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TABLE OF CONTENT

1	A Human Rights-Based Approach: Analysis of Administrative Instruments used in the Fight Against COVID 19 in Zimbabwe and Botswana Feddious Mutenheri	1
2	Social Media as a form of Digital Tool(s) and Academic Performance of University Students in Nigeria Aderinsola Eunice Kayode	10
3	Digital Integration into the Nigerian Educational System: Challenges and Prospects Abigail Olubukola Irele	17
4	Virtual Teaching and Learning: The Sustainable Tools in Digitalization of Education Olutayo T. Omole	24
5	Reinventing New Learning Model through Cultural Values and Transformational Education in a Digital Age Maria Ekpenyong	33
6	Strengthening School's Management Capacity for Better Education Outcomes in Eswatini: Calling for a Paradigm Shift Sbongile Patricia Khumalo-Zwane	41
7	Triggers of Acute Asthma in Patients Attending Emergency Centre in a Peri-urban District Hospital, Johannesburg, South Africa JMM Musonda	50
8	Colonization, Virulence Factors, and Antimicrobial Susceptibility Patterns of Staphylococcus Aureus Isolated from the Anterior Nares of Medical and Paramedical Students Venkataramana Kandi	57
9	Mosquito-Avoidance Practices among Caregivers of Children Under Five in Somolu Local Government Area, Lagos State, Nigeria Ojo OreOluwa	68

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A Human Rights-Based Approach: Analysis of Administrative Instruments used in the Fight Against COVID 19 in Zimbabwe and Botswana

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Abstract

Subsequent to the appearance of the COVID-19 contagion, governments around the world were confronted with the challenge of combating its spread. It has been established that the infection is predominantly human to human and this reality informed the approaches used to counter it. Governments, particularly those perceived to have impeccable democratic credentials, had the difficult decision to deploy martial laws against laissez faire tactics in order to save lives. Most countries resorted to martial law, which gave leaders of governments unfettered state power to make decisions "to save lives". Whereas most Western countries took a wait-and-see approach in implementing State of Emergencies, China and most countries in the developing world were quick to declare them. Developing countries' records on human rights are generally poor. There has been a worldwide human rights confrontation between governments and citizens on the extent of the instruments used to fight COVID 19. Have these instruments been effective? Have they been the only necessary and key instruments to fight the pandemic? To what extent did they impinge on the human rights imperatives of the citizen? This paper interrogates the necessity of using these instruments to combat COVID-19 and their consequences on people's rights. The paper presents the instruments used in Zimbabwe and Botswana and uses the Human Rights-Based Approach (HRBA) to compare their consequences on people's freedoms in these countries. This research uses mixed methods in interrogating the impact of the administrative instruments that were used to combat COVID 19. Where necessary, descriptive and ethnographic approaches are employed to deepen the understanding of the impact of these instruments on human rights.

Keywords: *Human Rights-Based Approach, State of Emergence, Lockdown, Administrative Instruments, COVID 19 Pandemic.*

Introduction

In the period following the declaration of COVID 19 as a pandemic by the World Health Organisation, countries around the world implemented cocktails of policies to curb its spread. The virus was diagnosed as being transmitted from human to human. The WHO prescribed wearing of masks, social distancing and washing of hands as the primary methods to reduce its spread. No vaccine to date has been found to cure the virus. According to Mutenheri (2020), "…By April 2020, China had the highest figures of recorded infections (81 054), followed by Italy with 53 578, and the USA with 26 892. As of March 22, 2020, the outbreak of the coronavirus disease (COVID-19) had been confirmed in around 188 countries. The virus had infected 308,592 people worldwide, and the number of deaths had totalled 13,069. The most severely affected countries outside of China included Italy, the USA, Spain, and Germany. Zimbabwe and Botswana instituted administrative instruments to curb the spread of the deadly virus. Zimbabwe, using Presidential Powers Act, instituted Statutory Instrument N0. 83, in which a State of Disaster and National Lockdown and prohibition of gatherings were legislated for the 21-day period commencing 30 March 2020; Statutory Instrument 136 of 2020, and other measures which will be discussed below were instituted as well. Botswana's Parliament, on the other hand, promulgated a six-month State of Emergency in April which was extended for another six months, solely for the purposes of fighting COVID 19. Besides these political measures, there were attendant economic and social measures that were put in

place in both these countries that have human rights dimensions to them. It is these measures that this paper seeks to evaluate against the human rights imperative in these two countries.

Definition of words

Human rights

According to the OHCHR (1996), these are entitlements or civil liberties that we have simply because we exist as human beings – they are not granted by any state. These universal rights are inherent to us all, regardless of nationality, sex, national or ethnic origin, color, religion, language, or any other status. They range from the most fundamental – the right to life – to those that make life worth living, such as the rights to food, education, work, health, and liberty. (https://www.ohchr.org). Yamin (2008) sums it up by pointing out that "Human rights are conceived as tools that allow people to live lives of dignity, to be free and equal citizens, to exercise meaningful choices, and to pursue their life plans."

Human Rights-Based Approach

A human rights-based approach (HRBA) is a conceptual framework in which the integration of human rights law and principles should be visible in all work, and in which the aim of all (governmental) programs and activities should be to contribute directly to the realization of one or more human rights.

Statement of the Problem

There is a rising tide of human rights violations which have been laid bare by the COVID-19 pandemic in Africa. I submit that while the government in Zimbabwe declared various restrictions on people's social, economic and political activities in a bid to upend the deadly contagion, human rights violations of vulnerable groups by law enforcement and public officials have been on the increase in Zimbabwe which has a dire COVID 19 situation, yet Botswana which has implemented similar measures, enjoys a greater level of peace and tranquillity yet also with a relatively effective COVID 19 combat machinery.

Limitations

The major limitation to this study has been the lockdown of borders which denied me as the researcher, the opportunity to tour Zimbabwe to experience first-hand some of the effects of COVID 19 and to interview some of the respondents. Secondly the research is largely dependent on secondary data and news reports whose veracity sometimes is difficult to verify. Most questionnaires that I sent to my key respondents were not returned on time and others not returned at all. Some of these respondents were key to the understanding of both the Zimbabwe and Botswana human rights situation under COVID 19.

Methods

This research was to a larger extent a qualitative one depending largely on secondary information as recorded in government reports, newspaper articles and internet databases. I also consulted some key people in informal conversations on their opinions. My observations and recording of events as they happened through the period of the Covid informed some of the perspectives that are contained in this paper.

Discussion

Theoretical Framework

Today, more than ever before, State political structures are premised on contractual agreements between the governing class and the governed. Amadasun et al, (2020) argue that social contract theorists have long spoken about commensurate relations among the ruling class and the followers in which the former, via the ballot, determines the outcome of policy-making. From idealism to pragmatism, such contractual principles- under the auspices of a democratic architecture- have now become a normative venture across political dispensations and transitions in many regions of the world, including Africa. (Amadasun, 2020). The COVID-19 pandemic, however has irrevocably shed light on the double standards, hubris, and despotic dispositions of many African leaders. Across the region, there have been widely reported cases of violence against citizens by security forces who were deployed to enforce curfews and lockdowns. (UN, 2020, France 24, 2020).

Outbreaks and health emergencies – such as the new COVID-19 pandemic – pose many ethical and public health questions on how to adequately respond and control transmission. The overall purpose is to keep populations informed and safe. (Schiariti, 2020) In order to do so,

public health strategies directed at the community level, nationally, or internationally, sometimes require restricting any one individual's rights to freedom of movement and association, for example, using measures such as quarantine in the interest of the greater population. (Leary, 1994). Nevertheless, during epidemics it is crucial to monitor the implementation of public health strategies with conscious attention to human rights, especially of those individuals who are socially, politically and economically vulnerable. (UNGA, 2007). An important point is worth mentioning at the outset, that having rights-based strategies and tools in place before the events happen is key for an inclusive response.

The equal and inalienable rights of all human beings provide the foundation for freedom, justice and peace in the world, according to the Universal Declaration of Human Rights, adopted by the UN General Assembly in 1948. (UNFPA, 2014). This work is based on the Human Rights-Based approach as it would relate to the tackling of the COVID 19 pandemic. This research takes cognisance of the fact that it is usually the poor sections, marginalised groups and politically vulnerable people and groups who are at the receiving end of state's excessive use of power.

It is therefore important to put the COVID 19 consequences into context in order to deploy a relevant human rights-based approach to tackling it. Firstly COVID 19 in many jurisdictions has led to the following: widespread deaths of people (with the poor most people being heavily affected); loss of livelihoods by many families, especially the vulnerable ones; erosion of social justice; loss of political rights particularly in countries run by dictatorial regimes; racial, political and social persecution of the marginalised in societies; lack of access to healthcare; deprivation by the state of the basic needs and, in many cases due to the COVID 19, related corruption.

A human rights-based approach therefore, is about empowering people to know and claim their rights and increasing the ability and accountability of individuals and institutions who are responsible for respecting, protecting and fulfilling these rights. This means giving people greater opportunities to participate in shaping the decisions that impact on their human rights. Any policy meant to tackle the pandemic should engage participatory strategies in order to have a buy in of the very people it seeks to protect. It also means increasing the ability of those with responsibility for fulfilling rights (government and its institutions such as the security services, judiciary and parliament) to recognise and know how to respect those rights, and make sure they can be held to account. A human rights-based approach in this case is about ensuring that both the standards and the principles of human rights are integrated into policymaking as well as the day to day running of the state in wading off the effects of COVID 19.

According to Unicef (2016), there are two main rationales for a human rights-based approach to tackling the pandemic. Firstly, is the intrinsic rationale, acknowledging that a human rights-based approach is the right thing to do, morally or legally; and secondly, the instrumental rationale, recognizing that a human rights-based approach leads to better and more sustainable outcomes. In practice, the reason for pursuing a human rights-based approach is usually a blend of these two. (https://www.unicef.org/)

A human rights-based approach requires the recognition of rights as legally enforceable entitlements and is linked in to national and international human rights law. The State and all other accountable bodies must be sure that their practices and procedures are grounded in human rights law. Under the law they must not breach the human rights of anyone. (Unicef, 2016).

A rights-based response to COVID-19 contains many important aspects, among them, the right to health, equality and non-discrimination, freedom of peaceful assembly, association and movement, an adequate standard of living, as well as the right to benefit from scientific progress. (UNAIDS, 2020). This viewpoint focuses on the right to health as underpinned by principle of transparency. The right to the highest attainable standard of physical and mental health was first articulated in the Constitution of the World Health Organization. It is enshrined in the International Covenant on Economic, Social and Cultural Rights, the Convention on the Elimination of All Forms of Discrimination against Women, the International Convention on Protection of the Rights of All Migrant Workers and Members of Their Families, the International Convention on the Elimination of Racial Discrimination, and the Convention on the Rights of the Child, among other international and regional treaties; as well

as in at least 115 national constitutions. (OHCHR, 2008).

The COVID-19 pandemic and the emergency public health measures implemented by governments in response to it have resulted in unprecedented restrictions on the civil liberties of the general population, especially freedom of movement, association and close physical contact with others. This has been used to deny political players other than those in power to be able to carry out their political activities and therefore weakening their voice, and restricting their ability to mobilise. This is particularly important in Africa where there is a dearth of democracy. An important question therefore arises which is: How does the need by governments to curb the transmission of COVID 19 through limiting some of their liberties co-exist with the imperative to respect their universal charter? It is my argument hither that a 'government of the people, by the people, for the people' will at all times derive its mandate from those very people, to implement policies for their good and that a social contract must at all times exist in which there is a balance struck between the state's administrative obligations and the peoples' civil liberties.

Background to Human Rights records in Zimbabwe and Botswana

In this section it is important to highlight briefly Botswana and Zimbabwe's human rights records from pre-independence through to post-independence. In Zimbabwe, the Liberation struggle has relentlessly been used as a boon to get away with human rights despoliation and sacrilege of democratic precepts. (Mutenheri: 2009). Dating back to 1890, the period when the British South Africa Company (BSAC) colonised the territory, the liberation struggles have at all material times been violent sadly with impunity. The 1896 Umvukela/Chimurenga in which natives were defeated led to liberation leaders, Kaguvi, Mbuya Nehanda and others being beheaded by the white settlers and yet no justice was ever served on the White perpetrators. This marked a trajectory, in Zimbabwe, of outlandish claim to power without justice for crimes committed in the quest for that power.

During the time, the BSAC and a pioneer column of settlers, expropriated land from the natives in a violent manner. The natives were either taken in as slaves on the newly created white farms or were driven out to dry, rocky and Tsetse infested areas which were not fit for habitation. These were called reserves. Again, this violent process went on with impunity. It marked the dispossession of the locals' modes of production and set alive the apartheid system in which Whites had special zones, laws and discrete treatment for them while locals had no source of redress.

Fast track to 1966 which officially was the beginning of the Second Chimrenga/Umvukela. Local people took up arms to fight an almost century old oppressive colonial system. It was a very violent war in which a small minority white settler army fought the nationalist guerrilla army. More than four million natives died and by 1980 an elite Lancaster Conference was convened which offered an armistice and gave political independence to Zimbabwe. The underlying feature of this struggle was its violent nature. The new government offered blanket reconciliation to the white settlers with no redress or justice to the traumatised natives.

The Independence government took over a relatively strong economy yet had no significant training in human rights and three years into their rule they were at loggerheads with local political opposition Zimbabwe African People's Union (ZAPU). More than twenty-thousand Ndebele ethnic group were massacred in an ethnic-political conflict where the incumbent ethnic group (Zezurus) wanted to consolidate power. Gukurahundi, as it became known was a violent crushing of dissent and to date the perpetrators have not been brought to justice. This alone is the tattered record of the human rights situation in Zimbabwe. The modern-day opposition, The Movement for Democratic Change (MDC) which was formed in 1999 has suffered the same fate to date. At the very time the MDC was formed, Zimbabwe embarked on a controversial Fast Track Land Reform Programme in which the government sought to redress the 1890's land expropriation. The process was so violent and the opposition MDC suffered torture, rape, disappearances and even death as collateral for they were accused of being the front of the colonial Britain against the Land Reform.

Elections in Zimbabwe since 1980 have all been conducted under the stigma of violence. The elections in (2002; 2005; 2008; 2013; 2018) all have been characterised by violence with deaths of opposition officials, abductions and disappearances of political opponents reported.

All this with impunity. A government programme called Operation Murambatsvina in 2005, saw the destruction of urban settlements of people perceived to have supported the opposition in the just ended election. The UN castigated the programme as action against people's fundamental rights.

When the current government came to power in November 2017, they did so via a military coup in which there were reports of widespread deaths. In July of 2018, a disputed election meant to legitimise the coup was characterised by a violent aftermath in which security forces killed more than seven protesters in the CBD of Harare. A Commission of Inquiry set up to investigate these killings pointed to the culpability of the security forces and recommended that perpetrators be prosecuted. To highlight the impunity, two years later, this recommendation had not been implemented.

Botswana, on the other hand, was never directly colonised but, as a result of the upheavals between Shona people living in Bechuanaland and the migrating Ndebele people from the Kalahari Desert into the territory who disturbed their peace and, tensions with Boers in the Transvaal, the then Bechuanaland leaders personally asked for assistance from the British government. While there was direct administration by the British, a system in which tribal rule was established allowed Botswana to peacefully transit from direct protection to establishing a constitutional democratic government by 1966. Therefore, Botswana never engaged in a violent struggle for its independence.

Botswana's first independence President, Seretse Khama, was a statesman who took over Botswana as one of the poorest countries in Africa to transforming it into a leading economy by his death in 1980. Though he died in office, the presidency was smoothly passed on to the Vice President Ketumile Masire who was also elected in his own right. Thus, a democratic culture set foot in Botswana. By 1998, Sir Masire retired of his own accord and new elections were held. To date Botswana has had four smooth power transitions which demonstrate the contribution of a non-violent past which predisposed the country to a more democratic and peaceful environment.

The 2018 transition of power from the government of Ian Khama, however, posed a new threat to a history of peaceful transfer of power. In an unprecedented fashion, the outgoing president joined the opposition ranks, threatening to destabilise a tradition in which the current vice president takes over before elections. A report in a local daily, The Standard, reported that, "Khama/Masisi fight threatens Botswana's Stability" and quoted a report which put it bluntly that "…even more respondents to the mark of 83% "agree" or "strongly agree" that this falling out is likely to affect the political stability of the country."(Sunday Standard, October 20-26, 2019). Even the incumbent president, Dr. Mokgwetsi Masisi, in his 2018 State of the Nation Address admitted that "the transition from the previous administration in 2018 has not been as smooth as expected". (SONA, 5 November 2018). However, the ensuing political and electoral battle did not degenerate into violence but ushered in a robust political contest which, for the first time in the region, saw the incumbent taking on political opponents in a televised electoral debate. This demonstrated the depth of a democratic culture that was founded at the birth of this country.

Analysis of the Instruments applied in Zimbabwe and Botswana to Fight COVID 19

In this section I show how a culture of democracy and respect for human rights (or lack thereof) have found expression in the ways in which the two countries of Botswana and Zimbabwe have handled, and continue to handle, the COVID 19 pandemic. I submit that this crisis has exposed on one hand, the penchant by tyrannical leaders to use state power to suppress people's human rights and on the other hand, how an environment with functional state institutions and a political will for respect of human rights can sustain a peaceful and democratic environment in which human rights are respected. The two examples used here are an example of how the South-South cooperation debate in entrenching human rights and African solutions to African problems intonation can be advanced with a view to learning and deriving from success stories in the region and learning lessons from failed examples like Zimbabwe.

Following the declaration by the World Health Organisation of COVID-19 as a global pandemic, a state of disaster was declared in Zimbabwe on the 20th of March 2020. A "National Lockdown and prohibition of gatherings" was legislated for

the 21-day period commencing 30 March 2020. The extent of lockdown has been reviewed and revised since then with the latest change taking effect from 22 July 2020 with a 18.00 to 06.00 curfew being implemented and business operations for non-essential services, low risk sports and permitted gatherings being restricted to times between 09.00 and 15.00. (https://home.kpmg). Many other measures such as direct and indirect Tax measures, employment-related measures (state compensation schemes and training), Economic stimulus measures (loans and moratorium on debt repayments) were also put in place to cushion citizens against adverse effects of the national lockdown. The Zimbabwe government has published 17 statutory instruments since March 2020 regulating the management of COVID-19, including national lockdown rules aimed at slowing down the spread of the respiratory disease. (https://zimfact.org).

President Emmerson Mnangagwa's announcement of a 21-day national lockdown across Zimbabwe to combat the spread of the Covid-19 virus was accompanied by a raft of laws, which have been described as draconian, excessive and as unconstitutional. Statutory Instrument (SI) 83 of 2020, the Public Health (Covid-19 Prevention, Containment and Treatment) (National Lockdown) Order, 2020, set out restrictions that potentially violated fundamental rights to property and to freedom of expression. (https://www.theindependent.co.zw).

Perchance, the most sweeping provision in curtailing freedom of expression was the provision in SI 83 of 2020 to punish the publication or communication of false or fake news during the national lockdown period. This offense attracts an excessive punishment of 20 years imprisonment. Section 14 of the regulations says: "For the avoidance of doubt, any person who publishes or communicates false news about any public officer, official or enforcement officer involved with enforcing or implementing the national lockdown in his or her capacity as such, or about any private individual that has the effect of prejudicing the state's enforcement of the national lockdown, shall be liable for prosecution under Section 31 of the Criminal Law Code ("Publishing or communicating false statements prejudicial to the state") and liable to the penalty there provided, that is to say a fine up to or exceeding level 14 or imprisonment for a period not exceeding 20 years or both." (https://allafrica.com/stories/202004030617.html).

According to Dewah Mavhinga, a Human Rights activist, while it is essential that journalists and members of the public take care not to spread false news, this provision potentially violates the constitution's Section 61 guarantee of the right to freedom of expression in that it is too broad and vague, and provides for excessive punitive measures. If implemented as currently framed, this law will constrain the work of journalists, unduly muzzle social media, and prevent legitimate criticism of the authorities' response to Covid-19. (https://www.theindependent.co.zw).

This type of offence appears to be less about protecting public health than safeguarding the State against scrutiny of its management of the COVID-19 pandemic, with a very harsh sentence as deterrent. It has a chilling effect on freedom of expression and public accountability by the State. In an unusual turn, the offence (section 31(a)(iii) of the Criminal Code) has been declared unconstitutional by the Constitutional Court of Zimbabwe in the case of Chimakure & Others v Attorney General. The Court held that the offence was overbroad, that the penalty was disproportionate, and that the offence had a chilling effect on the exercise of freedom of expression. (Gonese et al, 2020).

Probably the most dramatic example of the attempts by the government in Zimbabwe to act on such draconian laws was an internationally publicised case of an award-winning journalist, Hopewell Chin'ono. For publishing and exposing corrupt government activities the journalist went through a histrionic persecution by the state in which for forty-five days he was refused bail (itself a right under Zimbabwean laws). Dr. Alex Magaisa, (August, 2020) a Constitutional expert summed up this case:

The Chin'ono case has a higher profile. Chin'ono is an award-winning journalist, with associations at top institutions of learning, such as Harvard. It is meant to send a strong authoritarian message to all social media users. The aim is to intimidate and force citizens into submission. It is designed to get people to police themselves on social media. This includes censoring not only what others say on social media but also what they say. It represents a massive curtailing of free speech. The regime knows it has little power over social media, but

jailing a few prominent users will serve as an example to others. (Magaisa, 8, August 2020).

Acting under the cover of the State of Disaster and the National Lockdown rules, the Zimbabwe government banned all political activities in the country. However, while political activities from the ruling ZANU (PF) party could go on, (cases in point are the political party primary elections in Kwekwe in August) those organised by opposition political parties were banned or dealt with violently by security forces - a case in point is the 31st July 2020 organised protests whose organisers were incarcerated to thwart the protests and a dozen others who were arrested after participating in the actual protest.

During the subsistence of the lockdown it became clear, government was using lawfare. According to Magaisa (18, August 2020), "in warfare, combatants rely on guns and ammunition. They trade fire. The ones with supreme technology and organisational skills usually win. There is a different kind of war that takes place without guns and ammunition. In this war, the law is the primary weapon. This kind of war has been referred to as lawfare." The Supreme Court of Zimbabwe handed down a potently destabilising judgement to the main opposition Movement for Democratic Change (MDC) in the SC 56-20 - MDC et al v Mashavira et al - Supreme Court judgment of 31st March 2020. In essence, the admittedly moot judgement sought to turn back the wheels of time by resurrecting a political party of 2014 that had died with the death of its founding leader, Morgan Tsvangirai. This judgement has been used to date to dismantle the popular opposition party's hold in the parliament, replacing its deputies with political proxies of the ruling party. Using lawfare, the ZANU PF government used its politically captured institutions (security services and the judiciary) to weaken the political opposition.

Abductions and torture of political opponents were reported during the lockdown to fight COVID. Two cases made international highlights. Firstly, was the reported abduction, torture, sexual abuse and arrest of three girls, officials in the opposition MDC Alliance party. They were accused of having marched in protest over the hunger induced by the lockdown. Their case at the time of writing was still being postponed. The second case was that of a young journalist named Tawanda Muchehiwa, who movie-style, was caught on CCTV cameras being abducted by state agents. The abductions have similar traits, linked to a choreographed state-style political persecution. These and many other cases expose the worries among human rights activists in Zimbabwe who have always highlighted the heavy-handed tactics used by the Zimbabwe government particularly now under COVID restrictions. Amadasun (2020) contends that "suffice to underscore that such rights violations are not a matter of an isolated case since deaths and injuries resulting directly from these excessive uses of force have been reported in many African countries including Nigeria, Zimbabwe, Kenya, and South Africa."

To highlight how the administrative measures were used in Zimbabwe the Health Minister declared a ban on all elections during lockdown. Zimbabwe's electoral commission had just announced that by-elections to fill at least thirty-five parliamentary and eighty-four local government vacant seats would be held on December 5, 2020. The ban announced by Vice President Constantino Chiwenga, who also doubles up as Health and Child Care minister, coincided with a mass recall of opposition legislators under controversial circumstances. Alex Magaisa said the ban was evidence that President Emmerson Mnangagwa was using the Covid-19 to stifle democracy. "Statutory Instrument 225A effectively banning by-elections in Zimbabwe is living proof of it. President Mnangagwa is lifting restrictions in other areas, but not in elections, but the legality of this statutory instrument is doubtful. It seeks to amend not only the Electoral Act but also the constitution. The Health minister does not have power to do that. Second, the statutory instrument cannot operate retrospectively as it seeks to do. It's all very clumsy." (Magaisa, 2020). According to David Coltart, "the ban effectively suspends section 158 sub-section 3 of the constitution of Zimbabwe, which stipulates the time within which by-elections need to be conducted and a statutory instrument has no power to suspend a constitution,". (https://allafrica.com).

The role of security services in the enforcement of lockdown and its regulations captured the human rights debate in Zimbabwe. Section 213(2) of the Constitution states:

"With the authority of the President, the Defence Forces may be deployed in Zimbabwe … in support of the Police Service and other

civilian authorities in the event of an emergency or disaster."

It is important to note that no matter if the President had authorised it, soldiers have no power to arrest civilians as they would have done if the authorisation were given in terms of section 18 of the Maintenance of Peace and Order Act. Reports grew of the police force and the military using gruelling and humiliating punishments to enforce quarantine on the poorest and most vulnerable groups, including those who live hand-to-mouth and who risk starving if they do not defy lockdowns to seek work and food. In addition to an increase in police brutality during lockdown, Transparency International pointed out that there was an increase in bribery and corruption, which thrived during this time of crisis, when institutions and oversight mechanisms are weak and public trust is low. (Gonese, et al, 2020). Enforcement officers must respect the fundamental human rights of people they encounter in the course of their duties. In particular they must respect people's right to life, to human dignity and their right not to be subjected to cruel or degrading treatment.

