [10] have confirmed that there is a positive blend of African culture and social media, but this researcher believes that activities of social

media are well handled, they may not erode African values. The media should also create awareness in rural communities through community leaders. Community leaders comprise the church leaders, educational heads, men and women leaders, market leaders, youth leaders, heads of community artisans and so on. Responsibilities of media will include explaining and counseling the leaders at the grassroots how the new media and internet have changed the values, norms, and traditions already.

## Grassroots Transformation

Grassroots is usually identified with stagnation, under-developed, impoverished, and malnourished lifestyle. There are challenges of growth all over because Nigerian leaders are not ready to embrace change due to obsolete traditional laws and customs. As a result of irrelevant cultural values, the process of socio-economic activities is slow and almost stagnant at the grassroots. Religion, education, health, politics, economic activities and are also negatively affected. Nigeria must investigate traditional norms in local communities and see the areas that require cultural changes and enlighten the people through the media on how the grassroots people will benefit from the new traits of cultural values. The new traits of cultural values and ideologies could be inculcated through conventional and traditional media. The youths would be the best people to drive new changes at the grassroots because the elders may lose interest. The good news is that contact with other cultures and between other societies environments will bring technical inventions and innovations in education, health, technology and so on. Unfortunately, these are the areas change are often resisted.

[11] explains that grassroots transformation is radical thinking of how changing cultural values can connect the grassroots to the rest of the world. Including the fact that media has a part to play in making information accessible to everyone, sharing of information, leveraging on the new app and so on. Basically, The transformation will raise the standard of living at the grassroots, and this is what is required now in Nigeria. Local culture could be aligned with new new cultural values to reflect global trends. As a result, changes in traditional values and society will usher in growth, development, renovation, modernization and indigenization as people will no longer be afraid of cultural restrictions. Acquisition of new technology will lead to new skills for people to function in all areas. Grassroots transformation will enhance socio-economic growth, higher standard of living, adequate health and maternity care, a healthy environment, good morals, positive attitudes and behaviors, improved welfare in all aspects of life, increased tolerance and opportunity to come together with love and understanding.

In addition, the grassroots transformation will lead to knowledge transfer, respect for other cultures, values, beliefs, norms, and traditions. It will add value to the way community people act and deliver community services, will provide the opportunity for economic and social freedom. It will also usher in acculturation which is the transfer of values and customs from one group to another. According to [8], acculturation is a process through which a person or group from one culture comes to adopt the practice and values of another culture while still retaining their own distinct culture. And this new attitude will improve cultural exchange and open foreign investment socially, educationally, and economically.

## Cultural Values and Grassroots Transformation

Globalization has turned over everything all over the world. As the world is now a global village, nations must join the band wagon to be relevant in the affairs of things. The time is ripe for Nigerians to change what is termed “normal and acceptable”. Irrational thinking and an obsolete manner of doing things will result in

stagnation but no transformation. The new traits of cultural values will retain respect and be more capable of connecting Nigeria to the rest of the world. Grassroots transformation will ensure global exposure in the medical field, education, socio-economic sector, communication, fashion and in food production and nutrition. Obsolete traditional norms at the grassroots have obstructed Nigeria's connections to the world. The new cultural values will be relevant in all sectors, and women will no longer be relegated to the background. Community development officers and foreign investors will no longer be scared of investing in rural communities due to strange harmful traditional norms.

The media is culpable in retention and in the growing spat of harmful traditional norms because it has not carried out the creation of awareness on harmful traditional laws and customs. Ironically, the new media is eroding these harmful traditional values, norms, laws, and customs as well as connecting relevant values globally. Therefore [9] believes that social media can have a positive effect and increase connection between grassroots and the outer world. Nigeria media must take responsibility and expose irrelevant cultural values that can no longer ensure transformation at the grassroots. Men and women will share opinions. Pictures and other stuff are being shared on social media with other cultures, and this has increased creativity and social awareness for grassroots people to interact with others and share ideas on issues that have an impact on their daily lives. Cultural change is relevant in all sectors of life by both urban and rural populations in Nigeria to accommodate new innovations as manifested in other nations. As I noted earlier in this paper, during the Covid-19 era, all cultural values were ignored to give way for survival, and the same is required for grassroots survival and transformation. Therefore, if there is anything Nigeria should desire, it is to embrace change for transformation at the grassroots. There will be changes in the behaviors of the individual, changes in political structures, and the way people think globally. Holding on to obsolete cultural values has constituted a nuisance in the change in behaviors and the way people think globally. Changes in cultural values will promote valuable ideas or behaviors to deal with life successfully.

## Methodology

This article adopted primary and secondary sources of data collection, including discussion and observation methodology. The researcher engaged grassroots leaders in all sectors to obtain core information that was very useful to this work. Data were analyzed using a narrative approach.

## Results and Discussion

From discussions and observations, the paper found that digitized and modified cultural values would reposition and add values to daily lives at the grassroots. It was also revealed that grassroots are not progressive due to complex and obsolete cultural values which do not encourage innovation and creativity. It was also found that changes in cultural values and ideologies will create long-lasting social change, and there will be great changes in the socio-economic activities at the grassroots. Global connection and new values will influence social behaviors through their inculcation into the traditional beliefs, laws, and customs. The significance of this paper is that since values are widely recognized and respected by community people as what is important to their survival and identity, needs and aspiration, they will understand the zeal for new traits of cultural values. The importance of being connected to the rest of the world for survival has been topical among researchers. The new traits will open the floodgate and access to innovation and creativity for problem-solving and decision-making process to improve quality and raise the standard of living at the grassroots.

## Conclusion

This article has examined the cultural values and grassroots transformation with a view to understanding how changes in the cultural values will positively affect transformation in Nigerian communities. Based on the above, the paper concludes that due to global changes such as Covid-19 pandemic, Nigerians cannot afford to continue to live with what is termed "normal or acceptable" under this changing world. It is interesting to discover how many Nigerians were welcoming the issue of new traits of cultural values. This is imminent because of the need for Nigeria to create boundless contact with global communities for more ideas for transformation. In this age of globalization, Nigeria need not continue to stick to the obsolete cultural values when social media has initiated the dreaded change already. From all indications, there is connect between changing cultural values and grassroots transformation. New cultural values will reposition families and social systems and save them from extinction. It follows that the changes in values, attitudes and people's behaviors will promote and boost productivity. Again, obsolete modes of acting, speaking, and dressing, even in the eating habits of Nigerians, need more of global contents. I strongly believe that there will be a positive change in the modified cultural values, norms, people's lifestyles, access to new talent and enlightenment. Finally, cultural values must be shifted to give way to modernization, innovation, creativity, and changes in cultural value contents for grassroots transformation in Nigeria. Nigerians must adapt to change and embrace changes in cultural values, norms, and traditions, as well as ideas opinions and behaviors in other to deal with future challenges successfully.

## Recommendation

1. The article recommends that community leaders and community people be liberated from obsolete values and embrace acculturation to keep up with emerging global demand and survive future uncertainty.
2. Nigerians should embrace the new media as an instrument for cultural imperialism, and people from diverse cultures should use social media as a bridge to adapt into other people's culture to connect and build relationships to succeed and benefit from one another.
3. The man should no longer become his own enemy by forcing harmful values on the people but should be aware of his genuine nature and transform.
4. Human beings should use traditional laws and customs for progress and not for wicked purposes and descending to the level of an animal.
5. Henceforth, righteousness should be the norm that grassroots people must imbibe in order to change from good to better and from better to the best.

## Conflict of Interest

I hereby testify that this study was self-sponsored, and I am not in conflict with my employers as per the sponsoring of this study/conference. I also have no affiliation with any other organization that could influence this research. Therefore, there is no conflict of interest.

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# Innovation on Social Media Platform as a Tool for Students' Learning in Selected Public Institutions in Oyo State, Nigeria

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***Abstract***

*Innovation in the educational sector brings something new to enhance pedagogy using technological tools in teaching and learning globally. This study explored the actual impact of daily use of social media platforms in learning among students in selected institutions in Nigeria. A descriptive research design was utilized to gain an accurate profile of situations. Six hundred (600) University of Ibadan and Emmanuel Alayande College of Education students actively using social media are the respondents of the study. The research respondents cut across 6 faculties in the University of Ibadan and 3 Schools in Emmanuel Alayande College of Education. Summing up, social networks became an integral part of the students' full life and took up most of their free time. Undoubtedly, in social networks, there are also things useful for the development of the students. Social media is the most preferred online learning platform for students across Nigerian institutions. In addition, Students in Nigerian institutions during learning have limited access to free data. Thus, it can be concluded that social media have a dual impact on student achievement, and it is necessary to approach adolescents' use of social networks with ultimate responsibility. The findings of this research can be used to propose effective plans for improving students' learning in such a way that a balance in leisure, information exchange, and students' learning can be maintained. To this end, the researchers recommended that social media be used for educational purposes and Social Networking. Cite should be expanded, and new pages should be created to enhance academic activities and avoid students' learning setbacks.*

***Keywords:*** *Institution, Social media, Students' learning, Tools, WhatsApp.*

## Introduction

The emergence of social media has revolutionized communication and facilitated teaching and learning activities in recent years [1]. Previous researchers stressed that technology has developed immensely and has brought about significant changes worldwide in recent years to the educational paradigm [2]. As a result, there are now Improvements in the integration of information communication technology in education, which has developed the scope of teaching and learning in traditional methods, which has turned the entire world into a global village [3]. In particular, the internet has created a platform for millions of computer users who visit numerous sites in various countries, belonging to thousands of businesses, governments, research institutions, educational institutions, and other organizations [4]. For instance, face-to-face communication is being reduced through the daily advancement of technology, innovative development of new technological devices, and new mediums are being introduced to connect global audiences,

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such as social media platforms. In other words, social media serves as an effective medium of dissemination of information through its social networking sites – telegram, Google meet, twitter, yahoo messenger, facebook messenger, Blackberry Messenger (BBM), WhatsApp messenger, 2go messenger, skype, google messenger, Instagram, iPhone, and Androids [3, 5].

Most people use networking sites to interact with old and new friends and physical or internet colleagues [6, 7]. It closes the gap of distance and eliminates the geographical limitation of space among individuals. Social media is the platform that enables the interactive web by engaging users to participate in, comment on, and create content as means of communicating with their social graph, other users, and the public, which have content formats including text, video, photographs, audio, PDF, and PowerPoint [8, 9]. Therefore, it can be said that social media is the tools, services, and communication facilitating a connection between peers with shared interests to improve knowledge in technology.

Social media applications have become a vital tool for daily human communication and are widely used in the education process worldwide [10]. However, the use of social media for educational purposes has been neglected in Nigeria except for the fairly use by some instructors as a personal initiative. The outbreak of the Covid 19 pandemic inspired the world to implement virtual teaching and learning using social media as an essential tool in the educational setting. The desire for virtual learning might be related to modern technology and adapting to new challenging situations due to Covid-19 [11].

Social media can also be accessed on the web and can be run efficiently on a laptop, phone, and other social media platforms that can engage students to collaborate in their learning. This implies that messages, both incoming & outgoing, are sent by the users (students) and can be displayed on multiple platforms concurrently. Social media can also be used to conduct a flipped learning mode before the class-based method, as a means of passing information to students, and after the class lecture [3, 12, 13]

These past researchers also collaborated that social media is considered a student-centered asynchronous teaching app that uses online learning resources to facilitate information sharing beyond the constraints of time and place among a network of people and combines self-study with asynchronous interactions to promote learning, and it can be used to facilitate learning physically and virtually.

However, it has been argued that Nigerian Institutions need to encourage the use of social media platforms alongside with face-to-face classroom-based teaching and learning [14, 7, 3]. Due to this increased popularity of many platforms in social media, there are growing concerns over the possible influences the use of social media could have on students' learning and academic activities among the students in Nigeria. This study attempted to identify the Innovation on Social Media Platform as a Tool for Students' Learning in Selected Public Institutions in Oyo State, Nigeria.

## Research Objective

The main aim of the research is to investigate social media as a tool for teaching and learning in tertiary institutions in Nigeria. With the following objectives:

1. To determine the social media platform students mainly used to receive lectures in tertiary institutions in Oyo State, Nigeria.
2. To determine the availability of data connectivity during learning among students in tertiary institutions in Oyo State, Nigeria.
3. To examine the challenges students, face during the learning process using social media platforms in tertiary institutions in Oyo State, Nigeria.

## Research Questions

1. What social media platform do students mostly use to receive lectures among

students in the University of Ibadan and Emmanuel Alayande College of Education?
2. How well is the free availability of data connectivity during learning among students at the University of Ibadan and Emmanuel Alayande College of Education?
3. What challenges do students face during the learning process when using social media platforms among students in the University of Ibadan and Emmanuel Alayande College of Education?

## Literature Review

The use of technology tools has become part of life transformation, and social media are ICTs compliant with the usage of devices and networks such as computers, mobile phones and the internet. Previous studies focus on various approaches to Social Media platforms as a tool in technology that allow traditional teaching and learning to create a group chat and group forum. Students improve their learning and collaborate together [3, 7]. The paradigm shift from the traditional classroom to teaching and learning includes Web 2.0 internet knowledge, e-learning and online learning, and experience real-time communication on difference platforms to access relevant information online [15, 9, 16, 17].

Social media are Web 2.0 technologies that facilitate social interaction and collaboration and foster teaching and learning in a sense of community, and social media is often used to refer to the new forms of media that involve interactive participation [18, 19]. The birth of the media word saw it being almost centralized with one body: radio, television, and studio [3]. Prior research exposed that social media, since its emergence, has become one of the most impactful Information Technology (IT) phenomena. The use of Information Communication Tools or digital equipment has positively influenced the educational environment [20, 21].

Furthermore, it was stated that the term social media relates to the many easy-to-use services that anybody can use to interact with other people online, such as WhatsApp, Facebook, YouTube, Blog, Twitter, and so on and so on [22-24]. Therefore, using social media's accessible services enables us to create an online presence as quickly as signing up for Facebook and Twitter accounts, subsequently creating our content on the web within minutes [22, 24].

Social Media has also been defined as websites that allow profile creation and visibility of relationships between users and web-based applications which provide functionality for sharing, relationships, groups, conversation, and profiles [25]. [26], said that social media is use as "social networking sites" or a set of information technologies that ease collaboration and networking. Other studies explained that a taxonomy of social media is into 6 distinctive categories (Blogs, Social Networking Sites, Collaboration Projects, Content Communities, Virtual Social Worlds, and Virtual Game Worlds) introduced. [27].

The generation of students in Nigeria today is much more using and very motivated to use social media as blended learning to their face-to-face classroom-based. As noted by [28] that students these days are so occupied in social media that they are almost online for 24 hours with their learning positively enhance their academic performances.

In recent times during Covid 19, it has been observed that students have unlimited access to the internet and social media to kill dullness during the pandemic and make learning easy by avoiding physical contact to curb the spread of the virus [3]. Despite the frequency of use of social media among undergraduate students in various universities in Nigeria, have been hindered by the lack of free availability of data connection with Wifi in the campuses and some many challenges face on campuses during their teaching and learning. The need to expand this situation should be an urgency solution to the unavailability of Wifi, low internet bandwidth facilities, and unstable electricity in academia in most campuses in Nigeria.

## Methodology

The descriptive survey research design was adopted for the study. The population of the study consisted of full-time undergraduates in the University of Ibadan and Emmanueal Alayande College of Education, Oyo State, Nigeria. The students' population strength as at the 2020/2021 session has about 35000 students across the faculties in the University of Ibadan and about 15000 students across the schools in Emmanuel Alayande College of Education. Purposively total sample size of 300 students in each Institutions University of Ibadan and Emmanuel Alayande College of Education, making 600 students, was randomly selected. A well-constructed and self-developed questionnaire titled "Social Media Platforms and Students' Learning Questionnaire (SMPSL)" was used to get the desired information from the students. The Pearson Correlation Coefficient was used to determine the reliability of the instrument. A co-efficient value of 0.75 indicated that the research instrument was reliable. Responses from the questionnaire were analyzed using the descriptive statistics of frequency counts and percentage, and inferential statistics of t-test statistics and Spearman's Rank-Order Correlation were used to test the hypotheses that were formulated at 0.05 level of significance. Descriptive statistics of frequency counts and percentages were used in analyzing demographic variables and research questions, while the inferential statistics of t-test statistics and Spearman's Rank-Order Correlation was also used to test the stated hypotheses at 0.05 level of significance.

## Results and Discussion

Table 1 shows the analytical result of the most preferred platform students used during lectures in Nigerian institutions. The result revealed that a vast number (65%) of the respondents choose social media as the most preferred online platform students used during lectures in Nigerian institutions, 18% choose Email, 13% sided with search engines, whereas only a minute portion (4%) of the respondent considered other online learning platforms as the most preferred across Nigerian institutions. This shows that social media is the most preferred online learning platform for students across Nigerian institutions.

