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*P* is always italicized and capitalized.

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- iv) Expressing *P* to more than 3 significant digits does not add useful information since precise *P* values with extreme results are sensitive to biases or departures from the statistical model.
- v) Reporting actual *P* values avoids this problem of interpretation. *P* values should not be listed as not significant (NS) since, for meta-analysis, the actual values are important and not providing exact *P* values is a form of incomplete reporting.
- vi) Do not use 0 before the decimal point for statistical values *P*, alpha, and beta because they cannot equal 1.

### **Conclusions**

This should briefly state the major findings of the study.

### **Acknowledgements**

A brief acknowledgement section may be given after the conclusion section just before the references. The acknowledgements of people who aided in manuscript preparation, funding for research, etc. should be listed in this section. All sources of funding should be declared as an acknowledgement. Authors should declare the role of the funding agency, if any, in the study design, collection, analysis and interpretation of data, in the writing of the manuscript. If the study sponsors had no such involvement, the authors should so state.

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## Factors Associated with Risky Sexual Behaviours among People Living With Hiv/Aids in Bayelsa State, Nigeria

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### Abstract

*There is a growing concern over risky sexual behaviours among People living with HIV/AIDS (PLWHA) despite HIV counselling. Understanding the characteristics of PLWHA associated with risky sexual behaviours will provide information for targeted interventions. This study aimed to assess the association between socio-demographic characteristics and risky sexual behaviour among PLWHA in Bayelsa state, Nigeria. Six hundred (600) participants were recruited for this cross-sectional study from the HIV/AIDS clinics at Federal Medical Centre (FMC), Yenagoa, and Otusega Cottage Hospital, Ogbia in Bayelsa State, after obtaining informed consent. An interviewer-administered questionnaire was used to collect data comprising socio-demographic characteristics and sexual behaviours of the respondents in this study. The data obtained from the study were analyzed and presented as frequencies and percentages. Chi-square and Binary logistic regression were used to test the association between variables with statistical significance set at  $p < 0.05$ . A total of 600 PLWHA with a mean age of  $34.6 \pm 6.4$  years, comprising 160 males (26.7%) and 440 females (73.3%) were recruited. There were statistically significant associations between risky sexual behaviours and age ( $X^2 = 22.988$ ,  $P = 0.001$ :  $AOR = 2.17(1.46-3.22)$ ,  $P = < 0.001$ ), sex ( $X^2 = 9.327$ ,  $P = 0.002$ :  $AOR = 1.48(1.01-2.18)$ ,  $P = 0.044$ ), religion ( $X^2 = 17.243$ ,  $P = 0.001$ ), duration of HIV status awareness ( $X^2 = 9.983$ ,  $P = 0.002$ :  $COR = 1.69(1.22-2.35)$ ,  $P = 0.002$ ) and ART duration ( $X^2 = 10.410$ ,  $P = 0.001$ :  $COR = 1.73(1.24-2.41)$ ,  $P = 0.001$ ). Risky sexual behaviours were associated with age, sex, religion, duration of HIV status awareness, and ART duration of PLWHA in Bayelsa State, Nigeria. Focused interventions that target the dynamics of these factors could contribute to the reduction of sexual risk taken among PLWHAs.*

**Keywords:** Bayelsa State, Nigeria, PLWHA, Risky sexual behaviour.

### Introduction

Risky sexual behaviours represent a major public health challenge by serving as key drivers for the spread of sexually transmitted infections (STIs), which have become a serious healthcare problem in many countries in Sub-Saharan Africa (Maina *et al.*, 2016; Mudau *et al.*, 2018; Naidoo *et al.*, 2014). Evidence points to a complex relationship between STIs and HIV infection in which STIs have been shown to increase the risk of acquiring HIV infection (Buvé *et al.*, 2014; Ward & Rönn, 2010) and HIV infection on the other hand increases the risk of acquiring STIs (Solomon *et al.*, 2020). According to a study by Cohen *et al.* (2019), the infectious state of PLWHA is increased when they get infected with STIs because the infection causes an increase in the viral concentration in the genital tract, thus putting the HIV-naive individual at risk of getting infected. On the other hand, some STIs may cause an increase in HIV concentration in the blood, thus promoting disease progression. Hence, risky sexual behaviours among PLWHA indicate a particularly critical setback with humongous potential to erode the success attained in efforts toward control and adequate management of HIV/AIDS. By implication, engaging in risky sexual behaviours makes PLWHA prone to

contracting STIs, getting super-infected with other HIV strains, and continuing to propagate the spread of HIV to uninfected individuals.

Risky sexual behaviour refers to sexual practices that may increase the vulnerability of a person to the risk of reproductive health problems like STIs including HIV/AIDS, unwanted pregnancy, abortion and psychological distress (Adeomi *et al.*, 2014; Muche *et al.*, 2017; Tadesse & Yakob, 2015). Specifically, they have been suggested to include, engaging in unprotected sex with any partner, having multiple sexual partners, casual sex, sex under the influence of alcohol and sexual exchange (Wondemagegn & Berkessa, 2020). A study conducted in Côte d'Ivoire reported that the initiation of antiretroviral therapy (ART) was associated with risky sexual behaviour (Jean *et al.*, 2014). In Uganda, a study by Bajunirwe *et al.* (2013) reported that in a population of PLWHA on ART, alcohol consumption and ignorance of the HIV serostatus of the sexual partner predisposed people to risky sexual behaviours.

Furthermore, several studies investigated the association between initiation of ART and risky sexual behaviours among PLWHAs with conflicting reports. Some of the studies conducted in Boston (Mayer *et al.*, 2014), Uganda (Ayiga, 2012), and Cameroon (Suzan-Monti *et al.*, 2013) noted a decrease in rates of risky sexual behaviour among this population after initiation of ART. On the other hand, studies conducted in New York (Wiersema *et al.*, 2019), Nigeria (Lakshmi & Popoola, 2016), and Northwest Ethiopia (Dessie *et al.*, 2011) demonstrated that there is an increased likelihood of PLWHA engaging in risky sexual practice after initiation of ART. This indicates that other factors apart from or in combination with ART status may influence risky sexual behaviours among PLWHA. Hence, understanding the factors associated with risky sexual behaviour among PLWHA may contribute to the development of intervention strategies and policies aimed at improving their sexual behaviour towards better control of STIs including HIV infection among PLWHA and uninfected individuals.

This study aimed at assessing the association between sociodemographic characteristics and risky sexual behaviour among PLWHAs in Bayelsa state, Nigeria.

### **Study area**

Bayelsa State is one of the six States in the South-South geopolitical zone and is nicknamed "Glory of all Lands." It was created on 1<sup>st</sup> October 1996 by the former Rivers State. It got its name from 3 Local Government Areas -Brass, Yenagoa, and Sagbama. Bayelsa State has boundaries with Rivers State to the West and Northwest, then with Delta State to the East and Southeast. While to its South is the Gulf of Guinea. Its vegetation is mangrove and rainforest. Bayelsa State has a total land area of 9,059km<sup>2</sup> and is made up of 8 Local Government Areas namely, Brass, Ekeremor, Kolokuma/Okpokuma, Nembe, Ogbia, Sagbama, Southern Ijaw, and Yenagoa which is the State capital. The main occupation of the people is fishing. The 2006 National Census put the population of the state as 1,704,515 people comprising 874,083 females and 830,432 males (Bayelsa State Government, 2018). The State is blessed with vast natural resources- Solid minerals such as Clay, Limestone, and Silica. It also has the largest gas reservoir in the country (18 trillion cubic feet) and produces 40% of the on-shore of the country's crude oil (Nigerian Investment Promotion Commission, 2020). It has 25 health facilities that offer ART services, two of which are primary health facilities, two are tertiary health facilities, and the remaining 21 are secondary health facilities. The tertiary health facilities are the Niger Delta University Teaching Hospital (NDUTH), Okolobiri, and Federal Medical Centre (FMC), Yenagoa (Bayelsa State Ministry of Health, 2019).

## **Methods**

### **Study design and Study site**

This cross-sectional survey was carried out in Bayelsa state, Nigeria. One secondary and one tertiary health facility were selected for this study. The choice of the facilities where the study was carried out was achieved by independently balloting for the secondary and tertiary health facilities. Federal Medical Centre (FMC), Yenagoa was the tertiary health facility selected while Otuasega Cottage Hospital, Ogbia was the secondary health facility selected. The study was carried out between August and November 2021.

### **Ethical consideration**

Ethical approval was obtained from the ethics committee of the University of Port Harcourt (UNIPORT) with approval number UPTH/ADM/90/SII/VOLXI/1063. Administrative approval/permission was also obtained from the Ministry of Health, Yenagoa, Bayelsa state with approval number BSHREC/Vol.1/21/10-A. Written informed consent was obtained from all study participants after carefully explaining the study protocol and its significance. All materials used were de-identified by using randomly assigned research identifiers. The study participants were assured of the confidentiality of the information they provide.