In early April 2020, Botswana declared a six-month state of emergency due to COVID-19 and passed the Emergency Powers COVID-19 Regulations. Botswana initially declared a public health emergency in terms of its Public Health Act before withdrawing the declaration and declaring a state of emergency instead. Soon after the declaration, reports emerged of people being assaulted by the police for allegedly breaching lockdown regulations. (Gonese, et al, 2020). From a democratic discourse, it is instructive that the government immediately issued a statement on 11 April 2020, condemning the assault of citizens and calling on law enforcement agencies to uphold the rule of law and respect for human rights. This prompt response marked a crucial moment showing political will to respect human rights during COVID 19. The Botswana government demonstrated that excesses of law enforcement agencies would not be tolerated giving credence to the argument that the institutional framework in the country is independent and can be checked and balanced.

There was spirited debate on the need by government to declare a State of Emergency as opposed to a Public Health Emergency. The fundamental binary of the debate was primarily between a suspicious opposition camp and an extremely cautious state. To that end, besides political posturing by the opposition there hasn't been evidence of threatening violation of human rights in Botswana. Political will was given at the highest level of government when the president assured the nation that, the State of Emergency was intended to deal only with the COVID-19 crisis and would not in any way undermine people's fundamental rights. According to Motsamai (2020), Botswana's fight against COVID-19 pandemic was in line with the country's human rights-based approach to development. A human rights lawyer Tshiamo Rantao corroborated the human rights situation in Botswana arguing that human rights violations have not been cause for concern during the first State of Public Emergency (SOE) effective for a period of six months pointing out that a lot of lockdown conflicts or cases which could be noticed were Labour matters between workers and their employers due to deferment or salary slices. (https://allafrica.com).

A raft of economic, employment and tax measures that the government put in place helped to cushion Botswana from the devastating effects of COVID 19. According to the Botswana Trade and Investment Centre, Botswana's economic response to the COVID-19 has been ranked in the top 10 responders to COVID-19 economic challenges ranking 2nd after Egypt. (https://www.gobotswana.com).

Conclusion

From the foregoing it is clear that the two neighbours, Zimbabwe and Botswana have completely different human rights infrastructures and these set ups instructed the way COVID 19 administrative instruments were used. On one hand Zimbabwe authorities, due to the chequered human rights past, manipulated these instruments to asphyxiate people's basic rights, to strangle opposition political space and to inhibit scrutiny of its management of the COVID-19 pandemic. On the other hand, administrative instruments used in Botswana were rooted in a long history of democratic practice and a human rights-based approach to development. Covid actually helped to strengthen that culture because despite the fear of the State of Emergency being used to deal with political opponents, it had patently been used as a legal instrument for the purposes of fighting the pandemic and protecting the people of Botswana from the possible disaster it could cause. Leaders

with a dictatorial leaning find opportunities to curtail people's rights, even in crisis, to entrench their power – the case in Zimbabwe – yet, democratic leaning leaders take even the most difficult and unpopular decisions to save their people even if it threatens their power-the case in Botswana.

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Social Media as a form of Digital Tool(s) and Academic Performance of University Students in Nigeria

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Abstract

The purpose of this article is to access the use of social media as a form of digital tools on the academic performance of undergraduate students of the University of Ibadan, Nigeria. The paper reviews the actual impact of the use of social media with student's classroom learning. The descriptive research design was utilized. Two hundred (200) undergraduate students purposively selected from eight faculties. The paper reveals that a great number of students are addicted to the use of social media and frequency use of social networks in digitalization tool becomes an integral part of the students' development which has resulted in improving students' academic performance. In conclusion, the paper reveals that the use of social media is part of digital tools that shaping and influencing how students lean and interact with their studies and also, with e-communication with peers this help a student to collaborate and discuss issues related to their academic studies. Social media have a dual impact on student achievement, and it is necessary to approach adolescents' use of social networks with ultimate positive responsibility. With the outcome of the findings, this paper recommends that the government and educational planners should improve the leisure, information exchange among learners, therefore, academic performance can be maintained. The researcher recommends that social media should be used for educational purposes as well, Social Networking Sites should be expanded and new pages should be created to enhance academic activities and avoid setbacks in the students' academic performance.

Keywords: *Social media, Academic performance, Digital tools, University students.*

Introduction

Advancement in Digitalization Technological tools has made education more flexible and changes to the ways and of teaching and learning in traditional classroom worldwide. Social Media platforms innovation has continued to remove communication difficulties and replace new digital tools in a way of connecting globally (Alonge, 2017).

The researchers, Govender and Kayode (2020) stressed out that the improvements in communication technology which has develop the scope of communication through Information and Communication Technologies (ICTs) which has turned the entire world into a global village. In particular, the internet has created a platform for millions of computers users who visited, on a daily basis, numerous sites in various countries, belonging to thousands of businesses, governments, research institutions, educational institutions and other organizations. 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. In other words, social media serves as an effective medium of dissemination of information through its social networking sites – Twitter, Yahoo messenger, Facebook messenger, Blackberry Messenger (BBM), WhatsApp messenger, 2go messenger, Skype, Google messenger, Instagram, iPhone and Androids. Asemah and Edegoh (2012) said that these networking sites are used by most people to interact with old and new friends, physical or internet colleagues. It closes the gap of distance

and eliminates geographical limitation of space among individuals.

This technological advancement continues to break communication barriers and replacing them with new methods of connecting global audience. With the enablement of technology, anyone who has access to the Internet can be connected through numerous accessible social media platforms, and mobile telephony and be able to communicate video calls and electronic conferencing with peers regardless of distance.

Social media has, thus, become an international trend and has spread its influence to almost every part of the world. Studies indicated that social media networks usually displaying strong user engagement and making it possible for users to connect with people across geographical, economic or political span (Alonge, 2017; Ratzan, 2014). With these advancements in the global usage of Information Technology Communication, and through the huge technological development, social networking sites are becoming more and more popular among students especially in developing countries such as Nigeria (Adaja and Ayodele 2013; Kayode, 2020). The use of social media sites has exploded and evolved into an online platform where people create content, share it, bookmark it and network at a prodigious rate. Because of its ease of use, speed and reach, social media is fast changing the public discourse in society and setting trends and agenda in topics that range from the environment and politics to technology and the entertainment industry (Asur and Huberman, 2010; Kauser and Awan 2019; Aba and Makinde, 2020).

Academic performance of students is one of the vital factors for evaluating educational quality among undergraduate in Nigeria Universities. This is as outcome of the knowledge and skills developed by students in their different course of learning. Previous literature revealed that academic performance is calculated using assignments, tests, attendance and final examination results with the standards of various universities and present modern society expect every student to be a higher accomplishment in their performances (Pitan, 2015; Garner-O'Neale and Harrison, 2013). Moreover, student performance dealings the aspect of behavior that can be observed at a precise stage to establish performance in which a performance test is conducted. The performance test will throw light on the capacity to deal with things rather than symbol.

According to Tess (2013), the researcher, supported that a direct relationship exists between social media and the academic performance of students in the Universities. On the other hand, technological evolution has resulted in dilemma has hindered of real values of life especially among students who form the majority of users interacting through the use of social networking sites. With so many social networking sites displayed on the internet, students are tempted to abandon their homework and reading times in preference for chatting online with friends. Previous studies report that many students are now addicted to the online rave of the moment, with facebook, twitter, whatsApp etc. and students are so engrossed in the social media that they are almost 24 hours online (Naveen and Nagesh, 2017; Camilia, Ibrahim, Dalhatu, 2013; Olubiyi, 2012).

Globally, the use of internet is the most important source of information. Since social media sites has been embraced in the 1990s, it seems that the academic performance of students is facing a lot of neglect and challenges in this digital age. The educational system is faced with so many challenges which have certainly brought about a rapidly decline in the quality of education in Nigeria, this has become source of be concerned to scholars, especially in the academic performance of students in the universities (Ebenuwa-Okoh, 2010).

The use of the social media among the youths of today is growing exponentially and gaining great popularity among students. Many students get addicted to the use of social media site as they continue to engage in one activity or another on the social media sites very often. Due to this increased popularity, there are growing concerns over the possible influences the use of social media could have on students' academic performances, and to explore some of the trending issues facing student's academic performance as a result of social media. As several studies demonstrate, the use of social media could affect academic performance of students negatively (Owusu-Acheaw & Larson, 2015) or could positively impact academic performance (Buhari & Ashara, 2014; Haseena & Rasith, 2016). In the light of the above, this study intends to investigates the impact of social

media networks on the academic performance of undergraduate students in faculties in the University of Ibadan.

The purpose of this study is to aims to question whether social media has any impact on student's academic performance.

Research Questions

The following research questions were raised for this work.

1. What are the available of social media platforms that students make use of?
2. What are the frequently used social media platforms among students?
3. What are the students' class activities on social media platforms?
4. What is the influence of social media platforms on student's academic performance.

Methods

The research design adopted for the study was a descriptive survey. The respondents of the study were the students from the University of Ibadan who were taken from different faculties and departments across the University as samples from the thousands of students who were officially enrolled in the session of the school year 2018 – 2019 and with split over that will graduate in 2020. The faculties involved in gathering these respondents include; faculty of Education, Faculty of Arts, Faculty of Science, Faculty of Public Health, Faculty of Social Sciences, Faculty of Veterinary Medicine, Faculty of Pharmacy and Faculty of Agricultures.

A total of 200 copies of the questionnaire were distributed to elicit responses from the students and retrieved on the spot by the researcher. After the collection, the researcher retrieved a total of 200 valid questionnaires.

Results

Table 1. Respondents' perception on availability of the Social Media Platforms for use in their Faculty

S/n	Items	Not Available	Fairly Available	Available
1	WhatsApp	2(1.0%)	14(7.0%)	184(92.0%)
2	Instagram	4(2.0%)	19(9.5%)	177(88.5%)
3	Google	6(3.0%)	24 (12.0%)	170(85.0%)
4	MySpace	155(77.5%)	29(14.5%)	16(8.0%)
5	Twitter	14(7.0%)	88(44.0%)	98(49.0%)
6	YouTube	15(7.5%)	57(28.5%)	128(64.0%)
7	Blogs	27(13.5%)	65(32.5%)	108(54.0%)
8	Forum group	34(17.0%)	63(31.5%)	103(51.5%)
9	Networking sites	43(21.5%)	46(23.0%)	111(55.5%)
10	Skype	54(27.0%)	52(26.0%)	94(47.0%)
11	Facebook	22(11.0%)	31(16.0%)	147(73.5%)

Source: fieldwork, 2019

The table above showed the level of respondents' perception on the availability of social media platforms for use in their respective faculties; 2(1.0%) of the respondents said WhatsApp is not available in their faculties, 14(7.0%) reported it to be fairly available and larger parts of them 184(92.0%) declared it available. Also, respondents proclaimed the availability of Instagram as follow: 4(2.0%) not available, 19(9.5%) fairly available and 177(88.5%) said it is available. Again, the majority 170(85.0%) declared that Google was available in their faculties, whereas just 24 (12.0%) reported it to be fairly available while 6(3.0%) said they don't have it. Research also confirmed that the larger proportion 155(77.5%) of the respondents asserted that MySpace was not available in their faculties while 29(14.5%) and 16(8.0%) of them alleged its availability in the faculties of their studies. From respondents' point of view, 98(49.0%) agreed that Twitter as social media devices was available in their faculties, 88(44.0%) of them also said its availability was fair on the other hand, 14(7.0%) affirmed its unavailability. Results further revealed that 128(64.0%) of the respondents

approved the availability of YouTube in their faculties while 15(7.5%) said they did not have this social media device in their faculties. Still, information gathered show that 108(54.0%) of the respondents established Blogs device present in their faculties but 27(13.5%) denied its presence in faculties. More so, appreciable number 103(51.5%) of the respondents affirmed the existence of forum group in their faculties in contrast, 34(17.0%) of them declared it not available. Moreover, results show that 111(55.5%) of the respondents ascertained the existence of networking sites in their faculties, whereas 43(21.5%) of them disapproved this claim.

In addition, 94(47.0%) of the respondents claimed that they have Skype in their faculties to work with, while 54(27.0%) of them maintained that such social media device did not available for them. In conclusion,147(73.5%) of respondents asserted that Facebook was available for them in their various faculties while 22(11.0%) of them denied the claim.

Table 2. Frequently used of social media platform by respondents

S/n.	Items	Frequently	Percentage (%)
1	WhatsApp	126	63.0
2	Face book	17	8.5
3	Instagram	32	16.0
4	Twitter	14	7.0
5	E-mail	1	.5
6	You Tube	10	5.0

Source: Fieldwork, 2019.

From the table above respondents indicated social media platforms which is 126(63.0%) of the respondents that used WhatsApp, 17(8.5%) used Face book, 32(16.0%) make use of Instagram, 14(7.0%) used Twitter, 1(.5%) used e-mail and 10(5.0%) used YouTube.

Table 3. Students' Class Activities on Social Media Platforms

		Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
1	I make use of social media platforms to share information with my classmates	66(33.0%)	87(43.5%)	21(10.5%)	21(10.5%)	5(2.5%)
2	I follow latest developments and trends in my course through social media	47(23.5%)	76(38.0%)	42(21.0%)	30(15.0%)	5(2.5%)
3	The usage of social media has helped improve my grades	30(15.0%)	65(32.5%)	63(31.5%)	35(17.5%)	8(4.0%)
4	Social Media has negatively impacted my writing skills	15(7.5%)	45(22.5%)	48(24.0%)	58(29.0%)	34(17.0%)
5	Engaging in academic forums on social media is not smooth for me	22(11.0%)	65(32.5%)	66(33.0%)	31(15.5%)	16(8.0%)
6	I prefer using social media to chat than for academic purposes	19(9.5%)	89(44.5%)	48(24.0%)	30(15.0%)	14(7.0%)
7	We have a social media group for some of my courses	48(24.0%)	109(54.5%)	22(11.0%)	15(7.5%)	6(3.0%)
8	Social media has improved my communication skills	43(21.5%)	66(33.0%)	52(26.0%)	31(15.5%)	8(4.0%)
9	I communicate with my lecturers through social media	45(22.5%)	74(37.0%)	42(21.0%)	24(12.0%)	15(7.5%)

Source: fieldwork, 2019

The Table above, discusses some respondents' activities on Social Media and their academic achievement. It is vividly indicated from the responses of the respondents as follow: 66(33.0%)/87(43.5%) strongly agreed/ agreed that they make use of social media platforms to share information with their classmates, while 21(10.5%)/ 5(2.5%) disagreed/ strongly disagreed over the statement. Once more, 47(23.5%)/ 76(38.0%) strongly agreed/ agreed that they follow latest developments and trends in their course through social media while 30(15.0%)/ 5(2.5%) of them disagreed/ strongly disagreed on the allegation. Moreover 30(15.0%)/ 65(32.5%) of the respondents strongly agreed/ agreed that the usage of social media has helped improve their grades on the other hand, 35(17.5%)/ 8(4.0%) disagreed/ strongly disagreed over the declaration.

In addition, results show that 15(7.5%)/ 45(22.5%) of the respondents strongly agreed/ agreed that Social Media has negatively impacted their writing skills but 58(29.0%)/ 34(17.0%) disagreed/ strongly disagreed on the matter. Results further show that 22(11.0%)/65(32.5%) of the respondents strongly agreed/ agreed that engaging in academic forums on social media is not smooth for them while 31(15.5%)/ 16(8.0%) disagreed/strongly disagreed about the proclamation. The larger proportion 89(44.5%)/ 19(9.5%) of the respondents strongly agreed/ agreed that they prefer using social media to chat than for academic purposes in contrary,30(15.0%)/ 14(7.0%) disagreed/ strongly disagreed about the issue. From the responses of the respondents, 48(24.0%)/ 109(54.5%) of the respondents strongly agreed/ agreed that they have a social media group for some of my courses15(7.5%)/ 6(3.0%) disagreed/ strongly disagreed on the topic of their discussion. 43(21.5%)/ 66(33.0%) of the respondents strongly agreed/ agreed, 31(15.5%)/ 8(4.0%) disagreed/ strongly disagreed that Social media has improved their communication skills. In conclusion, 45(22.5%)/74(37.0%) of the respondents strongly agreed/ agreed that they communicate with my lecturers through social media whereas 24(12.0%)/ 15(7.5%) disagreed/ strongly disagreed about this issue.

Table 4. Social Media Platforms and Students' Academic Performance

S/n	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
1	The use of Social Media has helped me to increase my CGPA	17(8.5%)	50(25.0%)	95(47.5%)	28(14.0%)	10(5.0%)
2	The use of social media has affected my CGPA negatively	9(4.5%)	36(18.0%)	71(35.5%)	54(27.0%)	30(15.0%)
3	Social Media is encouraged by lecturers as part of class engagements and assignments	22(11.0%)	94(47.0%)	58(29.0%)	17(8.5%)	9(4.5%)
4	I make use of social media to make new friends and for socializing more than I use it for academic purposes	42(21.0%)	86(43.0%)	45(22.5%)	19(9.5%)	8(4.0%)

Source: fieldwork, 2019

Reports from research revealed that 17(8.5%) of the respondents strongly agreed, 50(25.0%) that the use of Social Media has helped them to increase their CGPA, on the hand, 28(14.0%) of them disagreed and 10(5.0%) strongly disagreed to this claim. From the responses of the respondents, 9(4.5%) strongly agreed, 36(18.0%) agreed, 54(27.0%)/30(15.0%) disagreed/ strongly disagreed that the use of social media has affected their CGPA negatively. Information gathered show that 22(11.0%)/ 94(47.0%) of the respondents strongly agreed/ agreed, 17(8.5%)/ 9(4.5%) disagreed/ strongly disagreed that Social Media is encouraged by lecturers as part of class engagements and assignments. Concisely, 42(21.0%) of the respondents strongly agreed, 86(43.0%) agreed that they make use of social media to make new friends and for socializing more than they use it for academic purposes while 19(9.5%) disagreed, 8(4.0%) strongly disagreed over this prove.

Conclusion

As the results of finding of this research work, the researchers concluded that Social Media Network tools can enhance and improve the teaching and learning in this digitalization with positive use among students to enhance their class activities and academic performance. This applies to all faculties in the university that have been studied.

Discussion

The result from the findings of this study showed that, though social media platforms have both and negative and positive effects on students such as lack of privacy, distracting students from their academic work, taking most of their productive time, and such like, they also have benefits and can be used appropriately if well managed. For instance, students can create online communities where they can plan for a project, have group discussions about class materials or assignments, or make use of the Social networking sites (SNS) as a way to keep in contact when a student who has been absent needs to be updated on current academic information. The results of this study suggest that lecturers should come up with a template on how their students can maximize the benefits of social media platform, that faculty management should incorporate rules and regulations on the use of the social media in the lecture rooms and, that the government should put in place adequate operational measures to regulate their use among students. This paper concluded that the use of social media platforms must be guided by the educator to students.

Conclusion/ Future Steps

Findings and results of this paper, the researcher concluded that use of social media must be guided by the educator to students in order to improve the academic performance of students in teaching and learning in traditional method. The first independent variable influencing the academic performance of students, that is, social media participation was negatively related with students' outcome, while the other independent variables were positively related with students' outcome. The results of this study suggest that lecturers should come up with a template on how their students can maximize the benefits of Social media and also faculty management should incorporate rules and regulations on the use of the social media in the lecture rooms and, that the government should put in place adequate operational measures to regulate their use among students during class lecture. And this applies to all the faculties in the University of Ibadan that have been researched.

The management of the university should encourage teaching and learning in the area of digitalization tools to influence the use of social media platforms on the students' academic performance especially those in traditional classroom learning.

Also, social media platform devices should serve as blended learning in the teaching and learning in this digital age and new normal.

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Digital Integration into the Nigerian Educational System: Challenges and Prospects

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Abstract

In the last ten years, there have been conscious attempts by every nation to integrate digital tools into their educational system especially at the tertiary level. Nigeria is no exception. The policymakers in Nigeria at the federal and state levels have felt the need to integrate Information Communication Technology (ICT) in their educational policies. It is felt that in this globalized world the country must embrace digital technology to enhance support teaching and learning environment. It is the belief that in the present globalized world every nation should embrace digital technology to be competitive and also have knowledge-based society as well as information society or as Castells, (1996) has put it "Network Society" and also Perevozchikova, et.al. (2020). The COVID-19 pandemic has also made it imperative that countries should advance towards e-learning. The future of education is therefore intertwined with Information Communication Technologies (ICTs). The Nigerian government has realized that the new normal or post-COVID-19 pandemic environment has made the traditional method of teaching and learning outmoded.

It is therefore in this regard that most policymakers in Nigeria are advocating an advance towards ICT hence there is what we can call paradigm-shift in terms of teaching and learning in Nigeria now. This paper discusses the Nigerian guidelines on digital education highlighting the challenges and the prospects of digital education. It concludes that digital education must be embraced because the post-COVID-19 pandemic has made it impossible to continue with the traditional mode of teaching/learning.

Keywords: *Digitalization, Education, E-learning, Globalization.*

Introduction

In recent years every nation has realized that Information Communication Technologies (ICTs) are important in all spheres of life of the society. Information Communication Technologies (ICTs) have become the most important factor in the rapid development of any society. History, it is asserted, has proved this in terms of countries that have developed rapidly because of their technical skills in ICTs. Globalization has been made possible by Information Communication Technologies (ICTs) which has triggered in an unparalleled way the shrinking of space and time in the world today. Modernity has become associated with information technology. Globalization has been defined in various ways but Giddens (1990) is probably the most appropriate definition which captures the process of globalization. He conceives the process of globalization as the interdependence of world societies in such a way that technology is the most singular factor that has propelled this process of globalization. This conception of globalization is also expressed by Hosen, (2020; Ivanov, 2020; Jameson, 2015; Appadurai, 2005; Lyotard, 1979; Conley, 1977). In each nation of the world today there is an awareness and appreciation of technologies as the most important factor for the advancement of society.

ICT has made the world highly dependent on knowledge produced by it in terms of information that can be accessed for socio-economic and political development. It is because of this that modern society has been characterized as a knowledge-based society. Some scholars have characterized this society as digital or information society which is an attempt to link it up with technology **(**Atoy, et.

al. 2020; Ayodele, 2020; Waheed, et. al.; García-Peñalvo et. al. 2017). These two concepts give us the idea that modern age is based on the accumulation of information which has a spinoff on society in terms of socio-economic and political development. Hernandez, (2017) defines knowledge-based society as the social transformation occurring in modern society and its impact on various areas of human endeavors. In another twist to the two concepts, Andalia (nd. cited in Hernandez) notes that there is a difference between knowledge-based society and the information society. He claims that information society is designated through information and communication technologies while knowledge-based society is anchored on a conception that conveys and stimulates its resources through the application of technological tools. The two concepts demonstrate that their origins and development stem from technological innovations and advances that are closely related to information communication technology. It is pertinent to note that technological innovation and advancement have been largely fostered or brought about in the field of education. Education has been the main agent of change in societies through technologies in the 21st century. It is in this regard that societies now give premium to information technologies in their educational system.

Most societies especially developed ones are conscious that technological innovations are important for society and hence they have a robust educational policy in the management of information technologies (Hernadez, 2017). Some developing countries like Nigeria have also become conscious of information technologies as an important factor in the transformation of society and have fashioned out a pragmatic educational policy in managing information communication technology in their educational system. It has been observed that there is a symbiotic relationship as earlier pointed out between technology and social transformation. It is in this sense that the connection between technology and knowledge has been seen as playing an essential role in societal development and transformation **(**Alaimo et. al., 2020; Valderrama, 2012). This connection between technology and education has implications for socio-economic development.

In knowledge-based society the impact of ICT is enormous. In terms of form and content, the changes wrought by ICT have had a multiplying effect to such an extent that the wider society has been permeated by the idea of ICT being the propeller of changes in socio-economic and political domains especially in developing countries like Nigeria.

Integration of Information Communication Technology (ICT) into the Educational System

The integration of ICT into the educational system has gone beyond the technological tools which are used in the teaching of students. It has made the learning process to go beyond the traditional teaching method. The technological tools have helped in imparting knowledge much better than the old methods. The Nigerian national implementation guidelines for ICT in education define Information Communication Technology (ICT) as "the art and applied sciences that deal with data and information. It encompasses all (equipment including computational machinery – computers, hardware, software, firmware, etc., tools methods, practices, processes, procedures, concepts, principles, and the sciences) that come into play in the conduct of the information activities: acquisition, representation, processing, presentation, security, interchange, transfer, management, organization, storage, and retrieval of data and information" (NIGICTIE, 2019). These tools started with the emergence of calculators, voice recorders, television sets, etc. But there are many more advanced tools now - computer, World Wide Web (www). Wang, 2020 defined "web as a series of interconnected documents stored on computer site or websites."

The use of the internet facilitates e-learning within the educational system. The internet relay chat includes some components that is been used to communicate globally such as Zoom, Skype, Google Meet, and Microsoft Team. Some other internet tools which allow people to exchange ideas with each other through the internet are e-portfolios, cyber infrastructures, digital libraries, and online learning object repositories, etc. There are also e-modules which are written and could be converted and stored into a digital

version and transferred into a computer using word processor accessible by the user through the internet. All these technologies are tools that are deployed now in education. They are also used in teleconferencing – audio conferencing involves a live exchange of voice messages over a telephone network and still images such as graphs, diagrams, or pictures. There is also video conferencing which makes it possible for showing moving images as well as voice and graphs. Video conferencing technology does not use telephone lines but either satellite link or telephone network. The next one is web-based conferencing and it is as the name implies the transmission of text and graphic, audio and visual media through the internet. It requires the use of a computer attached to a browser and communication can both be synchronous and asynchronous. All these technologies play a greater role in education by improving the quality of education. With the COVID-19 pandemic which is ravaging the world now, it is impossible to have the traditional face to face conference hence institutions have resulted in teleconferencing. Zoom is mostly deployed now. Zoom is a web-based video conferencing tool with a local, desktop client and a mobile app that allows users to meet online and collaborate with or without video. Zoom users can choose to record sessions, collaborate on projects, and share or annotate on one another's screens, all with one easy-to-use platform.