**Table 1.** Respondents according to the Social Media Platform Students Mainly used to Receive Lectures

| Social Media Platforms | Frequency | Percentage |
|---|---|---|
| Email | 108 | 18.0 |
| Search Engines | 78 | 13.0 |
| Social Media | 390 | 65.0 |
| Others | 24 | 4.0 |
| **Total** | **600** | **100.0** |

Table 2 reveals the level of free availability of data connectivity during learning among students in the institution in Oyo State, Nigeria. The result interpreted that students in Nigerian institutions during learning have limited access to free data and school Wi-Fi when using social media even when their schools made provision for free data connectivity for students' learning, couldn't afford data subscriptions, and their school didn't make provision for larger free data or Wi-Fi as majority (55% and 58.3% respectively) of the respondents disagreed they have access to free data and school Wi-Fi when using social media for learning whereas majority (48.3% and 46% respectively) likewise agreed their school provides free data connectivity for students' learning; and they couldn't afford data subscription and their school didn't make provision for it.

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**Table 2.** Availability of Data Connectivity and Students' Learning.

| Items | SA | A | U | D | SD | Total |
|---|---|---|---|---|---|---|
| I have access to free data when using social media for learning | 25.0 | 15.0 | 5.0 | 33.5 | 21.5 | 100 |
| I have access to school Wi-Fi when using social media for learning | 19.2 | 12.5 | 10.0 | 32.0 | 26.3 | 100 |
| My school provides free data connectivity for students' learning | 12.3 | 36.0 | 6.0 | 28.5 | 17.2 | 100 |
| I couldn't afford data subscription and the school didn't make provision for it | 14.5 | 31.5 | 15.0 | 24.5 | 14.5 | 100 |

Table 3 shows the Challenges faced by Students during the learning process when using social media platforms among students in institutions in Oyo State, Nigeria. The result is evident that Poor network connections, Poor electricity, much consumption of data by the social media platforms, inability to afford data subscription as the school would not also make available and limited access to data subscription constitute challenges faced by Students during the learning process when using social media platforms among students in the institution in Oyo State, Nigeria. Majority of the respondents agreed with percentage responses of 88.5%, 91.5%, 76.3%, 51.7% and 71% respectively.

**Table 3.** The Challenges faced by Students during Learning process when Using Social Media Platform

| Items | SA | A | U | D | SD | Total |
|---|---|---|---|---|---|---|
| Poor network connections usually make learning on social media difficult for me | 58.5 | 30.0 | 3.0 | 5.0 | 3.5 | 100 |
| Poor electricity usually affects the effectiveness of my learning via social media platforms | 39.0 | 52.5 | 3.0 | 4.0 | 1.5 | 100 |
| The consumption of data by the social media platforms is much thereby making it difficult to learn via the platforms | 45.3 | 31.0 | 15.2 | 6.5 | 2.0 | 100 |
| I couldn't afford data subscription and the school didn't make provision for it | 21.2 | 30.5 | 17.8 | 25.0 | 5.5 | 100 |
| Limited access to data affected my learning on social media because sometimes I was logged out of class when data finished | 39.3 | 31.7 | 11.0 | 12.0 | 6.0 | 100 |

## Hypothesis

The research hypotheses formulated were tested and the following results were obtained:

**Decision rule**: If P-value <0.05, reject the null hypothesis otherwise accept.

Spearman Rho: 0 to -1, negative correlation.

0 to +1, positive correlation.

Hypothesis 1 (Table 4) reveals the Spearman's Rank-Order Correlation between Age and usage of social media among students in Nigerian Institutions. The table showed a weak positive correlation (+0.066 at $p<0.05$). This shows that there is no significant relationship between age and usage of social media among students in Nigerian Institutions. Therefore, the null hypothesis was rejected.

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**Table 4.** Ho1-There is no Significant Relationship between Age and Usage of Social Media among Students in Nigerian Institutions

| **What is the most available or utilized social media platform for e-learning in your institution/faculty** | | |
|---|---|---|
| | **Pearson Correlation** | **Sig.** |
| Age | .066 | .108 |

Hypothesis 2 (Table 5) shows t-test Statistical difference in social media usage among students across different universities, which revealed a significant value of 0.00 (at $p<0.05$).

This shows that, there is a significant difference in social media usage among students across different universities. Therefore, the null hypothesis was rejected.

**Table 5.** Ho2-There is no Significant Difference in Social Media Usage among Students across Different Institutions

| **Institution** | **N** | **Mean** | **Std. Deviation** | **Sig.** |
|---|---|---|---|---|
| University of Ibadan | 300 | 2.99 | 2.637 | 0.00 |
| Emmanuel Alayande College of Education | 300 | 2.60 | 2.280 | |

**Summary of the Findings**

In this study, the following findings were made:

1. Social media is the most preferred online learning platform for students across Nigerian institutions.
2. There is no significant relationship between social media usage and students perception among students in Nigerian institutions. Though Social media enable students across Nigerian institutions to have easy access to online material, share information with classmates easily, follow the latest developments and trends in their courses, learn at their pace, and improve their academic performance.
3. During learning, students in Nigerian institutions have limited access to free data and school WiFi when using social media even when their schools made provision for free data connectivity for students' learning, couldn't afford data subscriptions, and their school didn't make provision for larger free data or WiFi.
4. There is a significant difference in social media usage among students across different universities. There is no significant relationship between age and usage of social media among students in Nigerian Institutions, as WhatsApp is the most utilized social media platform for e-learning among students in institutions in Oyo State, Nigeria.
5. Poor network connections, Poor electricity, much consumption of data by the social media platforms, inability to afford data subscription as a school would not also make available and limited access to data subscription constitute challenges faced by Students during the learning process when using social media platforms among students in the institution in Oyo State, Nigeria.

## Recommendations

In accordance with the findings of this study, the following recommendations are made:

1. Students should be educated on the influence of social media on their Academic activities.
2. Students in all tertiary institutions should be encouraged and increased in their practical aspect of learning by their lecturers in the

use of a Social Media Platform that relates to their academic performance.

3. Students should better manage their study time in and prevent distractions that social media can provide. There should be a considerable decrease in students' time spent when surfing on the internet.
4. Nigeria government and each institution's Management should expand the medium of WiFi connectivity on the campus. This should also be made free of charge for the students on the various campuses in Nigeria.

**Suggestion for further Studies**

Further research should be carried out on the impacts of social media as a tool for students learning in other states in Nigeria apart from Oyo. The study can also be replicated in other institutions in other states in the country to give room for generalization.

## Conflict of Interest

There is no Conflict of Interest, and it was self-sponsored.


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# Protective Masks: A Semiotic Discourse in Times of Pandemic

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***Abstract***

*Face masks have been an essential part of Personal Protective Equipment (PPE). Protective masks are pieces of kit or equipment worn on the head and face to afford protection to the wearer. They are usually worn for providing a supply of air or filtering the outside air (respirators and dust masks). In the past two years while coping with the pandemic, one of the most significant changes that have been part of our wardrobes is a face mask. The Covid-19 pandemic disrupted our normal to give rise to a post-pandemic new normal where the focus has shifted to multi-functional clothing that provides a multidimensional experience to the wearer. Safety, functionality, comfort and aesthetics are at the core of this fashion. However, what continues through the pandemic as well is the ability to communicate visually. Thus, making fashion as a major contributor towards the perception and interpretation of identities. With this as the base, the authors studied the semiotic discourse in perceiving a community's identity in the times of pandemic with respect to performance clothing. The authors conducted an in-depth qualitative analysis of workers using a questionnaire based on a Likert scale and open-ended questions from process industries and Original Equipment Manufacturers (n=50) of Northern and Western India to explore creating mask designs to communicate their work identities. The face masks were designed, which not only help protect against covid-19 and the work hazards but also projected the area and potential hazards of the job profile for better compliance in the workers.*

***Keywords:*** *Functional, Face masks, Fashion semiotics, Identity, Performance clothing, Pandemic.*

## Introduction

The pandemic changed what we referred as "a normal attire". In the past two years, while coping with the pandemic, one of the most significant changes that have been part of our wardrobes is a face mask [1]. The majority of us did not envision ourselves wearing, or being asked to wear, face masks on a daily basis. From being part of medical protective wear to being part of a common man's necessity, the masks have gone through multiple notable changes to evolve into their current form. People around the world are wearing masks for one of its core functions - protection from disease. One has known about the vital role of face masks in maintaining public health. However, today, the masks have become essential. The masks limit the spread of germs. Coughing or sneezing, and even talking may release tiny droplets from one person into the air that can infect someone. Wearing a face mask can reduce the number of germs that are released by the wearer. This can protect a healthy person from getting infected by someone who is sick. Face masks also cover the nose and mouth, protecting them from splashes or sprays of body fluids. As a consequence of the global pandemic, the strong demand for face protection has accelerated the development efforts for the same, resulting in dozens of new masks in the global market.

### Protective Face masks

A face mask is a tool that is commonly utilized for the prevention of the spread of diseases. They are called by various names such as dental masks, isolation masks, layer masks, medical masks, procedure masks or surgical

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masks. A mask that covers the mouth and nose, which can be secured by ties /bands at the back of the head or ear loops are called face mask. Nowadays, face masks come in many different colors, sizes and shapes and are manufactured by various brands.

Face masks have been an essential part of Personal Protective Equipment (PPE) [2]. PPE refers to protective clothing, helmets, gloves, face shields, goggles, respirators or other equipment designed to protect the wearer from injury or the spread of infection or illness. Protective masks are pieces of kit or equipment worn on the head and face to provide protection to the wearer. They are usually worn for:

1. Protection against dust/pollution/chemicals or for the supply of air (respirators and dust masks).
2. Protecting the face against flying objects or dangerous environments, while allowing vision.
3. Protection during warfare.

Protection against inclement weather.

## Evolution of Face Masks

For over around thousands of years, face masks have been in existence. Early masks, that were most likely made of natural materials and cloth, possibly decomposed at a far quicker rate as compared to the other relics of the past, such as weapons, pottery, utensils and so on. It is difficult to determine the exact period during which the masks made their first appearance. However, the earliest recorded face mask-like objects were found in the southwestern Asian society that date back to as early as the 6th century BC [3]. The archaeological evidence suggests that during Roman Empire, masks were used sometimes in the gladiatorial tournaments for multifunctional use of protection as well as to intimidate the competitor. According to the record of 'The Travels of Marco Polo', the 13th-century travelogue of the famous Italian traveller Marco Polo (1254 - 1324) who travelled in China in Yuan Dynasty (1279 - 1368), servants of the emperor who used to serve meals needed to wear silk scarves to cover their noses and mouths. These scarves, woven in silk and gold threads, are believed to be the earliest items in China that are similar to the face masks today. It was believed that these silk scarves would prevent the servant's breath from changing the smell and taste of the food [4].

The Black Death was a bubonic plague pandemic that occurred in Afro-Eurasia in the 14th century. It is recorded as the fatal pandemic in the human history. The spread of the Black Death to Europe greatly promoted the emergence of functional face mask-like objects. The physicians who tended to the bubonic plague victims in the 17th century wore special protective wear. This protective wear consisted of covering themselves head to toe along with a long bird-like beak mask [5]. The misconception about the spread and nature of the disease led to a beak-like plague mask. During outbreaks of the bubonic plague, a pandemic that recurred in Europe for centuries, towns gripped by the disease hired plague doctors who practised what passed for medicine on rich and poor residents alike. The beak was designed with only one hole on each side of the nostrils. The beak would be filed with herbs so as to breathe the impressions of the herbs enclosed. The material used to create these masks was leather and glass eyepieces. In some regions, due to poor economic conditions, people used waxed cloth masks. The compound placed in the beak of doctor's mask was Theriac, which comprised more than 55 herbs and components like myrrh, cinnamon, viper flesh powder, and honey. Theriac was put in the masks as it was believed to purify the air that the doctors would breathe in and in turn protect them from the plague. It Is believed by De Lorme that the beak shape of the mask provided the air sufficient time to be suffused by the protective herbs before it was inhaled by the doctors [6].

The present-day surgical masks came into existence around the time when germs and pathogens reshaped the medical understanding of diseases. Robert Koch in the 1880s discovered the bacteria responsible for tuberculosis and

cholera. It was in 1897 that the first study by Jan Mikulicz Radecki was published that supported the use of mask while performing surgery. Another recorded plague - the Pneumonic Plague/ Manchurian Plague, occurred mainly in Manchuria between 1910-and 1911. It is reported to have killed 60,000 people and led to the wearing of the first personal protective equipment (PPE) [7]. During the pandemic, Wu Lien-teh promoted the use of cloth plague masks for the healthcare workers and patients as well as to the population at large as per the feasibility. It is believed to be the first attempt at containing an epidemic through such a measure. This event has said to influence the setting up of personal protective equipment as a means to stop the spread of disease. The origin of the modern hazmat suit also credits its origin to this event. The influenza pandemic of 1918 and 1919 was the deadliest flu outbreak in history, killing up to 50 million people worldwide. It was the first recorded pandemic in the United States region, killing around 675,000 people [8]. The local governments to curb the spread rolled out initiatives like closing the schools/public places, no spitting ordinances were enforced, encouraging use of handkerchiefs or tissue papers as well as mandatory to wear masks in public. From 6th Century BC to present day, this evolution of mask is presented as a timeline in Figure. 1.

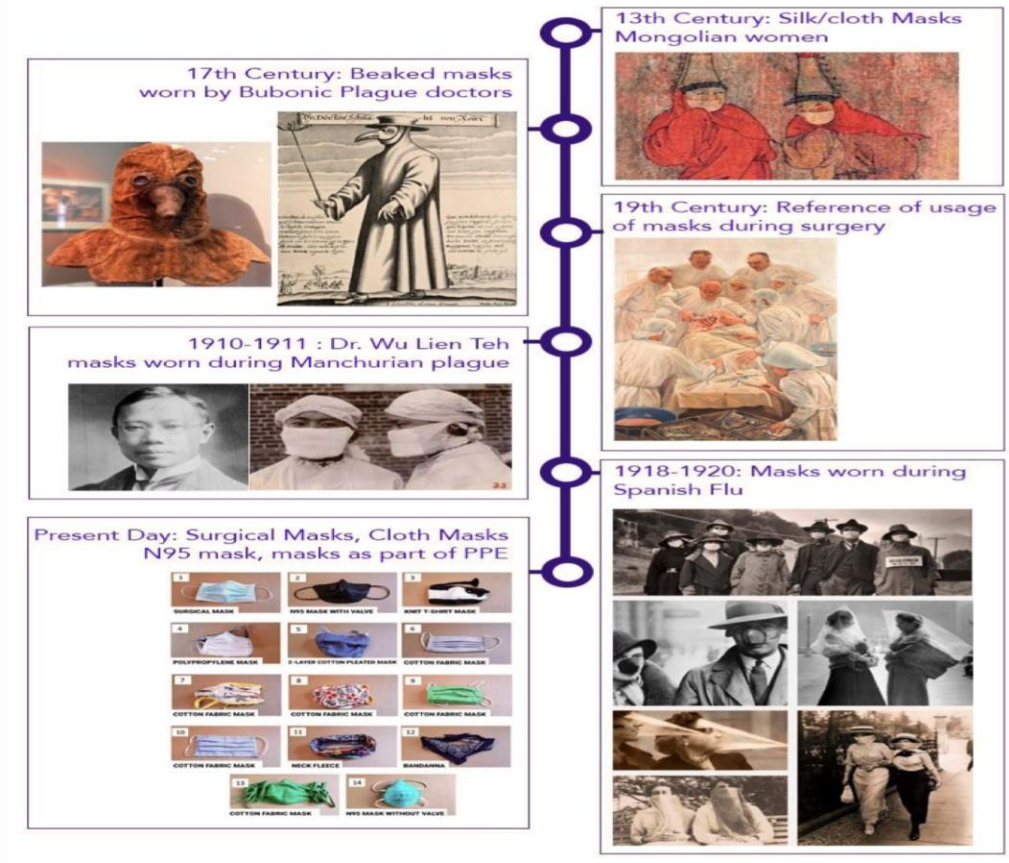


**Figure 1.** Timeline of Evolution of Masks

## Fashion Identity and Semiotics in Times of Face Masks

"Fashion provides one of the most ready means through which individuals can make expressive visual statements about their identities." - Bennett, A. (2005) culture and everyday life.

Semiotics of fashion is the study of fashion and how humans signify specific social and cultural positions through dress. Fashion is a language of signs that non verbally converse

meanings about individuals and groups. Three main parts of the semiotics of fashion: the sign, what it refers to and the people who use it. The conveyance of messages takes place through the development and use of signs. The form, existence and interpretation that it takes depend on the society and culture within which they operate [9]. Like when one sees a person wearing a camouflage print uniform, a direct relation with armed forces is made. Similarly, seeing a person dressed in a white apron and carrying a stethoscope is a uniform universally accepted for doctors. These visual appearances based on uniforms create a sense of fashion semiotics and help build a community. It creates a notion of belongingness created by individuals and groups to integrate cultural norms and values that are acceptable into their everyday lives in meaningful ways. Figure 2. depicts a fashion semiotics square that expresses the framework of semiotics in fashion. Fashion has the function, symbolic meaning, acceptance of social status and yet represents personal values.