### **Participants**

Study participants were selected using a multistage sampling technique. Following the selection of health facilities by balloting, the lists of PLWHA who visited the health facilities were generated from the database of the HIV clinics. These comprised of one thousand five hundred (1500) patients who then constituted the sampling frame from which participants were drawn. PLWHAs who attended the ART clinic had been on ART for at least one year, women of reproductive age (15-49 years) were included, while acutely ill persons who were unable to communicate were excluded. The probability proportional to size (PPS) method was used to determine the number of participants to be selected from each facility. This amounted to five hundred and forty (540) participants from FMC, Yenagoa that had one thousand three hundred and fifty (1350) patients who visited the HIV clinic in the previous month, and sixty (60) participants from Otuasega Cottage Hospital, Ogbia that had one hundred and fifty (150) patients who visited the HIV clinic in the previous month. All patients on the sampling frame were assigned numbers and the random start number of 3 and an interval of 2 were applied for the selection of participants from the sampling frame. A total of six hundred (600) participants were recruited for this study.

### **Study instrument and Data collection**

A pre-tested interviewer-administered semi-structured questionnaire was used to collect data in this study. The questionnaire was divided into two sections covering socio-demographic characteristics and sexual behaviour. Risky sexual behaviour was defined in this study as any of or a combination of the following behaviours: sexual intercourse with a casual partner, multiple sexual partners, sex with commercial sex workers, irregular use of condoms during sex and use of alcohol before sex.

### **Statistical analysis**

The data obtained were entered into an excel file and cleaned before exporting into the software, IBM Statistical Product and Service Solution (SPSS) version 25 for analysis. Data obtained from the study were analyzed and presented as frequencies and percentages. Chi-square and Binary logistic regression were used to test for association between variables. Statistical significance was set at  $p < 0.05$ .

## Results

A total of 600 PLWHA were recruited and a response rate of 100% was recorded in this study. The respondents comprised 160 males (26.7%) and 440 females (73.3%). Most of the respondents 340 (56.7%) were between 31-40 years, 338 (56.3%) had vocational/technical education as their highest level of education, and 284 (47.3%) were of the Pentecostal religion. The mean age of the respondents was  $34.6 \pm 6.4$  years. (Table 1).

The result shows that sex ( $X^2=10.744$ ,  $P=0.001$ ) was significantly associated with engaging in sexual risk behaviour, marital status ( $X^2=71.284$ ,  $P<0.001$ ) was significantly associated with sexual risk behaviour and religion ( $X^2=8.732$ ,  $P=0.033$ ) was significantly associated with sexual risk behaviour (Table 2). Males were 2.58 times more likely to exhibit sexual risk behaviour when compared to females. Also, respondents who were single/divorced/widowed were 7.71 times more likely to engage in risky sexual behaviours when compared with respondents who were married/cohabiting (Table 3).

**Table 1: Social Demographic characteristics**

Variable	Frequency (n=600)	Percent (%)
<b>Sex</b>		
Male	160	26.7
Female	440	73.3
<b>Age group</b>		
≤20 years	15	2.5
21-30 years	140	23.3
31-40 years	340	56.7
41-50 years	100	16.7
> 50 years	5	0.8
<i>Mean ± SD</i>	<i>34.6 ± 6.4</i>	
<b>Education</b>		
Basic primary	15	2.5
Secondary	78	13.0
Undergraduate	30	5.0
Vocational/Technical	338	56.3
Graduate	65	10.9
Postgraduate	74	12.3
<b>Marital status</b>		
Single	78	13.0
Married	457	76.2
Separated	24	4.0
Divorced	6	1.0
Widowed	13	2.2
Cohabiting	22	3.6
<b>Religion</b>		
Pentecostal	284	47.3
Protestant	87	14.5
Catholic	206	34.4

Islam	11	1.8
Traditionalist	8	1.3
Others	4	0.7

**Table 2: Factors associated with risky sexual behaviours**  
Significant at p<0.05

Variable	Sexual Risk		X <sup>2</sup> (P-value)
	No n(%)	Yes n(%)	
<b>Age group</b>			
<40 years	259(56.3%)	199(43.7)	1.902(0.168)
≥40 years	91(62.8%)	54(37.2%)	
<b>Education</b>			
Secondary education and below	272(59.0)	189(41.0)	1.115(0.291)
Tertiary education	75(54.0)	64(46.0)	
<b>Sex</b>			
Males	75(46.9)	85(53.1)	10.744(0.001)*
Females	272(61.8)	168(38.2)	
<b>Marital status</b>			
Single/Divorced/Widowed	29(24.0)	92(76.0)	71.284(<0.001)*
Married/Cohabiting	318(66.4)	161(33.6)	
<b>Income group</b>			
≤N 50,000	307(57.0)	232(43.0)	1.668(0.196)
>N 50,000	40(65.6)	21(34.4)	
<b>Religion</b>			
Pentecostal	174(61.3)	110(38.7)	8.732(0.033)*
Protestant	39(44.8)	48(55.2)	
Catholic	118(57.3)	88(42.7)	
Others	16(69.6)	7(30.4)	
<b>Duration of status awareness</b>			
≤ 4 years	189(55.9)	149(44.1)	1.165(0.280)
>4 years	158(60.3)	104(39.7)	
<b>ART Duration</b>			
≤ 4 years	203(55.2)	165(44.8)	2.783(0.095)
>4 years	144(62.1)	88(37.9)	

**Table 3: Predictors of risky sexual behaviours**

Variable	COR(95% C.I.)	P-value	AOR(95% C.I.)	P-value
<b>Sex</b>				
Males	1.84(1.27-2.64)	0.001	2.58(1.73-3.84)	<0.001*
Females	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Marital status</b>				
Single/Divorced/Widowed	6.27(3.96-9.91)	<0.001	7.71(4.78-12.42)	<0.001*
Married/Cohabiting	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Religion</b>				
Pentecostal/Protestant	1.70(0.68-4.22)	0.256	1.66(0.61-4.46)	0.316
Catholic	1.71(0.67-4.32)	0.261	1.77(0.65-4.95)	0.262
Others	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>

Significant at p<0.05

### Discussion

This present study assessed the association between socio-demographic characteristics and risky sexual behaviours among PLWHAs in Bayelsa state, Nigeria. Our results show that the factors, sex, marital status and religion, were associated with risky sexual behaviours among PLWHA in Bayelsa state, Nigeria. Significant associations between risky sexual behaviours and the sex of PLWHAs agree with previous studies (Musinguzi et al., 2014; Nakiganda et

al., 2017). Male PLWHAs were 2.58 times more likely to engage in risky sexual behaviour when compared with females. This supports previous studies among a population of young persons in Ethiopia (Muche et al., 2017), Nigeria (Odimegwu et al., 2016), and Zambia (Nshindano & Maharaj, 2008). However, it is contrary to the findings of the studies (Angdembe et al., 2015; Nakiganda et al., 2017) which reported that female PLWHAs were more likely to have unprotected sex compared to male PLWHAs attending a tertiary care government hospital in Kathmandu, Nepal and Rakai district, Uganda respectively.

In most countries within Sub-Saharan Africa, cultural practices arbitrarily confer the exclusive right to make decisions in a consensual relationship to the male figure, relegating the opinions and perceptions of the female in a bid to depict a posture of submission and dependence. These practices culminate in gender and sexual norms that embolden male promiscuity and increase risk-taking tendencies among males. This could explain our finding that male PLWHAs are more likely to engage in risky sexual behaviour compared to females. Moreso, activities related to risky sexual behaviour including having multiple sexual partners, alcohol use and substance abuse are more prevalent among males compared to females (Center for Behavioral Health Statistics and Quality, 2017).

Angdembe et al. (2015) noted that the decision to use or not use a condom was taken mostly by the males, and the females seemed to have very little or nothing to say when it came to deciding on its use. Our findings, therefore, identify male PLWHAs as a major target for effective intervention towards the control of risky sexual behaviours. An increase in the frequency of counselling and sex education for male PLWHAs may be highly beneficial in reducing their engagement in risky sexual behaviour thereby limiting the spread of HIV and other sexually transmitted infections. In addition, Nesoff et al. (2016) reported that the promotion of condom use would come from Health education interventions which are targeted towards heterosexual females where they are taught negotiation and relationship skills.

This study found a significant association between marital status and risky sexual behaviour with PLWHAs who were single (never married, divorced or widowed) being 7.71 times more likely to engage in risky sexual behaviour compared to PLWHAs living with their partner (married or cohabiting). A recent study by Adejumo et al. (2022) among people assessing HIV screening and counselling at a secondary health facility in Lagos, Nigeria reported that the chances of risky sexual behaviour occurring were 3.8-fold more among clients who were single compared to clients who were married. The study of Adejumo et al. (2022) also classified widows and divorced women as singles just like this present study, though the HIV status of the participants was not disclosed. Nonetheless, our finding gives credence to their report though with a twofold increase in the likelihood of risky sexual behaviour.

Reduced sexual risk-taking among PLWHAs living with their partner may be explained by sexual exclusivity generally practised when sexual partners live together as an expression of commitment to their relationship (Wagner, 2019). It could also be an indication of a stable sexual network between partners who live together as previously demonstrated (Direess et al., 2022). High-risk sex has also been reported among widows and divorced women (classified as singles in this study) from Sub-Sahara Africa who engaged in them due to the need for financial support (Tenkorang, 2014). Social support for this group may discourage them from engaging in this high-risk sexual behaviour thereby reducing the spread of HIV and other sexually transmitted infections.