Education is now regarded as the fulcrum of social change. In this regard societies all over the world lay much emphasis on the education of their citizens. They invest heavily in the education of their citizens. Education aids any nation in terms of its economy, social and political upliftment. It is therefore imperative for any nation that wants to develop to fashion its educational policies towards the development of its citizens as well as bringing about changes in all areas of human endeavors. It is also through education that knowledge is imparted which involves skills that can be used for the development of society. According to UNESCO, (2000), "Education refers to the total process of developing human ability and behaviours." It is an organized and sustained instruction in terms of learning designed or fashioned to communicate a combination of knowledge, skills, and understanding value for all activities of life. Education molds total humankind to solve his problems in life. It is also a tool through which they come to understand their environment and if necessary, change their environment for the better of their environment in the world. Fafunwa (2018) notes that education is "the aggregate of all the processes by which the learner develops abilities, attitudes and other forms of behaviors which are of positive value to the society in which he/she lives." He further claims that education is also a process of transmitting culture which allows for its perpetuity in space and time. Education also, according to Fafunwa, disseminates knowledge in other to ensure social control as well as guarantee rational control of society. Education could also be seen as a systematic procedure for the transfer and transformation of culture through both formal and informal methods of training people in society. It deals with the mental, physical, psychological, and social development of citizens. Education is also conceived as an institution that makes individuals think freely and rationally which enables social progress and innovations to be possible (Kurilovas, 2020). Social progress and innovation are the key ingredients of how society has fared better in terms of its advancement to a higher stage of development. When progress occurs in any society its members can think freely and rationally and can, therefore, innovate which could impact society. From the above therefore it can be seen that education is a tool for social change.

Given the importance of digital technologies most countries have fashioned out a robust educational policy in their educational system hence they have to prioritize digital technologies. Nigeria is not an exception to this. It is realized by stakeholders or educational policymakers that digital technologies must be incorporated fully into the educational system. This is reflected in the policy on ICT by the federal government of Nigeria in their 9- 3- 4 educational policy which is entitled National Implementation Guidelines for ICT in Education henceforth called (NIGICTIE, 2019). It has vision and mission. The vision is "to make education universally accessible, empowering, inclusive and enriching". And the mission is "to meet the human capital investment of the nation for attaining and enhancing sustainable socio-

economic development, global competitiveness as well as the individual's ability to survive in a contemporary environment" (NIGICTIE, 2019).

The guidelines have seven major components which are:

Human Capital Development in terms of ICT

- Infrastructure
- Research and Development
- Awareness and Communication
- Governance
- Financing
- Monitoring and Evaluation

The objectives of ICT in education are spelled out in the educational policy on ICT. These are:

- To facilitate the teaching and learning processes.
- To promote problem-solving, critical thinking, and innovative skills.
- To promote life-long learning and advance knowledge.
- To enhance the various teaching/learning strategies required to meet the needs of the population.
- To foster research and development.
- To support effective and efficient education administration.
- To enhance universal access to information.
- To widen access to education and the range of instructional options and opportunities for any-where, any-time, any-pace and any-path learning.
- To promote the commercialization of ICT in education.
- To develop and support technical infrastructure that maximizes digital creativity, sharing, and innovation.

The policy thrust of the guidelines is geared toward making ICT relevant in the educational system. The policy thrust involves government:

1. Building and encouraging the development, utilization, and sustenance of the ICT manpower required to achieve an ICT-enhanced Education;
2. Establishing and sustaining a common ICT infrastructure platform for education at all levels;
3. Ensuring and encouraging Research and Development (R&D) in ICT generally and ICT in Education in particular;
4. Engaging in and encouraging regular stakeholders' consultations (including the Private Sector), sensitization of the learning community, public awareness and inter-governmental relations to achieve a broad-based consensus on ICT in education;
5. Providing appropriate legal, regulatory and security framework to ensure that ICT in Education and the conduct of related activities are focused on achieving ICT-enhanced Education;
6. Adopting innovative and creative financing models for ICT in Education.
7. Using Monitoring and Evaluation (M&E) as a veritable tool in ICT in Education for tracking policy implementation, efficient service delivery, and compliance (ibid).

All the objectives and policy thrusts are elaborated upon in terms of how to implement them. Strategies and sub-strategies are laid out on how to go about them. The strategies and sub-strategies are explicit and comprehensive. For instance, human capital development strategies are such that the government has to play a vital role. It is realized that there is a severe shortage of ICT skills and personnel. To improve this government has to encourage the development, utilization, and sustenance of the ICT manpower to achieve an ICT enhanced education. The strategies that should be adopted to achieve this are these:

1. Restructure the environment for teaching and learning as well as education administration to be ICT-enhanced.
2. Carry out and encourage the continuous and mandatory professional development of core ICT Teachers and Administrators.
3. Ensure appropriate ICT training including content development and delivery for all staff.
4. Review the curricula periodically to reflect emerging good practices in line with national goals.
5. Promote ICT proficiency in mass and non-formal education with a special focus on children, women, and people with special needs.
6. Develop and strengthen standards and guidelines for content and instructional materials in electronic media and the use of ICT tools in formal and non-formal education.
7. Strengthen and expand Open and Distance Learning as well as blended and e-learning.

8. Carry out a needs assessment to identify skill gaps and encourage the acquisition of appropriate ICT skills to mitigate the gaps.
9. Encourage private sector participation in Education and Training in ICT.
10. Encourage ICT education at all levels.
11. Ensure periodic quality assurance in the development, utilization, and sustenance of ICT in education.

Each of these strategies has sub-strategies on how to implement them. The second policy thrust which is on infrastructure notes that there is an inadequate ICT infrastructure in the country in general and in the education sector in particular. It is therefore realized that there is the need to provide the infrastructure required to attain improved ICT in education. The strategies to achieve these among others are:

1. Ensure adequate supply of ICT systems for access to software applications, local and international content, and online learning resources at all educational institutions and establishments.
2. Ensure that all educational institutions and establishments are interconnected to create a common platform that will facilitate the sharing of resources and reduce duplication. The platform will provide a secure network for administrative purposes as well as access to the Internet for instructional and professional development.
3. Ensure that ICT systems for education administration are in place and all necessary common infrastructures for the storage and management of the ensuing data are provided in all educational institutions and establishments.
4. Promote and encourage the design, development, acquisition, and hosting of indigenous content.

All the other objectives - Research and Development, Awareness and Communication, Governance have strategies and sub-strategies on how to achieve them. They are all intentional guidelines that stipulate what should be done to bring about the deployment and transformation of ICT in the education sector especially in tertiary education.

Challenges

One question that comes to mind is how digital education has fared in Nigeria since the guidelines were introduced in 2010. One can say that not much has been achieved. Nigeria has not become educationally advanced in ICT. There have been problems and challenges that have militated against the country becoming tech-society or network society, especially within its educational system. The ICT policies are comprehensive in scope and are mainly statements of intention the implementation of such an ambitious intention has not been achieved. Several physical and pedagogical factors have militated against digital education. These include lack of electricity and frequent power outages, poor technology infrastructure, low bandwidth, lack of internet connectivity, insufficient and inappropriate software, and insufficient human capital to impart these digital technologies, which means those with skills in digital technologies are insufficient in numbers. There are insufficient computers in schools in the country. Most computer labs are either not available or equipped properly. Moreover, there is a lack of technical know-how in terms of maintenance of the equipment. Turel & Johnson, (2012) have noted that technical problems constitute a major barrier to digital learning in most schools. This position is also corroborated by Nwanchukwu et. al. (2020); Shedden, (2020). The issues also involve virus attack and non-functioning printer.

There is also the issue of connectivity as earlier highlighted. Nigeria depends on an expensive satellite that cannot be sustained hence connectivity is not available. Two-way satellite connectivity is now widely available but its cost is prohibitively high hence Nigeria cannot afford that. No submarine connectivity can link Nigeria with other parts of the world especially Europe and America though in recent years efforts are being made to connect to SAT-2 and SAT-3.

There is also the question of funding. The Nigerian government has not sufficiently funded education generally not to talk of funding digital technologies in the educational system. The country has not met the UNESCO benchmark of 26% of Gross National Product (GNP) to fund education and this has affected digital education.

In all, there is a need to address the challenges of infrastructure, connectivity, pedagogical integration of ICT into the educational system in Nigeria.

Conclusion

Prospects of Digitalization in Learning: A Peep into Future Learning

The present state of the world with the COVID-19 pandemic is now imperative that traditional mode of education will have to be abandoned for a new mode of learning which involves the introduction of digital technologies into the educational system in all ramifications. Nigeria has to embrace the new normal in terms of post-COVID-19. This new normal has made certain learning imperative which is different from the way learning was conducted in the past. In other words, there is a kind of paradigm shift in terms of teaching/learning which involves digitalization. It is in this respect that Nigeria has to embrace this new form of teaching/learning in its educational system and because of this, it must gear up the digitalization of its educational system.

The Nigerian guideline policy on ICT is comprehensive in scope and with this new reality, it must be updated to match the present situation in terms of the pandemic. Some stakeholders in Nigeria have voiced this out that Nigeria has to embrace digital technologies (Ajiboye, 2020). Nigeria has to deploy digital technologies in its educational system so that it will meet up with the competitive globalized world.

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Virtual Teaching and Learning: The Sustainable Tools in Digitalization of Education

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Abstract

Virtual teaching and learning have been part of the integration of the use of technological tools in this digital age and new normal. The formation of a knowledge society and the digital storage of development of modern civilization culture still remain a continuous process in the era of virtual teaching and learning within the education system especially during this global pandemic lockdown. This article reviews the use of virtual teaching and learning as techniques to improve digitalization in the use of new e-tools in teaching and learning in Nigeria. To achieve this, the concept of virtual teaching and learning is reviewed with the intention of looking at its features in digital education. The benefits of virtual teaching and learning are many which include opportunity for timely and distance education, better interactions, easily accessible to learners; the lesson can be easily tracked and recorded. It was concluded that virtual teaching and learning had great significant impacts on digital education and proved to be a vital and sustainable tool in digitalization of education. This paper recommends that the government of Nigeria should improve on adequate provision of infrastructures which will aid the use of virtual teaching and learning at all levels of education system.

Keywords: *Virtual Teaching, Learning, Digitalization and Sustainable Tools.*

Introduction

Presently, the world lives in information communication technology age and many people especially students in higher education and their teachers depend on computer to carry out various responsibilities. Virtually all higher educational institutions are aware that the use of network technology can create, foster, deliver, and facilitate learning, and enhance both teachers and students experience and knowledge (Li, Qi, Wang and Wang 2014). The rapid developments and growth of information and communication technology have had a profound influence on higher education, this is called e-learning, which means that teachers and students perform teaching and learning task through internet, a way different with traditional classroom. Higher education systems all over the world are challenged nowadays by the new information and communication technologies (ICT) and new normal that arises from COVID-19. These technologies have had a huge impact on the world economy, corporate management and globalization trends, and they bear a tremendous potential to reshape the nature of study environments everywhere, of both conventional and online teaching institutions.

Online teaching and learning are the newest and most popular form of virtual education today. Within the past decade it has had a major impact on postsecondary education and the trend is only increasing. Online learning is education that takes place over the Internet. It is often referred to as “e-learning” among other terms. According to Sufeng and Runjuan (2013) Virtual classroom refers to courses offered through the internet. It is a teaching and learning environment located within a computer mediated communication system. It consists of a set of group communication and work spaces and facilities that can surpass that of the traditional classroom, a process in which students and teachers are actively involved in creating and carrying out learning activities together like group discussion, joint projects, and debates, sharing of solutions to homework problems by emails, bulletin boards, chat rooms and conferences. The development of technology and the internet is the basis of virtual teaching and learning. Furthermore, Sufeng and Runjuan (2013) stated that the virtual teaching

and learning possesses some of the characteristics of the internet which is what the traditional classroom does not have. For example, there is no limit of time, place, distance, and it is more convenient for both the students and the teachers to get more information from the internet. This seems to be the hope for both teachers and learners so as to overcome all the problems existing in the traditional classroom and many people even are trying to use as much as virtual technology as possible in the real campus. The differences between virtual classroom and the traditional classroom have been ignored.

As the coronavirus spread increases, schools are working hard to respond to potential health-care crises, schools are closings, and other issues that are arising on a daily basis. The question is how can institutions continue to offer instructions if they decide to close or to cancel traditional face-to-face mode of teaching? A growing number of schools are moving their classes online as a short-term solution. Many teachers have never taught online and also, technical support is often lacking. Also, question as whether an online-only model would penalize students who may not have access to digital tools or the internet. Still, many institutions are looking to online learning as a way to salvage students' education in the wake of the pandemic and they believe that we will have to live with it for some time is very alarming. A lot of thing must first of all be put in place before virtual teaching and learning coming in place. The first thing is that everybody is presumed to have access to internet and broadband especially those in less cities or rural areas. In addition to this is the technical support from the institutions. Are the institutions ready to support teachers moving from face-to-face teaching and learning to virtual?

In Nigeria, public institutions are still lacking behind in terms of supporting their staff technically and readiness to move to online for virtual teaching and learning. This is very important in sustaining digitalization of education now that we are the era of new normal. It is on this basis that this study looked into virtual teaching and learning as sustainable tools for digital education in Nigeria.

Virtual Teaching and Learning

There are various views and opinions about virtual teaching and learning but all points to the use of internet, computers etc. Some of the definitions of virtual teaching and learning include: Virtual Teaching and Learning is an e-learning concept whose definition and prime objective is to enable the teachers and the students to impart and perceive education online, principally over the Internet. It also allows teachers and students to communicate, interact and, work together with one another remotely from any location, without actually being physically present face-to-face, though, You Tube, Facebook, Zoom, Free Conference, Webinars, Audio and Video conferences, Web Presentations, Live streaming, Text chats, Learning Management System (LMS) and online training courses (www.edusys.co, 2020).

Another definition refers virtual teaching and learning system is an online system that allows education materials to be transmitted through the internet and transfer knowledge from organization to employee, or teacher to student. Various examples of virtual teaching and learning include but not limited to Degree Programme, video or audio lecture, webnar etc.

Furthermore, Beek, (2011) stated that virtual learning uses computer software, the Internet or both to deliver instruction to students. This minimizes or eliminates the need for teachers and students to share a classroom. Virtual teaching is a place where teachers are facilitators and students are actively engaged and interacting with one another, this is a place where students are comfortable and safe and still to learn. Teachers make use of all available means of online teaching to teach the students, also make sure that the classroom interactive. In the classroom, there should be teacher-student interaction, student-teacher interaction and student-student interaction. Virtual learning does not include the increasing use of e-mail or online forums to help teachers better communicate with students and parents about coursework and student progress; as helpful as these learning management systems are, they do not change how students are taught.

Beck (2011) enumerated several forms of Virtual learning to include:

i. *Computer-Based:* Instruction is not provided by a teacher; instead, instruction is provided

by software installed on a local computer or server. This software can frequently customize the material to suit the specific needs of each student.

ii. *Internet-Based:* This is similar to *computer-based* instruction, but in this case, the software that provides the instruction is delivered through the Web and stored on a remote server.

iii. *Remote Teacher Online:* Instruction is provided by a teacher, but that teacher is not physically present with the student. Instead, the teacher interacts with the student via the Internet, through such media as online video, online forums, e-mail and instant messaging.

iv. *Blended Learning:* This combines traditional face-to-face instruction, directed by a teacher, with *computer-based, Internet-based* or *remote teacher online* instruction. In effect, instruction comes from two sources: a traditional classroom teacher, and at least one of the forms of virtual learning described above.

v. *Facilitated Virtual Learning:* This is *computer-based*, *Internet-based* or *remote teacher online* instruction that is supplemented by a human "facilitator." This facilitator does not direct the student's instruction, but rather assists the student's learning process by providing tutoring or additional supervision. The facilitator may be present with the learner or communicating remotely via the Web or other forms of electronic communication.

vi. Similar forms of virtual learning are sometimes grouped into broader categories (Beek, 2011):

vii. *Online Learning*: This is any form of instruction that takes place over the Internet. It includes *Internet-based* instruction; *remote teacher online* instruction; and *blended learning* and *facilitated virtual learning* that involves these two virtual learning methods. It excludes *computer-based* learning.

viii. *Full-Time Online:* This is online learning with no regular face-to-face instruction or facilitation. It is *Internet-based* and *remote teacher online* learning only, though it may include some occasional interaction with human teachers and facilitators.

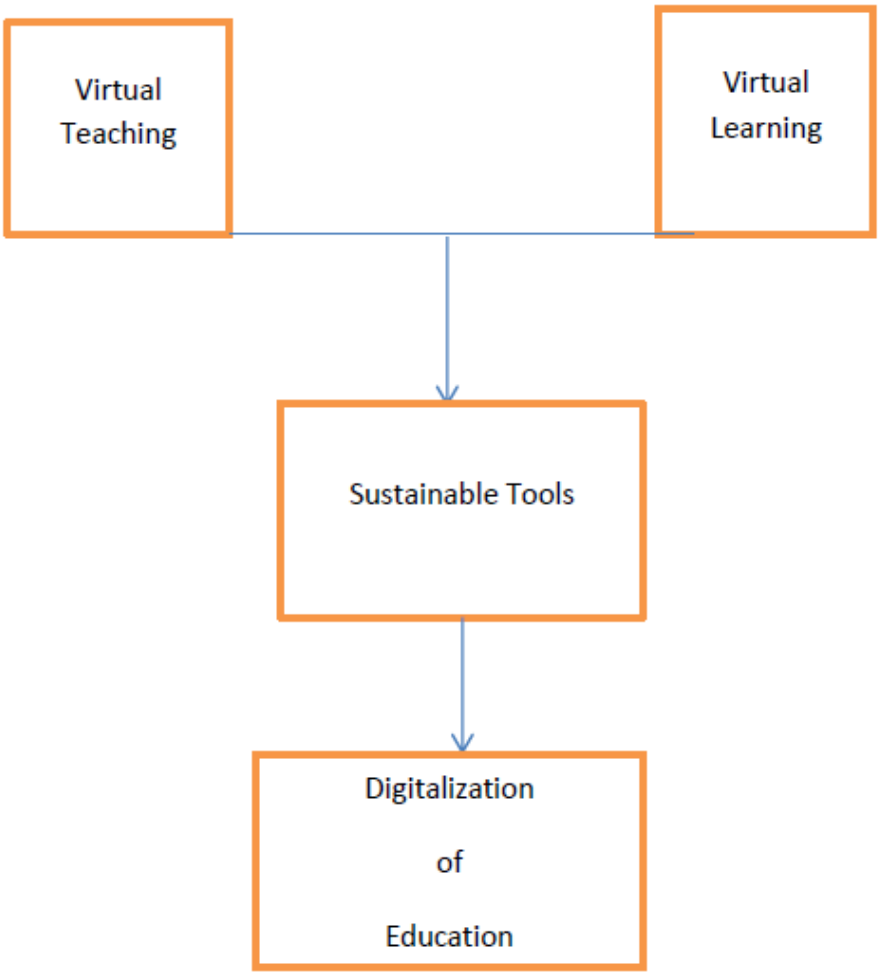

Figure 1. Conceptual Framework of Virtual Teaching and Learning for Sustainability

Components of Virtual Learning

Some positive features of virtual teaching and learning include being mobile accessible and self- spaced which are more convenient within any location. Its content came in variety of modalities such as:

E-learning Video: teacher recording the teaching on videos and send to students to watch. Students can watch repeatedly for better understanding.

Animated Course Content: It is the use of art and technology to bring images to life, by implementing design and computer software. Animation is the technique of using successive drawings or other art to simulate movement.

Interactive Game: interactive is action and communication between two people or two things, such as two-way communication. An example of an interactive game is one in which you communicate with the game and the game gives feedback back based on what you said or did.

Online Activities: Online interaction by end-users with other end-users, this includes the sharing of user content within the gameplay or online environment of Licensed Products with online elements such as PlayStation Home, the virtual, interactive community of PSN etc.

Online Instructor: These are school teachers who teach classes over the internet. They share many of the same duties as a traditional in-person instructor, but connect to their students through email, message boards, video chatting, and other online communications tools.

Many online teaching positions are being filled by part-time instructors. Many colleges and universities have found that this helps to reduce some administration of benefits and pay.

Digital Education Tools for Teaching and Learning

Many digital education tools have been created with the purpose of giving autonomy to the student, improving the administration of

academic processes, encouraging collaboration, and facilitating communication between teachers and learners. According to Chauhan (2018), digital education tools include the following:

Edmodo: is an educational tool that connects both the teachers and students, and is assimilated into a social network. Teachers can create online collaborative groups, administer and provide educational materials, measure student performance, and communicate with parents, among other functions. Edmodo has users who connect to create a learning process that is more enriching, personalized, and aligned with the opportunities brought by technology and the digital environment.

Socrative: designed by a group of entrepreneurs and engineers passionate about education, it is a system that allows teachers to create exercises or educational games which students can solve using mobile devices, it can be smartphones, laptops, or tablets. Teachers can see the results of the activities and use it modify the subsequent lessons in order to make them more personal.

Projeqt: is a tool that users you to create multimedia presentations, with dynamic slides in which interactive maps, links, online quizzes can be embedded in it. Also, Twitter timelines, and videos, among others. During a class session, teachers can share with students' academic presentations which are visually adapted to different devices.

Thinglink: allows educators to create interactive images with music, sounds, texts, and photographs. These can be shared on other websites or on social networks, such as Twitter and Facebook. Thinglink offers the possibility for teachers to create learning methodologies that awaken the curiosity of students through interactive content that can expand their knowledge.

TED-Ed: is a platform that allows creating educational lessons with the collaboration of teachers, students, animators, generally people who want to expand knowledge and good ideas. This allows democratizing access to information, both for teachers and students. On this platform, people can have active participation in the learning process of others.

cK-12: it seeks to reduce the cost of academic books for the K12 market in the United States and the world. To achieve its objective, the platform has an open source interface that allows creating and distributing educational material through the internet, which can be modified. It contains videos, audios, and interactive exercises. It can also be printed and comply with the necessary editorial standards in each region. The books that are created in cK-12 can be adapted to the needs of any teacher or student.

ClassDoj: is a tool to improve student behaviour. Here, teachers provide their students with instant feedback so that good disposition in class is 'rewarded' with points and students have a more receptive attitude towards the learning process. ClassDojo provides real-time notifications to students, like 'Well Done David!' and '+1', for working collaboratively. The information that is collected about student behaviour can be shared later with parents and administrators through the web.

eduClipper: this allows teachers and students to share and explore references and educational material. You can collect information found on the internet and then share it with the members of previously created groups, which offers the possibility to manage more effectively the academic content found online. This improves research techniques, and has a digital record of what students achieved during the course. Furthermore, it provides the opportunity for teachers to organize a virtual class with their students and create a portfolio where all the work carried out is saved.

Storybird: aims to promote writing and reading skills in students through storytelling. Using this tool, teachers can create interactive and artistic books online through a simple and easy to use interface. The stories created can be embedded in blogs, sent by email, and printed, among other options. With Storybird, teachers can also create projects with students, give constant feedback, and organize classes and grades.

Animoto: is a digital tool that allows you to create high-quality videos in a short time and from any mobile device, inspiring students and helping improve academic lessons. The Animoto interface is friendly and practical, allowing teachers to create audiovisual content that adapts to educational needs.

Kahoot!: is an educational platform that is based on games and questions. Through this tool, teachers can create questionnaires, discussions, or surveys that complement

academic lessons. The material is projected in the classroom and questions are answered by students while playing and learning at the same time. Kahoot! promotes game-based learning, which increases student's engagement, also, creates a dynamic, social, and fun educational environment.

Importance of Virtual Teaching and Learning

The emergence of virtual teaching and learning as a result of the new normal has been faced with some challenges. In spite of these issues, its advantages are numerous. They include:

i. It is more open: This is one of the biggest advantages of virtual teaching and learning. Students can register a course without the limitation of time, place, age and other factors. Student can learn in the morning, afternoon, or at night. You can work while you attending the virtual classroom and learn whatever you like. It is cheaper. You can save boarding fees, cost to travel to-and-from the campus.

ii. A good way to develop students self-learning ability: The students in virtual teaching and learning have to learn how to begin their learning, how fast they can go and how to solve some of the problems by themselves. These are really helpful to develop their learning ability. And the students become the main body of learning process. They can learn faster if they can. It is good for individual development. And if they foster the self-learning ability in the virtual classroom, they will benefit from it for all their life.

iii. Enhanced Learning: Research shows increased depth of understanding and retention of course content; more meaningful discussions; emphasis on writing skills, technology skills, and life skills like time management, independence, and self-discipline.

iv. Innovative Teaching: Student-centered approaches; increased variety and creativity of learning activities; address different learning styles; changes and improvements can translate to on-ground courses as well.

v. According to Jason (2001), students view the use of the virtual teaching and learning as an ease of accessibility. It is much easier with the information posted on the Web because it is available 24 hours a day. Distance learning courses can be done anywhere and at any time. Students can view this information without having to contact the instructor.

vi. Of the educational advantages of the virtual teaching and learning, the notion of distance acting as an actual aid to the teaching and learning is central and perhaps surprising. Instead of the technology solely acting as a barrier, it simultaneously seemed to force the users to be pragmatic in their actions and alter their behavior accordingly. Teachers and pupils who normally had difficulties in controlling their teaching and studying acts gradually found that the new learning environment required them to develop novel ways of teaching and learning. They found that they patiently had to wait their turn, speak more clearly, moderate their accents and plan more carefully what they were going to present. Both teachers and pupils had to adapt to the mediated interactions that required everyone to present their points quickly, precisely and audibly for the benefit of everyone and not just for the local classroom (Husu, 2000).

vii. Another educational advantage lies in the intellectual and social partnership created by technology of the virtual classroom. Pupils using the equipment engaged additional social skills when they spontaneously took leadership roles in relation to other pupils (Husu, 2000). The technology used increased group cohesion and mutual support especially in the remote classroom. Its suitability for small-group work and its interactive mode both contributed to the development of skills using information and communication technologies.

viii. Communication is considered a benefit because most contact with instructors will be done via email, messages can be sent at any time day or night. To the teacher the fact of everything being digital is an advantage. Since all work is sent over e-mail, instructions are able to deal with students work in an easy manner. Since everything is typed the teacher no longer is faced with the challenge of deciphering handwriting.