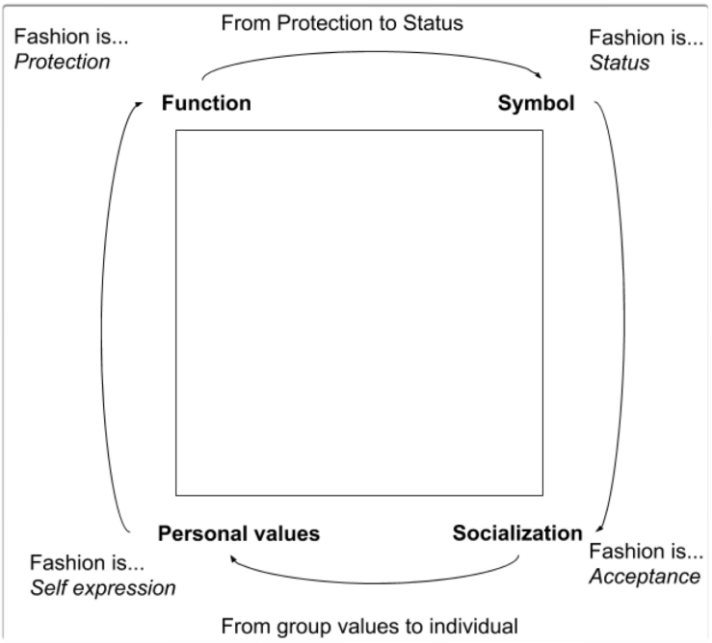


**Figure. 2.** Fashion Semiotics Square

## Fashion and Notion for Community Building

Global Community means people of varied origins from national and international regions who together form a community within and outside of a designated physical space while catering to diverse norms and values, which communicate their perspectives and visions about their beliefs and world. It is a notion of belongingness created by individuals and groups to integrate cultural norms and values that are acceptable into their everyday lives in meaningful ways. Implementation of the goal of building global communities within an identified context-corporate organization, educational institution, as well as corporate and community services, for example-encourages a favorable partnership in which social responsibility and accountability for actions are situated within the framework of the broader participating community that engages in that intercultural communications event in any way whatsoever**.** It is believed that building global communities is an attainable and honorable goal, one that requires deep respect, love and compassion for humanity, commitment to social responsibility and upholding of social justice and the belief that together it can overcome adversity. Even individuals have different roles or have been assigned different tasks, but they all have social responsibility roles. Their social responsibility

roles create an imperative for them to make a concerted effort to contribute to global community building [10].

Uniforms, as the word suggests, are clothes that unify and are constructed to the same repetitive format. Most people have experience of school uniforms, others of specific working clothes such as surgeons who wear special gowns when in the operating theatre, nurses who attend to them or guards' uniforms on public transport and in museums and art galleries. What one wears influences how fellow human beings see each other. People talk of 'dressing for the occasion and work clothes often differ from those that one wears for relaxation (sometimes called 'home clothes') or other non-work occasions. Work wear is a visible part of the corporate image. Work uniforms that are presentable and appropriate are an essential factor with regard to occupational safety and comfort at work. There are different kinds of uniforms throughout the world that give people a distinctive ordered identity [11]. Uniforms are generally functional but can also be aesthetically comfortable. These uniforms generate an idea as the wearers participate in specific activities, which help develop a sense of belonging, in turn generating an identity that is beyond the person. This belongingness can take over other pieces of a person's identity and create a larger brand image, hence creating a community of workers. The authors further studied the impact of a pandemic on this notion and the use of protective masks as an extension of this identity.



**Figure 3.** Workwear at OEMs as a Notion of Community Building

## Objective of the Study

1. To identify the Process Industries & OEMs in Northern and Western regions of India and understand their acceptance, behaviour and reaction to protective masks.
2. To explore the impact of the pandemic on the protective wear segment and communication in times of pandemic at workplace.
3. To conduct a survey for need assessment of design intervention at the process industries & OEMs with respect to the new added piece of clothing - a protective mask.
4. To signify that the designed and proposed masks will identify the job profile and work hazards of the wearer, thus promoting personal safety practices at workplaces.

## Research and Design Methodology

Process Industries & OEMs (Original Equipment Manufacturers) were identified through snowball sampling, personal contacts and internet, firstly to understand the acceptance, behavior and reaction to protective masks during the pandemic as an addition to their uniform and its scope of identity generation. Referring and reviewing collected secondary data.

Sample Selection: In order to gain an insight into the organization and functioning of the process industries and OEMs, people from different groups involved with protective clothing were selected by Purposive Sampling techniques. The total sample size comprised of 5 industries from Northern and Western India. A

sample size of 50 respondents was interviewed based on a convenient sampling method.

## Tools and Techniques of data collection

Interview Schedule was designed for workers and through the observation method it was noted about the needs, problems and impact of protective masks in building a notion of community as well as communication. Likert scale and open-ended questionnaire were used to gather information with respect to study the impact of the pandemic on the protective wear segment and communication & identity in times of pandemic at workplace. The following research questions were addressed in this study and evaluated using a 5 –point Likert scale:

1. Acceptance of Protective masks at workplace.
2. Impact of protective masks on job satisfaction and communication.
3. Aesthetic appeal of Protective masks.
4. Functionality of Protective masks and ease of working.
5. Comfort and Protective masks.
6. Their perception of Protective masks.
7. Motivation, acceptability and compliance of Protective masks.

The questionnaire is based on a Likert scale and a few were open-ended questions. Likert scale questionnaire requires each respondent to rate the statement on a 5-point. Such as scale 1 = strongly disagree, scale 2 = disagree, scale 3 = neutral, scale 4 = agree, and scale 5 = strongly agree. The questionnaire developed was attempting to measure the demographics, acceptance of protective masks, Protective masks influences on performance, masks as a Uniform, Organizational identification, other job-related data, and job satisfaction as well as several uniform features (such as style, appropriateness, functionality, material, color, comfort, etc.). The overall approach towards compliance of Protective masks and its role at communication.

## Results and Findings

The participants from the identified process industries and OEMs were interviewed to assess the impact of the pandemic on the protective wear segment and communication in times of pandemic at the workplace. The interview schedule was used to look at the requirement for design intervention for protective masks as an added accessory of their protective clothing, such that it helps in the identification of job profile, hazards and works as an extension for their protective clothing. The participants, who are serving in these process industries/OEMs for many years, have a certain level of professional knowledge, maturity and ability to provide data for this research, which showed in Figure 4. Analyses were performed using SPSS software for Windows (version 25, 2007, IBM Corporation, Armonk, New York, United States).

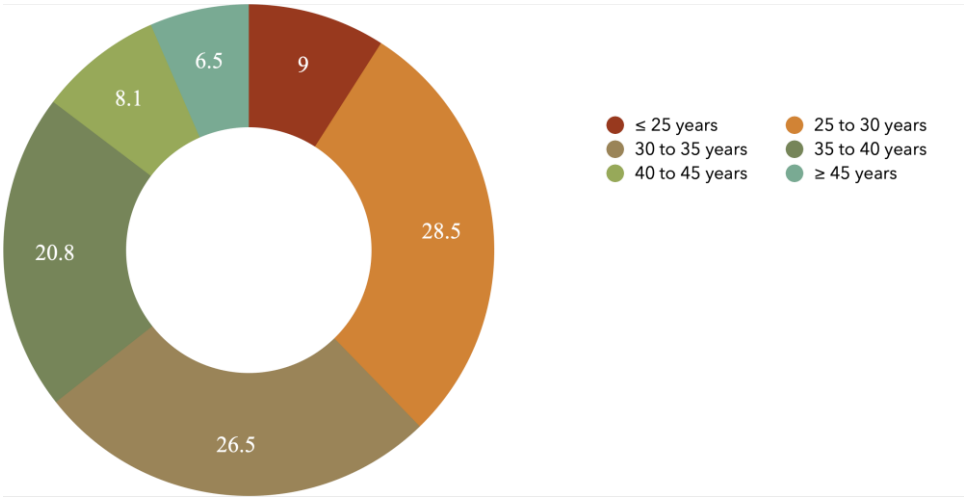


**Figure 4.** Age Distribution of Workers in the Study (Data Presented as Percentage)

The minimum age of the workers in the study was 18 years, and the maximum age of the workers in the study was 59 years. The mean age of the workers in the study was 33.9±7.4 years. Figure 4 gives the age distribution of workers in the study. As seen in Figure 4, the maximum number of workers in the study were between the age of 25 – 40 years. Figure 5 gives the educational qualification of workers in the study. As seen in Figure 2, 12.8% of workers had completed <10$^{th}$ class of education, 27.7% had completed S.Sc., 23.6% had completed H.Sc., 33.8% were either graduates or had completed diploma whereas 2.1% had completed Masters (Figure 5). Thus, the maximum number of workers in the study had completed less than the H.Sc. level of education.

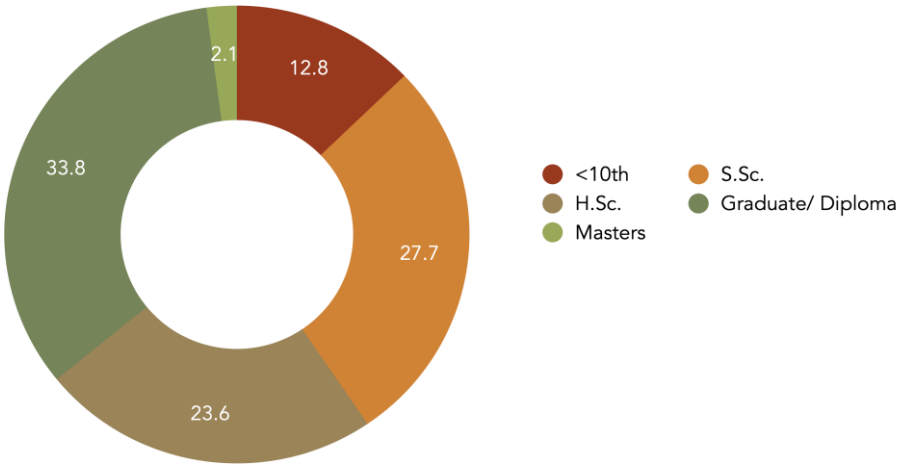


**Figure 5.** Educational Qualification of the Workers (Data Presented as Percentage)

The minimum work experience of the workers in the study was 1 month, i.e. they had newly joined the company, whereas the maximum work experience of the workers in the study was 35 years. On average, works had an experience of 10.1±7.4 years. Figure 6 gives the distribution of years of experience of the workers in the study. As seen in Figure 6, 61% of the workers had less than 10 years of work experience, whereas 38.8% of workers had more than 10 years of experience.

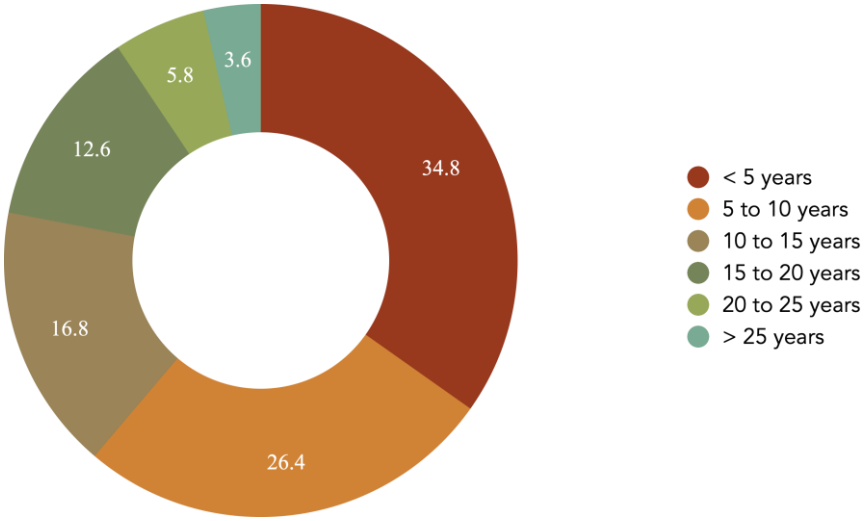


**Figure 6.** Number of Years of Experience of Workers (Data Presented as Percentage)

Table 1 shows the level of awareness of the participants on using the protective masks. Based on the table, most of them were aware that protective mask is very important in the times of

pandemic at process industries and OEMs. All the respondents were aware regarding the hazards that are present in the industries is as important as the usage of the protective clothing[12]. Supervisors are encouraging to wear masks and protective clothing, moreover, it is followed up by the safety officer conducting the training of Personal Protective Clothing (PPC) for the workers. Based on the result, the industry Safety Departments had understood and supported that training had been regarded as one of the compulsory measures or requirements that the construction companies would have to provide for the workers as well to ensure that the workers are well-equipped with the knowledge to carry out the work at the construction site with minimal safety hazards[13]. Videos on various pandemic control measurements were done to the participants to create awareness. Hence all these attempts suffice the objective for promoting personal safety practices at workplaces.

**Table 1.** Workers & safety professionals, engineers' response to PC

| **Workers & Safety Professionals, Engineers Response To Protective Masks** | **Mean Score** | **Rank** | **Rating** |
|---|---|---|---|
| Compliance of Protective masks by participant at Process industries & OEMs | 4.89 | 1 | Agree |
| Importance of Protective Masks | 4.8 | 2 | Agree |
| Design Components suffice your requirement | 3.78 | 3 | Agree |
| Role of Fashion in Protective masks | 3.5 | 4 | Agree |
| (Open ended questionnaire) What changes would you like to see in the protective masks? | | | |

The participants were also interviewed to understand the reasons for non-compliance of protective masks. Table 2 recorded that discomfort was the primary factor for non-compliance. The workplace tends to get hot and humid, and wearing protective masks which are not breathable led to non-compliance of the masks. It was also observed that they felt communication was restricted and had confusion in identifying workers.

**Table 2.** Reason for Non-compliance of protective masks

| **Reason for noncompliance of Protective Masks** | **Mean Score** | **Rank** | **Rating** |
|---|---|---|---|
| Uncomfortable | 4.5 | 1 | Agree |
| Restricted communication | 4.5 | 2 | Agree |
| Creates confusion about identity | 4.3 | 3 | Agree |
| Unattractive | 4.3 | 4 | Agree |

Table 2 stressed on the need for design intervention for protective masks for better compliance at workplace. The authors, based on their research, went across to modify J. Kersak and M. Marcic's design framework (figure 7) to understand designing protective masks and it's acceptability permissions and consents were taken from the industries to ensure no disturbance and harm occurred during the procedures for evaluations and voluntary participation of the participants.

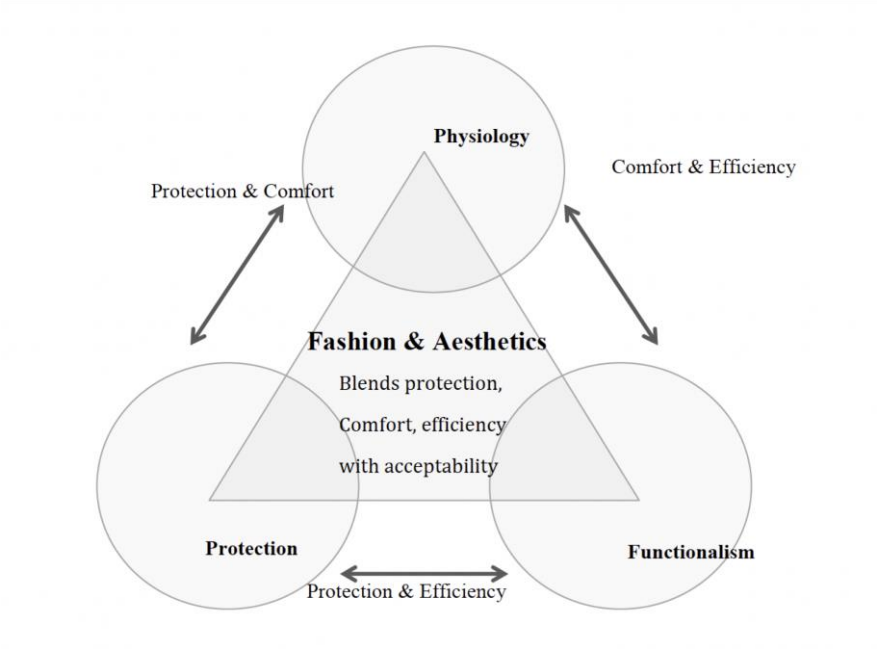


**Figure 7.** Design Framework for Developing Protective Masks

Based on the design framework shared in figure 7, protective masks were designed to suit the job profile and have references of potential work hazards. Semiotics and symbols were used to communicate the same as it was observed that communication with masks on was one of the factors for non-compliance. The masks include a combination of finishes with anti-microbial, flame retardant and moisture absorbency for enhanced comfort and safety. These icons help in understanding the potential hazards, in turn improving the safety compliance at the workplace. The icons developed are showcased in figure 8 that represent the hazards and finishes like lathe machine, fire resistant, anti-static and moisture management.