## Conclusion

Sex, marital status and religion were associated with the engagement in risky sexual behaviours among PLWHAs in Bayelsa state, Nigeria. Focused interventions targeting these factors' dynamics could contribute to reducing sexual- risk-taking among PLWHAs.

## Disclosure of interest

The authors state that there are no known conflicts of interest regarding this study.

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# **Motivational Factors and Barriers Influencing Partograph use among Midwives in Anambra State Tertiary Health Institutions, Anambra State, Nigeria**

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## **Abstract**

*The study discussed motivational factors and barriers influencing the use of partographs among midwives in Anambra state tertiary health institutions. Descriptive design was used. The population of the study consisted of 687 practicing midwives in two tertiary institutions in Anambra. A sample of 277 midwives was drawn for the study using multi-stage sampling procedure. "Partograph Use Among Midwives in Tertiary Health Institutions "(PUAMTHI)" was used to collect data. Test experts were used in validating the instrument while reliability was determined using test-retest method with an index of 0.92. Data analyses were done using the descriptive statistics. Result showed that the major motivations that encourage the use of partograph among midwives working in tertiary health institutions are proper education and trainings (mean=3.6+0.544); periodic refresher courses (mean=3.6+0.531); employment of adequate workforce (mean=3.6+0.516); proper and adequate supervision of midwives (mean=3.5+0.528); provision of electronic partograph (mean=3.4+0.532); positive attitude (mean=3.5+0.549); and provision of PartoPen (mean=3.3+0.618). Also, the major barriers that hinder the use of partograph among midwives working in tertiary health institutions were lack of knowledge (mean=3.5+0.612); incompetency among the midwives (mean=3.4+0.641), shortage of personnel (mean=3.4+0.581), non-availability of partograph (mean=3.4+0.680), poor attitude among the midwives (mean=3.2+0.695), heavy workload (mean=3.3+0.609), tedious nature of the task (mean=3.3+0.749), and time constraint (mean=3.5+0.641). Based on this, it was recommended among others, adequate employment of a good number of midwives to overcome the issue of understaffing in labour wards towards improving the effective use of partograph in the assessment and tracking of pregnant women in labour in tertiary health institutions in Anambra State.*

**Keywords:** *Motivation, Barriers, Partograph.*

## **Introduction**

Partograph is a vital tool for health professionals who need to be able to identify pathological labour (Mezmur, Semahegn and Tegegne, 2017). It is used to recognize complications in childbirth on time and to take appropriate actions. It is observed that women in developing

countries have clearly more pregnancies on the average than women in developed nations and as such, their overall prevalence of pregnancy-related death is higher (Levin & Kabagema, 2011). It is also noted that the success of every pregnancy is primarily determined by intrapartum care. The term intrapartum is the time period spanning childbirth, from the onset of labour through delivery of the placenta. The inadequacy of this is considered a leading cause of mortality and maternal morbidity around the world (WHO, 2019). Also, women die every day from preventable causes which is associated with pregnancy and delivery, with low and lower middle-income countries contributing a greater part of such deaths. Ganchimeg et al., (2014) averred that many complications during and after pregnancy and childbirth claim the lives of women. Greater part of these problems arise during pregnancy and are either entirely avoidable. Other issues may persist before the pregnancy, but they worsen throughout pregnancy, specifically if they are not addressed as part of the woman's treatment. According to WHO (2015), excessive bleeding (mainly after childbirth), infections (typically after childbirth), high blood pressure throughout pregnancy (pre-eclampsia and eclampsia), delivery difficulties, and botched abortion account for about 75 percent of all maternal deaths. The rest are caused by or linked to infections due to malaria, as well as chronic illnesses like heart disease, kidney disease or diabetes (WHO, 2019).

With the use of partograph, it could be that many maternal deaths could be avoidable. It is obvious that all pregnant women, as well as those who give birth, require high-quality care. It is no argument that all births should be supervised by well-trained health experts, because prompt care and treatment might mean the difference in someone's life for the woman. Countries have come together to support a new objective to reduce maternal mortality by 2030 as part of the Sustainable development goal. The global maternal death rate must be reduced below than 70 / 100 000 births, with no country having a maternal mortality rate greater than twice the global average (WHO, 2015). Efforts made globally have been concentrated on minimizing maternal and newborn morbidity and mortality related with intra-partum management, especially in developing countries, in order to provide the best possible care to mothers. The usage of the partogram, which was invented by Philpott in 1972 and later amended by the WHO, is one of many programs and instruments established to continuously monitor pregnant mothers in labour.

As defined earlier, the partograph or partogram, is a preprinted paper form used to record labour observations. The purpose is to give a visual representation of labour and to notify midwives and obstetricians of any changes in the mother, fetal health or labour progress. Partograph, as per Markos and Bogale (2016), is intended for the early identification of unusual labour progression and the avoidance of delayed labour in order to minimize the risk of postpartum haemorrhage, infection, delayed labour, and the complications such as uterine rupture and obstetric fistula. As a result, partograph enables early detection and diagnosis of abnormal labour.

In 2019, it was reported that the World Health Organization studied a multicenter experiment that discovered that when the partogram was used in conjunction with a care strategy, Outcomes of labour were considerably improved. The usage of the partogram, according to the WHO, (2020), lowered the rate of extended labours, the requirement for oxytocin augmentation, cesarean section rates, and infection rates. Partograph has the potential to lower maternal and neonatal mortality and morbidity, as per Markos and Bogale (2016). Partograph, when used in a busy labour room with many cases but limited workers to screen for atypical labour, it becomes a useful tool. It eliminates the need to continually record labour activities. Partograph aids in the prediction of deviations from normal labour

progression, as well as prompt and established treatment (Yisma et al., 2013). It also makes it better for the individual doing the work to take obligation (Ollerhead & Osrin, 2014).

It is also reported that the usage of the partograph by midwives is still very minimal due to the fact that they have limited expertise on the use of the partograph. It is therefore not routinely utilized to track mothers in labour. Opoku and Nguah (2015) stated that the non-use of the partograph has a negative impact on labour outcomes and prevents prompt referrals of complex cases for prompt interventions during labour. As contained in the Safe Motherhood Initiative, the use of partograph requires skills. Impeded labour, which contributes for roughly 8% of maternal fatalities worldwide and 13% of maternal mortality in Ethiopia, is avoided when partograph is used successfully. It acts as a "forewarning mechanism" (Federal Democratic Republic of Ethiopia Ministry of Health, 2013; WHO, 2014; Levin & Kabagema, 2011).

Ikeh and Manual (2022) averred that considerable effort was put into improving the partograph as a technique for graphically representing crucial events during labour and adapting it for use around the world. Nevertheless, reports show that partograph is used at different scales in obstetric units around the world, especially in developing countries. The utility and effectiveness of partograph as an obstetric tool cut across resource-poor and developed countries. While the partograph has gained widespread acceptance from health professionals, according to Lavender and Bernitz (2020), there are worries that it has not yet realized its maximum capabilities in terms of enhancing clinical results. As per Lavender and Bernitz (2020), appropriate utilization of the partograph necessitates obstetric caregivers having a thorough comprehension of the partograph's features and monitoring, documenting, and interpreting the data obtained in order to recognize and avert maternal and neonatal problems early.

Researchers discovered insufficient documentation from assessments reported by midwives and doctors, and linked poor usage of the partograph to increased maternal mortality and morbidity rates at the hospitals. Partograph is often underused in practice in low and middle / income countries, according to researchers, with obstacles and benefits relating to the partograph itself, professional practice and skills, quality assurance, clinical leadership, and the institutional environment inside the broader stipulation of care in obstetric units. Midwives zealously conduct their necessary tasks for assessments of labour progress, mother and fetal status, and recording of discoveries. In obstetric facilities in tertiary healthcare institutes, partograph charts are easily obtainable for use by interested personnel for documenting of findings during the labour cycle.

Interestingly, midwives gather and start / open a partograph for clients on admittance, but only fill the frontal page with generic data and statistics such as date / time of admission, vital signs, cervical dilation, and membrane status, without graphing the outcomes in the graph segments. The doctors then convert the midwives' notes into visual curves on a partograph chart for continuous evaluation of typical labour progress, as well as whether to intercede or assign. The unthinkable of it all is the midwives' failure to chart their results against the alert and action lines in the graphing phase, which shows the way the labour is progressing, whether good or negative, and when to intervene. Other midwives may suggest that the charting operation is something that doctors do.

While the partogram on its own may be seen as a very simple tool, it may not be utilized as expected or even plotted well, which may then suggest that there may be challenges with the

tool, the woman or the obstetric care setting. Such challenges will undoubtedly have effects on outcomes.

Ikeh and Manual (2022) also evinced that despite the fact, that the partograph was designed for use in underdeveloped countries and rural contexts, it is now an integral part of labour care and is utilized by obstetricians and midwives in many of the settings around the world. However, how well the partogram is used in obstetric settings, specifically in emerging countries, and the barriers that influence the partograph's practical usage in management of labour are still debated. Given that documenting and record keeping have always been and remain the most important aspects of midwifery practice, the motivation for the use of partograph stem from the various advantages that it has on preventing maternal death and still birth among mothers. However, despite the challenges in utilization of partograph, there are strong reasons why they are not used everywhere especially among midwives working in tertiary health institutions in Anambra State. Hence, the aim of this research is to investigate motivational factors as well as barriers influencing the use of partographs among midwives in Anambra state tertiary health institutions.