Challenges of Virtual Teaching and Learning

One of the issues facing teaching and learning is epileptic power supply in Nigeria is a great challenge to virtual teaching and learning. There is hardly supply of electricity for 12hours a day. Most students cannot afford generating set. With this virtual teaching and learning becomes a problem. Also, cost of purchasing data for online teaching and learning is expensive. This can discourage the students as most of the students are not working. They still depend on their parents to purchase data for them. Unstable network connectivity also posed a great challenge to virtual teaching and learning in Nigeria. For example, if a student is online taking a course and there is network failure, such student will not be able to continue with the class or later get discourage if the network connectivity is not stable. Another persistent problem has been the factor of time. Teachers have expressed their displeasure about not having too much demand on their time. The use of the Internet causes many teachers to step out of their comfort zones because; Internet teaching goes against the traditional method of teaching. In order to capitalize on the benefits of the internet, teachers must first structure their material to fit the layout of the internet. This process does not happen overnight, it requires time, dedication, and some patience. They are required to adjust their curriculum to meet the standard requirement for providing the right resources for the users (students). It can require more time than teachers want exert or afford to give up. One teacher stated "It is like having unlimited office hours." (Tinker 1998). Traditionally, teachers have the flexibility of making their own office hours to fit their schedule. Online courses cause teachers to be on call twenty-four hours a day because students expect a prompt response or feedback when they send email.

Furthermore, time related issue deals with training. Training is obligatory especially to teachers who are not comfortable with computers or the internet. In order for the college to be represented professionally, teachers must undergo training. The more familiar the teachers are with the online service, the more effective and efficient their curriculum will be. Adapting non-online course to online courses can be arduous or challenging. Although many classes have performed well with the online course, there are other courses that has not. For example, the laboratory portion of a science class. Laboratory classes require a great amount of hands-on work. Online courses cannot offer the hands-on experience that an in-class lab could offer. This is not to say that some of the laboratory exercises can be done by the computer, because it can. However, internet cannot duplicate the hands-on approach students experience with an in-class lab (Brown 2001).

The lack of face-to-face interactions with other peers and the instructor can be a disadvantage for the students and professors. For instance, some students desire the immediate feedback from the professor, which they do not get online. When in class a simple homework problem can be resolved one-on-one easily with the professor, however online that option is not available. Mail and bulletin boards can also cause confusion to Internet learners. Some students often create the problem because they do not read emails and class bulletins. An abundance of emails can cause students to get behind in their course work. Internet students are put at a disadvantage when it comes to networking and forming new relationships. Students can get to know each other over the net however it does not replace the bond that is formed from face-to-face meetings. Ambiguous instructions are also a fallacy of internet-based learning. These issues are often easier to resolve in person rather than over the Internet. Procrastination is another problem that occurs with Internet based learning because the individual is not forced to stick with a set schedule. Therefore, a routine is often not developed and work is not completed in a timely manner. (Hiltz, 1997). Online learning poses new challenges for teachers. In some cases, achieving student success can be as simple as preventing student withdrawals from distance learning courses. Distance learning gives teachers the opportunity to teach their students both course content and how to become lifelong learners.

Importance of Virtual Teaching and Learning on Education

The use of technology as a productivity tool has a much longer history in business than in education. Online learning is often suggested as a means for improving educational outcomes,

expanding access at lower costs than conventional approaches or allowing talented teachers to focus on what they do best by automating or offloading more routine tasks (Christensen and Horn 2008; Christensen, Johnson, and Horn 2008; Moe and Chubb 2009; Olster 2010; Wilson 2010; Wise and Rothman 2010). A review of the literature was conducted to gather empirical research that provides evidence of actual productivity impacts when online learning is compared with place-based instruction in secondary schools. However, the available research base was found to be lacking because studies did not adopt rigorous methodologies or did not provide comparable information about alternatives. Given the limitations of the research specifically regarding the costs and effects of online instruction for secondary students, the review that follows also draws on examples and research about the use of online learning for postsecondary instruction.

A review of this extended literature base suggests nine different pathways through which online learning might contribute to improved productivity. These nine pathways are not necessarily mutually exclusive. They are illustrated here through examples in order to demonstrate the kinds of tools and trade-offs needed to realize productivity gains. Five address improving educational access and effectiveness, while four relate more directly to potential cost reductions.

1) **Broadening access** in ways that dramatically reduce the cost of providing access to quality educational resources and experiences, particularly for students in remote locations or other situations where challenges such as low student enrollments make the traditional school model impractical;
2) **Engaging students in active learning** with instructional materials and access to a wealth of resources that can facilitate the adoption of research-based principles and best practices from the learning sciences, an application that might improve student outcomes without substantially increasing costs;
3) **Individualizing and differentiating instruction** based on student performance on diagnostic assessments and preferred pace of learning, thereby improving the efficiency with which students move through a learning progression;
4) **Personalizing learning** by building on student interests, which can result in increased student motivation, time on task and ultimately better learning outcomes;
5) **Making better use of teacher and student time** by automating routine tasks and enabling teacher time to focus on high-value activities;
6) **Increasing the rate of student learning** by increasing motivation and helping students grasp concepts and demonstrate competency more efficiently;
7) **Reducing school-based facilities costs** by leveraging home and community spaces in addition to traditional school buildings;
8) **Reducing salary costs** by transferring some educational activities to computers, by increasing teacher-student ratios or by otherwise redesigning processes that allow for more effective use of teacher time; and
9) **Realizing opportunities for economies of scale** through reuse of materials and their large-scale distribution.

Conclusion

Virtual teaching and learning are becoming increasingly prominent in tertiary institutions. From this research it will be concluded that:

In this era of digitalization, the scope of virtual teaching and learning has increased, and is beneficial to students, teachers, professionals and also institution

Virtual teaching and learning have brought a positive impact in the lives of students and teachers. It has given an opportunity to take up additional courses along with their studies.

Online teaching and learning have helped the to ask students to study some part of syllabus online which do not require much of classroom instruction.

More comfortable than normal classroom teaching.

The quality of education has improved by online courses and even it has become easy for students to refer the content as per their leisure.

Recommendations

The following recommendations are hereby made:

- There should be stability of power supply

- Cost of purchasing data should be reduced drastically
- Network providers should improve on the quality of services to the citizens
- Education providers to provide feedback. Giving students frequent written and verbal feedback encourages efforts and positive habits
- Policy makers should promote formative and summative valuation of the students.

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Reinventing New Learning Model through Cultural Values and Transformational Education in a Digital Age

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Abstract

For some decades now, Nigeria's socio-economic and educational crisis has deepened in every sphere of life, a predisposition attributable to unprecedented challenges from new for technologies and interconnectivity. In existence now is a system of education that is no longer relevant globally, which translates to a paradigm shift in ways students want to learn and how teachers want to instruct. This has resulted in uncertainties of knowledge dissemination, transfer and sustainability. This paper holds the believe strongly that revisiting cultural and values-based education and adjustment to the digitalization process will lead to inclusive learning without boundary, development and transformation in human values. The main thrust of the paper is to re-design, using the qualitative approach, the curricular and courses to reflect activities for the mind, character, and technical skills formation, on a conceptualised tripartite of the three ''H'': Head, Heart and Hands for online education for positive changes. It is, therefore, expedient to state that the outcome of new models, education for positive change is attainable by using a digitalized formula that synthesizes the head, the hands and the heart. The paper concludes that an induced change in mind-set and borderless education for all will liberate the world from digital uncertainties. Thus, the paper recommends youth-centred real-life application project-based learning and education in human values for the transformation of society. This will help reduce the rigidity of the formal method and a wide range of resource requirements, thereby making it more effective and affordable.

Keywords*: New Models, Cultural values, Transformational Education Digitalization.*

Introduction

Recently, the whole world is faced with health and educational crisis due to an outbreak of coronavirus that has led to disruption in learning, total lockdown and causing panics and uncertainties in educational and economy sectors. This situation has been attributed to conventional education, lack of integration of telecommunication and computers, and poor access to the required and relevant information on the learning platforms. In operation right now is a combination of conventional and online education which may not be relevant for future learning due occasional insurge and unexpected global disasters such as COVID-19 pandemic, most especially, educational sector. There is evidence of disruption of learning and other vulnerabilities during the recent COVID-19 pandemic and this raises questions, panic and uncertainties about access to information and their suitability to learner's personal needs. Various researchers have been making deliberate efforts to ensure that they arrive at a more suitable form of education that is more flexible and capable of impacting positively on future learning but the search is still going on. Incidently, the world is faced with both digitalized and conventional forms of education, but the choice would have to be made on the most suitable mode to future learning. Digitalization of education is seen as a powerful trend of reformation, and modernization of global education. Conventional education, on the other hand, is known for its rigidity and bureauracratic (formal) structure which is limited in some areas (Agbata, 2020).

Meanwhile, amidst the search for possible strategies to sustain future learning, no solid solution has been found yet. Available facts on the ground are speculations and suggestions for further literature and empirical reaserch. However, this article advocates re-designing a new curriculum to incorporate online courses

and digital technicalities with a focus on education in human values program. Cultural and value-based courses will be integrated in the online curriculum. Courses on the digitalized curriculum would be made into audio and video cassettes and distributed to different social media and online learning platforms for the benefit of online learners. In addition, in the re-designed online curriculum, value-based courses are meant to expand consciousness and conscience of learners. This process will be manifested as the unity of head (thought), hand (action) and heart (word). Through this process, learners become aware of their inner selves and acquire competency in academic, mental, social and physical spheres of life, the society and the world as whole. And education in human values program would enable learners to improve themselves and finding solutions to questions and problems learners face in the society. The courses under this program will change the mindset of learners and elicit latent qualities hidden in both teachers and learners to transform and enable them function for a lifelong learning.

Argument in Support of Conventional Education

Despite general criticism, conventional education is still in operation with full impact to develop, protect, and preserve learning. The goal has not changed from transmitting to the next generation, those skills, facts and standards of moral and social conduct that adults considered necessary for the next generation and to establish a form of teaching that focused general information in other to cultivate cultural values in the society. During the period of discussions with colleagues about conventional form of education, some of the discussants confirm it to be effective and familiar to most people. Several benefits of conventional education as confirmed by another researcher are visible as it has been utilized by our fore- fathers, still relevant for all, especially, in the rural communities and because the world needed to function in all areas, it started in a traditional or conventional form that groomed all the current educationists, professionals, technocrats and world reknown leaders. It has driven, sustained and moved the whole world to the present level. Before emergence of digital technicalities, actual learning takes place physically and participatory under this form of education. Traditional learning is effective because it allows for the wide variety of interpersonal interactions as in the classroom, is this possible with online learning? Students working on assignment together, create rappour, love and unity, calloboration, sharing ideas towards communal goals, body language and think togrther to solve a problem while being monitored by teacher. Most of all, issues are always clarified through face to face interactions among learners, teachers and fellow mates in the traditional situation Some researhers also agreed on the relevance of conventional form of education despite for guest for digitalized one (Rispoli, 2020; Monnappa, 2019; Huson, 2011).

Above all, it offers solid opportunity for feedback because urgent questions are given responses with instant feedback. Learners enjoy active learning and instant feedback and nobody is left hanging or surfing internet for answers. Learners were able to develop interpersonal communication skills through face to face interactions and this is completely lacking in online learning. All educational activities are organized, managed and all rules and regulations are strictly adhered to, by all stakeholders. Time management, punctuality and discilpline are of prime importance. Unfortunately, social benefits like sweet memories of attending schools physically and socialisation are absent in online learning because there are no physical interactions between facilitators and learners. Also, extra-curricular activities, such as field trips and social activities, like sports, clubs and others cannot be enjoyed online. Although online learning is the global trend now, but the fact remains that conventional education cannot be completly replaced by digital learning. Most of all, it will be difficult to forget conventional mode because of physical interaction that takes place between the teachers and the learners, its habits and routines punctuality and discipline, these are the facts that makes it very memorable. Trust between learners and the teachers can only be attained by person to person contact and this level of intimacy cannot be developed in an online setting. Moreover, the system is less expensive and does not require compulsory electricty for computer use or unnessary burning of data to be on internet (Herman, 2020; Erstad, 2017).

Present-Day Education

There is complexity with present day education due to a combination of conventional and digital forms of education. In my opinion, what makes it complex is due to the fact both learning modes operate on different learning environments. Also, some researchers in the educational sector also agree that the conventional form has bureaucratic structure with series of limitations while the online one is digitalised, flexible, borderless and can take place anywhere without travelling across the globe, sailing through the sea, flying or driving through rigorous mountainous roads. Learnres who are education, students are able to have more control over what and how they learn and this method of learning is more effective. And this makes the society push for digitalized learning. Any form of education that overlooks the skill acquisition but lays emphasis only on certificates acquisition should be declared irrelevant because learners should benefit from their training. Conventional education relies only on acquisition/uploading of information, passing examinations, securing qualifications for future employment cannot be relevant to learners in fifty years' time. Some researchers are equally thinking along this researcher's line of thoughts as regards the current modes of education (Lessem, Adodo and Bradly, 2019; Saa- Aondo, 2019; Eastment, 2018; Jones, 2018).

Further, another problem associated with today's education lies in the fact that, it is highly secularised with too much emphasis on academic performance, equiping learners with only technical skills and passing examination to gain well paid jobs in this aggressive and competitive world without provision for overcoming natural disasters that may cause disruption of learning and closure of all levels of education. Again, it lacks certain courses synchronizes unity of thoughts, words deed and character formation, leading to negative attitude towards learning. In Nigeria, it is a fashionable thing for parents to send their children abroad to study any course without emphasis on the mind and character formation and skills that developed that inner potentials. Such children end up returning home with drugs, guns, ideas about rapping, kidnaping, cybercrime, greed as well as thirst for foreign ways of living. The following researchers also react to the forms of education currently in operation. (Ritchie, 1998; Danjuma et al, 2015; Alelseev, 2011).

Moreso, with this complexity of present-day education, students are no longer at ease with conventional learning because of available digital tools, access and suitable information on the social media and learning platforms. Students want to study and receive wages at the same time and this is only possible with e-learning. Some schools and employment sectors were shut down in the past six months exposing the fact that the present-day education has no provision for filling the gap in time of world crises or disasters. During the global shut-down, only online classes and courses were trending because of digitalization of such programs. Therefore, online which is also borderless education is recommended so as to accommodate online- work –study, real life and project-based programs. In the same vein, teachers want to instruct in a different way and incorporate online classes and courses like cultural and positive values necessary for mind, character and technical skills formation. In this case, the combiation of these two modes of education may not be relevant in the next fifty years. Monnappa, (2019), also lends credence to this idea.

As the whole world is yearning for a suitable system of education, redesigning an online curriculum to integrate education in human values program uniquely fills the gap. With provision of all- comprehensive education in the newly designed curriculum, it promises to be a complete programme with all components of a curriculum. And all courses would be captured within the new online curriculum, such as course contents, activities, techniques, instructional methodology, evaluation procedures and a training module. This would be a holistic pedagogy of instruction. The new curriculum suggests and promotes the integration of values with academic subjects and co-curicular activities and with relation to life's real situation through experiential learnings. (IDI/ Ukpabi, May, 2020).

Social Media Educational Platforms for Online Learners

Social media and other educational online platforms will play very crucial and significant roles in the newly redesigned curriculum

because all courses under education for human values program will be empowered on the social media platforms. Some of the known academic e- learning platforms include: Zoom meeting at a scheduled time, Google -Hangout, Learning management System (LMS), Digital Educational tools (DET) and a lot of others. These educational platforms are generally cloud-based soft-wares and both teachers and students are able to access all the digital tools that come as part of it, including interactive contents and virtual classroom, by logging in through a standard web browser (Rosell, 2020). Even facilitators would require planning skills as well as develop skills for capacity to lead motivate and mentor learners. Kalish (2020), in his contribution, lists online classes or Digital platforms capable of boosting facilitators' skills as follows: Youtube, Zoom, LinkedIn, Instagram and others. Alison, Udemy, Coursera, edX, Udacity, LinkedIn Learning, General Assembly, Skillshare, LearnSmart, Codecademy, Pluralsight, Adobe TV, FutureLearn and Academic Earth. Some of these classes are completely free while some are not. Those that more related to university classes include edX, Coursera, Elsevier, Alison, Udemy and so on. All the social media platforms, especially, the online classes would be integrated in the new curriculum (Pswarayi-Riddihough, 2019; Herman, 2020; Kalish, 2020)

Value- based courses will be recorded, videoyed and sent to some of the above-mentioned educational platforms. Those learning platforms harmonise conventional and online learning because they create alternative mode of learning for both learners and teachers in the society. The importance of integrating new technologies and education in human values courses in the Nigerian curriculum is to provide learners, both and teachers with different choices for academic advancement. Even online learners would be benefitting from self-development and interpesonal communication skills through such training programmes under Zoom meeting and other electronic workshops, seminars, symposium and so on. This is a better way of utilizing social media platforms and not to promote time wasting and lack of control over their usage. Future learners would be advised and discouraged against using these platforms for irrelevant intentions such as personal information, watching movies, playing games, just scrolling and just following people as done by the youths (June 21, 2020). Social media platforms will play positive role in attitudinal behaviours of citizens if utilized positively. Already, some of these platforms have been developed into learning and socio-economic activities, so many people have been networking, learn marketing, sell products, learn new skills therefore, leveraging on digital knowledge can be satisfying experience for everyone. Moreso, both the falicitators and learnres would benefit greatly from greater access on internet and social media platforms for improved efficiencey and self- transformation. The newly designed curriculum would be capable of re-awakening learners' conscience to act on what have been learnt, and the courses video would aid learners to practice and put the acquired skills into action in everyday activities (Agbata, 2020).

Concept of Education in Human Values

Education in human value program is to create the need for meaningful change in education for the future. It should be on records that the real classroom of the future will take place inside the minds of the students, whereever they happen to be. The whole world has been yearning for a system of value-based education especially for the young learners, hence**,** education in human values programme uniquely fills this gap. With provision of all-comprehensive education in the newly designed curriculum, it promises to be a complete programme with all components of a curriculum and all courses captured within the new curriculum, such as, course contents, learning activities, teaching techniques, instructinal methodology, evaluation procedures and a training module. This will be a complete and holistic pedagogy of instruction. The new curriculum will balance the integration of values with academic subjects and co-curricular activities and learners' will be able to relate teaching to life's real situation through experiential learning (Kalianna and Chandran; 2015; Herman, 2020).

Unfortunately, the actual role of education has been narrowed down to developing a manipulative intelligence in order to exploit human and natural resources. This has resulted in man's inability to meet inner aspirations. Above are some of the challenging experiences

in education today. Therefore, it is time to find solution to future learning because today's education only aims at making learners breadwinners and citizens but it offers no secret to neither happy life nor discrimination between real and unreal. But the truth must be told that education is not for a mere living, it is for a lifelong, a fuller, a more meaningful and for more worthwhile living. Although to gain employment is alright, but living a more honest, truthful, transparent, integrity and good quality life are the real goal of education. Above all, character formation and good conduct is the most important. Incidentaly, above few points are the missing links in today's education. Meanwhile, education in human values program model curriculum has been established in some schools in India, South Africa and few other countries but the program is yet to be introduced and integrated in the Nigeria's school curriculum. Education in human values has been acclaimed a model of excellence by the government of host the countries, this is why the program has been adopted by educational authorities in a country like Thailand. The program covers, formal, non-formal and informal education and capable of providing lifelong and transformation proces. These programmes will be adapted to suit local cultural aspiations as would be required by national and local educational authorities in a particular.

Judging from the current situation with COVID-19 in the world, re-designing of a new model of curriculum is a path way towards continuity of learning without hitch, panic, fear or disruption of learning activities. The reason is that learning will be personal and suitable information will be accessible. It is always best to adjust for quality education). In the view of Obama (2020), "Education is not a name of any degree or certificate that can be shown to others as a proof. Education is the name of our attitude, actions, langauge and behaviour with others in real life" Obama's view is in line with promoting education in human values as would be integrated in the new school model.The question is, what has education in human values has to with future education? The answer is a lot because the program is not just ordinary or secular education but an educational program that enlightens and brings out latent potentials in both teachers and learners. It represents an intergrated attempt to perfection of body, mind and soul but for it to be relevant to the future learners and the society it must be an intergral part of educational and societal progress (SSS Education in Human Values, 2020**).** Value-based courses that would go directly to the heart, would eliminates desire, greed, materialistic detachment but promote progress, mind and character formation that offers natural satisfaction, deflates ego and confer trianquility on individual and the society (stael, 1999; Ogundele 2012). (Shemis et al, 2020).

The Philosophy behind Education in Human Value Program

This programme draws upon philosophy of Educare and pedagogy of integral education which characterises Satya Sai education in human values, this is why the program maintains coherent because of philosophy of Satya Sai Education and Educare. Sri Satya Sai Baba of India is the founder of this Integral Education, meant to be education for human excellent with the aim of meeingt challenges of future education. Therefore, in the re-designed curriculum, consciousness will be expanded and conscience will be manifested as the unity of head, (thought), hand (action) and heart (word). Through this process, learners become aware of their inner selves and at the same time acquire competency in academic, mental, social and physical spheres of life, the society and the world as whole. Education in human will enable learners to better themselves better, feel more confidence about finding solutions to questions and probles learners' face in clasroom, home and the society. For complete balance of human beings, ability to synchronize thoughts, words and deeds will be developed for learners to learn how to use their mind for good thoughts, uphold truth, dignity and honesty because learners will be dealing with facilitators they have never met and may not see face to face. (Jones, 2018; Sathya Sai Institute of Education, 2017).

Meanwhile, the tripot stand of the unity of "Head, Heart and Hands" is to gaurantee that learners will master the arts of transfering their acquired skills to good deeds. This is the functioning of the Heart, Head and the Hands together and will be intergrated into the digital curriculum. This is known as 3HV and also referd to the harmony of Heart, Head and Hand. The goal of 3HV is the purification of heart. Therefore, education in human values

programme is the 3HV; where the first H is for heart, second H, for head and third H for the Hand. It is the harmony of the head heart and hands that symbolizes true human life. This harmony of head, heart and hands will enable the learners to creat good thoughts and think positively all the time. Emphasis will lie in mastering the relationship between expanded consciousness and manifested conscience and this relationship will act as the guiding force in life to monitor the activities of the mind during online learning. This is necessary because the mind is like the wind that blows both foul and sweet fragrance of this world. The mind brings both disappointment and hope to consciousness. This is why the mind must be trained and be guided to focus on good thoughts, words and deeds for better flow of information and individual transformation. And for balance of the five elements to enable learners experience peace of mind within (Oyovbaire, 1983; Shoda, 2020; Layiwola, 2020; 2020). (Wiana, 2019; Sathya Sai Institute of Sathya Sai Education, 2017).

Revisiting Popular Culture and Social Values

Culture is perceived as a set of patterns of human activity within a community as reflected in the customs, laws, dress mode, social standards, religious and traditional belief (Wikepadia, 2020). This paper holds the belief that, revisiting cultural and value-based courses in the new digitalized curriculum will lead to all-inclusive learning without boundary and will sustain it for years to come. Cultural values and positive attititudes are the elixir of life to help human beings grow and develop, and help create the future we want to experience for individual transformation. (Wikepdia, 2020). Integration of traditional culture and societal norms in the newly designed curriculum will elicit natural and positive values already inherent in every individual for application during the period of the online study. The curriculum will reflect the use of videos, audios, articles on value-based education and online short courses on social media platforms to enable learners advance their career at their convenience. Popular culture will strengthen African belief systems, and expose values and good qualities prevailent in African society in the form of music, genres in the society. The focus would be on the youths who are leaders of tomorrow. Unity is one of the African traditional values and a secret of African integration, social progress and service that will provoke societal change. But the citizens are like rusting mechines because they are no longer dedicated to work as they dream of wealth but priority is on materials welfare which can never lead to progress. Any culture that is at variance with the culture of the land and traditional customs is a culture of the metropolis. Unholy accummulation of power, wealth and fame, crime and corruption due to societal decadence will be reduced (Layiwola, 2019; Alekseev, 2013; Njoku, 2015).

Expectation of New Model

The paper reveals that integration education in human values program in the redesigned digital curriculum is a formular that will synthesize the head, the heart and the hands. This is to ensure individuals transformation and sustainability of future education. Education will become experiential, all incusive and more focused on youths because they will gain employable skills while in school, maintain positive attitudes and values that will help them function for life. The new model is expected to be multicultural in approach and in context to enable learners have required access to information. The outcome of incorporated digital, cultural and values-based courses will elicit innate abilities and inculcate societal values in the learners. Experts in the field of digital and values-based education will work hand in hand with the leaners for accessibility of suitable information. For instance, such courses would include; entrepreneurial ship to promote critical thinking and leadership and ethics will promote character formation. The model will be all inclusive for anyone interested in scaling all educational boundaries and bottle- necks associated with formal education. There will be no fear, panic and uncertainties for future because of poen access to education. Acquisition, storge and dissemination of knowledge, will be empowered by social media and other academic platforms and other online classes. Education sector would be migrated from traditional form to online/social madia platforms via/Zooms, Cloud and others. Educational institutions would have opportunity to maximize students' learning potentials to ensure enabling environment by providing all

the required digital technicalities to rule out any hitch in the online operations (Agbata, 2020).

Both teachers and learners would benefit from the new model because it would be flexible for courses and programs to be scheduled to fit into everyone's agenda (Wikipadia 2020. Online learning will **i**mprove academic performance, both young and old will benefit online degrees, virtual education will be repositioned and learners will no longer be affected by continued closure of schools. The vision of online ami at ensuring personalisation, collaboration and informal learning will be achieved. Online learners will perform better because they will no longer see their instructors as teachers but as facilitators, guides and mentors. They would also want to respect and abide by the instructions of their mentors and facilitators. This independent nature of self-explorations will turn students to be more responsible to themselves, their parents and the society as a whole. The following researchers in the field of online education have also added credence to the relevance of online education. (https://www.howtolearn.com; Rispoli, 2020; Barnett, 2004; Agbata, 2020).