**Figure 8.** Design Framework for Developing Protective Masks

The protective masks developed were aligned with the protective clothing designed for the workers of process industries and OEMs. The fabric identified was 100% cotton denim because of its strength and ability to apply finishes. Figure 9 represents the protective clothing developed using a 9oz denim with reflectors and suitable finishes like anti-microbial, stain release for workers working with lathe machine and spray painting. The masks were designed to match the aesthetic and functional requirements of the protective wear. Figure 10 represents a 3d rendering of the mask designed for understanding of the design development and clarity of appearance and fit of the mask.




**Figure 9.** Protective Wear and Specification Sheet for Protective Masks



**Figure 10.** Protective Wear and Specification Sheet for Protective Masks

## Discussions & Conflicts

The researchers were able to identify 50 workers within 5 process industries and OEMs to conduct the research and understand the acceptance, behaviour and reaction to protective masks. Table 1 was able to depict the findings related to objective 1 and share insights into the acceptance of the protective masks in these industries. Through the observation method it was noted that things that were an accepted norm, to converse and have a clear communication, was a challenge during these times of wearing a protective mask. The workers were also not able to identify each other with all the masks while wearing protective clothing as a uniform at the work place. This reinforced the objective of the research for the need to develop protective masks that help with better communication at the workplace while ensuring safety of the workers. The designed masks were evaluated by the workers, and respondents were very well received. Though the designed masks didn't create individual identity, they certainly created a sense of community identity while spreading awareness about the job profile hazards.

## Conclusion

Clothing contributes to how people define and perceive themselves and is a necessary part of their everyday lives. Clothing promotes a feeling of well-being and has the potential for a multidisciplinary functional approach. To be acceptable and comfortable, products must look stylish and attractive and function reliably in relation to the technical and aesthetic concerns of the wearer. Good aesthetic and technical design, driven by meaningful end-user research, can help exploit niche markets where form and function work in harmony in the research and development of comfortable and attractive products that can assist us in many aspects of our daily lives[14].

Based on the results and discussions, it was observed from Table 1 and Table 2 that though the workers were wearing masks out of the need for safety, they didn't find the masks comfortable. The masks restricted their communication and caused confusion about their identities at the workplace. The protective masks designed through the design framework (figure 7) comprising of symbolic references (figure 8) had the potential of addressing the needs of the wearer. It created a better sense of acceptance and yet provided a community identity of workers working with a certain job profile and potential work hazards. Thus, fashion has played its major role, in serving the industry by giving a design solution, which gives all employees an identity, irrespective of the role or task assigned hence creating a community, which stands out from the common group of people even outside the industry.

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# The Perceived Quality of Life amongst Diabetic Patients Attending the Outpatient Department at a District Hospital in South Africa

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***Abstract***

*Diabetes is one of the most prominent chronic diseases in the world today. South Africa has the highest prevalence of this disease in Sub-Saharan Africa. The purpose of treatment is not solely symptom remission but a comprehensive approach to enhancing the overall quality of life despite the limitations connected with the disease. The study aimed to assess the influence of socio-demographic factors with the perceived quality of life amongst diabetic patients attending the Outpatient Department at a District Hospital in Gauteng Province, South Africa. A cross-sectional study was undertaken on 270 diabetic patients from November 2016 to January 2017 in a district hospital. A researcher-administered questionnaire, using the modified version of the Short Form 36 -2 tool, was used to collect data on the socio-demographic, clinical characteristics, and quality of life. The analysis included descriptive statistics and logistic regression. The mean age was 55 years, and the seventy-four percent of the participants had been diagnosed with diabetes within the past five years. The mean scores for quality of life were 50.44 and 51.38 for the Physical Component Summary and the Mental Health Component Summary, respectively. Regression analysis showed that being married, having education, and not having co-morbid diseases were protective factors associated with the physical component of quality of life. Health workers should consider symptom stressors, functional status, emotional well-being/mental health, and the multiple chronic diseases of the patients during the assessment. Allied health workers play a significant role in the life of diabetic patients.*

***Keywords:*** *Diabetic patients, Emotional wellbeing, Quality of life, Sociodemographic.*

## Introduction

Diabetes mellitus, a non-communicable disease, has become a public health challenge. There are four hundred and twenty-two million people living with diabetes mellitus in the low- or middle-income countries, with 1.5 million deaths in worldwide [1] and 321,100 deaths in Africa. Countries affected by Diabetes mellitus in Africa are South Africa, the Democratic Republic of Congo, Nigeria and Ethiopia, and it is stated that it will increase from 14.2 million (2015) to 34.2 million by 2040 [2]. The primary goal of diabetes mellitus is to improve the quality of life (QOL) through early diagnosis and treatment. There are 4 different components to assess the quality of life (physical, mental, cogitative, psychological, and social components) [3]. Although the Quality of Life (QOL) of patients with diabetes is not a new concept in the literature, there was a paucity of local information among diabetic patients in South Africa on health-related quality of life (HRQOL). The impact of the disease on a patient's QOL is often ignored during the consultation with health workers.

There are various tools used to measure QOL. These include Short Form-36(SF-36), Euro QOL (European quality of life), EQ-5D (EuroQOL-5

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dimensions), QWB-SA (Quality of well-being questionnaire) and WHOQOL-Bref (the World Health Organization quality of life-Brief), etc. [4].

Ugandan study reported the commonest age group to be below 50 years, followed by 50-59 years [5]**.** The Pretoria study [6] showed that a majority (54%) of the patients were married, followed by those who were widowed (29%). The high proportion of elderly participants (36%) in this study probably explains the high percentage of widowed subjects. Similarly seen in an American study [7]. The Pretoria study showed that widows had significantly poorer QOL than married or single respondents ($p< 0.01$). Married and divorced subjects had significantly worse QOL when compared to their single counterparts in the UK study ($p< 0.05$ and $< 0.01$, respectively).

A study conducted in America showed that the quality of life was low amongst diabetic patients [8]. A population study using the SF-36 questionnaire conducted in Australia [9] to assess the quality of life with diabetes and depression showed that there were more patients with depression compared to non-diabetic patients (24% vs 17%). The mean score was low (43) and (48.6) for physical and mental component summaries.

## Methods

### Design and Sample Size

A descriptive cross-sectional study was undertaken on 270 diabetic patients over a three-month period (1 November 2016, to 31 January 2017) in a district hospital in South Africa. Patients included were 18 years and older, had been diagnosed with diabetes mellitus for at least one year (Type 1 and Type 2), and provided consent. The exclusion criteria were those who had diabetes in pregnancy, who were too ill to participate, those who were seen after normal working hours, in casualty or during weekends, and those who had participated in the pilot study. Three hundred and seven patients were approached, 17 declined, 290 patients were willing to participate, but 20 were excluded as they were less than 18 years, had DM less than 1 year and were too ill to participate. The total number of participants for the study was 270.

### Site

The study was conducted at the outpatient department of Dr Yusuf Dadoo Hospital, a public district hospital in Gauteng, South Africa, that caters for two third of the district with various types of patients (informal, rural, semi-urban and urban areas). The outpatient department operates from Monday to Friday (08:00-16:00), and five doctors care for an average of 120 patients daily. Between 100 and 150 diabetic patients seek consultation each month.

### Measuring tool

A researcher-administered questionnaire, written in English, was modified from a previously validated tool (SF-36 version 2). The questionnaire contained the socio-demographic factors, clinical factors and quality of life.

The SF -36 v2 Health survey [10] is a generic measure of health status with 36 questions that yields an eight-scale profile of functional health and well-being, as well as two psychometrically based physical and mental health summary measures and a preference-based health utility index. It has proven useful in surveys of general and specific populations, in comparing the relative burden of diseases, and in differentiating the health benefits produced by a wide range of treatments.

The SF-36-v 2 questionnaire was of interest for this study for the following reasons: high internal consistency and reliability on all scales of the questionnaire. The Cronbach's alpha was 0.76–0.86 and was used in diabetic patients in different countries. It has high construct validity, is sensitive to change, has been adapted in 29 countries and has been translated into over 30 languages including English and Afrikaans.

In South Africa, the SF36 questionnaire has been used to assess QOL in patients with chronic

diseases (such as rheumatoid arthritis and HIV), and surgical patients discharged from ICU. Since no study had used the SF-36 questionnaire for diabetic patients in South Africa, the researcher thought that it would be a useful measuring tool.

The SF-36 questionnaire had 36 items measuring eight scales of health: social functioning vitality, role limitations due to emotional problems, mental health, physical functioning, role limitations due to physical problems, body pain, and general health perception. There was a single unscaled item asking respondents about health changes over the past year.

These eight scales of health were summarized into two major components.

1. The physical component summary comprising physical functioning, role limitations due to physical problems, body pain and general health perception.
2. The mental health component summary comprising social functioning, vitality, role limitations due to emotional problems and mental health.

For each scale of the SF-36 questionnaire, item scores were coded, summarized, and transformed onto a scale from 0 (lowest well-being) to 100 (highest well-being).

Participants with scores of <50% were classified as low QOL, and participants with scores of ≥50% were classified as high QOL. This was done in accordance with the standardized scoring (<50= low QOL, ≥50 = high QOL) for the SF-36 summary scores (PCS and MCS). In this study, the researcher chose 50% of the total score of PCS and MCS as the cut-off point in categorizing the QOL as high or low.

## Data Collection

A nurse at the outpatient reception who screens the patients directed all the diabetic patients to the researcher's consultation room. The researcher explained the research, patient information leaflet and the consent form to the patients.

Each patient was given an information sheet (which explained the purpose of the study and provided contact details of the researcher) and a consent form. Those who signed the consent form were now seen by the researcher. The patients who refused to participate in the study were taken back their spot in the queue to be seen by another doctor. The patients were first seen for their problems, and then the researcher would interview the participants. Each completed questionnaire was kept in a box and taken by the researcher at the end of the day. It was kept in a closed cupboard for the confidentially and safety of the files.

All files were colour-coded to avoid repetition of the patients, but identifying data were excluded to guarantee anonymity. Captured data was transferred to MS Excel, which was password-protected, and only the main researcher knew the password.

## Data Analysis

The data was captured and analysed in Stata 12. Descriptive statistics such as frequency and percentages were used on socio-demographic features, a physical component summary (PCS) and a mental component summary (MCS). The associations between socio-demographic features and PCS/MCS were tested using chi-square and logistic regression. Statistical significance was considered if the P-value was ≤0.05 and the confidence interval was 95%. Ethical approval was granted by Witwatersrand University (M160215).

## Pilot Study

A pilot study was conducted on eight participants in August 2017 to test the questionnaire and get an estimated time for the participants to read the information leaflet and answer the questionnaire. It was concluded that no questions needed modification, and it could be answered within 20 minutes. The

respondents, data and results were not used for the actual study.

## Result

The mean age was 55.1 ± 8.6 with the age group (50-59 years). Most of the respondents were black (68%), South African (92%), married (53%), females (60%) who had a primary school education (50%), were employed (52%), and had a monthly income of < R5 000 (55%). (Table 1). Table 2 shows that the majority (74%) of respondents have been diagnosed with diabetes within the previous 5 years.

**Table 1.** Socio-demographic Characteristics of the Study Respondents

| **Characteristics** | **Frequencies (N=270)** | **Percentages (%)** | **Mean ± SD** |
|---|---|---|---|
| **Age (years)** | | | |
| ≤ 39 | 12 | 4.44 | 55.1 ± 8.6 |
| 40-49 | 62 | 22.96 | |
| 50-59 | 116 | 42.96 | |
| > 60 | 80 | 29.63 | |
| **Gender** | | | |
| Male | 109 | 40.37 | - |
| Female | 161 | 59.63 | |
| **Country of birth** | | | |
| South African-born | 249 | 92.22 | - |
| Foreign-born | 21 | 7.78 | |
| **Race** | | | |
| Black | 184 | 68.15 | - |
| White | 45 | 16.67 | |
| Coloured | 41 | 15.19 | |
| **Level of education** | | | |
| No educational background | 38 | 14.07 | - |
| Primary | 135 | 50.00 | |
| High school and above | 97 | 35.92 | |
| **Marital status** | | | |
| Single | 28 | 10.37 | - |
| Married (married and cohabiting) | 142 | 52.59 | |
| Divorced/Separated | 67 | 24.81 | |
| Widowed | 33 | 12.22 | |
| **Income** | | | |
| < R5,000/month | 149 | 55.18 | - |
| ≥R5,000/month | 121 | 44.81 | |
| **Source of income** | | | |
| Employment | 111 | 41.11 | - |
| Pension | 4 | 1.48 | |
| Depending on family member | 84 | 31.11 | |
| More than one source | 71 | 26.30 | |
| **Number of dependents** | | | |
| None | 2 | 0.74 | - |

| | | | |
|---|---|---|---|
| 1-2 | 97 | 35.93 | |
| 3-4 | 142 | 52.59 | |
| >4 | 29 | 10.74 | |
| **Employment** | | | |
| Unemployed | 129 | 47.78 | - |
| Employed | 141 | 52.22 | |
| **Unemployed Category** N=129 | | | |
| No work | 84 | 65.12 | - |
| Pensioner | 45 | 34.88 | |

**Table 2.** Diagnosis of Diabetes of the Study Respondents

| Time of diagnosis of Diabetes | N | % |
|---|---|---|
| < 5 years | 71 | 26.30 |
| ≥ 5 years | 199 | 73.70 |

Figure 1 shows that sixty-two percent of participants reported low quality of life in the physical component, with a minimum score of 28 and a maximum of 83, and a mean score of ±SD (50.44 ±12.3). Sixty-three percent of the participants reported low QOL in the mental health component, with a minimum score of 33 and a maximum score of 90 and a mean score of ±SD (51.38 ±11.53). Only Physical and social functioning were score high.

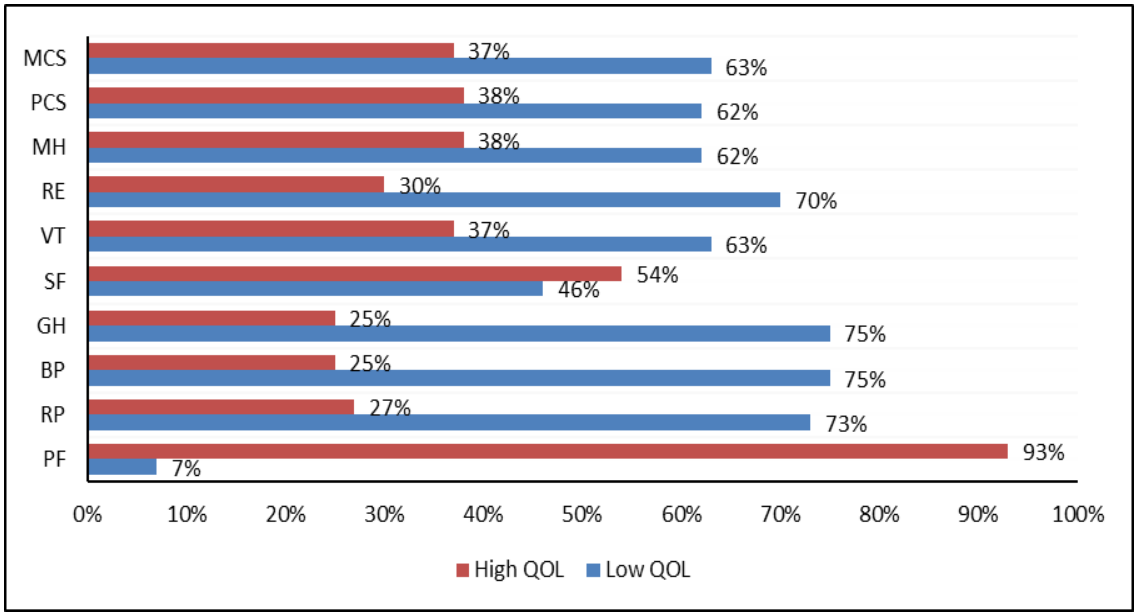


**Figure 1.** Physical and Mental Health Component Summaries of the QOL Perceived by Diabetic Patients

X axis: Perceived percentage & Y axis: Different components of the Physical and mental health summary

## Note

MCS: Mental Health Component Summary; PCS: Physical Component Summary; MH: Mental Health; RE: Role limitations due to emotional problems; VT: Vitality; SF: Social Functioning; GH: General Health; BP: Body Pain; RP: Role limitations due to physical problems; PF: Physical Functioning; QOL: Quality of life.