### **Methodology**

Descriptive-survey design was adopted by the researcher in the study. Population of the study consisted of 687 practicing midwives working in Nnamdi Azikiwe University Teaching Hospital (NAUTH) and Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COUTH).

### **Sample Size Determination.**

Sample size of 277 midwives was chosen to participate in the study. Sample size calculation was done using Taro Yamane's formula. Also, the proportionate sampling technique was employed in this study to select sample from each of the two tertiary health institutions based on each population with the formula.

### **Data Collection**

Data collection was done with the use of an instrument titled "**Motivations and Barriers to Partograph Use Among Midwives in Tertiary Health Institutions "(MBPUAMTHI)".** It was structured in two sections: A and B. Section A was designed to elicit demographic data of the respondents, while section B consisted of 36 items on the Midwives' Knowledge of partograph, the use of Partograph among midwives, the Barriers influencing and Motivations on the use of partograph in tertiary healthcare institutions in Anambra State. The questionnaire was structured using the 4-point Likert scale format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) rated as 4, 3, 2 and 1 for positively skewed items. The questionnaire was validated by giving copies to the researcher's supervisors and experts in Midwifery, as well as test and measurement to assess the content for clarity, congruence with the study objectives and appropriateness of language. The reliability of the instrument was done using test-retest method. After administration to a pilot group, collation was made and correlation was done using Pearson Product Moment Correlation with an r-coefficient value of 0.92. The administration and collection of data was done on face to face basis.

### **Method of Data Analysis**

Data analyses were done using the descriptive statistics of simple frequency, mean and percentages as well as inferential statistics of t-test, and spearman ranking correlation.

**Result**

**Table 1**

Item by item Analysis of the motivators influencing the Use of Partograph among Midwives in Anambra State

S/N	Item	Mean	Std. D
1. 29	Proper education and trainings of the midwives in their training institutions encourages the usage of partograph	3.6	.54397
2. 30	Refresher courses e.g. workshops and on the job training, after graduating from training institution encourages midwives' skill to use partograph in labour	3.6	.53119
3. 31	Employment of adequate midwives on duty encourages their use of partograph	3.6	.51633
4. 32	Adequate supervision of midwives working in maternity wards, influence their use of partograph positively	3.5	.52852
5. 33	E - learning increase the knowledge of midwives' use of partograph in labour	3.4	.55272
6. 34	Provision of electronic partography that prompt assessment and action, will help midwives to overcome gaps in their knowledge of using partograph	3.4	.53166
7. 35	Provision of PartoPen (a digital pen, that assist in documentation and provide prompts and decision support to the midwives) will encourage the use of partograph	3.3	.61907
8. 36	Midwives positive attitude encourages their use of partograph in monitoring of labour	3.5	.54921

The result from Table 1 shows that mean values of responses on items 1-8 which aimed to determine the motivations influencing the use of partographs among midwives in tertiary health institutions ranges from 3.3 - 3.6 with corresponding standard deviations of 0.52-0.62. The mean responses are all higher than the criterion mean value of 2.50 and were all accepted.

The result inferred that the midwives accepted that proper education and trainings of the midwives in their training institutions encourages the usage of partograph; refresher courses e.g. workshops and training on the job, after graduating from training institution encourages midwives' skill to use partograph in labour; employment of adequate midwives on duty encourages their use of partograph; adequate supervision of midwives working in labour wards, influence their use of partograph positively. They further agreed that e - learning increase the skill of midwives in using partograph in labour; provision of electronic partograph that prompt evaluation and action, will help midwives to overcome gaps in their knowledge of using partograph; provision of PartoPen (a digital pen, that assist in documentation and provide prompts and decision making to the midwives) will encourage the partograph use; and that midwives positive attitude encourages their use of partograph in evaluation of progress of labour.

**Table 2**

Item by Item Analysis of the Barriers Influencing the Usage of Partograph among Midwives in Anambra State

S/N	Item	Mean	Std. D
1	Lack of knowledge hinders the use of partograph by midwives in monitoring labour	3.5	0.61
2	Plotting of partograph is additional task	3.3	0.74
3	Plotting of partograph is duplication of work	3.2	0.71
4	Lack of midwives competency and skill hinders the use of partograph	3.4	0.64



5	Plotting of partograph is time consuming	3.5	0.64
6	Shortage of midwives on duty hinders the use of partograph	3.4	0.58
7	Heavy workload in labour ward hinders the use of partograph in monitoring labour	3.3	0.60
8	Non availability of partograph charts limits the use of partograph	3.4	0.67
9	Poor attitude of some midwives hinders the use of partograph to monitor labour	3.2	0.69

The result from Table 2 shows that mean values of responses on items 1-9 which aimed to determine the barriers influencing the use of partographs among midwives in tertiary health institutions in Anambra State ranges from 3.2 - 3.5 with corresponding SDs of 0.58 - 0.74. The mean responses are all greater than the criterion mean value of 2.50. The result indicated that the midwives concurred that lack of knowledge hinders the use of partograph among midwives in monitoring labour; plotting of partograph is additional task, duplication of work, and time consuming; lack of midwives competency and skill hinders the use of partograph among midwives. They further acknowledged that shortage of midwives on duty hinders partograph use among midwives; heavy workload in labour ward hinders midwives partograph use in monitoring labour; non availability of partograph charts limits the use of partograph; and that poor attitude of some midwives hinders the use of partograph labour monitor.

**Table 3**  
*One-sample t - test Analysis of Influence of Motivations on the Use of Partograph among Midwives Working in Tertiary Health Institutions in Anambra State*

	T	t <sub>table</sub>	Df	Mean difference	Sig.
Incentives influencing usage	171.8	1.660	276	28.2697	.000

Table 3 t-test table shows that at degree of freedom of (276), the calculated t-test value is 171.8, p-value obtained is 0.000 while the t<sub>table</sub> value is 1.660. The t<sub>cal</sub>>t<sub>table</sub> while the p-value obtained (0.000) is less than the 0.05. This concludes that there is momentous disparity in the identified motivations influencing the use of partograph among midwives in tertiary health institutions in Anambra State. The significance difference mean is 28.26.

**Table 4**  
*One-sample t-test Analysis of Barriers Influencing the Use of Partograph among Midwives Working in Tertiary Health Institutions in Anambra State.*

	t <sub>cal</sub>	t <sub>table</sub>	Df	Mean difference	Sig.
Barriers influencing usage	152.7	1.660	276	30.5769	.000

Table 4 t-test table shows that at degree of freedom of (276), the calculated t-test value was 152.7, p-value obtained was 0.000 while the t<sub>table</sub> value was 1.660. The t<sub>cal</sub>>t<sub>table</sub> while the p-value obtained (0.000) was less than the 0.05. This concluded that there was significant difference in the identified barriers influencing the use of partograph among midwives in tertiary health institutions in Anambra State. The significance difference mean is 30.57.

**Discussions of Findings**

Result obtained from this work revealed that proper education and trainings (mean=3.6+0.544); periodic refresher courses (mean=3.6+0.531); employment of adequate workforce (mean=3.6+0.516); proper and adequate supervision of midwives

(mean=3.5+0.528); provision of electronic partography (mean=3.4+0.532); positive attitude (mean=3.5+0.549); and provision of PartoPen (mean=3.3+0.618) are the main motivations influencing the use of partographs among midwives at tertiary health institutions in Anambra State. The findings in this result is related to the ones obtained by numerous authors who had undertaken similar studies; proper and adequate supervision, and periodic refresher courses identified by this study were also identified by Opoku and Nguah (2015) to be among the motivations that encourages the usage of partograph among midwives in selected delivery centers of the Accra Metropolis Health facilities, Ghana. Seminars and periodic workshops were also affirmed by Opiah et al. (2012) as motivational factors in their study.

It was revealed that lack of knowledge (mean=3.5+0.612); incompetency among the midwives (mean=3.4+0.641), shortage of personnel (mean=3.4+0.581), non-availability of partograph (mean=3.4+0.680), poor attitude among the midwives (mean=3.2+0.695), heavy workload (mean=3.3+0.609), tedious nature of the task (mean=3.3+0.749), and time constraint (mean=3.5+0.641) were the main barriers influencing the use of partographs by midwives at tertiary healthcare institutions in Anambra state. Although the study discovered that the midwives have adequate knowledge of partograph and uses it during labour; it also discovered that some barriers are preventing the effectiveness of using partograph. These identified barriers are issues that could be tackled through proper and effective policies: Policies that incorporates periodic training and seminars for midwives, encourages competency and good attitude among midwives; employment of competent and adequate workforce, and allocation of manageable workload. The findings of the investigation was similar to that obtained by Assifuah (2018) , who reported that inefficient knowledge, and poor motive on good attitude on the use of the partograph recordings are among the barriers influencing the usage of partograph among midwives in the Cape Coast;. Ingwu et al. (2018) who identified absence of periodic training of nurse-midwives and non-available partograph charts as the factors that discouraged the use of partograph among midwives in tertiary hospitals in Enugu; Musiime (2018) who identified understaffing, and absence of in-service training as the factors that prevented the usage of partograph among midwives in Kiryandongo District, Kampala. Furthermore, studies by Haile et al. (2020), Opiah et'al. (2012), Zelellw et al. (2018) also confirm the results of this research work when they reported that caregivers level of knowledge is significantly related to the level of utilization of patographs.