Conclusion

In this position paper, i have presented the importance of re-designing a digital school curriculum for integration of cultural and value-based courses enhance access to required and relevant information for online learners. This will also improve, sustain and add value to digitalized teaching and learning. All lessons on cultural and value-based course will be recorded on a vedeo and send to some learning platforms for use by online learners. There will be a change in the mindset and characters of learners because the process will elicit all the latent virtues and potentials hidden in them. This is the reason why integration of cultural and value-based courses on the new digital curriculum for online users is proposed in this paper. It will also serve as a practical approach that would improve the quest for increased access to information and its suitabilty to learners' personal needs. Both learners and facilitators will benefit greatly from the new digitalized curriculum because the process will reveal their inner abilities and potentials. This will create a balance and flexibility in the society and will erase all forms of fears, uncertainties as a result of occasional insurgent and unexpected global disasters such as COVID-19 pandemics.

Recommendations

The Federal Ministries of Education and policy makers in Nigeria should initiate a national conversation with educational experts, brainstorm to upgrade National policy of Education and offer new education al applications and platforms for both schools and higher institutions for the benefit of online learners. Secondly the new online curriculum should incorporate value-based courses that will be used on social media platforms and other online classes to serve as access for online learners and future education. Thirdly, youths centered- real life application project-based learning should be created to enable online learners develop creative skills. This could be driven through Zoom, Cloud and other online academic platforms.

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Strengthening School's Management Capacity for Better Education Outcomes in Eswatini: Calling for a Paradigm Shift

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Abstract

This paper provides a critical analysis of the various competencies necessary for the development and training of effective principals in the light of the current school administrative and management practice in Eswatini. In order to provide a cadre of effective school administrators, it is important that administrators get equipped with a range of the essential administrative and management skills. The Eswatini education school system allows for ascendency into management and administrative positions without the requisite knowledge and experience. Promoted officers invariably tend to get presented with the learning-on-the-job kind of experiential management engagement. Yet the Principals and their Deputies are disproportionately critical in the facilitation and implementation of the current education reform processes. Furthermore, there seems to be rare if at all any occasions where they are assisted to deal with the "culture shock" in their new roles as Managers of schools — they are left to swim or sink on their own. This paper presents findings drawn from observations, experiential practice and interaction with some principals in the Manzini Region. It further suggests pathways for addressing the critical administrative and management gaps in the school education system. These include constructive utilization of pre-deployment capacity building forums, on the job training, supportive supervision, monitoring and evaluation for optimal educational outcomes.

Keywords*: Principals, Management, Administration, Development, Supportive Supervision, Monitoring, Evaluation & Educational Outcomes.*

Introduction

This paper endeavours to explore how school management capacity could better be strengthened in the Manzini region in Swaziland. The education sector from this country, drawn from anecdotal evidence, seems to point to the fact that the one area that has not been given prime consideration to improving the management capacity of schools is improving the leadership and management resources (the principals of schools) the country has in this regard.

According to Farkas et al (2001) the work of school principals grows in complexity, and demands multiply each year. This job exhausts experienced principals, hence new principals feel severely staggered. Smith (2002), in the same vein advances that leading is inherent in teaching. It can be regarded as the heart of the management process because it is by means of leading that planning and organizing is activated. Also, the quality of the achievements of the learners is determined mainly by the way in which the principals as the leaders execute their tasks.

Conceptual framework

The study was based on the concept that appointments and promotions into the office of the principal have inbuilt challenges within itself. The conceptual framework hypothesized that there are many challenges that principals, especially newly appointed ones in management of schools. These include misconceptions about school management, importance of delegation, teacher management and students' management as well as financial management-based challenges.

The independent variables were; school management, delegation of duties, teachers, students and finance. The intervening variables, included lack of specific administration skills, mismanagement of human resources, negative attitude and absenteeism. The dependent

variable was challenges principals face in their endeavour to provide quality education.

The purpose of this study

According to Taylor & Francis (2010) the education system is in the process of change and adaptation, and in order to understand the present position of education one should remember that the provision for education is taking place at a time when the present extent of change is far greater than that of the past. Against this background the purpose of this study is to investigate problems and challenges encountered by principals as school administrators. Furthermore, the study seeks to determine the effectiveness of school management by principals in schools in the Manzini Region. The study also seeks to determine the extent to which principals contribute to the attainment of educational goals in secondary schools. It is the debate of the authors that a study of the administrative process as well as managerial issues facing personnel at schools in the Manzini Region, may offer helpful recommendations concerning the improvement of school administration in the area concerned.

Statement of a problem

As the system of education in Swaziland is in the process of transformation, the principal is confronted with major administrative challenges and problems. Principals, in their role of administering schools, need to manage and lead students, teachers as well as parents in order achieve their main purpose, namely to be worthwhile institutions of learning. They appear to face challenges regarding guiding and enabling teachers to impart knowledge to learners, managing school finances, and harmonizing relationship with parents.

In view of the above observation the researchers want to assume that unless the problems, challenges and misconceptions are investigated, addressed and recommendations are made, school administration will remain a problem to the school principal and his management team, staff, parents and students.

Research questions

Main question

- How competent are principals in the management of their schools?

Sub-questions

- How effective are the schools managed administratively?
- How well is discipline maintained?
- How effective are the school finances managed?
- How is delegation applied in these schools?

The Multiple Roles of Principals' administration

The role played by the principal is a multifaceted one profoundly influenced by his/her knowledge, life experiences, values as well as skills both learnt and acquired. Traditionally, the principal resembled a middle manager as suggested in William Whyte's 1950's classic *The Organization Man* – an overseer of the educational operations in the school organisation., However, today, in this rapidly changing era of standards-based reform, outcomes based oriented learning, transparency and accountability, a different conception has emerged– one which draws lessons from contemporary corporate life to suggest leadership that focuses with great clarity on what is essential, and how to get it done.

Stein and Book (2000) bring clarity to the principal's roles when they enumerate a breakdown of some of the manifold individual tasks that the principal ought to carry out.

- Prepare a development plan, receive school monies, keep records of those monies, administering the school's budget, procurement.
- Cognisant of teachers' welfare, ensuring effective instructional supervision, teachers.
- Professional development.
- Monitoring student welfare, ensuring effective teaching and learning, admitting and placing students, ensuring that report cards are sent to parents.
- Administer the welfare of support staff.
- Attending meetings, acting as a resource person in the school, ensuring infrastructure of school development.

One may easily come to the conclusion that at various times, principals must be administrators, managers, diplomats, teachers and curriculum leaders, sometimes all within one school day. It is definitely a balancing act, and principals must be proficient in all of these areas, as well as able to fluidly move from one role to another. Figure

1, below presents a vivid view of the principal's role.

The US Congress (as quoted in Onyango 2001:2) stateshat:

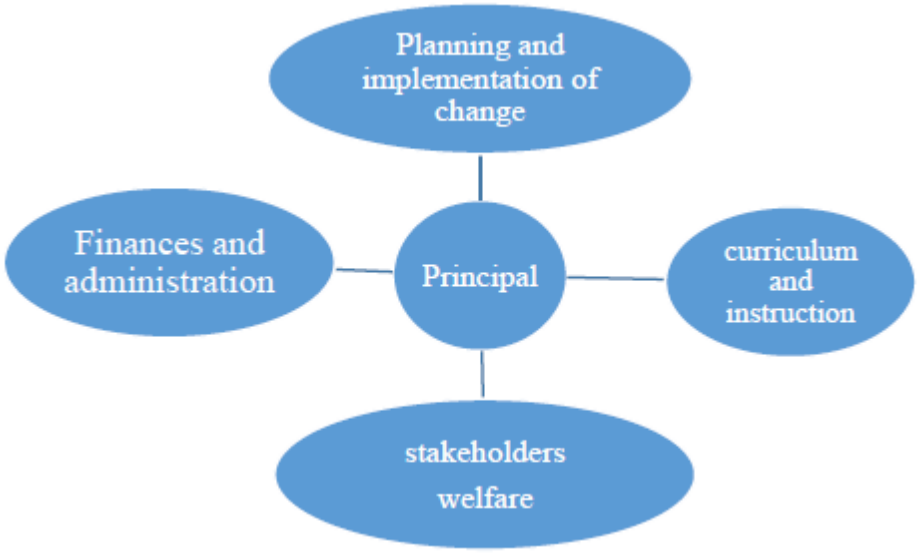

Figure 1. Role of a principal

In many ways the school principal is the most important and influential individual in any school. He /she is the person responsible for all activities that occur in and around the school building. It is the principal's leadership that sets the tone of the school, the climate for learning, the level of professionalism and morale of teachers, and the degree of concern for what the students may or may not become. The principal is the main link between the school and the community and the way he or she performs in that capacity largely determines the attitudes of students and parents about the school. If a school is vibrant, innovative, child entered place, if it has a reputation for excellence in teaching, if students are performing to the best of their ability, one can almost point to the principal's leadership as the key to the success.

Why principals fail to successfully execute their duties

There are several reasons why school principals fail to successfully implement curriculum reforms in their schools. These are discussed below:

Lack of change Knowledge

Sahlberg (2006) states that lack of understanding of change as the necessary condition for improved implementation of the new curriculum. Curriculum reforms and introduction of new approaches in teaching are usually full of good ideas that fail to be properly implemented. Sometimes the reforms are successful in one context and fail in another. This is, in most cases due to the lack of the understanding the insight about the process of curriculum changes and the essential ingredients that help in a successful curriculum implementation.

Lack of involvement

Principals need to be closely involved in the conceptualization and direction of curriculum reforms. Sahlberg (2005) argues that, for a long time the role of stakeholders, including principals was not seen relevant and necessary in the last twenty years. This lack of involvement of principals in the curriculum reforms means that they wouldn't be privileged with to know the changes affecting the curriculum, hence they would oppose all that is in the packages.

Curriculum change is not just about curriculum matters, but it affects other facets of schooling, including learning, teaching, administration and the culture of the school. In Eswatini the level of stakeholders' consultation varies with different reforms. If there is little involvement of principals in curriculum reforms, it will be difficult for them to properly plan for the reforms. Therefore, developing and implementing relevant activities for the new program might be a challenge, thus it will be hard to achieve the desired goals. For instance, nothing much was heard about the involvement of stakeholders when International General

Certificate of Secondary Education (IGCSE) was introduced in 2006 in Eswatini. The first few years of the introduction of IGCSE encountered some opposition from teachers and principals. This was because they didn't know level of demand the program required; it was learning on the job scenario.

Principals need to create an atmosphere that will make all the groups available in a school ready to meet the curriculum reforms. The climate is not only for the successful implementation of the reforms but also for breaking down resistance and turning limiting powers to facilitating powers.

Lack of a Conducive Climate



Figure 2. Critical considerations in school management for better education outcomes

Source: https://www.google.com/search?q=++Plan+Do+Act+Check&tbm

Methodology

This study employed the mixed research design to closely examine the competencies necessary for the development and training of effective principals who are able to lead and deliver worthy results. It also attempted to capture an overview of the current level of both teachers' confidence in their principals' ability to execute instructional leadership. It is in this premise that the researchers sought to collect data using closed-ended and open-ended questionnaires as well as in-depth interviews. Open-ended questions were also used for they give the respondents a chance to deliver rich information and not a fixed choice question. The questionnaire is chosen as a tool for it is cheaper in terms of finance and time as compared to other tools. Moreover, it covers a large percentage of the population. Face validity of the questionnaire and interview schedules was established by experts in Educational Administration Offices. These included officers from the inspectorate, college lecturers as well as other relevant education officers. The population comprised 30 principals from secondary schools, and 60 teachers. Simple random sampling was used to select the teachers from secondary schools in the Manzini region

Findings

Below is a table 1 that presents results of the questionnaire administered to teachers. 60 teachers participated in this survey and all of them were able to give feedback, and hence the table below.

Table 1 a. Teachers' perceptions on principals' ability on administrative and instructional supervision issues

Administrative role	*Strongly Disagree*	*Disagreed*	*Sometimes*	*Strongly* agree	*Agree*	*Totally Agree*
1.Principal and staff define goals and objectives	10 - 16.7%	13 - 21.7%	25 -41.7%	16 -26.7%	14 -23.3%	31/60 - 52%
2. Principal and staff work out a plan of school activities	5 - 8.3%	7 - 11.7%	11 - 18.3%	20 - 33%	17 - 28.3%	37/60 - 62%
3. Principal delegates administrative duties to staff members	8 -13.3%	10 16.7%	17- 28.3 %	8 - 13.3%	17 - 28.3%	25/60 - 42%
4. Principal keeps staff updated about policies	0 - 0%	5 - 8.3%	15 -16%	20 - 33.3 %	20 - 33.3%	40/60- 67%
5. Principal recognizes good teaching procedures	15- 25%	8 - 13.3%	14 - 23.2%	13 - 35,8%	10 -16.7%	23/60 - 38%
6.Principal experiments with teachers' suggestions	20 -33.3%	10 - 16.7%	11 - 18.3%	11 - 18.3%	8 - 13.3%	19/60 - 32%
7.Principal effectively solves staff problems	15 - 25%	16 --26.7%	11 -18.3%	10-16.7%	9 – 15%	19/60 - 32%
8. Leading in the school is democratic	17 -28.3%	18 -30%	15 -25%	9 -15%	1 2.-7%	10/60 -17%
9. Goals and objectives mutually established by staff and principal	10 -16.7%	15- 25%	17- 28%	10 - 16.7%	8 - 13.3%	18/60 - 30%
10. Teachers permitted to be innovative	9 - 15%	11- 18.3%	18 -30%	11 - 18.3%	11 - 18.3%	22/60 -37 %
11. Principal promotes a sense of belonging	9 - 15%	7- 11.7%	23- 50%	16 - 26.7%	5 -8.3%	21/60- 35%
12. Principal achieves status from staff	5- 8.3%	5 - 8.3%	12 -20%	18 - 30%	20 - 33.3%	38/60 - 63%
13. Principal establishes a climate conducive to effective teaching	5 - 8.3%	9 -11.7%	20 - 33.3%	18 - 30%	8 -13%	26/60-43.3%
14. Principal establishes communication channels	10 -16.7%	5 - 8.3%	23 - 38.3%	5 - 8.3%	17- 28.3%	22/60 - 37%
15. The principal provides instructional supervision	13 -21.7%	11 - 19.3%	16 - 26.7%	10 - 16.7%	10 -16.7%	20/60 -33%

18. Principal is acquainted with the school curriculum	13 21.7%	11 - 19.3%	16 26.7%	10 - 16.7%	10 16.7%	20/60 -33%
19. instructional leadership evaluated by principal staff	19 -31.7%	15 - 25%	11- 18.3%	6 - 10%	9 - 15%	15/60 - 25%
20. The principal solves staff problems	15 25%	14 - 23.2%	8 - 13.3%	13 - 5,8%	10 - 16.7%	23/60 – 38%

Table 1a. One notices that a majority of the teachers believe that principals do not value their input in the general running of the school. They believe that schools principals do not see them as relevant and participatory human resources in the school setting.

Table 1b. Teachers' perceptions on the principal's attitude towards individualised learning

Administrative role	**Strongly Disagree**	**Disagreed**	**Sometimes**	**Strongly agree**	**Agree**	**Total Agree**
21.Principal encourages individualized learning	15- 25%	15 - 25%	13 - 21%	7 -12%	10- 16.7%	17/60 – 28%
22.Principal encourages special programmes of methods for individualizing instruction	20-33.3%	17- 28.3%	11- 18.3%	4 - 7%	8 - 13.3	12/60- 20%
23.Principal provides material and psychological support for learners with special needs	19 -31.7%	15- 25%	11-18.3%	6 - 10%	9 -15%	15/60- 25%
24. Principal provide feedback on learners with special needs to parents	20 -33.3%	17- 28.3%	11- 18.3%	4 - 7%	8 -13.3%	12/60- 20%
Principal sensitize the community on inclusive education.	19 -31.7%	15- 25%	11- 18.3%	6 -10%	9 -15%	15/60- 25%

Table 1b presents a poor attention provided by principals of public schools towards individualised learning. Since we are teaching individuals, not groups of individuals, it is the function of the school within its budgetary, personnel and curricular limitations to provide adequate schooling for every learner no matter how much he/she differs from every other learner. This solely lies in the hands of the principal. The country has embraced inclusive education; hence it is the duty of every school to ensure that the common goal towards inclusion is achieved.

Below is a table that presents results of the questionnaire administered to school principals from thirty schools in the Manzini Region. A total of 30 principals participated in this survey and all of them were able to give feedback, and hence the table below.

Table 1 c. Principals' responses

Administrative process	**Strongly Disagree**	**disagree**	**Not Sure**	**Strongly agree**	**Agree**	**Total Agree**
1. You received orientation before assuming your position?	30 -100%	0 - 0%	0 - 0%	0 - 0%	0 -0%	0/30 - 0%
2. The Regional Education office gave you, your job description	24 - 80%	4 - 13.3%	2 - 3.3%	0 - 0%	0- 0%	0/30 - 0%
3. The MoET prepared you for the management and administrative Position	27- 90%	3 - 10%	0 - 0%	0 0%	0 0%	0/30 - 0%
4. You had management and administrative experience before your promotion	10- 33.3%	12 - 40%	0 - 0%	3 - 10%	5 - 16.7%	8/30 -27%

5. The Ministry has trained you on leadership since you have assumed your position	13 - 30%	6 -16.7%	0 - 0%	8 -26.7%	3- 30%	11/30 -37%
6. Principal and staff define goals and objectives	0- 0%	0 -0%	3- 10%	24 -80%	3- 10%	27/30 - 90 %
7. Principal and staff plan activities early in the year	2 - 6.7%	2 - 6.7%	5 -16.7%	11-36.7%	10 -33.3%	21/30 -70%
8. Principal and staff develop rules and regulations	0 0%	0 0%	0 0%	16- 53.3%	14 -46.7%	30/30 -100%
8. Principal and staff develop rules and regulations	0- 0%	0 -0%	0- 0%	16 - 53.3%	14 -46.7%	30/30- 100%
9. Decisions are taken in consultation with staff	0- 0%	0-0%	6 - 20%	13- 43.3%	11 -36.7%	24/30 -80%
10. Teachers are permitted to be innovative	0- 0%	0- 0%	8 -26.7%	12 -40%	10- 33.3%	22/30 -73%
11. Principal encourages strong relationship among staff	0 -0%-	0 -0%	0 - 0%	27 -90%	3 - 10%	30/30 -100%
12. Teachers share their problems and concerns with principal	5 16.7%	2 6.7%	10 33.3%	8 26.7%	5 16.7%	13/30- 43%
13. Principal provides Instructional supervision	0 - 0%	2 - 6,.7%	3 - 10%	10 - 30.3%	5 16.3%	15/30 - 50%
17. Principal consults staff before modifying curriculum	0 -0%	0 -0%	12 -40%	17 -56.7%	1 -3.3%	18/30 -60%
18. Principal facilitates learning and teaching	0 - 0%	0 - 0%	10 - 30.3%	17 - 56.7%	3- 10%	20/30 - 67%
19. Principal facilitates staff evaluation procedures	2 - 6.7%	3 - 10%	7 - 23.3%	13 - 43.3%	5 -16.7%	18/30 - 60%
20. Principal and staff establish evaluation procedures	2 - 6.7%	4 - 13.35	2 - 6.7%	15- 50%	12- 40%	27/30- 90%
22. Principal holds meetings proposed by teachers	4 - 14.3%	11 -36.7%	3 -10%	8 -26.7%	6 - 20%	14/30 - 47%

Table 1c. One notices that in the 22 questions to which principals were required to respond regarding their competences to manage schools, they disproportionately responded by stating that they were not sure. At other instances, the felt they had not been capacitated sufficiently to play their roles effectively and efficiently to attain the desired education outcomes.

Conclusions on the Findings

In most developed world countries like America, England, Sweden and Australia preparation and development is formally institutionalized with colleges offering training for principals before and after appointment. The preparation and development are well structured and systematic in the sense that aspiring principals are prepared for school leadership before appointment and then continuously developed after appointment to enhance performance in their administrative duties.

In Africa, preparation and development of principals is not as entrenched into the systemic processes of the education policy design as it is in the developed countries. In most cases, it is either lacking or not formal (Bush & Oduro, 2006). In Eswatini, however, principals are appointed into positions not necessarily because of relevant training for the position but the focus is placed on teaching experience and corresponding experience as deputy principal of a school. It is also common for most aspiring principals to be driven by the benefits that come with the package of being appointed principal (Naidoo 2006).

In view of the findings of Table 1 one may come up with the following conclusions:

1. There is evident lack of ability to unify the stakeholders and ably execute all their duties, hence this leads to poor management and poor relationships with teachers, learners and parents. The most common factor leading

towards this failure being the inability to recognize their position requires them to serve rather than to seek to be served.

2. Principals are rated low on caring relationships in schools. Poor and unhealthy relationships hinder the teaching and learning process for they result in poor co-operation between the parties involved. When results are bad especially the externally examined classes (Form 3 or 5), principals tend to blame teachers for low pass rates, teachers blame learners for not studying, and learners blame principals for poor management and teachers for not teaching.

3. Delegation of responsibility to teachers and other staff in the school relieves the principal from many pressures of work. Without effective delegation by school principals, cases of inefficiency, disharmony, and a poor working environment could result in poor school performance. Many principals still believe that if they promote participative management, their roles will diminish drastically with respect to power, control and authority.

4. Many teachers feel stuck in a dead-end position with few opportunities for growth or expectancy of reward. Keeping teachers motivated once they are in the profession is a growing problem. Job stress, alienation, feelings of ineffectiveness in the classroom and frustrating working conditions all contribute to this lack of motivation. It is the duty of the principal to ensure staff development in his/her school in order to keep his/her staff motivated and goal driven.

5. To learn well students, need high quality instruction and a well- crafted curriculum and they benefit most from positive and effective school leadership.

6. Principals are finding it increasingly necessary to make choices and decisions, often with far-reaching consequences. The problem is that they are not always sufficiently equipped to make carefully considered decisions in meeting situational demands.

7. An effective and creative performance of task depends on the extent to which individuals manage to hold their own demands successfully, both professionally and personally.

Conclusion

This study has attempted to determine the principals' capacities and roles as school administrators in the secondary schools of the Manzini Region. The need emerged from the researchers' concern about the radical change that is currently taking place in the Eswatini education system. This concern is clearly articulated by Whitaker (2003), who maintains that schools are undergoing radical changes in the manner in which their business is conducted. One of the most significant elements in this is that the leadership and administration in schools should be seen as the most crucial focuses for institutional development and growth in the years ahead. It should be remembered that school administration is a wide-ranging process and it needs principals to understand their roles and primacies. It is necessary that an administrator knows and grips the mechanisms of his/her institution. The findings indicated that in many instances' stakeholders' involvement is limited.

This is opposed by Tofller (1980), who argues that it will be necessary to release ourselves from the myth of authoritarian efficiency which attaches so much importance to the small group at the top of the organizational hierarchy to provide all the direction, supply all the answers and exercise all the control; which has the effect of missing the capacity of others in less senior positions to offer their capacities and creativity. However, no school is a perfect environment and school managers need to focus centrally on teaching and learning as the core purpose of education, through becoming a learning organization. The role of principals and other school managers is to adopt a critical perspective, constantly questioning how to improve teaching and learning in your school.

In supporting the need for stakeholder's involvement in school administration, Whitaker (2003), proposes that effective administration will be achieved when stakeholders have played an active role in designing and planning the activities and the development of the school as a learning organization.

Recommendations

I. **Recommendations directed to the Ministry of Education and training**.

a) The Ministry should develop programs that would equip young educators with leadership skills.
b) Principals should be periodically in serviced in administration and leadership skills
c) Experiential administration programs should be introduced in the pre-service training programs.
d) MoET should develop programs that will educate communities with inclusive education.

II. The recommendations to principals.

a) School principals should have a shared vision that in order to gain the cooperation of their staff. Principals must consider that staff members also have goals and needs which must be incorporated in the organizational goals.
b) Collective planning gives a sense of ownership. Planning without staff involvement is tantamount to dictatorship. Whittaker (1993:116), believes that the school developmental plan is a vital policy link between the governors, the professional staff of the school and the local education authority. This implies that planning must be inclusive.
c) Principals should expose Education policy documents and regulations to staff members familiarity with policy documents, may assist implementation thereof.
d) Principals need to learn to enhance trust of their educators and delegate without reservations. Delegation increases trust between parties involved. Once trust is built, there will be less need for supervision by the principal and there will be increased job satisfaction. (e) Principals should create more opportunities for educators' participation in decision making.
e) Principals must be open to be appraised by teachers, this would assist them grow in their job.
f) Principals should develop a well-coordinated instructional program which will assist in creating an effective teaching and learning process in the school.

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Triggers of Acute Asthma in Patients Attending Emergency Centre in a Peri-urban District Hospital, Johannesburg, South Africa

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Abstract

Introduction: Many avoidable triggers lead to acute asthma attack and subsequent visit to the emergency centre. The aim of the study was to determine triggers of acute asthma in order to target prevention efforts in patients attending emergency centre in a district hospital, Johannesburg, South Africa. Objectives were to describe acute asthma patients, identify triggers and severity at presentation. Methods involved a prospective descriptive cross-sectional study conducted from April to August 2015, in consenting adult participants. A researcher or trained assistant completed the semi-structured questionnaire in English. Results: Overall, 239 patients enrolled (139 males, 100 females with the median age 31 years). Majority presented with moderate acute asthma (52.72%). Active cigarette smoking (p-value<0.001) and/or passive cigarette smoking (p-value=0.004) were identified potential triggers for acute asthma attack. Chi-square or Fisher Exact test analysis were used for associations between variables and severity. Bivariate logistic regression was used to ascertain triggers associated with acute asthma attack. P-value < 0.05 was statistically significant. Confidence interval was 95%. There were no significant associations between the severity of acute asthma attack and acute respiratory infection (p-value=0.818), use of medication-related asthma triggers (p-value=0.942) and knowledge of asthma allergens (p-value =0.086). Conclusion: The majority patients presented in moderate acute asthma attack which was most probably triggered by active and/ or passive cigarette smoking. Hence, frequent visits to hospital in acute asthma attack could be minimized by removing avoidable triggers from households.