Table 3 shows that those above 60 years of age is 24 times were 24 times more likely to report low quality of life when compared to those below 40 years of age (OD 24.1, P= 0.006,

CI 2.47-235.23). Those with primary school education were less likely to report low quality of life (OD 0.21, P=0.05, CI 0.04-1.02) when compared to those with no education.

Married people were less likely to report low quality of life when compared with single people (OD 0.03, P=0.05, CI 0.10-0.99). Similarly, widowed were less likely to report low quality of life. (OD 0.09, P=0.04, CI 0.01-0.91).

People with no co-morbid disease were less likely to report low quality of life when compared to those with co-morbid disease (OD 0.34, P=0.01, CI 0.14-0.80).

**Table 3.** Quality of Life and Sociodemographic Feature

| **Variables for Physical component summary** | **Odds ratio** | **P value** | **95% CI** |
|---|---|---|---|
| 40-49 | 0.50 | 0.37 | 0.11-2.25 |
| 50-59 | 3.13 | 0.22 | 0.51-19.50 |
| >60 | 24.10 | 0.006 | 2.47-235.23 |
| Primary | 0.21 | 0.05 | 0.04-1.02 |
| High school and above | 0.78 | 0.76 | 0.15-3.97 |
| Married | 0.30 | 0.05 | 0.10-0.99 |
| Divorced | 1.72 | 0.48 | 0.38-7.70 |
| Widowed | 0.09 | 0.04 | 0.01-0.91 |
| ≥ 5 years | 1.45 | 0.52 | 0.46-4.52 |
| No comorbid disease | 0.34 | 0.01 | 0.14-0.80 |
| **Variables for Mental health component** | **Odds ratio** | **P value** | **95% CI** |
| 50-59yrs | 0.78 | 0.74 | 0.18-3.42 |
| Married | 2.56 | 0.22 | 0.56-11.57 |
| Divorced | 1.60 | 0.48 | 0.43-6.04 |
| ≥ 5 years | 1.72 | 0.61 | 0.21-14.09 |
| No comorbid disease | 0.58 | 0.43 | 0.15-2.25 |

## Discussion

The study was evaluating the quality of life amongst diabetic mellitus patients in a district hospital and if socio-demographic factors contributed to these changes.

The mean score in the physical component of QOL (50.44) was higher than the Australian and American studies, where mean scores were 43 and 46.06, respectively. In the current study, the physical functioning (PF) was reported to have the highest score, which showed that the diabetic participants were able to carry out basic activities such as carrying groceries, sweeping, climbing a few stairs, and walking 100 meters. Body pain (BP), role limitations due to physical problems (RP) and general health (GH), were reported to have affected them, and their scores were low. Black South African diabetic patients tended to have poorer general health and more body pain than the healthy black patients. This means that symptom distress might be a primary factor for low scores in the physical component of QOL. An American study confirms this statement by stating that there was a strong association between greater symptom distress and low HRQOL among low-income older African. Symptom distress was a major determinant of HRQOL in patients with type 2 diabetes.

The mean score in the mental health component of QOL (51.38) was lower than the Australian and American studies, where their mean scores were 53.4 and 58.52, respectively. In the current study, the social functioning (SF) item of the mental health component showed that they could engage in normal social activities with family, friends and neighbours, or groups.

This contradicted the Pretoria study, which suggested that social functioning reflected the residential area of the participants and that insecurity or lack of facilities limited their social activities. The other items of the mental health component (role limitations due to emotional problems [RE], vitality [VT] and mental health [MH]) of this study were scored and reported low by most of the patients.

Religion had a positive effect on the physical and mental well-being of the health outcomes of the individuals in the American study, and this current study did not examine the relationship as it was not part of the objectives.

Depression was also a factor in the above study, and it has been proven that clinical depression is common amongst diabetic mellitus patients. We need to explore for depression during our consultation and treat it which will improve the quality of the patients.

The mean age (55.1 ± 8.6) in this study was slightly lower than the Kenyan study (56.4 years) and very low when compared to studies from developed countries. This might be a reflection that patients are better cared for and live longer in developed nations before they develop a non-communicable disease.

The most common age group in this study was similar to other studies in this country. Either diabetes mellitus is more common in middle-aged populations than the younger populations or patients in the middle-aged group seek more medical help than other age groups.

The study conducted in Pretoria showed that physical function, role function and general health (three of the four scales of the physical component of QOL) were poor in the older group than their younger counterparts. Similar findings were seen in the current study(P=0.00). It is very difficult to specify that diabetes mellitus was the cause as there are many changes in this older age group, and it can be considered as a confounding factor.

The majority of the diabetic participants were primary school attendees in most of the studies except for the Alberton study, where they were high school attendees. A systematic review proved that lower educational levels were a predictive factor to impaired HRQOL. The study showed that education was a protective factor in the physical component (p= 0.004). Education in patients have proven to prevent many diseases and death. We should encourage the community to educate themselves as we can use it to teach preventive measures like exercise and a balanced diet.

Employment seems to be a protective factor in both physical and mental health components of QOL (P= 0.000). Other studies have shown a significant association between employment and high QOL score. The Pretoria study showed that employed respondents had significantly better physical and role functioning, mental and general health, and less body pain than unemployed respondents (p< 0.01). Employment improves their physical, and mental state and quality of life.

Married diabetic patients tend to seek more medical help than their counterparts in most of the studies reviewed [11]. The current study showed that separated/divorced participants had low QOL when compared to their single counterparts in the physical and mental health components (P= 0.007 and 0.030, respectively). This is similar to the UK study [11], in which significantly worse QOL was reported in divorced subjects compared to their single counterparts. The Pretoria study showed that widows had significantly poor physical and role functioning and more body pain than married or single respondents. Being married was a protective factor (p= 0.05) in the current study. During a patient consultation, it is important to consider the marital status of the patient as it has an impact on their lifestyle.

The current study showed that participants who had equal to or more than five years duration of diabetes were seven times more likely to have low QOL in the physical component, which concurs to the Kenyan study. The Alberton study [12] did not find any significant relationship, but the Kenyan study

reported the physical domain to be significantly related to the duration of diabetes, using the WHO-QOL BREF tool. However, all the studies used different measuring tools. A systematic review of QOL in diabetic patients in a primary care setting in Nordic countries stated that the duration of diabetes is one of the predicting factors of impaired HRQOL. The longer the duration of diabetes, the poorer the QOL, a non-modifying factor. We need to educate the community to prevent diabetic mellitus.

Various studies have looked at the relationship between co-morbid diseases and the QOL, but no significant correlation was found. Having no co-morbid disease was a protective factor in the physical component of QOL (p= 0.01). This finding contradicted the above studies.

The limitations of the study were the following: A cross-sectional survey was used to explore the prevalence of QOL in diabetic patients, it could have weakened the strength of the study. A qualitative study would have given a better understanding of QOL among these participants, but due to time constraints, the researcher decided to use the SF-36v2 tool, which looked at the perceptions of the participants in a quantitative manner. A qualitative method is recommended for future studies. Reporting bias cannot be fully excluded as a convenient sampling method was used, and the results were dependent on the participants' self-reporting on QOL. This might have affected the mean score of the items in the SF-36v2.

In summary, symptom stressors, mixed co-morbid diseases, duration of diabetes, functional limitation due to emotional, and physical problems and depression might be associated with low QOL in the current study.

## Conclusion

Quality of life in diabetic patients has been assessed worldwide by using various measuring tools, which were cited in the literature section of this study. This study showed that there was poor quality of life amongst diabetic patients. Marital status, education, employment, income, co-morbid disease, and the onset of diabetes must be considered during the consultation as it has an impact on the quality of life. Recommendations are:

A holistic approach in managing a diabetic mellitus patient should consider symptom stressors, functional status, emotional/mental well-being and multiple chronic diseases during clinical assessment of a diabetic patient; Support group and social gathering should be implemented for these patients; Further studies should examine the effects of depression, religion, and QOL of diabetic patients.

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## Conflict of Interest

The authors declare that there are no competing interests in this article.

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# The Impact of Moderated WhatsApp Text Messaging for Improving Maternal and New-born Referral Outcomes among Health Facilities in Luapula Province, Zambia

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***Abstract***

*Technological advancement has continued to change patient care by progress in treatment and diagnostics. However, the paper-based referral communication method between the initiating and receiving facility in most developing countries has remained the same. In Zambia, Luapula Provincial Health Office (LPHO) decided to strengthen its referral system by means of moderated WhatsApp, a mobile telecommunication application, to arrest rising maternal mortalities. The current study assessed the impact of the intervention in maternal/neonatal outcomes. The study used a Mixed Method approach. The Quantitative-retrospective cross-sectional design, using a data extract from Mansa General hospital between 2017 and 2020. SPSS v. 25 was used to analyse data. Demographic traits were analysed using descriptive statistics. The impact was assessed using mortality figures from 2016-to 2020 for referrals that did or didn't use WhatsApp across 8 districts. Two focus group discussions explored the factors leading to the maternal or neonatal patients receiving inadequate and inappropriate care at the receiving facility prior to the intervention. Findings showed that maternal mortalities resulting from referrals (used the intervention) reduced by 99.4% from 2017 to 2020, with only 0.5% mortalities, compared to a 78.5% reduction, with 21.2% recorded mortalities from referrals that did not use WhatsApp. Moderated WhatsApp messaging application had a positive impact in improving maternal and neonatal referral outcomes in Luapula Province.*

***Keywords:*** *Moderated WhatsApp, Maternal Mortality, Neonatal Mortality.*

## Introduction

Advancements in technology has changed and continue to change patient care by progress in treatment and diagnostics. However, the communication method among healthcare workers has remained as before the advent of the smartphone. Hospitals continue to use paper-based communication channels for referrals and general patient care between and within facilities. Studies have shown that these types of communications hinder timely patient care and that most hospitals are now adopting mobile communication technology to enhance effective communication in the health system [1].

In Zambia, upon realisation of the potential that mobile health (Mhealth) platforms can offer to improve health outcomes, Luapula Provincial Health Office (LPHO) on 25th December 2016, decided to strengthen its referral system by means of mobile telecommunication applications, using WhatsApp groups to arrest the rising maternal mortalities. It was agreed that each district within the province creates a linked WhatsApp group with Mansa General hospital (The main referral Hospital for OBS/GYN).

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Despite significant progress in maternal and child health (MCH) globally, the burden of poor maternal and new-born health accounts for over a quarter of healthy years of life lost [2]. Worldwide, over 300 000 women die from maternal causes, 3.3 million are stillborn, and an additional 3.3 million mortalities within the first month of life every year, with a vast majority of these deaths occurring in sub-Saharan Africa (SSA) and South Asia [3, 4]. The World Health Organisation (WHO) defines maternal death in International Classification of Diseases version-10 (ICD-10) as; the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Similarly, the organisation asserts that Maternal deaths are subdivided into two groups: direct obstetric deaths and indirect obstetric deaths. Direct obstetric deaths are defined as those resulting from obstetric complications during pregnancy, labour, and the puerperium or from interventions, omissions, and incorrect treatment. The cause of direct obstetric deaths is further classified as: pregnancies with an abortive outcome, hypertensive disorders, obstetric haemorrhage, pregnancy-related infection, obstructive labour, and unanticipated complications.

Maternal mortality differs vastly between high-income and low-income countries; the latter account for 99% of deaths, and SSA alone accounts for two-thirds [5]. Global efforts to improve maternal outcomes spearheaded by the United Nations continue to be pursued with limited success. While maternal deaths decreased by 45% between 1990 and 2015, short of the 75% target set through the Millennium Development goals, now succeeded by Sustainable Development goals (SDGs) which aim to reduce mortalities in every country to <140 per 100 000 live births by the end of the decade [6].

With Zambia's fertility rate of 4.98 births per woman aged 15-49 years (7), it is a notorious fact that on the one hand, the population will continue to grow steadily, while on the other hand, maternal death will continue to be a major cause of death for women. The ZNPHI further observed that associated maternal deaths were a 4$^{th}$ leading cause of death among women of childbearing and accounted for 17.2% of deaths in women aged 15-49 in Zambia. Similarly, between 1990 and 2013, Zambia's rate of maternal decline was 0.56% per annum [8]. The study further posited that, at its current rate, Zambia is likely not to reach the third SDG's goal of a maternal ratio of less than 70 maternal deaths per 100 000 live births by 2030. While there are no size fits all solutions to maternal and neonatal mortalities, digital technologies if aligned properly, can prove useful in arresting the upward trend in mortalities. This is because social media has transformed communication and has provided innovative strategies for information transfer. Additionally, quality, and timely information is critical to patient management and improving health outcomes.

Thus, the Luapula Province Medical office in Zambia envisaged that improving communication between initiating facilities and receiving facility for Obstetrics and Gynecology (OBGYN) emergencies via a moderated WhatsApp platform would aid the receiving facility to prepare adequately in advance to improve maternal and neonatal outcomes. However, 4 years down the line, there has not been any study conducted to assess the efficacy of moderated WhatsApp text messaging for improving maternal and new-born referral outcomes in the province. Hence, the current study will assess the impact and effectiveness of the intervention in maternal outcomes.

## Methodology Of Study

### Study Design

The study used a Mixed Method approach involving both Quantitative and Qualitative.

The Quantitative used a retrospective cross-sectional design from 2017 to 2020 on OBGYN data stored at Mansa General Hospital. Included Clients who were referred from facilities within Luapula Province to Mansa General hospital, OBS/GYN department. The sample size was calculated using the Sample Size Calculator, an electronic platform (15). The following parameters were used. A total population of 8688 patients were referred to Mansa General Hospital from 2017 to 2020. Confidence Interval at 95%, the sample size required was 368. The study used stratified random sampling. The patient records were grouped into strata based on years, that was 2017, 2018, 2019 and 2020. In each year, a total of 92 patients were selected randomly. The Data was extracted from DHIS2 and referral registers from the period 2017 to 2020. On the other hand, an open-ended questionnaire to medical staff were administered on two focus group discussion (FDGs) with each member only in each group. Data Analysis for the quantitative approach used SPSS version 25. Demographic traits were analysed using descriptive statistics and presented in form of tables and graphs. In addition, the impact was assessed using health outcomes from referrals that used WhatsApp messaging from those that did not during the period under review.

## Qualitative Approach

The study used a Phenomenology study design. The focus group participants' interviews focused on subjective experiences and understanding the structure of those lived experiences while working in OBGYN. Phenomenology is used to describe, in-depth, the common characteristics of the phenomena that have occurred. The study population constituted of Health Care workers at Mansa General Hospital who works or worked in the OBGYN department during the period under study and participated in the Focus Group Discussion. The sample included two (2) Focus Groups. Each focus group comprised of 8 participants that were selected through purposive sampling. The data was collected through in-depth interviews, and a questionnaire with open-ended questions was used to conduct the interviews. The focus group interview lasted between 40-45 minutes per session. The data was collected using Recorders and paper and later decoded for analysis. The data was analysed using the Thematic Analysis approach. The study closely examined the data to identify common themes, topics, ideas, and patterns of meaning that came up repeatedly. Suffice to mention that the thematic approach followed a six-step approach which included the following.

1. Familiarization.
2. Coding.
3. Generating themes.
4. Reviewing themes.
5. Defining and naming themes.
6. Writing up.

## Data Management & Control

The following measures were used to ensure data quality; Extracted data showed that the woman was referred. Data showed that the woman was pregnant at the point of referral. FDG participants were medical personnel in OBS/GYN.

## Ethical Consideration

The ethical clearance was sought through the Mulungushi University School of Medicine and Health Sciences Research Ethics Committee (MUSoMHS-REC), the Provincial Health Office and the District Health Office. In addition, all the data that was abstracted from the DHIS2 was de-identified. Similarly, consent was sought from FDG participants before they can participant in the interview, and participants were allowed to opt-out of the session any time they felt like. All the FDG participants were provided with Covid-19 protective gear (Mask, Hand Sanitizer, Head shield), and interviews were conducted in a spacious environment that allowed for social-distancing.

# Results

## Socio-demographic Traits

The demographic traits revealed that Mansa district, cumulatively, had the highest total number of referrals 74.2% (N=273), while Kawambwa district had the lowest recorded number of referrals 0.3% (N=1), recorded and communicated via the WhatsApp platform. Additionally, only Luwingu and Chembe districts recorded maternal mortalities within the period under review, 1 in each district. On the other hand, Mansa district, cumulatively, recorded the highest number of neonatal deaths, 80.4% (N=37), while Milenge and Kawambwa had recorded no deaths.