### **Conclusion**

Based on the findings, it is concluded that there are a lot of factors that motivates midwives working in tertiary health institutions in Anambra state towards the use of partograph during labour. Despite this, there are also some factors that act as barriers to the effective use of partograph. In any case, it is only a well-managed situation that can bring the best and yield a safe delivery. It is he hospital management board should put in place a hospital practice guideline policy as standard operation procedures on the utilization of partograph in maternity wards.

Adequate employment of a good number of midwives to overcome the issue of understaffing in labour wards towards improving the effective use of partograph in the assessment and tracking of pregnant women in labour in tertiary health institutions in Anambra State.

### Limitations to the Study

The process of this research was constrained by the problems of data collection for the study as most midwives were busy when the researcher visited their institution.

### Contribution of Author

All authors confirm total contribution to the paper all-rounded beginning from the study conception and design, data collection, analysis and interpretation of results. The corresponding author (Mrs Pauline) was responsible for writing the manuscript, design as well as collection of data. The second authors (Dr. Manuel) as well as the third author (Dr. Nnabuenyi) were totally responsible for mentorship, encouragement, strict supervision, proof - reading analysis and interpretation of the findings.

### Conflict of Interest

Prior to the commencement of the investigation, there was no conflict of interest.

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# **Enablers and Bottlenecks to Infection Prevention and Control Policy Guidelines Implementation in Low- and Middle-Income Countries – A Systematic Literature Review**

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## **Abstract**

**Background:** Healthcare associated infections continue to be a major concern for all particularly low-and middle-income countries. This systematic review therefore seeks to identify enablers and bottlenecks to Infection Prevention and Control (IPC) policy guidelines implementation in low-and middle-income countries.

**Methods:** Articles published on the topic in English between January 1, 2000 and December 31, 2021 were searched in Google Scholar, Medscape, PubMed, Scopus, Global Health, and African Index Medicus. Articles obtained were then reviewed for quality and as well as full text of the articles extracted.

**Results:** Of the 115 articles initially identified, 8 were eligible for inclusion. These were studies published from 2014 and 2021 in Ghana. The findings from the reviewed literature observed that the major enablers to IPC implementation were implementation fitness, influential individuals and peer-to-peer learning. Additionally, major bottlenecks to its implementation in low- and middle-income countries are IPC education and training, negative culture and attitude of IPC guidelines end users as well as lack of infrastructure to support the program.

**Conclusion:** This study concluded that the major factors that contribute to the smooth implementation of infections prevention and control programs are education and training, provision of requisite infrastructure as well as the attitude of the end users. The significance of IPC in our health settings needs to be reemphasized and its implementation revitalized especially in the advent of highly infectious diseases such as COVID-19 which has exposed the huge gap in various resource limited settings. It is important to consider the major factors that contribute to the effective implementation of IPC into consideration to ensure its success.

**Keywords:** *Infection Prevention and Control, Hospital Acquired Infections, Health care delivery.*

## **Introduction**

Globally, healthcare-associated infections pose a major concern in all healthcare systems (Langford et al., 2018). Low- and middle-income countries (LMICs) are hard hit by this phenomenon due to their already weak healthcare systems. However, the emergence of various diseases, such as COVID-19, Ebola among others, and their threatening effects to life knows no boundaries. This therefore calls for revitalization of our infection prevention and control (IPC) mechanisms needed to reduce and aid in the eradication of these diseases. Constant evaluation of the IPC programs by health facilities is also necessary so as to identify drawbacks in the program to be addressed in order to enhance the overall performance of the program in ensuring the effective prevention and interruption of disease transmission among patients and health practitioners both within and without our healthcare centers.

Various infections prevention and control policy guidelines have been created in various countries in an attempt to deal with healthcare-associated infections. For instance, Sierra Leone developed an infection prevention and control policy document in 2016 after their experiences with the Ebola epidemic and the lessons learnt (Kanu et al., 2019). A similar document was developed in 2015 in Ghana to streamline practices in health care settings (Akagbo et al., 2017). Infection prevention and control (IPC) policy document in both countries, like other settings, have the sole aim of assisting healthcare workers to gain the needed skill in standard practices that are nationally and globally accepted and to ensure patients safety and that of health workers (Sunkwa-Mills et al., 2020).

Though the IPC documents developed in various LMICs are comprehensive, they are faced with various challenges in their implementation in various health settings. This study therefore seeks to review enablers and bottlenecks to IPC implementation in low- and middle-income countries.

## **Methods**

### **Literature Search Strategy**

#### **Keywords used/ Search terms**

A wide range of search terms were initially used to cover a broad scope of knowledge in order to capture the scope of this review. Afterwards, key word synonyms were identified and combined with key words to allow a more comprehensive search.

#### **Eligibility Criteria**

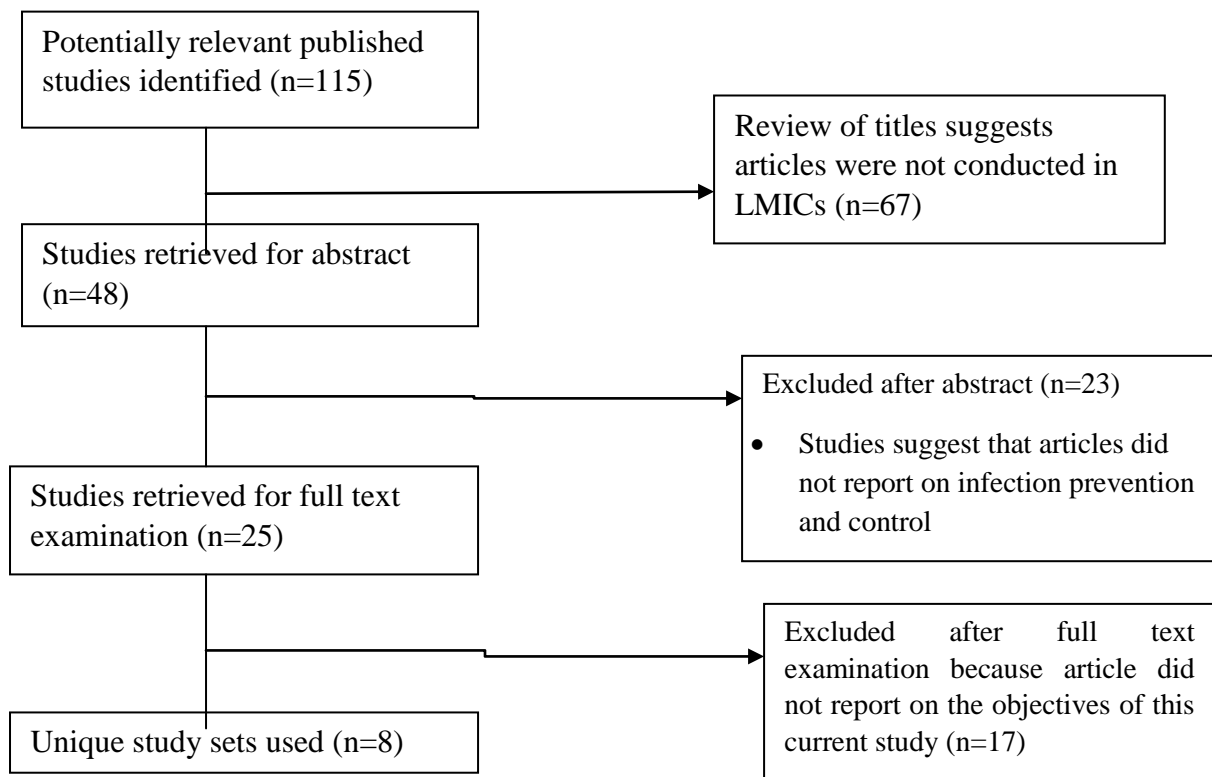
All articles that were found on the subject matter in English had their abstracts read. Those that were found to have reported on the enablers and barriers to infection prevention and control were included in the study. Consequently, duplicate articles as well as those published in languages other than English were excluded from the study.

#### **Databases Searched**

Relevant literature from published articles and books related to the specific objectives of the study. Search engines and databases such as Google scholar, Medscape, PubMed, Scopus, Global Health and African Index Medicus were used to obtain electronic information on the topic.