Keyswords: *Acute asthma attack, Emergency centre, Severity of asthma, Triggers of asthma, Peri-urban district hospital.*

Introduction

Asthma is a major public health problem worldwide, generates significant healthcare costs and high morbidity and mortality. The World Health Organization (WHO) estimates that about 235 million people worldwide suffer from asthma, and over 180 000 deaths occur annually.[1,2] South Africa with an asthma prevalence of 8.1% over all ages is ranked the 25th worldwide, and the asthma case fatality rate is reported to be the fourth highest in the world at 1.5% deaths annually.[1,2,3].

Adeloye et al[3] conducted a systematic review to ascertain the prevalence of asthma in Africa in which they included 45 studies covering most parts of Africa (South Africa 11 studies, Nigeria eight (8) studies, Ethiopia 6 studies, Kenya five (5) studies, and four (4) studies in each of Algeria, Morocco and Tunisia). They found that cumulative prevalence of asthma was the highest in South Africa. Asthma morbidity and mortality were potentially preventable with optimal control of chronic asthma and appropriate management of acute exacerbation.[3].

Many triggers have been reported to cause patients with poor asthma control to increasingly frequent visits to emergency centres.[4] These triggers include active and/or passive cigarette smoking, acute respiratory infection, asthma allergens, and medication-related asthma triggers such as non-steroid anti-inflammatory drugs (NSAIDs) and beta-blockers. Asthma triggers can induce a functional state of airway

narrowing and bronchospasm with subsequent wheezing and dyspnoea or chest tightness in patients.[5] Most experts agree that reducing the need for the use of emergency centres for acute asthma treatment remains an important goal of the overall management of the disease.[4,5]

The aim was to determine triggers of acute asthma attack in patients attending emergency centre in a peri-urban district hospital, Johannesburg, South Africa. Objectives were to describe the proportion of acute asthma patients, identify triggers, describe the severity in patients attending the emergence centre at the peri-urban district hospital and associations between severity and other variables. Researchers believed that by proactively identifying avoidable triggers among asthma sufferers in the community, the frequency of visits to hospital could be minimized and save health costs, indirectly. Further, it was hoped that the study would provide a better understanding of asthma among health professionals to advance opportunistic health promotion for patients.

Materials and Methods

The Study design

This was a prospective, descriptive, cross-sectional study.

Study site

The study was conducted at Bertha Gxowa District Hospital emergency centre located in Germiston, a peri-urban of Johannesburg, South Africa. It was a level-one generalist hospital with 258 inpatient beds catering across all major clinical disciplines. The hospital had a catchment area of 34 satellite primary care clinics (PHC) and some community health centres (CHC). It had outpatient, operating theatres, and a 24-hours emergency centre.

Study population and sampling approach

We took all patients who presented with acute asthma episode, met the study criteria and consented to participate in the study. Data collection period was from April to June 2015.

Sample size

This was predetermined in consultation with a statistician. The emergency centre had unpredictable number of patients presenting with acute asthma per month owing to seasonal variations. Hence, there would be between 180-210 acute asthma episodes in the emergency centre per month and 540 to 630 per three (3) months or quarterly, depending on the time of the year. With population size of 630, a 5.0% margin of error, p-value of 0.05, confidence interval (CI) 95% and a response distribution rate of 50%, the minimum sample size required was 247 using a Raosoft Sample Size Calculator.

Data collection tool

A semi-structured questionnaire which addressed socio-demographics, concurrent respiratory infections, current medications, adherence to treatment and possible triggers of asthma was developed by researchers according to standard asthma guidelines from literature.[4] Further, The acute asthma severity was assessed using validated guidelines from the Working Group for South African Thoracic Society (WGSATS).[4]

Data collection process

After initial emergency treatment and stabilization, patients who presented with acute asthma episode, met the criteria and consented to participate in the study were enrolled for three months from April to June 2015. The semi-structured questionnaire was administered by the researcher or two trained assistants who collected data from 239 adult asthma patients. Excluded were patients who declined to participate in the study and patients who were unable to perform peak exploratory flow (PEF) assessment correctly even after stabilisation. Research was approved by the Human Research Ethics Committee (HREC) of the University of the Witwatersrand (approval number M141115) and Ekurhuleni District Ethics Committee.

Data capture and analysis

The collected data was captured on Excel spread sheet and analysed using Stata version 12 software. Participant characteristics and variables such as concurrent acute respiratory infection, asthma triggers, knowledge of asthma allergens and active and/or passive cigarette smoking were collected. These variables were cross tabulated with the severity of asthma (mild, moderate and severe) to determine statistical significance. Descriptive statistics for non-normal distributed continuous variables, such as median and their associated ranges were

used to summarize quantitative characteristics. Frequencies and percentages were used to summarize the above participant categorical characteristics.

The Chi-square test or Fisher exact test were used to test the associations between different variables (acute respiratory infection, medication-related asthma triggers, knowledge of asthma allergens, active and passive cigarette smoking) across acute asthma attack severity. The Fisher exact test was used when the expected numbers of subjects in the cells were less than five. Bivariate logistic regression was used to ascertain triggers associated with acute asthma attack presentation in the emergency centre. Odds ratios (OR) with 95% CI and p-values were tabulated. P-value of less than 0.05 was statistically significant.

Results

We enrolled 239 participants in the study. The sample included 139 males (58.18%) and 100 females (41.82%), age range 18 - 75 years (median age was 31 years). Eight (8) out of 247 patients with acute asthma (3.20%) were not able to perform a Peak Exploratory Flow (PEF) assessment because of their clinical conditions at the time of presentation to the emergency centre. Hence, they were excluded from the study.

Medication-related acute asthma triggers

Table 1. Distribution between medication-related asthma triggers and severity of acute asthma

Medication used	Frequency of treatment	Mild	Moderate	Severe	Total
None	97.91%	33.76%	52.99%	13.25%	100.00
NSAIDs	2.09%	60.00%	40.00%	- -	100.00
Total	100.00%	34.31%	52.72%	12.97%	100.00

--: zero percent

The majority of participants were not exposed to medication-related asthma triggers and presented in moderate asthma attack. Chi^2 =1.8015, degree of freedom= 2, p-value =0.432

Severity assessment of acute asthma attack

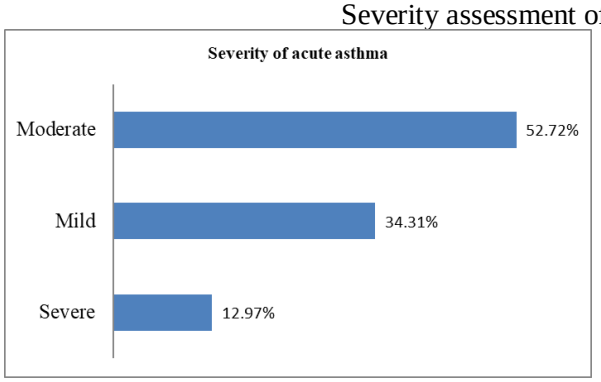

Figure 1. Severity assessment of acute asthma attacks of patients who presented in the emergency centre. Majority of patirnts presented in moderate acute asthma attack. (52.72%)

Acute respiratory infection and severity of acute asthma attack

Table 2. Distribution of acute respiratory infection and severity of acute asthma attack

Acute infection	Frequency of acute infection	Mild attack	Moderate attack	Severe attack	Total
None	89.12%	33.33%	53.52%	13.15%	100.00
Upper Respiratory Tract Infection (URTI)	10.05%	41.67%	45.83%	12.50%	100.00
Lower Respiratory Tract Infection (LRTI)	0.84%	50.00%	50.00%	- -	100.00
Total	100.00%	34.31%	52.72%	12.97%	100.00

--: zero percent

The majority of patients had no acute infection and suffered from moderate asthma attack. Chi^2 =1.0945, degree of freedom=4 and p-value=0.873.

Cigarette smoking and severity of acute asthma attack

Table 3. Distribution between cigarette smoking status and severity of acute asthma attack

Cigarette smoking	Frequency of cigarette smoking	Mild attack	Moderate attack	Severe attack	Total
Yes	15.06%	22.22%	30.56%	47.22%	100.00%
No	84.96%	36.45%	56.65%	6.90%	100.00%
Total	100.00%	34.31%	52.72%	12.97%	100.00%

The majority of participants did not smoke and presented in moderate asthma attack. Chi^2 = 44.0897, degree of freedom=2, $p < 0.001$.

Passive cigarette smoking and severity of acute asthma attack.

Table 4. Distribution between passive cigarette smoking and severity of acute asthma attack

Passive cigarette smoking	Frequency of passive cigarette smoking	Mild	Moderate	Severe	Total
Yes	22.19%	28.57%	42.86%	28.57%	100.00%
No	77.82%	35.29%	54.41%	10.29%	100.00%
Total	100.00%	34.31%	52.72%	12.97%	100.00%

The majority did not experience passive cigarette smoking yet presented with more moderate episodes than those who were exposed to smoke. Chi^2 =8.8442, degree of freedom=2 and p-value=0.012

Bivariate logistic regression of variables

Table 5. Bivariate logistic regression results between variables and severity of acute asthma attack

Variables	OR	95%CI	p-value
Acute respiratory infection	-		
None	0.86	-	-
URTI		0.24 to 3.06	0.818
Medication-related asthma triggers	0.95	0.27 to 3.41	0.942
Asthma allergens knowledge score	0.79	0.60 to 1.03	0.086
Smoking	12.08	5.16 to 28.27	<0.001
Passive cigarette smoking	3.49	1.47 to 8.25	0.476

The above table shows active cigarette smoking (OR 12.08, 95% CI: 5.16 to 28.27; p-value < 0.001) and passive cigarette smoking (OR 3.49, 95% CI: 1.47 to 8.25; p-value = 0.004) were statistically significant factors

Summary of main study findings

The proportion of patients presenting with acute asthma episode was 4.77%. Majority of them had moderate acute asthma (52.72%), were black (63.18%), young adults (83.68%), males (58.18%), completed secondary school (77.82%), employed (83.26%), had an occupation (83.63%), lived in modern or urban type of house (96.65%), and were adherent to asthma treatment (58.00%).

Statistically significant findings were low level of education ($p < 0.001$) which was associated with acute asthma attack presentation. Active cigarette smoking ($p < 0.001$) and/or passive cigarette smoking ($p = 0.004$) were identified triggers associated with acute asthma attacks and more than usual hospital visits.

Not statistically significant findings were associations between acute asthma severity and age ($p = 0.592$), gender ($p = 0.240$), race ($p = 0.759$), occupation status ($p = 0.291$),

employment status (p = 0.268), numbers of cigarette smoked per day (p = 0.059), type of housing (p = 0,982), acute respiratory tract infection (p = 0.818), use of medication-related asthma triggers (p = 0.942), knowledge of asthma allergens (p = 0.086), and stress or anxiety (p = 0.475).

Discussion

The majority patients had moderate acute asthma attack (52.72%). This was in line with studies by Dankner et al[6] in Israel and by Westerman et al. in Cape Town et al[7]. Active cigarette smoking and/or passive cigarette smoking were identified potential triggers associated with acute asthma attack. However, there were no significant associations between the severity of acute asthma attack and the number of cigarettes smoked per day (p-value = 0.059), acute respiratory tract infection (p-value = 0.818) and knowledge of asthma allergens (p-value= 0.086) because there were possibly other environmental factors which influenced this finding..

The difference in proportions of moderate and severe acute asthma could be explained by many factors. These included the wide geographical factors and guidelines used to classify asthma, social habits (such as cigarette smoking), adherence to asthma treatment, occupational status, help-seeking behaviour, the presence of acute viral respiratory infection and asthma allergens.[4,5, 6,7]

We used the WGSATS guideline to classify severity of asthma yet there were significant differences in PEF values between different guidelines.[4]

This study highlights that cigarette smoking is one of the main factors associated with severe acute asthma attack at presentation in the hospital.[8,9,10,11]

In the study by Refaat et al[12], 25.40% of patients were current smokers, whereas there were only 15.06% in our study. Hence, the higher rate of severe asthma exacerbation documented by Refaat et al[12] compared to this study could be due to significant number of current cigarette smokers in their study.

Chi-square showed no significant association between medication-related asthma triggers and severity of acute asthma attack (p-value = 0.432), which was in line with the findings of logistic regression (OR 0.95, 95% CI: 0.27 to 3.41; p-value=0.942). Medication-related asthma triggers were not associated triggers for acute asthma attack in these patients. This was similar to the conclusion reported by Geyser et al[13] (OR 1.2, 95% CI: 0.64 to 2.76; p = 0.45).

Also, Sanya et al[9] in Uganda also came to the same conclusion. Thus, the finding was not surprising because asthma triggers might vary from an individual to the other. Hence, prevention strategies of flare ups of acute asthma may also differ from one person to the other.

Further, the difference between medication-related asthma triggers and asthma exacerbation was not statistically significant in our study. This observation could be attributed to the small proportion of medication-related asthma triggers (2.09%) in our study. It could be possible that this proportion was under-represented, which affected the outcome. Therefore, the finding should be interpreted with caution.

There was no significant association between lack of knowledge on asthma allergens and acute asthma attack on Chi-square (p-value =0.462). Hoever, participants showed adequate knowledge about asthma allergens and be have benefitted from it.

A significant association between cigarette smoking and acute asthma attack was highlighted (p < 0.001). For example, patients who smoked cigarettes were more likely to suffer severe acute asthma attack compared to patients who did not smoke cigarettes. The finding was in agreement with the logistic regression findings, OR 12.08, 95% CI: 5.16 to 28.27; p-value < 0.001. This study reinforces the belief that cigarette smoking is a potential trigger associated with acute asthma attack and subsequent hospital visits.[8,9,10,11]

Asthma sufferers who smoked cigarettes were more likely to have uncontrolled asthma than non-smokers, and this could lead ultimately to an increase in the number of asthma exacerbations with subsequent hospital visits.[8,9,10] Patients who had households in which cigarettes were smoked were more likely to suffer severe acute asthma compared to patients who did not, and the finding is in line with findings of the logistic regression (OR 3.49, 95% CI: 1.47 to 8.25; p-value=0.004). Passive cigarette smoking was a potential associated trigger for acute asthma attack.

This study had some strengths. Firstly, it was a prospective study and, therefore, an opportunity to collect all the information that was required for the study analysis. Secondly, the study ensured that sufficient participants were enrolled from a study site which had 34 satellite clinics in a peri-urban area in order to allow a reliable analysis. Finally, this study has relevance to the practice of family medicine and primary health care because asthma has significant morbidity and mortality, particularly in resource-constraint countries.[3,4].

However, the study also had some limitations. The study was conducted at one site although the catchment area had a wide geography involving nearly 34 satellite clinics which referred to the district hospital. The findings might not be generalizable to other district hospitals, settings and levels of care. Nevertheless, the study highlights the important link between asthma control and smoke cessation. Acute respiratory infection was not objectively assessed because it was based on self-reporting. In the context of this study, the definition of passive cigarette smoking was limited to cigarettes smoked in the patient's household and not the public. It would seem more likely that a large proportion of passive cigarette smokers, sample size, and multiple study sites would make findings more reliable and generalizable than otherwise.

Lastly, patients who were unable to perform Peak Exploratory Flow assessment were excluded from the study. Hence, an opportunity exists that further studies could explore an observational study across all cases of asthma exacerbation presenting across the entire primary care platform including community health centres and big clinics which were not part of this study.

Conclusion

Our study reports that majority patients had moderate acute asthma attack when they presented to the peri-urban district hospital. Further, we demonstrated and reinforced the belief that active and/or passive cigarette smoking was one of the potential triggers for acute asthma attack in adults in our area. The smoking behaviour is a modifiable or avoidable trigger and warrants prompt community health interventions to enhance its cessation. The latter will mitigate for indirectly minimizing frequency of hospital visits for acute asthma attack among patients from households who smoke cigarettes.

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Colonization, Virulence Factors, and Antimicrobial Susceptibility Patterns of Staphylococcus Aureus Isolated from the Anterior Nares of Medical and Paramedical Students

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Abstract

Background: Hospital environment and healthcare personnel form an integral part of healthcare system. Patients visit the hospital for various reasons. Some patients require hospitalization and others require medical and surgical interventions. Microbes present in the hospital environment and those colonized in the anterior nares, and on the skin of healthcare personnel could pose an increased threat of hospital acquired infections. Staphylococcus aureus (S. aureus) is one among many microbial species with potential to cause mild to severe infections that could be present colonized in the healthcare personnel. This study is aimed to evaluate the colonization of S. aureus in the anterior nares of medical and paramedical students.

Methods: Nasal swabs were collected from a total of 100 medical, and paramedical students. The swabs were cultured on blood agar, and the staphylococcal isolates were identified to the species level by using standard and conventional microbiological techniques. The colonies were counted on isolation (<10 colonies-scanty growth; <25 colonies-moderate growth; <50 colonies-moderate to heavy growth; and > 50 colonies; heavy growth). The virulence determinants including hemolysis, pigment production was assessed. The antimicrobial susceptibility testing was performed using Kirby-Bauer disk diffusion method.

Results: Microbes had grown in 97% of the nasal swabs. Most frequent bacterial isolates were Coagulase negative Staphylococcus (CONS), and diphtheroid bacteria (bacterial resembling Corynebacterium diphtheriae. S. aureus was isolated in 13% of the study participants.

Conclusion: The isolation rates of S. aureus were noted to be 13%. Increased resistance was noted against vancomycin, and commonly used antimicrobial agents. Most isolates demonstrated hemolysis on blood agar.

Keywords: *Staphylococcus aureus, diphtheroid, Healthcare personnel, medical and paramedical students, anterior nares, nasal swab, Coagulase negative Staphylococcus (CONS).*

Introduction

Staphylococci are a group of gram-positive cocci. These bacteria are noted to be normal colonizers both human and animals [1, 2]. In 25-40% of healthy humans, they can be colonized on skin, and mucus membranes [3]. Staphylococci are either coagulase positive or coagulase negative. The *Staphylococcus aureus* (*S. aureus*) is the coagulase positive variant and among the several coagulase negative Staphylococcal species, the *Staphylococcus saprophyticus* and the *Staphylococcus epidermidis* are frequently associated with human infections [4]. The *Staphylococcus hyicus* was reported to be having both the coagulase positive and the coagulase negative variants. *S. hyicus* was reported to cause exudative dermatitis in pigs [2].

S. aureus has been found to colonize the nasal mucosa as noted from the previous research studies. Because of the site of colonization of the staphylococci, both on the skin, mucosa, and the nasal orifices, there is an increased potential for these organisms to easily transmit among people and may therefore cause infections in the susceptible population.

Also, most staphylococcal species, although are present as normal human colonizers, have several virulence factors making them

potential/opportunistic pathogens in the susceptible humans [5, 6].

Staphylococci are also stringent and may survive in the environment for months in dried pus, thus increasing their transmissibility.

Among the staphylococcal species, the *S. aureus* is considered as a significant pathogen owing to its ability to cause mild to severe and superficial to deep seated infections. *S. aureus* has been identified to colonize in the anterior nares and become source of infection for susceptible population [3].

In a previous research study performed by me and my colleagues, we found that 16% school going children were colonized with *S. aureus*. Of the *S. aureus* isolates 19% were identified as methicillin resistant *S. aureus* (MRSA) [3].

Significance of methicillin resistant s. Aureus (MRSA)

Penicillin was among the first discovered antibiotics, which was found most effective against microbial infections. The discovery of penicillin in the 1920's was followed by its increased use during the II world war. Although, penicillin use was instrumental in minimizing the morbidity and the mortality during the II world war, its indiscriminate use later had caused the emergence of penicillin resistant staphylococcal strains. Resistance to penicillin during the 1970's had led to the discovery of modified penicillin's/synthetic penicillin's like the methicillin, and nafcillin. Later, it was observed that there were some *S. aureus* strains which were found to be resistant to the other antibiotics belonging to the cephalosporins, an alternate antibiotic group to penicillins.

Further research had revealed that the *S. aureus* strains which were resistant to the methicillin (MRSA) could develop resistance to other group of antibiotics [7]. Infections caused by these strains was posing treatment failures and resulting in mortality [8]. It was later identified that the MRSA strains were indeed showing a gene called as *Mec A* gene, probably coding for resistance [9]. Since most laboratories do not have access to molecular techniques, the phenotypic detection of the presence of *Mec A* gene was confirmed by checking with methicillin (5µg), oxacillin (1µg), or the more specific cephoxitin (2µg) by using the routine Kirby-Bauer disk diffusion method [10].

Vancomycin Resistance Among Staphylococcus Species

In 1999, for the first-time strains of *S. aureus* moderately resistant to the vancomycin (vancomycin intermediate sensitive *S. aureus*-VISA) were reported, followed by some of the *S. aureus* resistant to vancomycin (VRSA) [11]. Since vancomycin is the stock antibiotic which was used to treat deep-seated/invasive *S. aureus* infections, there were several cases of treatment failures resulting in severe morbidity and mortality [12].

Considering the potential of the *S. aureus* from being present as a normal colonizer in healthy individuals, to produce several potential virulence factors, to be able to develop resistance to most commonly use antimicrobial agents, and to be able to cause both endogenous and exogenous infections it is important to know the colonization frequency and antimicrobial susceptibility patterns of *S. aureus* among different groups of population [13].

In view of the close association of the health-care workers with various patient groups, it is important to analyse the health-care workers for the colonization of *S. aureus* [14, 15, 16]. The *S. aureus* colonized in the health-care workers may potentially be transmitted to the patients and lead to serious infections which can be difficult to treat.

Aim of The Study

Therefore, this study is undertaken to assess the colonization of various staphylococcal species with special reference to *S. aureus* colonization, virulence, and their antimicrobial susceptibility patterns.

Materials and Methods

This is a prospective, and cross-sectional study. A group of 100 students were recruited in the study. All the subjects included in the study were either medical (pursuing MBBS), para medical students pursuing B. Sc medical laboratory technology or B. Sc nursing students. All the students were briefed about the study protocol, and only those who volunteered were included in the study. An informed and written consent was obtained from each participant in the study. The study was approved by the institutional ethical committee (PIMR/IEC/2019-10000119).

Screening for colonization

A sterile cotton swab was used to obtain the nasal swab from each subject. The swab was carefully rolled inside both the nasal orifices, by gradually rolling and touching most areas of the nasal mucosa, and by taking care not to smear the surrounding skin surface. The swab is then immediately transported to the laboratory for further processing.

The nasal swabs were inoculated into blood agar and were incubated overnight at 35-37^{0}C. All the culture plates were checked for the presence of a visible growth, the next day. The specimens showing a visible growth were recorded. The colony colour, the presence of single or multiple bacterial growth was recorded along with the presence or absence of haemolysis production (alpha, beta, or gamma haemolysis) as shown in **Figure 1**.

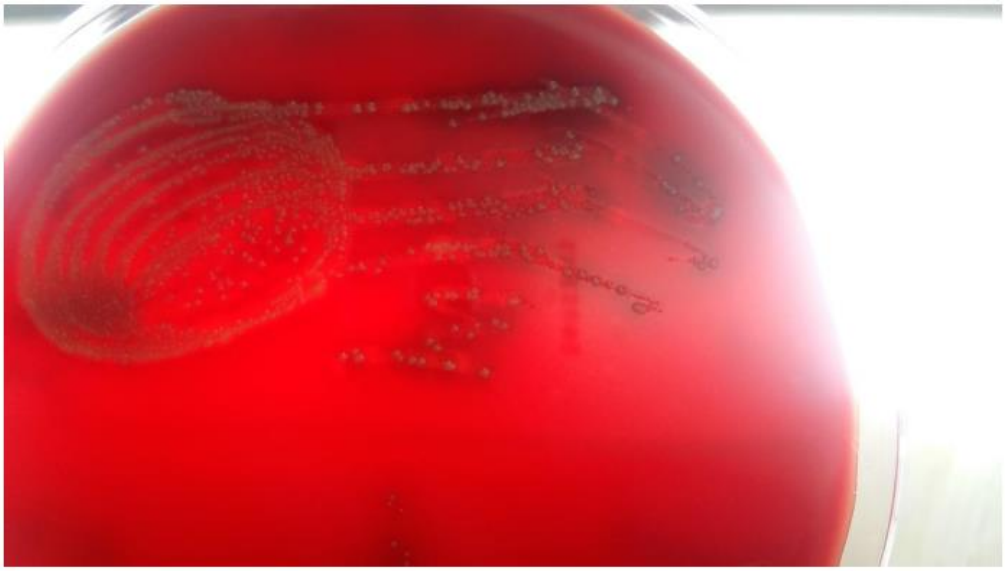


Figure 1. Staphylococcal species showing beta haemolytic colonies on blood agar

Gram's Stain

The colonies were gram's stained to confirm their gram's reaction, and were observed for the arrangement, if gram-positive cocci (GPC) were seen. When GPC's were seen, they were confirmed as either in clusters, tetrads, or in pairs. All those GPC's which were seen in clusters were suspected as belonging to the staphylococcal group as shown in **Figure 2**.

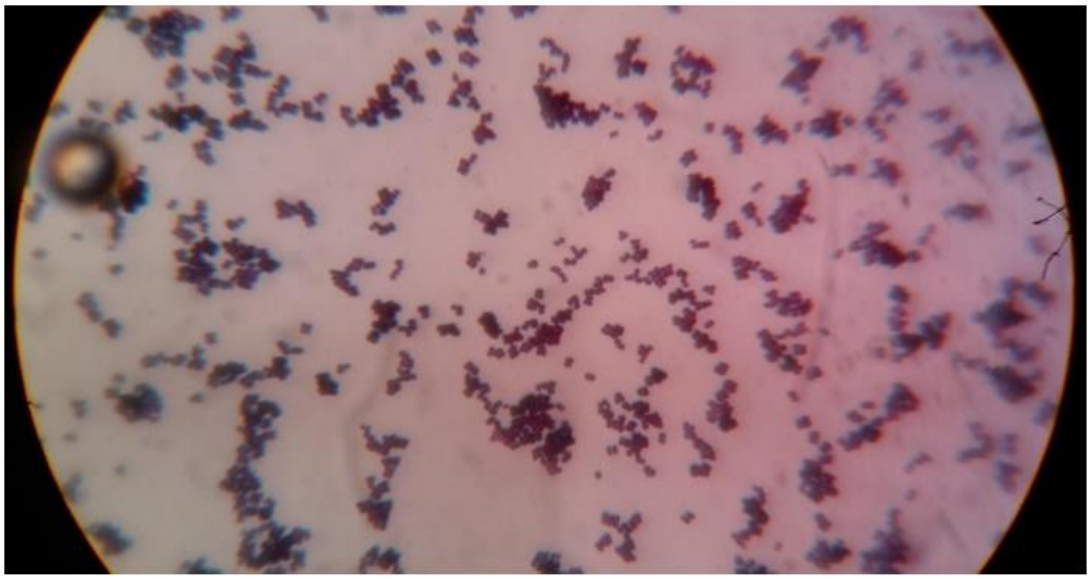


Figure 2. Staphylococcus seen as gram-positive cocci in clusters after grams staining

Colony Count

The growth obtained from the swabs were interpreted using the colony counting, where in the growth was categorized as <10 colonies (scanty growth), <25 colonies (moderate growth), <50 colonies (moderate to heavy growth), and > 50 colonies (heavy growth).