**Table 1.** Social-Demographic Traits

| Variable | | District | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Mansa** | **Samfya** | **Chiengi** | **Kawambwa** | **Chipili** | **Milenge** | **Chembe** | **Luwingu** | **Total** |
| **Referral Year** | **2017** | 66 | 5 | 1 | 1 | 4 | 3 | 12 | 0 | 92 |
| | | 71.7% | 5.4% | 1.1% | 1.1% | 4.3% | 3.3% | 13.0% | 0.0% | 100.0% |
| | **2018** | 115 | 1 | 0 | 0 | 9 | 1 | 24 | 1 | 151 |
| | | 76.2% | 0.7% | 0.0% | 0.0% | 6.0% | 0.7% | 15.9% | 0.7% | 100.0% |
| | **2019** | 64 | 5 | 1 | 0 | 8 | 0 | 10 | 4 | 92 |
| | | 69.6% | 5.4% | 1.1% | 0.0% | 8.7% | 0.0% | 10.9% | 4.3% | 100.0% |
| | **2020** | 28 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 33 |
| | | 84.8% | 0.0% | 0.0% | 0.0% | 6.1% | 3.0% | 6.1% | 0.0% | 100.0% |
| **Total** | | 273 | 11 | 2 | 1 | 23 | 5 | 48 | 5 | 368 |
| | | 74.2% | 3.0% | 0.5% | 0.3% | 6.3% | 1.4% | 13.0% | 1.4% | 100.0% |
| **Maternal Outcome** | **Alive** | 273 | 11 | 2 | 1 | 23 | 5 | 47 | 4 | 366 |
| | | 74.6% | 3.0% | 0.5% | 0.3% | 6.3% | 1.4% | 12.8% | 1.1% | 100.0% |
| | **Dead** | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| | | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 50.0% | 50.0% | 100.0% |
| **Total** | | 273 | 11 | 2 | 1 | 23 | 5 | 48 | 5 | 368 |
| | | 74.2% | 3.0% | 0.5% | 0.3% | 6.3% | 1.4% | 13.0% | 1.4% | 100.0% |
| **Neonatal Outcome** | **Alive** | 236 | 9 | 1 | 1 | 22 | 5 | 44 | 4 | 322 |
| | | 73.3% | 2.8% | 0.3% | 0.3% | 6.8% | 1.6% | 13.7% | 1.2% | 100.0% |
| | **Dead** | 37 | 2 | 1 | 0 | 1 | 0 | 4 | 1 | 46 |
| | | 80.4% | 4.3% | 2.2% | 0.0% | 2.2% | 0.0% | 8.7% | 2.2% | 100.0% |
| **Total** | | 273 | 11 | 2 | 1 | 23 | 5 | 48 | 5 | 368 |
| | | 74.2% | 3.0% | 0.5% | 0.3% | 6.3% | 1.4% | 13.0% | 1.4% | 100.0% |

## Impact of Moderated Whatsapp Messaging in Improving Maternal and Neonatal Referral Health Outcomes

### Maternal Mortalities

Figure 1 below shows that more maternal mortalities were recorded from cases referred with no prior WhatsApp messaging than cases referred with prior communication. With 2017, recording the highest number of mortalities, 32.9% (N=26). On the other hand, cases referred with prior WhatsApp messaging, texting or phone call had recorded no mortalities except for 2019 which had 2 (two) mortalities.

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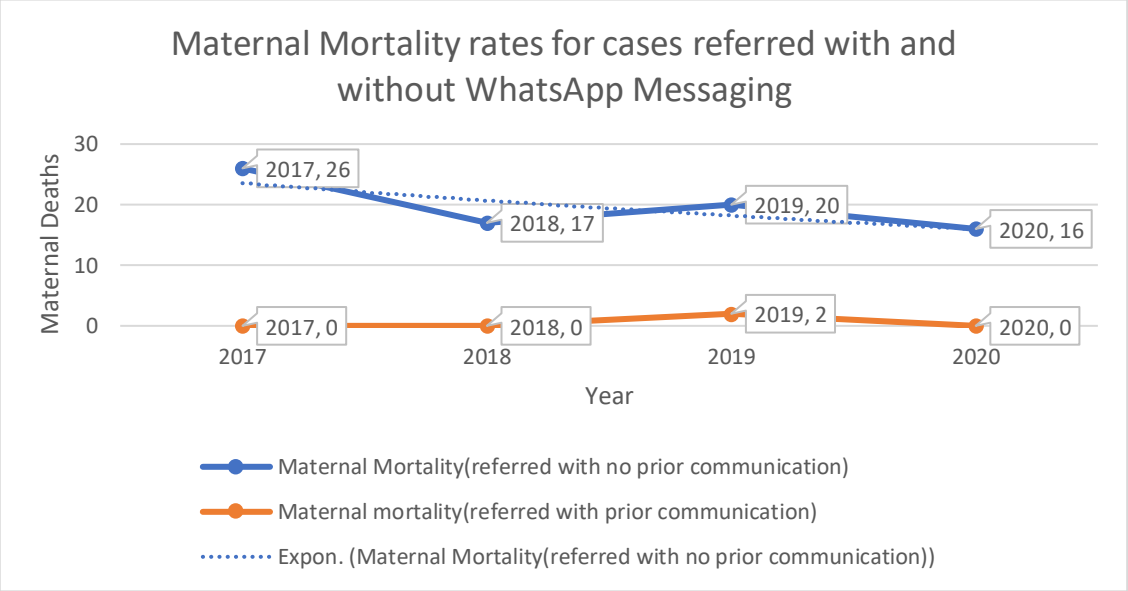


**Figure 1.** Maternal Mortality Rates for Cases Referred with and without WhatsApp Messaging

**Neonatal Mortalities**

Figure 2 below indicates that a total of 250 and 46 neonatal mortalities were recorded from cases referred without and with the communication intervention, respectively. It is also important to that mortalities were the communication intervention was applied dropped from 39.1% (N=18) in 2017 to 10.9% (N=5) in 2020, respectively.

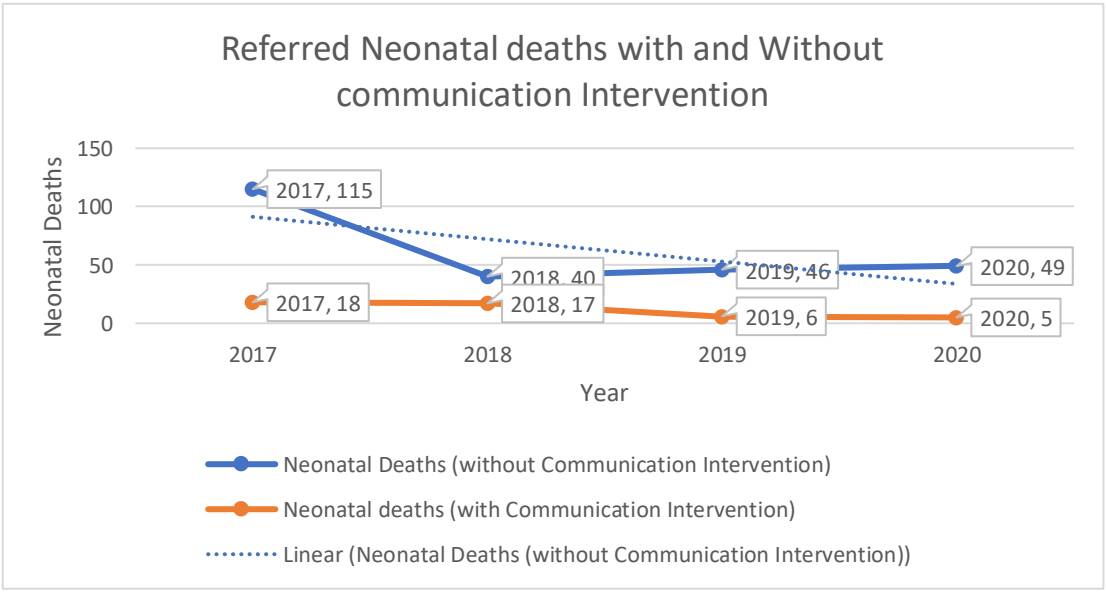


**Figure 2.** Referred Neonatal Deaths with and without Communication Intervention

## Factors Leading to Maternal or Neonatal Patient Receiving Inadequate and Appropriate Care at the Receiving Facility

Most FGD members observed that prior communication via moderated WhatsApp by the sending facilities was critical in adapting care to each specific case. It was reported that the mode of emergency communication before the intervention was poor; FGD1/FDG2/FDG5/FDG6/FDG7 asserted that emergencies communicated via phone calls only, which made it difficult to reference what

was said if the narrative escaped memory. Similarly, FDG3/FDG10 intimated that while referral letters sometimes accompanied the patient, often, the quality of handwriting made it difficult to comprehensively understand the message. Additionally, in FDG4 and 9, members of staff at the receiving facility, shared their experience by noting that 'there was very minimal to no communication prior to a referral. That in many cases, we would just receive patients with no prior communication'.

With the introduction of moderated WhatsApp as an intervention of choice to improve communication since 2016, FDG2, staff at the receiving facility observed that the intervention was a good move as it helped staff with sufficient referenced information to prepare adequately prior to receiving the emergency. In adding their voice, FDG3/FDG9 intimated that; 'it was a good move that has led to significant maternal and neonatal mortalities as it has arrested the malaise of poor communication, a huge contributor to poor outcomes. In the same vein, FDG4/FDG6/FDG8 said,' WhatsApp messaging has really helped us a lot, in the sense that it allows us to prepare effectively well in advance before the patient arrives on the other hand, FDG7 made a very good observation that, while moderated WhatsApp was very useful, it should be accompanied by a phone call, just in case someone is offline

### Factors Affecting Maternal Outcomes with Respect to Mortality, Postpartum Infection, Postpartum Haemorrhage and 3rd Or 4th Degree Tear

The analysis of submissions from all the 16 Focus Group Members highlighted the following factors: medical mistakes, delay in making the decision for a referral, inadequate medication stock and stockouts and delay in providing adequate and necessary care at the receiving facility. Similar findings were observed by Jean B, and friends, where they observed medical mistakes and delayed in making a referral decision were major contributors of negative maternal outcomes [6].

## Discussion

A mixed-methods convergent study was conducted to assess the Impact of Moderated WhatsApp Text Messaging for improving maternal and newborn referral outcomes among health facilities in Luapula Province, Zambia. It was premised that improvement in communication using moderated WhatsApp messaging between the sending and receiving facility for Obstetric and Gynaecological referrals would lead to the reduction of maternal and neonatal mortalities. In this vein, the study assessed the impact by looking at referral outcomes with and without prior WhatsApp messaging between the sending and receiving facilities.

The research findings in the Eight (8) districts in which the sending facilities were located showed that there were fewer maternal and neonatal deaths among referrals that used the communication intervention platform compared to those that did not.

Maternal mortalities resulting from referrals (used the intervention) reduced by 99.4% from 2017 to 2020, with only 0.5% mortalities with the sample population. On the other hand, maternal mortalities from referrals (without the intervention) were only reduced by 78.5%, with 21.2% recorded mortalities within the same period. Similarly, in terms of neonatal mortalities, the findings showed that there were fewer recorded mortalities from referrals that used the intervention compared to those that did not.

The improvement in the maternal and neonatal outcomes at the receiving facility could be attributed to improved communication as expressed by the focus group members. Prior studies as to how Woods J and friends, in their descriptive analysis of the role of a WhatsApp clinical discussion group in Eastern cape, asserted that; the use of WhatsApp in a medical setting as an effective means of communication

is very important in improving medical outcomes of complicated clinical cases [17]. As already alluded to in the focus group discussion, improved outcomes can be attributed to the fact that the intervention affords the receiving facility sufficient time to prepare effectively well in advance before the patient arrives.

On the other hand, potential impediments to the intervention as reported by FGs included poor and intermittent internet connectivity in certain health settings, loss of communication tools (cell Phones) and the cost of bundles and airtime. Similar studies had observed that the effectiveness of WhatsApp messaging hinged upon overcoming the afore-mentioned barriers [3,18]. Additionally, these barriers could be addressed as suggested by FGs that WhatsApp messaging should instead re-enforce the multiple referral communication package that should include referral letters and phone calls. That these should be incorporated as a combo to improve effectiveness and efficiency.

## Conclusion

Maternal and neonatal health continue to be national and global priorities, given the fact that both are still touted as public health challenges. They remain aspirations in the sustainable development goals; therefore, interventions that seek to promote maternal and neonatal outcomes should be supported and extensively researched for their efficacy. The research findings showed that moderated WhatsApp messaging applications had a positive impact on improving maternal and neonatal referral outcomes in Luapula Province.

## Acknowledgement

We wish to acknowledge the support received from Luapula Provincial Health Office and Mansa General Hospital for the support during this research.

## Competing Interest

The author currently saves as the District Health Director for Milenge district in Luapula, and these data were included in the dissertation that was written as part of a Master's Degree program at Texila American University.

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# Knowledge, Attitudes and Perceptions of Women of Child-Bearing Age Group on Abortion Services, Case Study Location Clinic, Kasama District, Northern, Zambia

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***Abstract***

*Unsafe abortions are a serious public health problem and a major human rights issue. In low-income countries, where restrictive abortion laws are common, safe abortion care is not always available to women in need. The main object of the study was to explore the knowledge, attitudes, and perceptions of women of child-bearing age (15 to 45) on abortion services in Kasama District of Northern Province Zambia. Almost all the study participants demonstrated a great understanding of the adverse dangers and consequences of unsafe abortion, which includes death, bleeding, mental problems, uterus injuries and menstrual disturbances. About 75% of the health care providers exhibited good knowledge and understanding of the laws of abortion in Zambia, including the 1972 termination of pregnancy act and the conditions that allow for abortion to be approved, while health seekers in the sample demonstrated a lack of knowledge on the termination of pregnancy act and safe abortion in Zambia which was partly attributed to their low levels of education. Abortion is a social reality despite opposition to its practice and the stigma that surrounds it, and it remains one of the most controversial sexual health topics around the world and in Zambia. The findings both from the health care providers and reproductive health users were a bit biased because the majority of the respondents were Catholics who don't allow family planning and abortion. It can also be concluded that majority of the women know and understands the adverse dangers and consequences of unsafe abortion.*

***Keywords****: Abortion, Complications of abortion, Health care users, Stigma***.**

## Introduction

Abortion is a controversial subject that often polarizes people. According to [1], abortions are directly correlated with poverty, social inequity and the constant, methodical denial of women's' human rights. Although there has been much debate on the circumstances that might lead one to abort, the United Nations Committee on the Elimination of Discrimination against Women argue that women alone have the right to decide whether to have an abortion or not. Many countries, including Zambia, have legalized abortion, but it has been observed that it is a highly explosive topic and usually associated with stigma. This prevents women from accessing safe abortion services [1]. The stigma associated with abortions may mean that the providers of these services suffer discrimination in and outside the workplace [2], which may lead the health care providers to cease providing abortion services. Furthermore, abortion providers' attitudes may be in conflict with the national abortion law, while the seekers may do so outside the confines of the law. The need to study the perceptions of seekers of abortion services is important in establishing the abortion seeking behavior within the communities [3]. Induced abortions are legal on various grounds in several sub-Saharan Africa, including Zambia.

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Since most countries in this region are resource-challenged, abortion laws were not in place until the last few years [4].

In Sub- Sahara, abortion laws were developed between 2001-2010 on safety and human rights grounds. These laws permit abortion at the request of the women based on the grounds as guided by the United Nations. Seven grounds have been identified on which an abortion may be permitted: (1) to protect the life of the mother, (2) to preserve the mother's physical health; (3) to preserve the mother's mental health; (4) in cases of rape or incest; (5) for fetal defects; (6) for socioeconomic reasons and (7) on request [5]. However, in most countries in sub-Saharan Africa, Zambia included, abortion laws are restrictive and may need the approval of not less than three medical doctors. Abortion is legal at the request of the women in only two countries in sub-Saharan Africa: Cape Verde and South Africa [2].

There is low awareness of the availability of safe abortion, and Public awareness and acceptance of safe legal abortion is reflected in ongoing debates about the implications for abortion of a draft amendment to the Constitution of Zambia that stated that a person has, subject to clauses and the right to life, which begins at conception, and a person shall not be deprived of life intentionally, except to the extent authorized by this Constitution or any other law [5]. While some commentators have suggested that such a change in the definition of the beginning of life would undermine the legality of abortion, others have argued that provision for the law as set out in the Termination of Pregnancy Act (1972) [6] is given in the final clause of the revision [7].

Abortion is the deliberate termination of a human pregnancy, most often performed during the first 28 weeks of pregnancy. People within and among cultures differ widely in their views on the morality of and their support for the legalization of abortion [8].

The legalization of abortion does not remove all the barriers to safe abortion services. Strong societal moral judgment against abortion, even where laws are less restrictive, can create abortion-related stigma, and women who seek or have abortions experience discrimination and potentially make choices that endanger their health [9]. Stigma against women who have abortions causes shame, guilt, denial, and fear that may result in a delay in care, choice of unsafe/illegal providers, or even self-induction that can result in serious negative health outcomes such as clinical complications or even death.