### Number of Literature Results found

This systematic review was done based on Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Ayosanmi et al., 2022; Saleem et al., 2019). The study selection approach was in three steps. The first involves the identification of potentially relevant published studies via data base searches; the second step involves the reviewing and scrutiny of abstracts of articles carefully to identify those relevant to the study; afterwards full text scrutiny and review was conducted to confirm that the articles met the inclusion criteria and the final stage was their inclusion into the study. These steps followed are demonstrated in the Figure 1.0 below. One hundred and fifteen (115) potentially relevant published studies were identified out of which sixty-seven were dropped because titles suggested articles involved studies that were not conducted in low- and middle-income countries (LMICs). Again, twenty-three (23) articles were excluded because studies did not report on infection prevention and control. Final examination of remaining articles excluded seventeen (17) articles because the studies did not report on the required specific objectives which are the enablers and bottlenecks to implementation of infection prevention and control policies. Eight (8) articles met the eligibility criteria and were considered for review. Name of first author, year of publication, study design, study objectives, were extracted from articles that were identified and selected for inclusion in the review process.



**Figure 1.0 PRISMA Diagram**

### Results

The Table 1 below summarizes the findings on the enablers and bottlenecks to infection prevention and control guidelines implementation in low-and middle-income countries (LMICs). Six (6) articles reported on bottlenecks and challenges to the smooth implementation of IPCs with two (2) on the enablers. Among the major challenges to IPC implementation are education and training of healthcare workers and sensitization of patients,

lack of hospital infrastructure and human resource, lack of monitoring and surveillance as well as financial constraints

**Table 1: Summary of Findings**

<b>Authors (Year)</b>	<b>StudySite/ Country of Study</b>	<b>Topic</b>	<b>Enablers to IPC</b>	<b>Bottlenecks</b>
Khan et al., (2018)	Pakistan	Factors hindering the implementation of surgical site infection control guidelines in the operating rooms of low-income countries: a mixed method study		The major challenges reported in their study included surveillance, knowledge, education and training and healthcare workers culture of infection control
Brouwer et al., (2014)	Mozambique	Healthcare workers challenges in the implementation of tuberculosis infection and control measures in Mozambique		Healthcare workers find it difficult to clearly interpret guidelines contributing to guidelines
Lowe et al., (2021)	Multi sites (Central African Republic, South Sudan, Democratic Republic of Congo, Mali, Nigeria, Lebanon, Yemen and Afghanistan)	Challenges and opportunities for infection prevention and control in hospitals in conflict-affected settings: a qualitative study		Inadequate hospital infrastructure, resource and workforce shortages as well as inadequate education and training of staff on infection prevention and control
Clack et al., (2019)	Multi-site (Kenya, Uganda, Zambia and Zimbabwe)	Implementation of a surgical unit-based safety program in African	The study reported influential individuals, peer-to-peer learning, implementation	



Rajakaruna et al., (2017)	hospitals: a fitness multicenter qualitative study	Strategy and technology to prevent hospital-acquired infections: Lessons from SARS, Ebola and MERS in Asia and West Africa	The study found that healthcare systems and hospital management in affected healthcare facilities had poor strategies in IPC implementations
Cooper et al., (2016)	Liberia	Infection Prevention and Control of the Ebola Outbreak in Liberia, 2014-2015: Key Challenges and successes	The study reported the lack of supplies such as personal protective equipment (PPEs), running taps to be among the major challenges to IPC implementation
Mugomeri, (2017)	Lesotho	The efficacy of infection prevention and control committees in Lesotho: A qualitative study	Major challenges as observed in their study is poor sense of competence, administrative constraints, inadequate financial support as well as negative staff attitude.
Ashinyo, (2021)	Ghana	Ghana beyond the epi-curve: Initial lessons learned from the implementation of IPC measures in the COVID-19 response	The study reported the enablers to IPC guideline implementations as good governance, human resource capacity building, adequate logistic supply and IPC Education

Additionally, key enablers for infection and prevention policy guideline implementation were influential individuals, peer-to-peer learning, implementation fitness as well as good governance characteristics

## **Discussion**

Regarding the enablers of IPC policy guideline implementations, the findings from this reviewed literature observed that the major enablers to IPC implementation were implementation fitness, influential individuals and peer-to-peer learning. Additionally, major bottlenecks to its implementation in low- and middle-income countries are IPC education and training, negative culture and attitude of IPC guidelines end users as well as lack of infrastructure to support the program.

Clack and his colleagues in a study conducted among five hospitals in four sub-Saharan African countries found implementation fitness to be an important enabler (Clack et al., 2019). In their explanation, they pointed out that momentum characterized by the building on the energy that was already channeled towards quality improvement from previous projects are extremely crucial. Additionally, enabling infrastructure such as knowledge, surveillance systems and practices already in place because of previous quality improvement initiatives serve as a foundation for the introduction of new practices in scenarios including the implementation of IPC guideline policies. Ashinyo (2021) further buttressed the points made by Clack et al., (2019). She raised the fact that these enabling infrastructure earlier discussed is a function of good governance, human resource capacity building and IPC Education and training.

Again, Clack et al., (2019) in the same study observed that influential individuals as well as peer-to-peer learning was an important determinant of IPC implementation success. In other words, when IPC policy is championed by individuals who command a lot of respect in their institution, it helps in their success. They also mentioned the importance of transfer of knowledge from one worker to the other. This stands to suggest that healthcare workers tend to learn faster from their colleagues than from formal settings. Therefore, to build a system or a policy that lasts, it is important to contact grassroots influential individuals train them adequately for them to act as agents of change in their departments and hospital settings.

Brouwer et al. (2014) in their Mozambican study conducted to determine the challenges of implementing infection prevention measures found that most end users of the policy document had difficulty in interpreting the IPC documents. This suggested that the stakeholders involved in the policy document development either did not use clear language or it was not properly explained to the end users. The latter is more likely. The above finding also points to the fact that healthcare workers and other key stakeholders who are the end users of the IPC documents have low education of the subject, hence the observation.

Other related studies have reported similar findings on the role of low infection prevention and control education on its implementation. These include a study in Lesotho by Mugomeri, (2017), various conflict-stricken areas (Central African Republic, South Sudan, Democratic Republic of Congo, Mali, Nigeria, Lebanon, Yemen and Afghanistan) by Lowe et al., (2021) as well as in low- and middle-income country (Pakistan) by Khan et al., (2018). This suggests that infection prevention and control (IPC) education and training is a very big challenge that confront low-and middle-income countries that requires urgent attention.

Finally, Mugomeri (2017) as well as Khan et al., (2018) observed that there is a negative culture and attitude relating to the acceptance of new trends and guidelines. This according to their served as a major challenge in the implementation of infection prevention and control guideline policies in low-and middle-income countries.

## Conclusion

This study concluded that the major factors that contribute to the smooth implementation of infections prevention and control programs are education and training, provision of requisite infrastructure as well as the attitude of the end users.

## Recommendation

The significance of IPC in our health settings needs to be reemphasized and its implementation revitalized especially in the advent of highly infectious diseases such as COVID-19 which has exposed the huge gap in various resource limited settings. It is important to consider the major factors that contribute to the effective implementation of IPC into consideration to ensure its success.

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## **Trends in Malaria Diagnosis: A preference for a combination of Rapid Diagnostic Test (RDT Combo) at Point-of-Care**

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### **Abstract**

*Malaria diagnosis is one of the guidelines considered by the World Health Organization on the road to eliminating malaria parasites worldwide. There is a high need for an affordable and acceptable method of malaria diagnosis in the African region due to the high burden of the disease. This technical review aims to understand the current malaria diagnostic methods and to know, if a combination of diagnostic methods or types could yield better results in resource-constrained countries. Pieces of literature that are relevant to malaria diagnosis were identified through a thorough search of an online database, malaria guidelines and technical reports. The study identified different types of malaria diagnostic methods (Malaria Microscopy, Clinical Diagnostic Method, Polymerase Chain Reaction (PCR), Loop-Mediated Isothermal Amplification (LAMP), Nucleic Acid Sequence-Based Amplification (NASBA), Saliva-Based Test with Nucleic-Acid Amplification, Saliva-Based Plasmodium Protein Detection, Urine-Based Malaria Test, Transdermal Hemozoin Method, and Rapid Diagnostic Tests). Malaria microscopy remains the gold standard while Rapid Diagnostic Tests (RDTs) is the only relevant and affordable type of malaria diagnostic method at point-of-care, especially in resource-limited countries but with some limitations. Identified limitations (deletion and false negatives) for single RDT forms. Plasmodium Glutamate dehydrogenase (pGDH), Fructose-bisphosphate aldolase (aldolase), P. falciparum lactate dehydrogenase (pLDH), and Plasmodium Histidine-Rich Protein 2 (pHRP 2) were reduced with the introduction of a combination of RDTs (e.g pHRP 2/pLDH) combo). Therefore, the adoption of RDT combo for malaria diagnosis before treatment in resource-constrained regions would aid in reducing malaria to zero levels in nearest future.*

**Keywords:** *Malaria diagnosis, Resource-limited, Rapid Diagnostic Tests (RDTs), Microscopy.*

### **Introduction**

Malaria is a public health menace, affecting both old and young human beings by presenting with asymptomatic or uncomplicated (WHO, 2018) but could cause fever, headache, tiredness, anaemia, respiratory distress, convulsions in many children, and hypoglycemia. Eventually, becomes fatality becomes evident when malaria is not diagnosed and treated early (Pulido et al., 2021). World Health Organization (WHO) report shows that there are 241 million estimated cases of malaria in the world, this global record spread across 85 endemic countries, and Nigeria has the largest population of people with the highest burden of the disease (WHO, 2021). The estimated total death due to malaria was 558,000 in 2019 but in 2020, it increased to 627,000 amounting to a 12% increase. From now till 2030, an average of \$850 million would be committed to malaria research and development programmes every year to achieve the goal set for malaria elimination in the world. A series of research showed that malaria parasite is much higher in African countries than in other European countries (Ezeoru et al., 2021).