Catalase Test

A catalase test using the 3% hydrogen peroxide (H_2O_2) was used to confirm that they belong to *Staphylococcus* group (catalase positive), and *Streptococcus* group (catalase negative).

Coagulase Test

All the strains which were GPC's present in clusters, and were catalase positive, were identified as belonging to *Staphylococcus* group. These strains were checked for the production of coagulase enzyme. The strains were inoculated into a defined quantity of plasma, and after an overnight incubation at 37^0C, were checked for the presence of clot. Those strains showing the clot were identified as *S. aureus* or coagulase positive staphylococci (COPS), and those not forming were considered as coagulase negative staphylococci (CONS) as shown in **Figure 3**.



Figure 3. Staphylococcus species showing coagulase positive and coagulase negative reactions respectively

Antimicrobial Susceptibility Testing

All staphylococcal isolates were tested for their susceptibility against various antibiotics using the traditional Kirby-Bauer disk diffusion method. Here the strain to be tested was first inoculated in to the peptone water, and after an incubation od 1.5-2 hours at 37^0C, when a certain degree of turbidity (MacFarland's 0.5 standard) was obtained, a sterile cotton swab is immersed in the growth and lawn cultured on a Muller-Hinton agar (MHA).

Then various antibiotic discs were applied, and the plates were incubated overnight at 37^0C. After overnight incubation, the plates were observed for zones of clearance around the antibiotic discs, where there is no growth, also called zones of inhibition, indicating that the antibiotic is effective and did not allow microbial growth. If the bacterial growth was observed near the disc, and little or no zone of inhibition was seen, the antibiotic was considered as ineffective i.e. the bacteria is resistant to the antibiotic as shown in **Figure 4**.



Figure 4. Antimicrobial susceptibility testing result of the Staphylococcal species using Kirby-Bauer disk diffusion method

Results

Of the 100 nasal swabs cultured 97 (97%) grew bacteria. Among the bacteria isolated include the coagulase negative *Stahpylococcus* spp, and the *S. aureus* (13%). Few subjects were colonized with dual bacteria including the Gram-positive bacilli, which were identified as bacteria morphologically resembling *Corynebacterium diphtheriae* also called as diphtheroids or non-diphtheritic *Corynebacterium* species. The bacteria isolated were categorized based on the colony colour, coagulase production, haemolysis on blood agar, the types of growth on primary cultures, and the colony counts as shown in **Figure 5, Figure 6, Figure 7, Figure 8, Figure 9, and Figure 10** respectively.

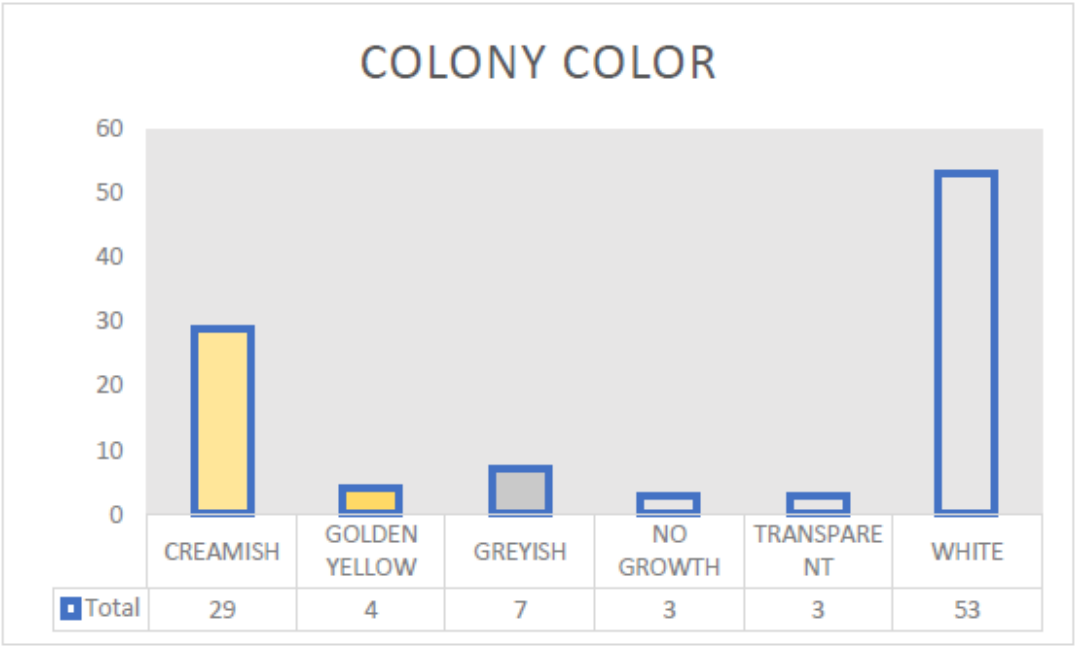


Figure 5. Categorization of the isolated *Staphylococcus* species based on colony colour

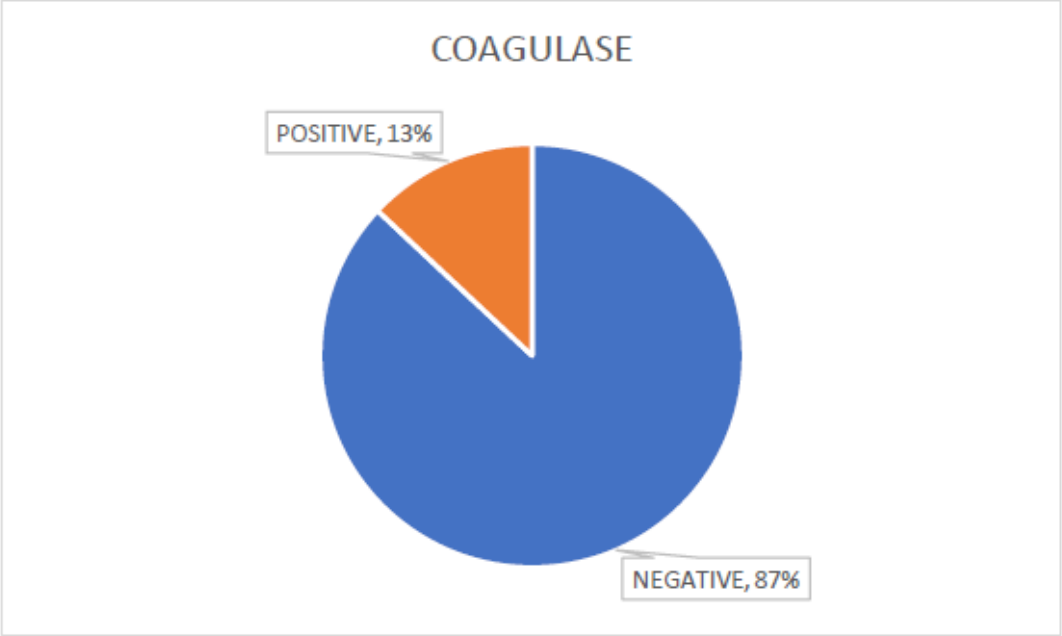


Figure 6. Characterization of the isolated Staphylococcus species based on coagulase test

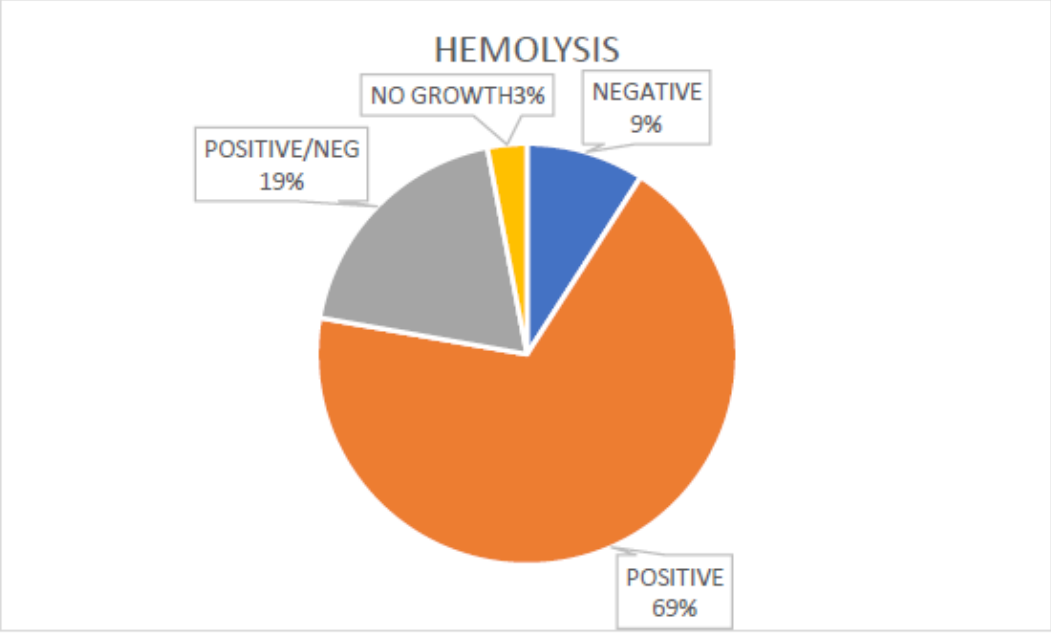
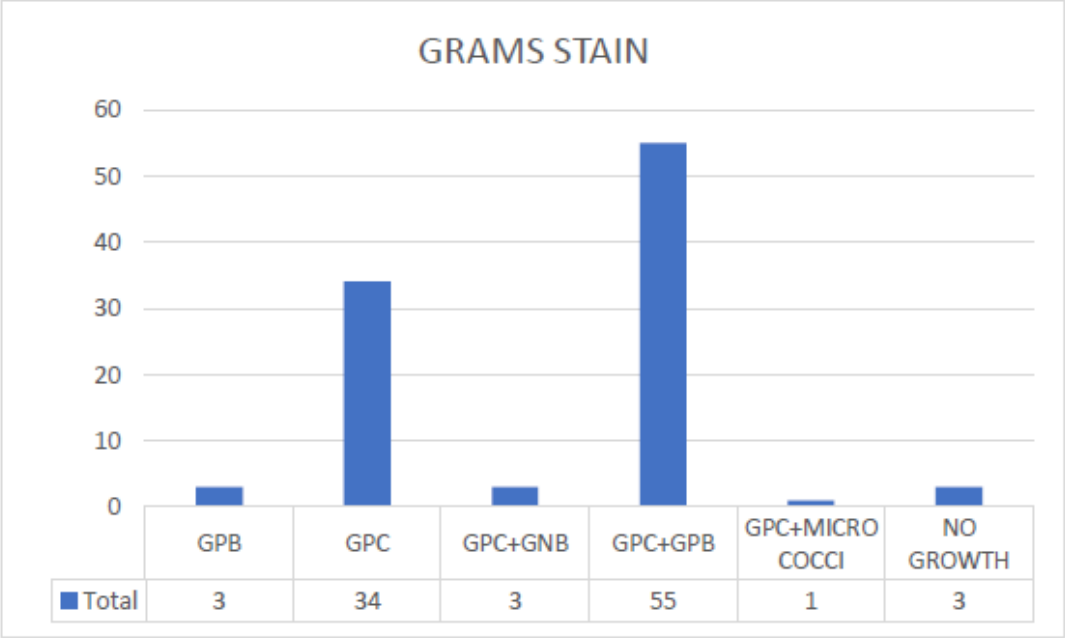


Figure 7. Categorization of the isolated *Staphylococcus* species based on haemolysis on blood agar



GPB: gram positive bacilli; GPC: gram positive cocci; GNB: gram negative bacilli

Figure 8. Type of growth on primary isolation from the nasal swabs

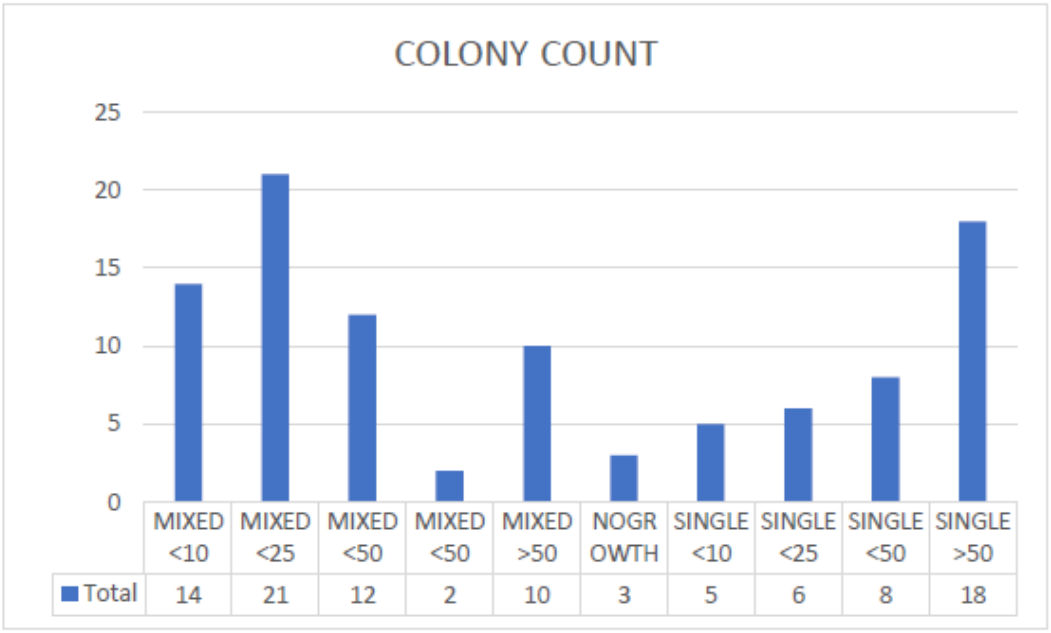
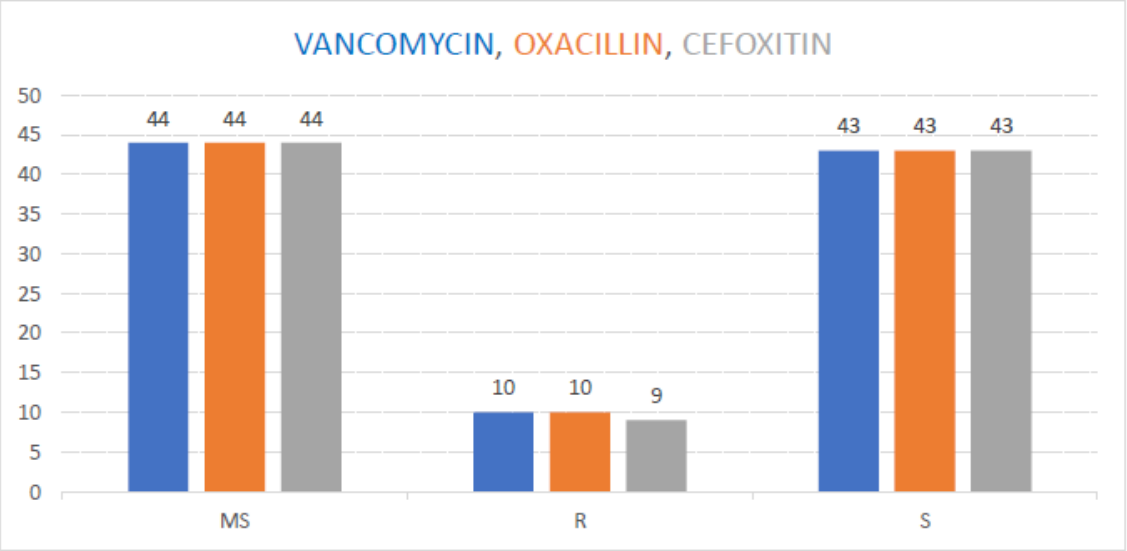


Figure 9. Categorization of the isolated Staphylococcus species based on colony counts

The antibiotic sensitivity testing of the isolated *Staphylococcus* spp was performed and interpreted with special reference to the methicillin resistance and vancomycin susceptibility as shown in **Figure 11**.



MS: moderately sensitive; R: resistant; S: sensitive

Figure 10. Vancomycin, Oxacillin, and Cefoxitin susceptibility patterns of the staphylococcal isolates

Discussion

Colony colour assumes significance because the pathogenic strains i.e. *Staphylococcus aureus* show golden yellow non-diffusible pigment [17, 18, 19, 20, 21]. Also, the cream coloured colonies usually have been noted to produce the coagulase enzyme. Most coagulase negative staphylococcal strains produce white coloured colonies and are assumed to be either non-pathogenic or opportunistic pathogens. In the present study 87% of the isolated Staphylococcal spp. were coagulase negative and only 13% were coagulase positive. When the colony colours were analysed, 53% showed white coloured colonies followed by cream coloured colonies (29%), and only 4% produced golden yellow coloured colonies. All the white coloured colonies were noted to be coagulase negative staphylococci, and all the golden yellow pigmented colonies were coagulase positive. Of the 29 cream coloured colonies only 9 (31%) were coagulase positive. These results suggest that pigmentation may not completely correlate with the colonization and pathogenicity.

Haemolysis is considered as an important virulence determinant among bacteria [22]. Most pathogenic bacteria were noted to possess the haemolytic properties. In the present study, 69% of the staphylococcal isolates showed haemolysis on blood agar. Few other nasal isolates revealed clones of bacteria, of which some were haemolytic and the others non-haemolytic (19%). All the coagulase positive staphylococcal isolates were positive for haemolysis and only 9% of all the staphylococcal isolates were noted to be non-haemolytic. These results suggest that the haemolytic properties can be positively correlated with the colonization of bacteria.

Assessment of the type of growth from the nasal cultures assumes significance due to the easy transmissibility [23, 24, 25, 26]. A pure growth of gram-positive cocci was observed in 34% of the study population and 55% of the cultures revealed mixed growth that included both the gram-positive cocci (*Staphylococcus* spp.), and gram-positive bacilli (non-diphtheritic *Corynebacterium* species). Mixed gram-negative bacilli, along with gram positive cocci were isolated in 3% of the population and only 1% revealed the growth of *Micrococcus* spp. Only 3% of the cultures showed single gram-positive bacilli and 3% were negative (no growth) in culture. These results suggest the fact that the *Staphylococcus* spp., and the non-diphtheritic *Corynebacterium* spp. can be present colonized in healthy subjects and such colonized individuals may act as reservoirs of bacteria and may transmit infections to susceptible population.

Colony counts have been successfully used to assess the urinary tract infections and colonization rates of several other bacterial like the *Campylobacter jejuni* in the intestine [27, 28]. The nasal cultures were assessed for growth by counting the number of colonies. Nasal cultures in this study revealed 59% mixed cultures and

among the mixed cultures 83% were showing <50 colonies and 20% showed >50 colonies. Pure growth of single colony was observed among 39% of cultures and 3% were negative for culture. Of the culture which showed pure growth, 46% were showing >50 colonies. The study results with respect to the type of growth suggests that in most mixed cultures, the colony count was <50 and many single cultures were showing >50 colonies. The presence of a pure colony may correlate well with the colonization of the bacterial species.

Not only the colonization, and the virulence factors, the assessment of antimicrobial susceptibility patterns of the microorganisms is significant in the health care perspective [29, 30, 31, 32]. The antimicrobial susceptibility patterns of the isolated Staphylococcus spp. revealed increased resistance the antibiotics that include the clindamycin (85%), erythromycin (90%), amoxycillin-clavulanic acid (92%), and piperacillin-tazobactam (92%). Moderate sensitivity was noted against the ceftriaxone55%, ciprofloxacin (62%), and co-trimoxazole (65%).

All the strains were sensitive to linezolid (100%), and 98% sensitivity was noted against imipenem. Variable sensitivity was observed against the aminoglycoside antibiotics amikacin (75%), and gentamicin (68%).

Conclusion

The study results noted an abnormally high rates of colonization among the medical, and para-medical undergraduate students. There was an overall colonization rate of 97% and 13% were colonized with the potentially pathogenic *Staphylococcus aureus*. Most isolates were showing the haemolytic properties, and many were producing pigmentation (cream, golden yellow), which may potentially predict their pathogenicity. The antimicrobial sensitivity patterns of all the isolates revealed increased resistance to the oxacillin/cefoxitin (methicillin resistant *Staphylococcus aureus*) and vancomycin. Variable susceptibility patterns were noted against other regularly used antimicrobial agents.

Future Perspectives

The health care persons, and the people constantly exposed to the patients and hospital environment are at increased risk of getting colonized with microorganisms. The anterior nares/nasal cavities have been known to colonize staphylococcal species, and especially S. aureus. The colonization of bacteria among healthy individuals causes no harm but if such microorganisms are transmitted to the susceptible populations, like the hospitalized patients, they may cause serious consequences. Also, the microorganisms present in the hospital environments may potentially be multi-drug resistant and pose an increased threat to the patients from the colonized healthcare workers. Therefore, regular screening of the people involved in the healthcare must be done, and necessary steps may be initiated to stop the transmission of such microorganisms to the already debilitated patients.

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Mosquito-Avoidance Practices among Caregivers of Children Under Five in Somolu Local Government Area, Lagos State, Nigeria

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Abstract

Malaria control efforts currently lay emphasis on reducing transmission by limiting human-vector contact. Meanwhile, Mosquito-Avoidance Practices (MAPs) have been shown to be sub-optimal in urban areas, especially among under-five children (U-5C), resulting in high child morbidity and mortality. This study was therefore designed to investigate MAPs among caregivers of U-5C living in Somolu; an urban Local Government Area (LGA) in Lagos State, Nigeria.

A cross-sectional survey was conducted involving 394 female caregivers of U-5C. The LGA was stratified into three layers based on the level of planning and drainage using a geographic information system (GIS). Data were collected using a semi-structured, interviewer-administered questionnaire and were analysed using descriptive statistics and Chi-square test at p=0.05.

Mean age of respondents was 33.6±7.7 years. The proportion who mentioned mosquito nets as a MAP by strata were: S1-59.3%, S2-80.7% and S3-64.3%. Other MAPs reported included: spraying insecticide: S1-20.5%, S2-26.3% and S3-17.1%, shutting door after sunset: S1-9.6%, S2-10.5% and S3-11.4%, and clearing surroundings: S1-2.9%, S2-5.3% and S3-2.9%. Ownership of bed nets was: S1-76.0%, S2-75.4% and S3-68.6%, and out of these, S1-73.1%, S2-70.7% and S3-72.4% reported that their child slept under the net the night before the survey.

The most common mosquito-avoidance practice among caregivers of under-five children was the use of bed nets, and this did not differ by level of planning and drainage of the study site. Therefore, strategies to improve and sustain the use of bed nets and to promote the use of other effective mosquito-avoidance practices should be encouraged.

Keywords: *Malaria control, Mosquito-avoidance practices, Care-givers, Under-five children.*

Introduction

Malaria remains an overwhelming global health problem. It is a disease known to be associated with poverty and underdevelopment, and is a major scourge in the vast majority of tropical and subtropical regions of the world, particularly in the tropical regions [1,2]. In 2013, the estimated number of malaria cases was 198 million, and an estimated 584,000 deaths [3]. The highest mortality levels occur in sub-Saharan Africa, where children under 5 years of age account for 90% of all deaths due to malaria [4]. Malaria is the fourth leading cause of death of children under the age of five years in developing countries [5]. Although the under-five deaths have declined from 12.0 million in 1990 to 7.6 million in 2010 globally, this reduction is unequally distributed, with India and Nigeria together accounting for a third of under-five deaths worldwide [6].

Malaria is caused by the *Plasmodium* parasite and transmitted through the bite of an infected female *Anopheles* mosquito. The majority of malaria infections are caused by *P. falciparum*, the most dangerous of the four human malaria parasites. Other parasites are *P. vivax*, *P. ovale*, and *P. malariae*. Some major causes for this deleterious situation include: high malaria transmission intensity, limited access to adequate treatment, increasing parasite resistance to affordable and safe medicines, increasing vector resistance to widely used insecticides, delayed care-seeking and

inappropriate treatment at home or community level [7,8].

Symptoms and signs of malaria, which include headache, nausea and vomiting experienced by patients infected with *P. falciparum* are usually more severe than in other malarial infections, and there is a greater tendency towards the development of delirium, haemolytic jaundice and anaemia. This type of malaria is the most difficult to control; it causes severe disease and the mortality rate is much greater than in other forms [9-11]. Young children and pregnant women are the population groups at highest risk because of low immunity. Severe malaria in young children can present with such life-threatening complications as severe anaemia, respiratory distress, repeated convulsions and unconsciousness. Severe malaria can develop from uncomplicated malaria in a few hours, especially if the malaria has not been properly treated or is caused by a drug-resistant parasite. Severe malaria accounts for a third of all childhood deaths in Nigeria [12,13]. Children who survive cerebral malaria may develop neurological abnormalities like deafness, blindness, speech disorders, epilepsy and learning disabilities, which persist in a few children with significant impairment in their development and education [14]. Due to the high burden of malaria among pregnant women and children under the age of five years, targeting women in the reproductive age group and under-five children to deal with the disease has recently been widely recognized [14,12].