Zambia has one of the least restrictive abortion laws in Sub- Saharan Africa. Under the 1972 Termination of Pregnancy Act, pregnancy termination is permitted for the following reasons: risk to the life of the pregnant woman; risk of injury to the physical or mental health of the pregnant woman; risk of injury to the physical or mental health of any existing children of the pregnant woman; or risk of physical or mental abnormalities to the unborn child [10]. Many more women are treated for complications due to unsafe abortions than undergo safe, legal abortions in Zambian hospitals. In Zambia, women continue to experience unsafe abortion even in contexts where abortion is legally accessible in part due to the requirement that abortions be performed by a physician and with the consent of two additional medical practitioners [11].

## Statement of the Problem

Access to safe, legal abortion is inaccessible to many women in Zambia [12]. Moreover, an unknown number of women each year resort to illegal abortions, many of which are performed under unsanitary and unsafe conditions despite a law that legalizes abortions under stipulated conditions. It is estimated that more than 40 million abortions occur in the world annually half of which are unsafe and contribute to 13% of global maternal deaths [9]. Of all the abortions, 75% happen in the developing world, where complications kill at least 68,000 women each year. It is also estimated that in many sub-

Saharan African countries, 20 to 50% of maternal deaths result from unsafe abortions [13].

Abortion remains a major public health problem globally and in Zambia [14]. It affects the health and well-being of women in the reproductive age group and is estimated to cause 20 - 50% of maternal deaths in developing countries [15]. With over 300,000 abortions in Kenya, high stigma and a restrictive legal status, services are possibly unavailable in health facilities, and most of the procedures could be unsafe [16].

In Zambia, very little or nothing at all has been documented with regards to the attitude and knowledge of service users towards abortion. Therefore, this research gap has prompted and motivated the researcher to conduct this study on the knowledge, attitudes, and perceptions of women of child-bearing age from 15 to 45 on abortion services: a case study of Location clinic in Kasama district, northern Zambia.

## Study Objectives

### General Objective

The general objective of the study was to explore the knowledge, attitudes, and perceptions of women of child-bearing age from 15 to 45 at the Location clinic in Kasama District.

## Specific Objectives

The specific objectives of the study were.

1. To assess knowledge among women of child-bearing age towards abortion services.
2. To explore attitude and perceptions among women of child-bearing age towards abortion services.

## Research Questions

The study sort to answer the following questions.

1. What is the knowledge among women of child-bearing age towards abortion services?
2. How is the attitude and perception among women of child-bearing age towards abortion services?

### Significance of the Study

This study reviewed the perceptions of both seekers of the service to determine the scope of unsafe abortions and the unintended pregnancies that precede them. It also provided insights and drive the formulation and achievement of effective policies to reduce maternal deaths and improve the reproductive health of Zambian women, particularly those of Kasama District.

## Scope of the Study

This study was conducted at Location clinic in Kasama. The study's parameters were the women of the reproductive age group in the community. In an actual sense, the research embraced different views from different women's community of the Kasama district.

# Methodology

## Research Design

This study used a qualitative method, and case study design was used to explore the knowledge, attitudes, and perceptions of users (from 15 to 45 years of age) on abortion services. This qualitative approach was used to provide a better understanding of the research problem.

## Study Area and Site

The study was conducted in Kasama district located in the northern part of Zambia. The main economic activities include farming and businesses. In this study, one center was included among other centers which are in the district.

This center is selected because abortion services are provided at this facility, and it has a bigger catchment area with some staff trained in

comprehensive abortion care (safe abortion care).

## Target Population

The target population of the study comprises of female residents of reproductive age (15 to 45 years of age) of Kasama district under the Location clinic catchment area.

## Sampling procedure

The purposive sampling technique was employed in this study. The advantages of purposive sampling are, it's relatively easy to get a sample, it's inexpensive compared to other techniques, and participants are readily available.

## Sample Size

1. A total of 25 participants.
2. 12 key informants.
3. 6 focused group discussions.
4. 7 implementers of the programs.
5. The sample size 25 is, according to [17], who recommended that researchers interview from 5 to 25 with experience on the phenomenon.

## Selection Criteria

### Inclusion Criteria

Women of child-bearing age (15-45yrs) seeking reproductive health services.

### Exclusion Criteria

All the females aged below 14 and above 45 years old will not be included in the study.

## Data Collection Methods and Tools

Qualitative data was collected from users in form of focus group discussions using a topic guide with the same topics as in the semi-structured questionnaire. Interview schedule helped the respondents to express their views without interruption or fear, while focus group discussion in ensuring that everyone felt comfortable in expressing their opinion.

### Data Analysis

Data was analyzed qualitatively; the researcher used thematic and content analysis to analyze qualitative data. Content analysis, "which is the qualitative analysis of what is in the documents... Instead of directly observing or interviewing. it deals with something produced for the purposes of our enquiry, and it also deals with something produced for some other purpose" [18].

## Ethical Considerations

Ethical clearance was sought from the Ethics committee. In addition, permission was also sought from the health facility authorities to conduct the research at the sites. Informed consent was obtained from the respondents and informants prior to the surveys and interviews or discussions.

Respondents and informants had the right to refuse to participate or refuse to answer specific questions. The researcher ensured courtesy and that the rights of participants was respected. As such, he avoided getting into personal or unrelated issues but only collect data related to study objectives. The respondents were assured of confidentiality that the information given would only be used for the purpose of the study.

# Results

## Introduction

This chapter presents the findings from the respondents who participated in the study, and it looks at the demographics data and perceptions of the service users towards abortion.

## Findings from Health Service Users

### Demographic Data

**Table 1.** Respondents Age Group

| Age Group | Frequency | Percentage |
|---|---|---|
| 15-20 | 13 | 26 |
| 21-30 | 16 | 32 |
| 31-40 | 16 | 32 |
| 41+ | 5 | 10 |
| **Total** | **50** | **100** |

Source: (Field data 2021)

Table 1 above shows the frequency and percent distribution of respondents by age group. According to the table, 26% of the respondents were in the age group 15-20, while 32% belonged to the age group 21-30 and 31-40, respectively. The least respondent represented by 10%belonged to those above 41 years.

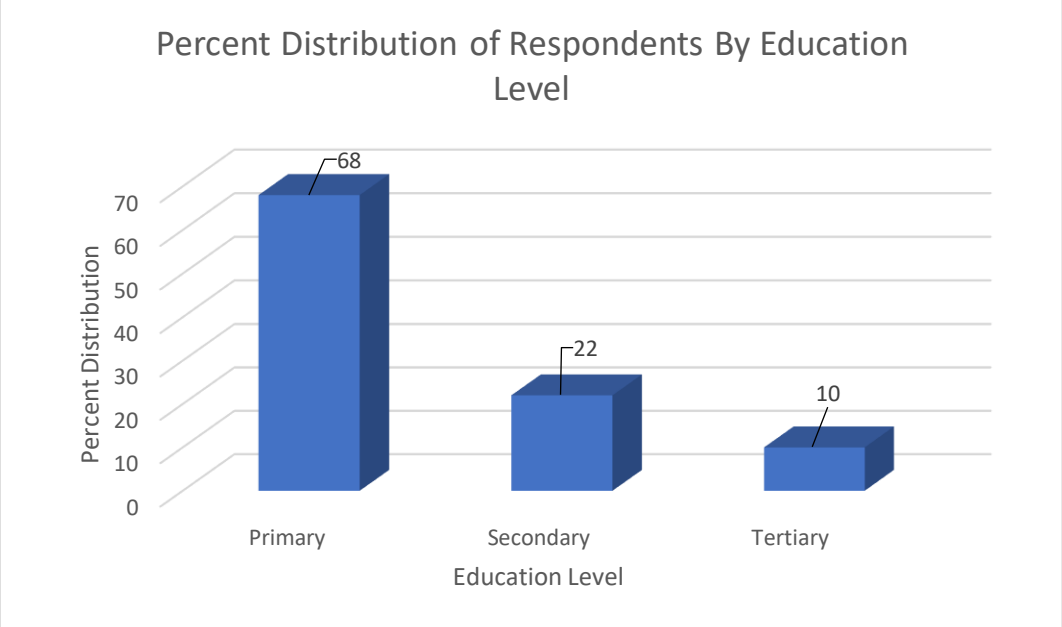


**Figure 1.** Respondents Level of Education

Source: (Field data 2021)

The majority (68%) of the respondents in the sample went up to primary level education, while 22% of the respondents went up to secondary level education. Tertiary level education only accounted for 10% of the total respondents in the sample.

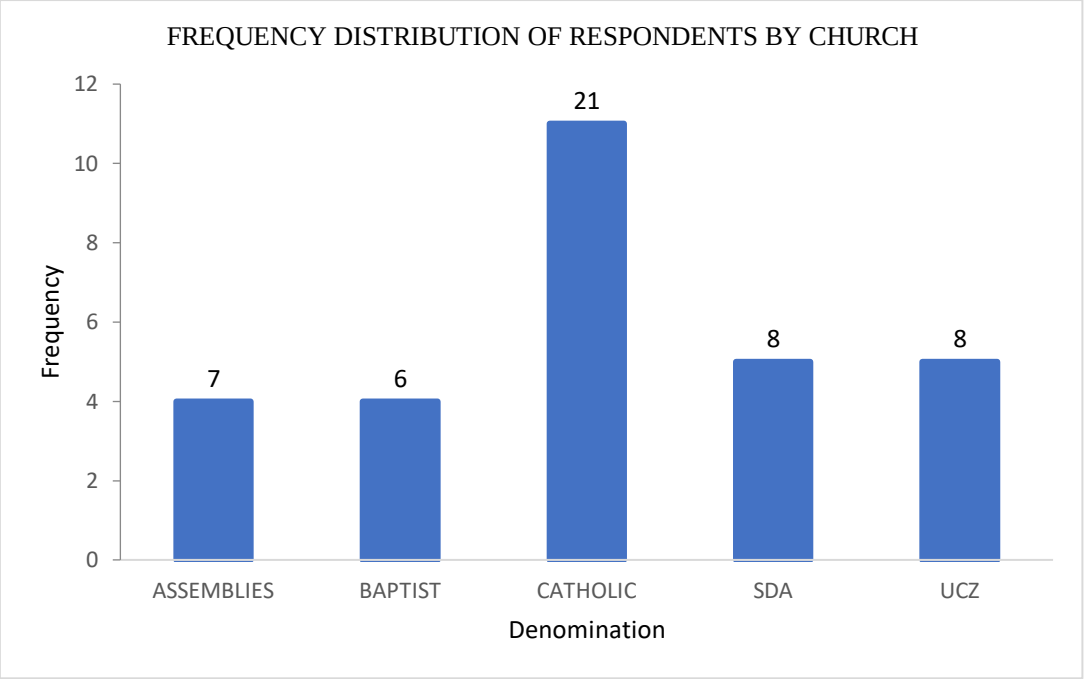


**Figure 2.** Respondents Denomination

Source: (Field data 2021)

Figure 2 above indicates that there were 21 respondents who belonged to Catholic church, 8 respondents belonged to SDA, UCZ, 7 Assemblies, and the other 6 respondents belonged to Baptist church.

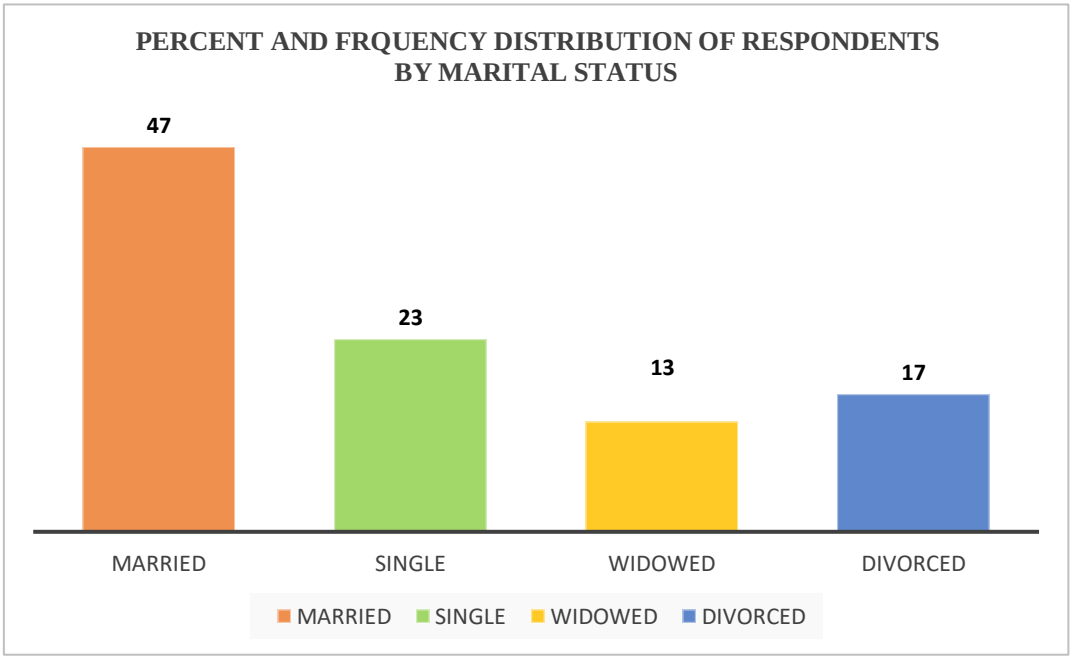


**Figure 3.** Respondents Marital Status

Source: (Field data 2021)

Figure 3 above indicates that majority of the respondents were married, and this was represented by 47 percent. This was followed by single respondents, represented by 23%, while divorced and widowed were represented by 17% and 13%, respectively.

Figure 4 above shows the percent distribution of respondents by occupation. According to the figure, majority of the sample represented by 46% were engaged in business and fishing as the main occupation. This was followed by farmer who accounted for 27% of the total respondents. Housewives accounted for 20% while only 7% of the respondents were employed.

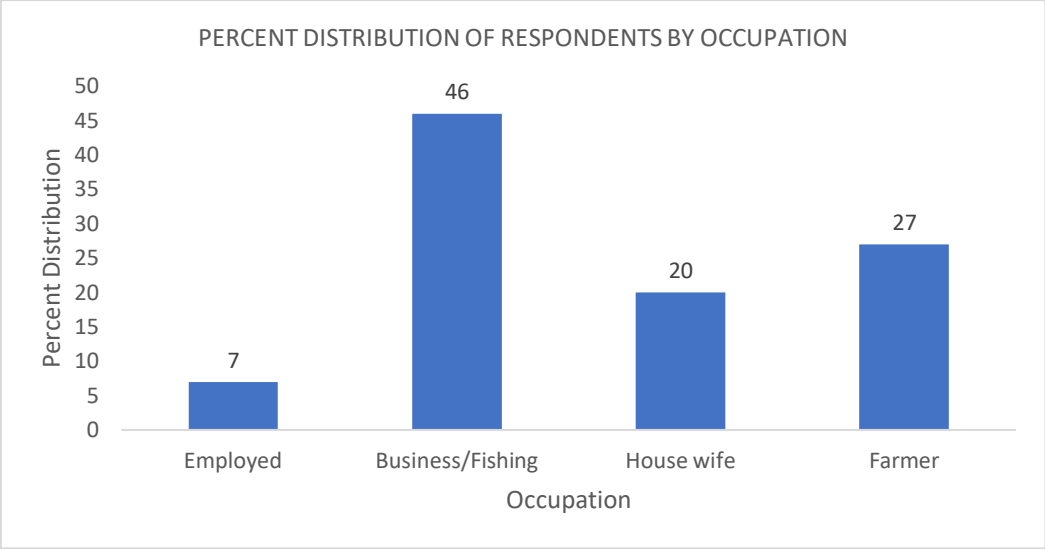


**Figure 4.** Percent Distribution of Respondents by Occupation

Source: (Field data 2021)

## Perceptions on Abortion Services by Users

### What is Abortion?

When asked what abortion meant, almost all the respondents demonstrated a very high understanding of what abortion was. They defined abortion as the killing of the unborn child. Others defined it as the termination of a pregnancy, and still, others defined it as the killing of the fetus. With only about 3 respondents who reported that they did not fully understand what abortion was.