The most virulent malaria parasite is the *Plasmodium falciparum* but there are other species which infect humans namely: *P. malarie*, *P. ovale*, *P. vivax*, and *P. knowlesi*. Generally, malaria infects the red blood cells a female *Anopheles* mosquito serves as the vector. There are over four hundred anopheline species in the world but only 25 to 30 species transmit *Plasmodium* from one person to another (Bango et al., 2020). There are well-established characteristics that enhance the global distribution of the anopheline mosquitoes, and by devoting the transmission of the disease, they include insect biting rate, effectiveness, longevity and density of the vector (Bango et al., 2020). Diagnosis and treatment are some of the major guidelines for reducing the threat of malaria. While the development of a vaccine against the malaria parasite has witnessed a great set back by the evasion mechanism by the parasite, the novel malaria RTS,S subunit vaccine had only 30% to 50% efficacy seems to be a good start for the journey to the development of a vaccine against malaria parasite (Mahmoudi & Keshavarz, 2017). Having this record, prompt and continuous malaria diagnosis together with the use of an appropriate drug regimen has been adopted as one of the major ways to reduce the transmission of the malaria parasite. This review, therefore, aims to understand the current malaria diagnostic methods and to know, if a combination of diagnostic methods or types could yield better results in resource-limited regions.

### **Data collection methods**

The study involved the collation of previously published research work from well-accepted journals. Electronic search, through an online database such as PubMed, Google Scholar, or Ebscohost; searches with Boolean operators (“and/or”) in September 2022. Published framework by World Health Organization, National malaria control programme, and African Malaria control guidelines were accessed for holistic review.

## **Results**

### **Malaria diagnostic methods**

#### **Malaria Microscopy**

The use of thick and thin blood films remains the gold standard as recommended by the world health organization. Blood collection could be through a finger prick or venipuncture, blood films are stained with Giemsa, Wright's, or Field's stain before the microscopic examination (Warhurst & Williams, 1996). The specificity and sensitivity of this method are between 95% and 98%, which makes this method more acceptable although there are some disadvantages accompanying malaria microscopy. A well-trained microscopist, labour intensive are required (Oboh et al., 2021), well-maintained quality reagent, high-quality binocular microscopes, and it is time consuming (WHO, 2021). Provision for constant electricity is important. In Nigeria, and other developing countries, there are records of epileptic supply of electricity, this could delay the time required for the test result.

#### **Clinical Diagnostic Method**

This method is cost-effective; it involves the observation of symptoms that are associated with malaria infection in patients. These symptoms are fever, chills, weakness, headache, malaise, anaemia, anorexia, dizziness, splenomegaly, and other symptoms that are generally associated with flu (Desakorn et al., 2005). It should be noted that since this method of malaria diagnosis is based solely on the symptoms that are associated with the disease, other diseases could present these symptoms. Therefore, relying singly on this method for malaria diagnosis should be avoided (Desakorn et al., 2005), because these symptoms could vary from one geographical zone to another or from one country to another

### **Polymerase Chain Reaction (PCR)**

There are different types of PCR methods; this includes nested PCR, multiplex real-time PCR, and reverse transcriptase PCR. Generally, the PCR method in the amplification of malaria target genes on the 18S rRNA of the malaria parasite (Cordray & Richards-Kortum, 2012) in the blood samples via specific primers (forward and reverse). This method is more sensitive, it can identify both symptomatic and asymptomatic malaria in patients. Although this method is better than other types, it takes more than two hours for the test result to be completed. Besides, it is expensive, requires expertise and training and retraining of personnel, and the equipment and the consumables are also expensive (Oriero et al., 2015) which is difficult for resource-poor countries to easily access.

### **Loop-Mediated Isothermal Amplification (LAMP)**

This method was described in 2000, it is a form of nucleic-acid amplification which involves staining with calcein and hydroxyl naphthol blue for proper visualization (Abdul-Ghani et al., 2012). When compared to microscopy, the sensitivity ranges from 98.3% to 100%. This method is faster when compared to PCR and it does not require a thermocycler during the amplification process but trained personnel is also required (Polley et al., 2010).

### **Nucleic Acid Sequence-Based Amplification (NASBA)**

Three enzymes – reverse transcriptase, T7 RNA polymerase, and RNase H are involved in the amplification of 18S RNA (Oriero et al., 2015). Thermocyclers are not involved in the amplification process. The sensitivity of this method ranges from 97.4%-100% and a specificity of between 80% and 94% (Cordray & Richards-Kortum, 2012). This method had a low detection rate and it involves skilled personnel.

### **Saliva-Based Test with Nucleic-Acid Amplification**

In this method, nested PCR is used to detect the plasmodium gene, 18S rRNA or *P. falciparum* dihydrofolate reductase gene in the saliva. Two sets of primers are used in two successive PCR steps, during which, the product of the first PCR is used as a template for the second reaction (Mfuh et al., 2017). The cost of this test is high and skilled personnel are required. Most times, the procedure takes six hours before completion, but the use of saliva does not require prolonged training by health personnel.

### **Saliva-Based *Plasmodium* Protein Detection**

This method involves the detection of specific *Plasmodium* proteins in the saliva of infected patients. The sensitivity of this method ranges between 77.9% and 97.2% depending on the region where the test was conducted (Gbotosho et al., 2010). One of the limitations of this method is the ability to detect only 1-10 gametocytes per microL of blood. However, this method requires less time to be completed.

### **Urine-Based Malaria Test**

This urine-based form of malaria test involves the detection of *Plasmodium* protein pHRP-2. The method involves dipping the test strip into urine samples for 2-3 minutes and incubating for 20 minutes (Oguonu et al., 2014). Detection of pHRP-2 from *P. falciparum* is considered a limitation of this method but the use of urine is an added advantage because it is relatively affordable.

### **Transdermal Hemozoin Method**

In this method, an ultrasound sensor is used to detect hemozoin-generated vapor nanobubbles. The hemozoin is a waste product of hemoglobin digestion by the blood stage of the parasite. It involves an application of a short laser pulse to blood vessels through the skin. This short laser does not affect the skin when applied and the test result does not take too long (Lukianova-Hleb et al., 2015). There are no reagents involved in this method; however, highly skilled personnel are required.

### **Rapid Diagnostic Test (RDT) method**

It was designed for the preliminary screening of malaria parasites, for quick results, and it is readily available for use in resource-limited areas (WHO, 2021). Rapid diagnostic test kits are quick and easy to operate with little or no additional equipment, high-quality, easy-to-use test at point-of-care, and a limited number of samples are required for the test. It is preferable compared to the conventional method, the test result is available within a limited time, and performs well when stored at room temperature. The acronym ASSURED - Affordable, Sensitive, Specific, User-friendly, Rapid, and Robust, was used to describe the rapid diagnostic test. Forms of RDTs are:

#### ***Plasmodium* Glutamate dehydrogenase (pGDH)**

This enzyme is used in different laboratories where malaria diagnosis is determined. It can determine both viable and dead organisms (Rodríguez-Acosta et al., 1998). A complete RDT with pGDH as antigen has been developed in China (Li et al., 2005) and it has successfully been used in India (Ahmad et al., 2019).

#### **Fructose-bisphosphate aldolase (aldolase)**

This enzyme plays a major role during glycolysis; this enzyme catalyzes an important action during glycolysis; the process involves energy production by all four species (Meier et al., 1992). The protein is present in all the species of *Plasmodium* (WHO, 2010), they are used to diagnose the presence of malaria parasites without any reference to the species involved.

#### ***P. falciparum* lactate dehydrogenase (pLDH)**

This is an oxidoreductase enzyme concentration (Bzik et al., 1993), involved in the glycolytic pathway. Unlike histidine-rich protein 2, pLDH does not persist in the blood but clears after successful treatment (Iqbal et al., 2004). The characteristic of clearing blood circulation easily is useful in predicting treatment failure. Hence it has successfully been used by different researchers in the diagnosis of the malaria parasite (Tang et al., 2018). Observations showed that pLDH can detect all types of malaria parasites with more specificity for PfLDH and PvLDH. Unlike histidine-rich protein 2 with gene deletion, there is no record of gene deletion with LDH.

#### ***Plasmodium* Histidine-Rich Protein 2 (pHRP 2)**

This enzyme is specific to detecting *Plasmodium falciparum* in an infected patient. This protein is water soluble and immunogenic (Parra et al., 1991). The expression of PfHRP2 by *P. falciparum* is found during the asexual erythrocytic stage of the life cycle of *Plasmodium* infection in humans, and this expression is not limited to one stage, it is found in the two stages (Desakorn et al., 2005). The highest amount of PfHRP2 is observed during the trophozoite and schizont stages (Desakorn et al., 2005). A patient who presents a chill or fever coincides with a schizonts rupture, releasing numerous merozoites; during this period, a large amount of PfHRP2 is leased into the circulation. PfHRP2 can be detected during



diagnosis; this comes from plasma, serum, whole red blood cells, urine, cerebral spinal fluid (CSF), and saliva (Odeniyi et al., 2020). Research show the persistence of *Pf*HRP2 in the blood after treatment from different regions; this forms one of the limitations of this method.