In Nigeria, a child will be ill with malaria between 2 and 4 times each year. The financial loss due to malaria is estimated to be about ₦132 billion ($663,316,583) annually in form of treatment, cost, prevention and loss of man-hours [32]. Transmission of malaria occurs throughout the year, with a higher intensity in the southern parts of the country due to the longer rainy season that favours breeding of mosquitoes. The mosquito species that commonly transmit malaria are *Anopheles gambiae*, *An. funestus* and *An. arabiensis* [15].

Currently, the Nigerian malaria control programme emphasizes the behavioural change communication strategies as an integral part of the mass insecticide-treated net (ITN) distribution campaigns [13]. Understanding the local perceptions and practices could be of immense relevance to such interventions that seek to enhance a community's potential to adopt and sustain the use of ITNs. Arogundade *et al*. (2011) reported that misconceptions about prevention and causes of malaria have an impact on net usage even when ITNs are available.

In a study carried out in Nigeria, it was revealed that 40.3% of the respondents used insecticide spray every night to prevent malaria, whereas 4.4% used mosquito repellent cream, 23.8% cleared bushes around house, 25.5% slept under an ITN, 23.4% used mosquito coils and 26.2% destroyed mosquito breeding places [16]. Andrzejewski carried out a study in Ghana in which participants agreed that malaria could be prevented, and several mentioned methods through which mosquitoes can be avoided, like the use of mosquito coils, sprays, window screen as well as mosquito nets [17].

This study was carried out to investigate the various practices adopted by caregivers of under-five children (U-5C) to avoid mosquito bites and the effectiveness of such methods. The results obtained may be used by both malaria control officials and policy makers as a baseline to initiate acceptable intervention and community-based programme activities with regards to the health needs of caregivers of under-five children in relation to the socio-economic status of inhabitants.

Materials and Methods

Study Area

The study was carried out in Somolu Local Government Area (LGA), which is one of the twenty LGAs in Lagos State, Nigeria, and lies on the north of Lagos city. The LGA is densely populated (as at the last census in 2006, the population was 602,673) and it has an area of 12 km^2. Social infrastructures like roads, water, health facilities and educational institutions abound in the LGA. It is close to the lagoon and it is predominantly an Ijebu settlement with some Ilaje and Ijaw populations along the shoreline of the lagoon. There are also other tribes present due to migration.

Study Design

A descriptive, cross-sectional study was carried out to investigate geographical/ecological differentials in the

knowledge of malaria transmission and use of ITNs among caregivers of U-5C.

Sampling Technique

The study was carried out between June and July 2013. The study site was stratified into three strata, based on the road network system and the drainage system observed across the study site using Geographic Information System. This helped to control for environmental and topographical variation that is assumed to influence mosquito ecology. This resulted in three strata for the study site: (1): planned, well drained. Here, the streets were planned with a very good road network. (2): Planned, poorly drained. Here, the area had a good road network system with the streets linking each other; however, there were open drainage systems revealing litter-filled drains. (3): Unplanned, poorly drained. Here, the road network was poor, with pot holes serving as mosquito breeding sites; there was also the presence of blocked and water-logged drainage systems.

Figure 1 shows the LGA according to the level of planning and drainage system.

Sample size and sampling

The minimum sample size was estimated at a minimum of 394 using the formula for a single population proportion [18], considering the use of the cluster sampling method and the 95% confidence interval assumption, 5% margin error, 20% non-response rate and prevalence of use of ITNs among under-five children in South-western Nigeria as 28.8% [19].

The WHO Lot Quality Technique sampling method (WHO, 2006) was used to select 394 caregivers of under-five children from the study communities. The WHO Lot Quality Technique was selected so as to make judgement about individual strata, and hence formulate policies to direct resources to the strata that need it most.

The number of grids to sample in each stratum was selected proportionately and the sample size was shared proportionately among the three strata.

The sample size determined for each stratum was divided by the number of grid cells selected for each stratum to determine the number of caregivers to be studied per grid. A coin was tossed at each grid, with head up signalling that data collection should start from the right of each grid, and tail up signalling that all houses on the left with caregivers of under-five children should be sampled until the number of households in each grid was achieved. The age range of the respondents was 53 (17-70years).

Data collection methods

A pre-tested, interviewer-administered semi-structured questionnaire was administered to caregivers with at least one child under the age of five.

The questionnaire was adapted from the study of Macintyre [20] in Kenya.

Data collection procedure

To obtain high-quality data, the selection and training of research assistants is the first step. A demonstration interview was conducted by the principal investigator who was also the field supervisor to show how a good and efficient interview is conducted. To ensure inter-observer agreement, the supervisor also conducted periodic spot-check re-interviews for each research assistant as well as observing each research assistant interview respondents at least once. There was also close supervision of research assistants and editing of completed interviews to ensure that accurate and complete data were collected (quality assurance). Further information, such as the caregivers' socio-demographic data as well as mosquito-avoidance-practice and ownership and usage of long-lasting insecticide-treated nets (LLINs), was elicited.

Ethical Considerations

The study was approved by the Nigerian Institute of Medical Research Institutional Review Board. Prior to data collection, permission was sought from Somolu Local Government. Informed consent was obtained from all caregivers before interviews commenced.

Results

Socio-demographic characteristics of respondents

The socio-demographic characteristics of the caregivers are summarized in Table 1. Three hundred and ninety-four caregivers were interviewed.

Signs and Symptoms of malaria as reported by respondents according to location

Figure 1 shows the response of the caregivers on questions relating to the signs and symptoms of malaria which they observed in their children. Headache was the most-reported symptom in stratum 1 (102 participants, 32.7%) and stratum 3 (18 participants, 25.75%), whereas in stratum 2 both headache and loss of appetite had the same rate of 16 (28.1%).

Mosquito breeding sites as reported by respondents

A summary of mosquito breeding sites as reported by the caregivers is shown in Table 2. In all strata, over 60% mentioned stagnant water as a mosquito-breeding site.

Cause(s) of malaria as reported by respondents

A summary of cause(s) of malaria reported by the caregivers is shown in Figure 2.

Mosquito avoidance practices

Figure 3 presents the methods the respondents mentioned they adopt to prevent their children from being bitten by mosquitoes. Across all strata, mosquito net was the mosquito avoidance method with the highest proportion among the respondents, 147 (64.4%) in stratum 1, 61 (68.4%) in stratum 2 and 62 (64.7%) in stratum 3.

Factors influencing choice of mosquito avoidance practices

The respondents were asked about the factors influencing the method they use to prevent mosquito bite in their under-five children and what informed their choice.

Multiple mosquito avoidance practices among caregivers of under- five children

Multiple mosquito avoidance practices among caregivers of under- five children refer to the practice of at least two of the following methods: mosquito net, mosquito repellent cream, spraying insecticide (aerosol), indoor residual spraying, use of window and door screen and clearing of bushes and surroundings. Overall, ~85% of the respondents practice just one of the methods listed above, whereas ~15% practiced two or more of the methods.

Relationship between socio-demographic characteristics and the use of multiple mosquito avoidance practices

The relationship between the socio demographic characteristics of the caregivers of under-five children and their use of multiple mosquito avoidance practices is shown in Table 4. There was no significant relationship between location and use of multiple mosquito avoidance practices; however, there was a significant statistical relationship between monthly earning ($p=0.000$), education ($p=0.007$) and the use of multiple mosquito avoidance practices.

Discussion

This study showed the various methods that caregivers of under-five children adopted to protect their children from mosquito bites. It also explored some of the factors influencing the choice of mosquito avoidance practice among the respondents. Some of the factors explored included socio-economic characteristics as well as knowledge of malaria among the respondents. The results of this study showed that caregivers are actively engaged in protecting their children from mosquito bites.

Our findings also showed that the respondents are knowledgeable of the signs and symptoms of malaria. Some of the signs and symptoms mentioned include: chills and rigour, headache, loss of appetite, fever, paleness of eyes and weakness in child. It is encouraging that most respondents knew the signs/symptoms of malaria, because the correct knowledge of the signs/symptoms would significantly influence the individual's ability to take early and appropriate action to treat malaria at the onset of any of its signs/symptom.

The mentioning of headache, loss of appetite, vomiting, chills, rigour and weakness as the major signs and symptoms of malaria by caregivers were similar to those reported in previous studies in Burkina Faso, Nigeria, Ethiopia, Uganda and Cameroon [21-25,28] and agrees with malaria symptoms in clinical case management.

Among the mosquito avoidance methods mentioned, the use of mosquito nets was the most frequently mentioned method. This does

not agree with the findings of Omole *et al.* in Oyo State [12], Chukwuocha *et al.* in Imo State [26] and Muhammad *et al.* in Kano State [27], in which the use of mosquito coils, aerosols and netted windows were the main mosquito avoidance methods. The reportedly high mosquito net usage in this study could be a result of their free distribution by the Local Government as well as health officials.

Our study results are similar to a study conducted in Ethiopia by Yewhalaw *et al.* [2], in which all respondents reported practicing at least one mosquito avoidance method, but contrary to studies carried out in Kenya and Cameroon in which some respondents did not practice any form of mosquito avoidance, and the most commonly practiced preventive method was environmental sanitation [20, 28]. Our results also differ from those of Oyewole and Ibidapo [29], in which the use of fans was the most reported mosquito-bite avoidance strategy. It is also different from that obtained by Hlongwana *et al.* [30] in South Africa, in which most of the respondents used mosquito coils and aerosols, whereas others did not use any method.

It should be pointed out that the fact that all the respondents practiced mosquito avoidance may not be due to explicit knowledge of malaria transmission but could be due to the term 'nuisance avoidance', in which the individual seeks to prevent being bitten or avoid the 'humming sound' so as to sleep peacefully. This aspect was not explored in this study.

The finding that more than half of the respondents across all strata reported using mosquito nets as a mosquito avoidance practice could be due to the state-wide free distribution of LLINs, and also to the distribution of LLINs to pregnant women during antenatal care. Although health education may be an important factor in the use of mosquito nets, the toxic irritant in the saliva of the mosquito which causes irritation may be the only reason for people to adopt the use of LLINs. It is worth noting that, despite having window and door screens, most of the respondents did not report their use as a form of mosquito avoidance method, with even more reporting shutting the door after sunset.

For there to be sustained reduction in malaria cases, individuals must not only perceive malaria as a problem, but also understand its origin and cause for there to be behaviour change. This is the basis of the Health Belief Model (HBM) and it is what drives the Behaviour Change Communication (BCC) programmes, in which sensitization of the community on the challenge at hand takes place before an intervention is put in place [31]. In the case of mosquito avoidance, the use of mosquito avoidance methods should be preceded by knowledge of the mosquito as being a carrier of the malaria-causing parasite.

Few studies have been carried out to determine the use of multiple mosquito avoidance practices [20]. In our study, a very low proportion (13%) engaged in multiple mosquito avoidance practices. This is contrary to the findings of Oyewole and Ibidapo [29], in which ~67% of the participants adopted multiple mosquito avoidance methods, although it was not stated whether there was an LLIN campaign or not. We could believe that more of the respondents adopt one mosquito avoidance method because the method they practice is effective in protecting their under-five children against mosquito bite [20]. There was no significant association between location and the use of multiple mosquito avoidance methods. This is contrary to the findings of Macintyre *et al.*, in which there was a significant association between stratification of study area and the use of multiple mosquito-avoidance behaviour [20]. However, this study corroborates some other findings of the same study by Macintyre *et al.* [20], in which significant association existed between education, monthly earning, wealth quintile, and the use of multiple mosquito avoidance method. This can be explained by the fact that those who are better educated, who earn well and have more expensive household items are usually exposed to more information and can also afford to get more mosquito avoidance methods.

Conclusion

This study showed that caregivers of under-five children are actively engaged in mosquito avoidance practices, which include the use of mosquito nets, spraying aerosols, use of window and door screens and shutting doors after sunset.

The study also demonstrated that socio-economic factors, such as monthly earning, wealth quintile and education, influenced the

adoption of mosquito avoidance practices. The respondents reported that their choice of mosquito avoidance practice is because of the ease of use of the adopted method.

The frequent use of mosquito nets in the study area by caregivers of under-five children is due to health workers' advice and probably related to the fact that such mosquito nets were freely distributed to the community members.

The most common mosquito-avoidance practice among caregivers of under-five children was the use of bed nets, and this did not differ by level of planning and drainage system of the study site. Therefore, strategies to improve and sustain the use of bed nets and to promote the use of other effective mosquito-avoidance practices should be encouraged.

Figures and Tables

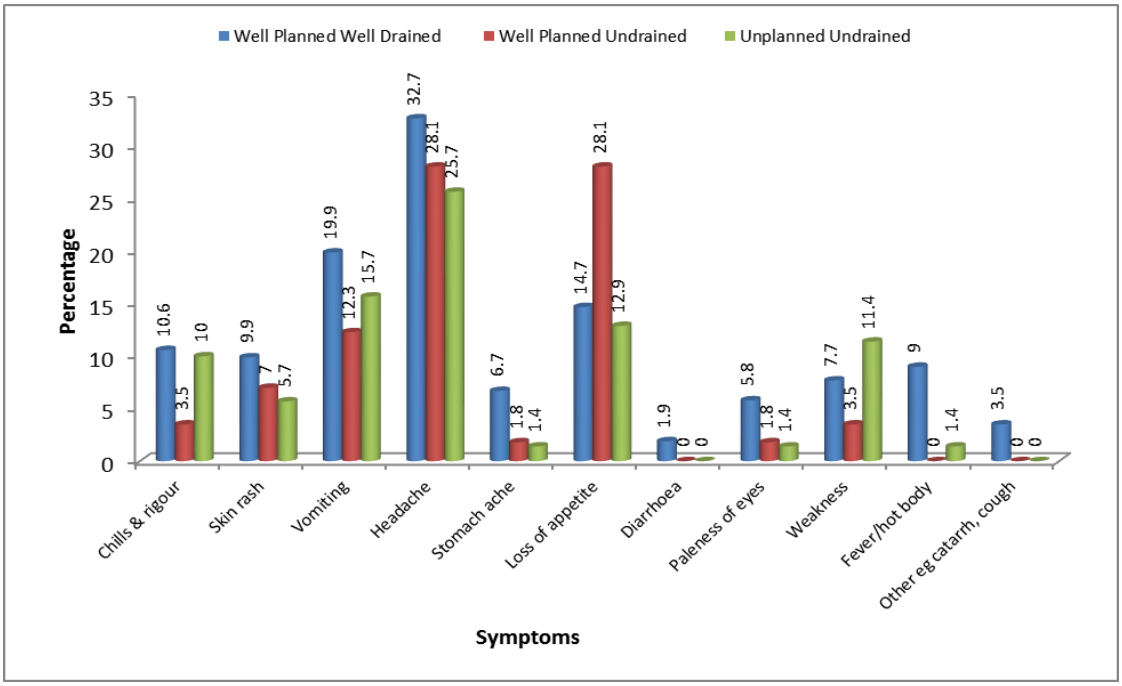

Figure. 1: Signs and Symptoms of Malaria as Reported by Respondents

Note: Multiple responses

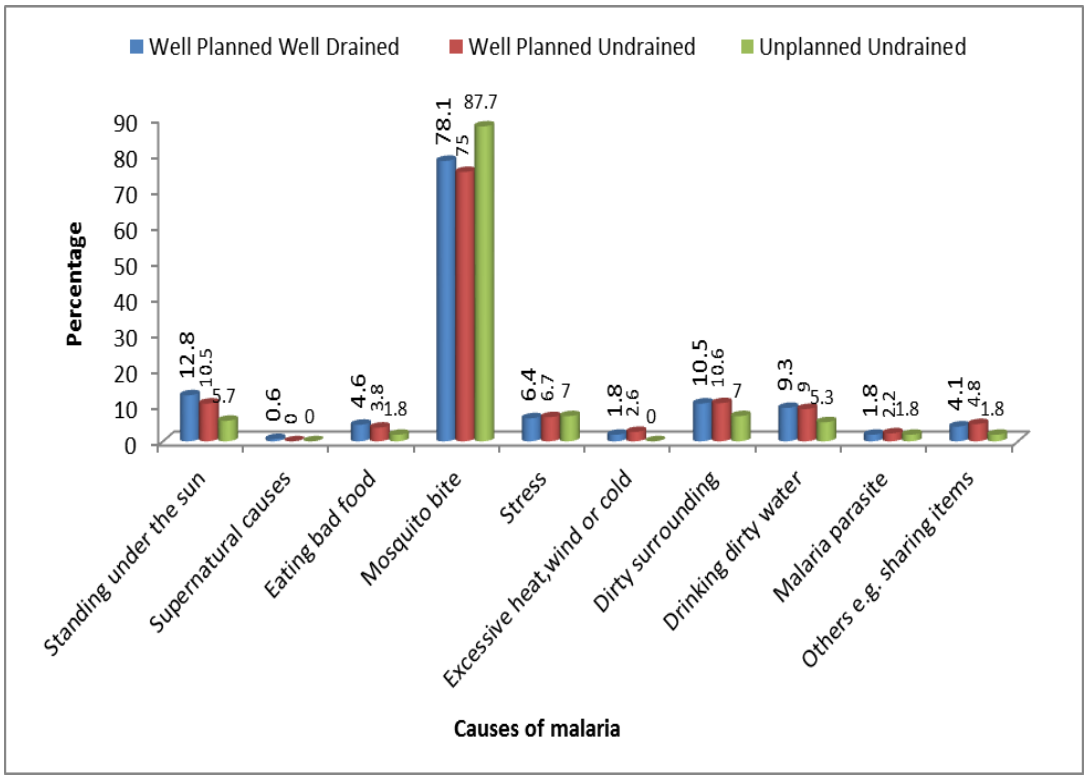

Figure. 2. Causes of Malaria as Reported by Respondents

Note: Multiple responses

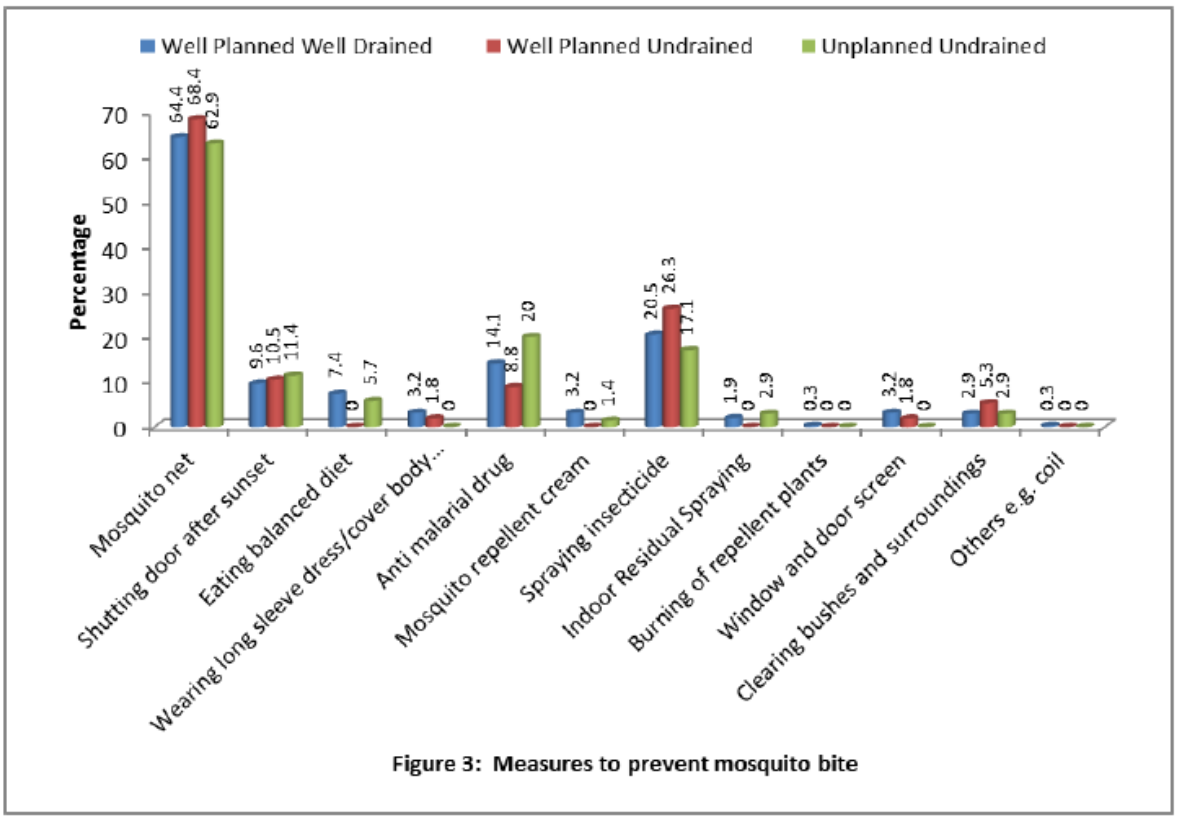

Figure. 3. Mosquito Avoidance Practices As Mentioned By The Respondents

Table 1. Socio-demographic characteristics of the care-givers. N= 394

Characteristic	**S1 n(%) N= 207**	**S2 n(%)N=89**	**S3 n(%) N=98**	**Total n (%) N=394**
Age group				
<20	8(3.8)	0(0)	0(0)	8(2.0)
20-29	56(27.2)	12(14.0)	22(22.9)	90(22.8)
30-39	107(51.9)	56(63.2)	15(15.4)	178(45.1)
40-49	27(13.1)	17(19.3)	20(20.0)	64(16.2)
>49	8(3.8)	3(3.5)	6(5.7)	17(4.3)
χ^2= 12.721, df= 8, p = 0.122				
Marital status				
Currently married	182(87.8)	86(96.5)	95(96.5)	363(92.1)
Others	25(12.2)	3(3.5)	3(3.5)	31(7.9)
χ^2= 4.186, df= 2, p = 0.123				
Occupation				
Unemployed	45(21.5)	16(17.5)	13(12.9)	74(18.8)
Student	25(11.9)	8(8.8)	10(10.0)	43(10.9)
Artisan	21(10.3)	6(7.0)	10(10.0)	37(9.4)
Trader	102(49.4)	58(64.9)	62(62.9)	222(56.3)
Civil servant	14(7.1)	2(1.8)	4(4.3)	20(5.1)
χ^2= 9.530, df= 8, p = 0.300				
Educational status				
No formal Education	15(7.4)	6(7.0)	4(4.3)	25(6.3)
Primary	9(9.3)	6(7.0)	13(12.9)	38(9.6)
Secondary	111(53.8)	58(64.9)	62(62.9)	231(58.6)
Tertiary	61(29.5)	19(21.1)	20(20.0)	100(25.4)
χ^2= 6.339, df= 6, p = 0.386				
Wealth Quintile				
Lowest	43(20.8)	12(14.0)	20(20.0)	75(19.0)
Second	36(17.3)	27(29.8)	24(24.3)	87(22.1)
Middle	38(18.3)	27(29.8)	20(20.0)	85(21.6)
Fourth	44(21.2)	11(12.3)	21(21.4)	76(19.3)
Highest	46(22.4)	12(14.0)	14(14.3)	72(18.3)
χ^2=13.897, df= 8, p = 0.084				

Note: Multiple responses

Table 2. Mosquito breeding sites as reported by respondents

	S1 n(%)	**S2 n(%)**	**S3 n(%)**	**χ^2**	**df**	**p-value**
Stagnant water	126(60.9)	54(71.9)	78(80)	10.460	2	0.005*
Uncovered water container	19(9.0)	8(8.8)	3(2.9)	2.973	2	0.226
Gutters and ditches	61(29.5)	34(38.6)	41(41.4)	5.738	2	0.057
Waste containers	11(5.4)	3(3.5)	1(1.4)	2.29	2	0.032*
Dredges from construction site	13(6.1)	0(0)	4(4.3)	3.847	2	0.146
Broad leaves of plants and weeds	7(3.5)	5(5.3)	0(0)	3.215	2	0.200

*****significant at 5% level of significance

Table 3. Factors mentioned that influenced the choice of mosquito avoidance practice N=394

*What informed choice of preventive measure	Well planned, well drained stratum n (%)	Well planned, not well drained stratum	Not planned, not well drained stratum	χ^2	df	p-value
Affordability	21(10.3)	15(14.0)	11(11.3)	1.374	2	0.503
Media	65(31.4)	33(36.8)	28(28.1)	0.660	2	0.719
Perceived Effectiveness	30(14.4)	19(21.1)	10(10.0)	3.103	2	0.212
Health worker	77(37.3)	23(26.3)	41(42.1)	6.494	2	0.039
Friends/neighbour	11(5.1)	0(0)	6(5.7)	3.172	2	0.205
Readily available	3(1.3)	0(0)	1(1.4)	0.766	2	0.682
Easy to use at home	7(3.2)	2(1.8)	1(1.4)	0.915	2	0.633
Total	207	89	98			

Table 4. Relationship between Socio demographic characteristics and multiple mosquito avoidance practices

Variable	Use of multiple mosquito avoidance practices					
	Yes	No	Total	χ^2	df	p-value
Location						
Stratum 1	42(20.4)	164(27.6)	206(79.6)	0.977	2	0.614
Stratum 2	9(10.1)	80(89.9)	89(100)			
Stratum 3	7(7. 1)	91(92. 9)	98(100)			
Monthly earning						
Less than ₦20,000	20(17.9)	92(82.1)	112(100)	20.558	4	0.000*
₦21,000-₦40,000	8(16.7)	40(83.3)	48(100)			
₦41,000-₦60,000	3(17.7)	14(82.3)	17(100)			
₦60,000 and above	9(45)	11(55)	20(100)			
Difficult to say	18(9.1)	179(90.9)	197(100)			
Wealth quintile						
Lowest quintile	8(10.1)	71(89.9)	79(100)	11.536	4	0.021*
Second quintile	5(6.3)	74(93.7)	79(100)			
Third quintile	12(15.2)	67(84.8)	79(100)			
Fourth quintile	14(17.9)	64(82.1)	78(100)			
Highest quintile	19(24.1)	60(75.9)	79(100)			
Education						
None	5(20.0)	20(80.0)	25(100)	12.252	3	0.007*
Primary	7(18.4)	31(81.6)	38(100)			
Secondary	21(9.1)	210(90.9)	231(100)			
Tertiary	25(25)	75(75)	100(100)			

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