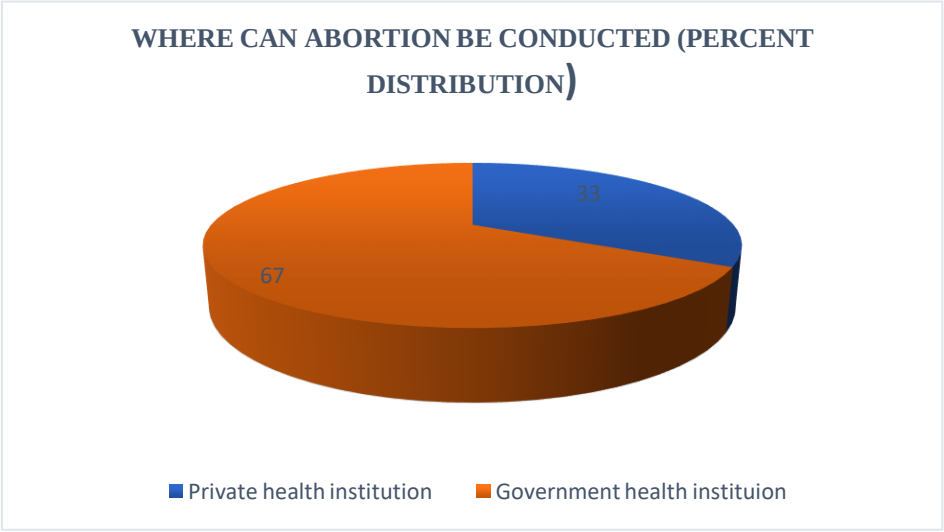


**Figure 5.** Where abortion services can be conducted

Source: (Field data, 2021)

Respondents were asked where abortion can be conducted from and according to figure 5 above, 67 percent of respondents said government health institution while 33 percent said private health institution.

## Is it Safe to Conduct Abortion Outside a Health Facility, and if yes, what are the Reasons?

All the respondents who participated in the study reported that it was not safe to conduct abortion services outside the health facilities. When asked for the reasons why it was not safe, most respondents associated abortion with the complication of bareness and death in most cases, while others associated it to immoral acts and against the teaching and doctrines of the Bible. They reported that it was forbidden by the Bible, and it was regarded as a sin regardless of where it is conducted. The other reasons reported were that most of these abortions are performed by unqualified personnel and traditional birth attendant and that it leads to serious complications.

## Have you ever Heard of Safe Abortion and where?

When asked if they have heard of safe abortion, 60% of the respondents reported that they have heard of it, and 40% of the respondents said they did not.

Of the respondents who heard of safe abortion, they further reported that they heard about safe abortion from the health posts and health facilities, while others heard about it from the colleagues outside Kasama district. Others mentioned schools and in the community. One respondent reported that they heard about abortion as a rumour, and they did not have more information about it.

## Problems associated with Unsafe Abortion

Respondents were asked to list the problems associated with unsafe abortion and according to the study findings, death, bleeding, and bareness were the prominent problems associated with unsafe abortion. Other respondents associated mental problems to abortion.

## Complications associated with Unsafe Abortion

The participants were asked if they were aware of the complications that come with unsafe abortion, and all the participants in the FGD knew abortion was associated with complications and often severe. Complications mentioned were infection, incomplete abortion, bleeding, abdominal pain and swelling as well as death. One of the midwives further added that "Others are Vesico vaginal fistula, infertility, amenorrhea and other menstrual disturbances, anaemia, uterine injury/damage with hysterectomy in some cases".

The participants reported that abortion was a major problem in the communities and consistently mentioned that it was one of the main means of resolving the issue of an unplanned pregnancy.

While a few of the abortion seekers use various forms of local and orthodox medications to attempt self-procurement of abortion.

## Recommendations on How to Improve Safe Abortion Services

The reproductive health seekers were asked on how best the abortion services can be improved. The majority of the respondents consistently reported that community sensitization is a good strategy to improve the service. Other respondents were of the view that there need to strengthen family planning services and engaging of adolescent in schools so that these issues should be discussed openly.

During the focus group discussion, one of the respondents said "… I think if more people in the communities are educated about this topic, they will be aware about the dangers of unsafe abortion. They will also know about the availability of safe abortion because as thing

stands a lot of people don't know much about it (safe abortion)".

## Discussion

## Introduction

This study clearly demonstrates that unsafe abortion is widespread in Kasama and Zambia at large. While the study is based on a relatively small sample of women, the findings are not generalizable to an entire population, it has, however, produced several notable results. Unintended pregnancies place women and men in a situation where they must choose whether or not to have an abortion and despite the reported high incidence of far-reaching reproductive health consequences, including mortality, the prevalence of unsafe abortion is still very high. This is not different from the reports of the surveys undertaken in Nigeria by Oye-Adeniran and Campaign Against Unwanted Pregnancy (CAUP) in collaboration with the Guttmacher Institute (GI) across several states of Nigeria [19] and is also consistent with the findings of the qualitative surveys undertaken in India, Pakistan, and Kenya. This gives further credence to the well-established view that abortion is one of the neglected problems of health care in developing countries Zambia inclusive.

### The Knowledge of Users towards Abortion Services

The majority of women in this study expressed ignorance on safe abortion. Most of them it was their first time learning about the method, and so their responses could be due to their unfamiliarity with the service. 78 % of the women did not know the existence of safe abortion in Zambia.

The few respondents who claimed to have heard of safe abortion did not have full information and how to go about it if they needed to access the service. It was also reported that the majority (55%) of reproductive health seekers in this study were Catholics who don't support family planning and any form of abortion. This factor could explain why the majority of the respondents had little knowledge about safe abortion and why many seek abortion outside health facilities to avoid being disclosed. However, another factor that could explain why respondents had little or no knowledge about safe abortion is the education level of the health service seekers. The study has revealed that the majority (68 %) of the respondents in the sample had primary level education. This clearly entails that the respondents are limited to information access, and even if they have access, they cannot understand it due to their level of education.

The implication of the above scenario is that people will continue practicing criminal abortion outside the health facilities by unprofessional personnel, and this will increase the prevalence of maternal mortality in Kasama and Zambia at large. Therefore, there is a need for the ministry of education to somehow to incorporate topics on abortion in the education curriculum at lower levels of education. This will allow people to become knowledgeable about the dangers of criminal abortion and the benefits of safe abortion. Effectively, this will increase awareness on abortion and thus contribute to the reduction of maternal mortality and other complications of unsafe abortions.

The report further revealed that some women who had little knowledge about safe abortion were concerned with the difficulties/barriers to accessing safe abortion, which was consistent with other findings in the literature. They argued that the process of accessing safe abortion in Zambia was too restrictive, and this hindered service seekers from accessing the service and thus forced them to resort to unsafe abortion, which is readily available. The dearth of safe abortion information on the general public and the communities has significantly exacerbated the unsafe abortion prevalent rate in the communities, thus increasing maternal mortality.

### Knowledge on the Consequences Associated with Unsafe Abortion

According to the findings in this study, participants reported that abortion was a major problem in the communities and consistently mentioned that it was one of the main means of resolving the issue of an unplanned pregnancy. Further findings showed that the health service users had great knowledge on the consequences of unsafe abortion. However, despite the danger associated with unsafe abortion, most women are still using this method as a way of getting rid of unwanted pregnancies. Therefore, these findings call for drastic measures by the Ministry of Health to invest in safe abortion and awareness campaigns as a way of increasing the knowledge on safe abortion to the communities thus, minimizing maternal mortality and other related complications from unsafe abortion. These findings support other studies in South Africa that women are still using unsafe methods outside of health facilities. In the context of unsafe, illegal abortions occurring in Zambia, safe abortion has the potential to reduce the number of unsafe abortions happening. If more options are available to women that are more suitable to their needs, there is a great possibility they would seek services at health facilities instead of outside providers for abortion.

## Conclusion

Abortion is a social reality despite opposition to its practice and the stigma that surrounds it, and it remains one of the most controversial sexual health topics around the world and in Zambia. This study explored the knowledge, attitudes and perceptions of women of child-bearing age from 15 to 45 and health providers on abortion services in the Kasama district. The study findings both from the health care providers and reproductive health users were a bit biased because the majority of the respondents were Catholics who are don't allow family planning and abortion. This factor played a critical role in the research results. It can also be concluded that majority of the women fully know and understands the adverse dangers and consequences of unsafe abortion. They consistently mentioned the following as some of the consequences of the unsafe abortion; death, mental problem and uterus injuries. The few women who had knowledge about safe abortion expressed concerns on the restrictiveness of the service and its unavailability to all the health care centers. Therefore, lack of knowledge about safe abortion, coupled with its restrictiveness, forces the majority of the women to resort to unsafe abortions outside the health facility, and this is done in an unsafe environment and by untrained personnel's.

The study findings also reveal that the women from the sample had good knowledge of what abortion was and were able to define abortion. Further, they demonstrated a good understanding on the dangers of conducting abortion outside a health facility. It can further be concluded that some health care provided are not willing to provide abortion services to the clients because of religious and cultural reasons. Many said it was against want they believe in and believed it was a sin and forbidden by the Bible and taboos.

## Recommendations

Education and awareness are important aspects to any successful public health intervention. Recommendations suggested draw on a number of issues that were highlighted by providers and service users who participated in this study.

1. Access to training and further opportunities for health care providers to attend values clarification workshops and abortion training needs to be encouraged and strengthened. The General Nursing Council of Zambia should consider incorporating abortion training into the nursing curriculum.
2. Knowledge and understandings of the 1972 termination of pregnancy act, including

conscientious objection, needs to be strengthened amongst all health care providers, including health managers.

3. There is a need for the Ministry of Health to come up with deliberate programmes aimed at sensitising and educating the general public on the adverse dangers of unsafe abortion. Furthermore, the communities need to be educated and sensitised on safe abortion to reduce on the number of maternal mortality rate.

## Conflict of Interest

The author had no conflict of interest in the subject and was not in any position to gain personal benefit from actions or decisions which may be made in regard of this article.

## Acknowledgment

Writing a report is extremely hard work to be accomplished by a single person. It requires support and input from a number of sources. I am, therefore duty-bound to express my sincere and heartfelt gratitude to all those who helped me in whatever way to accomplish this work.

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Special thanks go to the entire Department, Lecturers and Mentors of Texila University Zambia for their input in different ways. These people molded my understanding and inspired me during the course of my studies.

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# Impact of Covid-19 Pandemic on Clinical and Non-Clinical Staff Working in United Nations in Burundi

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***Abstract***

*Coronavirus disease (Covid-19) is a very serious pandemic disease which threatens many people's life around the world. Covid-19 has currently killed 5,783,776 people and with 404,910,528 Confirmed cases. The objective was to explore the Impact of the Covid-19 Pandemic on Clinical and non-Clinical Staff working in the United Nations in Burundi from 1st March 2020 to 31st January 2022. This research was conducted under a cross-sectional study design and used a self-administered structured questionnaire. A total of 1400 participants out of 1432 were included in this study from 1st March 2020 to 31st January 2022. Univariate and bivariate analysis were processed using SPSS 25, and Chi-square test were calculated with a $p<0.05$. The findings of this study showed that 188(13.4%) of females and 224(16%) of males were covid-19 positive. Different age structures with Covid-19 were respectively, 29(2.1%) were with 21-30 years, 109(7.8%) with 31-40 years, 130(9.3%) with 41-50 years and 142(10.2%) with >50 years. However, the gender and age structure relationship for contracting Covid-19 was not statistically significant, $X^2=0.01$, $p=0.9$ for gender and $x^2=6.4$, $p=0.9$. The clinical staff with covid-19 were 33(2.4%) out of 66. Thus, 33(50%) for clinical employees were positive. Also, the positivity rates in non-clinical employees were 379(27.1%) among 1334 participants, while only 28.4% were positive. The relationship was highly significant, $X^2=14.1$, $p<0.001$. As a conclusion, the evaluation of the Covid-19 morbidity impact was crucial to emphasize on the invested effort to protect the non-clinical UN employees and to plan a highly monitored policy for clinical employees to minimize their infection rate.*

***Keywords:*** *Covid-19, Clinical staff, Impact, non-clinical staff, United Nations.*

## Introduction

Covid-19 is both an international health emergency and a worldwide financial danger. To decrease the spreading of covid-19, global implemented a lockdown of enterprises and activities that were to protect both employees and employers around the globe. Consequently, different changes were implemented to protect staff, including work from home, and dismissal from different posts, whereby some staff started to search for the nation-specific comparable unemployment benefits. Furthermore, in more institutions, the economic shutdowns and most of them were closed [1].

Globally, by the beginning of 2021, the World Health Organization (WHO) reported approximately 111 million confirmed cases of Covid-19, including less than 2.5 million deaths [2]. Based on its rapid transmission and its mortality rates in the world, the Covid-19 is upsetting the health of people, causing staffing

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problems in health care institutions and the community in the general [1]. the information on morbidity and mortality rates in the general population is regularly recorded.

There were 19,954 cases of covid-19, 287 vaccine doses have been administered and 14 deaths as of 26th October 2021 [3]. However, although Staff is exposed to covid -19 due to their involvement in the treatment of patients and serving the population in different sectors, there is limited information on morbidity impact on Clinical and non-Clinical Staff working in United Nations. Therefore, this study explored the morbidity impact of the Covid-19 Pandemic on Clinical and non-Clinical Staff working in United Nations in Burundi, and the results of this study will help to inform decision-makers about staffing in response to Covid-19.

## Materials and Methods

This research was conducted under a cross-sectional study design and used a self-administered structured questionnaire to all United Nations (UN) Staff that visited the UN Clinic in Burundi during the period of 23 months starting from March 2020 to 31st January 2022. An approval letter was obtained from the UN health manager in Burundi. Also, the inclusion criteria were being a UN staff involved in different working activities during the period of study and accepting to participate in the study; and exclusion criteria were not being a UN staff and not accepting to participate in the study.

Furthermore, consent forms were signed by participants, and participation was voluntary. Therefore, a sample size of 1400 participants from the study population of 1432 clinical and non-clinical staff were included in this study from 1st March 2020 to 31st January 2022. Univariate and bivariate analysis were processed using SPSS 25, and the Chi-square test were calculated with a $p<0.05$.

## Results

The findings of this study showed that 188(13.4%) of females and 224(16%) of males were covid-19 positive. Different age structures with Covid-19 were respectively, 29(2.1%) were with 21-30 years, 109(7.8%) with 31-40 years, 130(9.3%) with 41-50 years and 142(10.2%) with >50 years. However, the gender and age structure relationship for contracting Covid-19 was not statistically significant, $X^2=0.01$, $p=0.9$ for gender and $x^2=6.4$, $p=0.9$. The clinical staff with covid-19 were 33(2.4%) out of 66. Thus, 33(50%) of clinical employees were positive. Also, the positivity rates in non-clinical employees were 379(27.1%) among 1334 participants, while only 28.4% were positive. The relationship was highly significant, $X^2=14.1$, $p<0.001$.

## Discussion

Based on the results of this study, 188 (13.4%) of females and 224 (16%) of males were covid-19 positive. Also, different age structures with Covid-19 were 29 (2.1%) with 21-30 years, 109(7.8%) with 31-40 years, 130(9.3%) with 41-50 years and 142(10.2%) with >50 years. However, the gender and age structure relationship for contracting Covid-19 was not statistically significant, $X^2=0.01$, $p=0.9$ for gender and $x^2=6.4$, $p=0.9$.

Furthermore, the clinical staff with covid-19 were 33(2.4%) out of 66. Thus, 33(50%) of clinical employees were positive. This goes together with another study conducted in Bangladesh, whereby many nurses, doctors, and other health care providers developed psychosocial problems contaminated by Covid-19 whereby 73 doctors died, and it was well clarified that 10% of all infected people were found among health workers [4]. In the same way, in a study conducted in Ghana for health care providers, it was found that 14% of frontline workers allocated to perform their duties in covid-19 treatment centres were at high risk [5].

Additionally, the positivity rates in non-clinical staff were 379(27.1%) among 1334 participants, and only 28.4% were positive. The relationship was highly significant, $X^2$=14.1, p<0.001. This differs from another study conducted to assess the Covid-19 Impact on Hospital Healthcare Workers, and it was revealed that there are differences in infection rates between clinical and non-clinical staff whereby it was found that fewer health care workers were covid-19 positive than other staff. Therefore, the risk factors were co-worker connected rather than patient-related [6].

## Conclusion

Based on the findings of this study, the positivity rate was higher in Clinical than non-clinical staff that were working in United Nations in Burundi.

Therefore, the evaluation of the Covid-19 morbidity impact was crucial to emphasize on the invested effort to protect the non-clinical UN employees, and we recommended planning a highly monitored policy for clinical employees to minimize their infection rate.

**Table 1.** Clinical and Non-clinical Participants

| Variable | Covid-19 Positive | Covid-19 negative | Total | Statistic test |
|---|---|---|---|---|
| Clinical participants | 33(2.4%) | 33(2.4%) | 66(4.7%) | $X^2$=14.1 |
| Non-clinical participants | 379(27.1%) | 955(68.2%) | 1334(95.3%) | Df=1 |
| Total | 412(29.4%) | 988(70.6%) | 1400(100%) | P<0.001 |

## Disclosure Statement

The authors report no conflicts of interest.


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