### **Incidence of Gene deletion/Negative Result with *Pf*HRP2**

The *Pf*HRP2 can produce a false negative result which is due to the lack of protein that is produced and circulating in the blood; this is popularly referred to as gene deletion (Gendrot et al., 2019). Furthermore, *Pf*HRP2 could persist in the blood for up to 40 days after successful treatment; this could also lead to a false-positive result when diagnosing malaria infection in patients. If the use of *P. falciparum* RDT in combination with other RDT that are species-specific is encouraged, it could minimize the effect of false-negative results caused by *P. falciparum* HRP2 alone (Iqbal et al., 2004).

### **RDT combination for malaria diagnosis**

Due to certain limitations with HRP 2, the use of a combination of malaria diagnostic tests for malaria detection was considered one of the suggested rapid diagnostic tests for the detection of malaria is CareStart™ malaria histidine-rich protein 2/parasite lactate dehydrogenase (HRP-2/pLDH) combo. This test kit has three bands which were designed to target HRP 2 (this is involved in the detection of *P. falciparum*) and pLDH (this is involved in the detection of other types of malaria parasites apart from *P. falciparum*). Furthermore, if the combo test kit shows both HRP 2 and pLDH, this indicates the presence of *P. falciparum* and one or more other types of *Plasmodium* species. This test kit has been used in some malaria-endemic areas, for instance, in 2010, samples collected from Africa (444), Asia (54), Latin America and the Caribbean (12), and Oceania (4) were analysed using microscopy, PCR, and HRP 2/pLDH combo test kit, the result showed that the overall sensitivity for *P. falciparum* was 88.8%; *P. vivax*, *P. ovale* and *P. malariae* had sensitivities of 77.6%, 18.4%, and 30.4% respectively (Maltha et al., 2010).

In Sri Lanka, CareStart™ malaria Pf/pan (HRP2/pLDH) Combo test, microscopy and nested PCR were used to confirm malaria infection in 350 suspected malaria patients. The result confirmed that *Plasmodium falciparum* occurred in 48% of the population, 44% for *P. vivax*, 6% for *P. ovale*, and 2% for *P. malariae*. The sensitivity and specificity of RDT were 95.5% and 94.9% for any malaria infection respectively and for *P. falciparum* 100% and 97.00% respectively (Gunasekera et al., 2018). In North Sumatera, Indonesia, malaria tests showed 48% positive through microscopy, while 50% were positive with CareStart™ Pf/Pan (HRP 2/pLDH) RDT. Meanwhile, some records of false-positive results were observed with the RDT used but the sensitivity and specificity were high (100 and 96.15%, respectively) (Pasaribu et al., 2022).

### **Discussion**

Malaria remains a world problem, particularly in endemic regions, therefore, World Health Organization (WHO) came up with a global technical strategy for malaria which spans over 15 years period. The plan aims to reduce the infection rate of the disease in endemic countries, and ultimately eliminate the diseases by 2030 (WHO, 2016). This global strategy, as developed by World Health Organization, includes different approaches, which are: the use of appropriate artemisinin-based combination therapies (ACTs), improve efficient surveillance approach which includes an active malaria case detection and management; vectoral approach, which involves indoor residual spraying (IRS) and insecticide-treated bed nets (ITN), and lastly the use of rapid diagnostic test (RDT) and microscopy for point-of-care

detection of malaria and treatment. The overall aim of all these strategies is to interrupt and reduce the transmission of malaria to zero incidences as a result of deliberate actions and intentions taken at all levels of health care in different parts of the world (WHO, 2018), though the African region still recorded high prevalence of the disease.

Malaria microscopy was one of the highest search results for detecting malaria parasites. The method was either used as a confirmation method or to quantify parasite species (Oboh et al., 2021). Our study found that the same limitation to this method was mentioned by the majority of searched results, indicating the need for expertise in the identification of stages of malaria parasites (Umegbolu et al., 2021). Although it was suggested that using the clinical method singly for malaria diagnosis should be avoided, our search result showed that this method had the highest result, showing that, in most cases, the clinical method has been used for malaria diagnosis irrespective of the limitation that is associated with the method. One of the major reasons why this method was considered by many clinicians could be the result low cost and easy access ((Varo et al., 2021). The polymerase chain reaction method of malaria diagnosis was widely reported during our findings. Although the method is costly in some resource-limited countries, on the other hand, most developed countries preferred this method because of its accuracy. This is because there is access to skilled personnel, equipment and other important materials needed during the laboratory process (Ahmad et al., 2021). The loop-Mediated Isothermal Amplification (LAMP) method of malaria diagnosis was another malaria method being used by clinicians or research officers in the field of malaria control. This could be due to high sensitivity and specificity ( $\geq 95\%$ ) for detecting both *P. falciparum* and *P. vivax* infections when used in endemic settings (Selvarajah et al., 2020). However, this method could fail in differentiating species of malaria parasites.

Other methods of malaria diagnosis, such as Nucleic Acid Sequence-Based Amplification (NASBA), Saliva-based tests with nucleic-acid amplification, saliva-based *Plasmodium* protein detection, urine-based malaria test, and transdermal hemozoin method received lower search results. This could be due to a lack of awareness about these methods or lack/inadequately trained personnel, and the high cost of equipment (Asadi & Mollasalehi, 2021).

A rapid diagnostic test was one of the methods used for malaria diagnosis and the method had a high score, especially in Africa where there are limited resources. Of all the types of RDTs, pHRP 2 and pLDH are widely used. The sensitivity and specificity of pHRP 2 *P. falciparum* are high; over 80% of all RDTs utilize HRP 2 because the prevalence of *P. falciparum* is high in endemic areas. However, when parasitemia is low, the test line is found to be faint, which, at a time could be interpreted as a false negative (Lee et al., 2006), although this is not limited to pHRP 2. *Plasmodium* LDH also had a low performance when the level of parasitemia is low. Furthermore, a major limitation to pHRP 2-based RDTs is a base deletion in the HRP2 and pHRP3 genes (Lee et al., 2006), leading to a false negative result (Hendriksen et al., 2011), which is more prevalent at low parasitemia (Lee et al., 2006). This base deletion has been recorded in the Philippines, Thailand, and Papua New Guinea (Lee et al., 2006). Also, both pHRP 2 and pHRP 3 have been reported in Nigeria, China, Ethiopia, Ghana, Sudan, Tanzania, Zambia, Uganda, and Equatorial Guinea (Berzosa et al., 2020; World Health Organization, 2021). The problem of persistence has been reported for pHRP 2; false positive results still occurred 14 days and 21 days after successful treatment (Murray et al., 2008). Unlike pHRP2 which is specific to *P. falciparum*, pLDH can test all types of the malaria parasite. Also, pLDH does not have many of the limitations that were found in pHRP 2 and

the sensitivity varies between 82.6-88% (Eibach et al., 2013). These complement characteristics between pHRP 2 and pLDH form a good opportunity for adopting the pHRP 2/pLDH combo for malaria diagnosis. With Boolean operators ("and"/"or") for pHRP2/pLDH combo showed 46 research items, however, when we removed reviewed articles, the number of original research articles was 26 items. This showed that the level of adoption of for pHRP2/pLDH combo is low; this could be due to inadequate knowledge or information about the use of for pHRP2/pLDH combo. Most of the research rather compared the effectiveness of each of the RDTs rather than exploring the sensitivity and specificity of for pHRP2/pLDH combo for malaria diagnosis.

In conclusion, the use of RDTs has affected the ability of malaria diagnosis positively, especially in poor-resource countries. Although there are limitations when pHRP2 and pLDH are used individually, however, when these two RDTs are combined, most of the limitations are reduced to the barest minimum. Therefore, if pHRP2/pLDH combo malaria diagnoses among patients are emphasized, the management of malaria infection would be done early to reduce the prevalence of malaria to zero levels in the world.

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## MIDWIVES' POSTPARTUM CARE AMONG MOTHERS IN TERTIARY EDUCATION HOSPITALS IN ANAMBRA STATE, NIGERIA

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### **Abstract**

*Postpartum care is crucial to the survival of mother and child and prevention of their morbidity and mortality. The aim of the study was to assess the postpartum care provided by midwives in two Anambra State Tertiary Hospitals. Data was collected using a structured questionnaire consisting of 33 items in a 4-point Likert scale and analyzed using Chi-square test: Both descriptive and inferential statistics were used to analyze the data. The descriptive statistics revealed that most of the respondents, 294 (88%) were females. The respondents, 168 (51.1%) and 161 (48.9%) were from Nnamdi Azikiwe University Teaching Hospital and Chukwuemeka Odumegwu Ojukwu University Teaching Hospital respectively. Their mean age was 40.4 (SD: ± 9.9) years and their modal years of experience was 1 – 9 years: (n=113: 34.2%). The result showed that respondent age was statistically significant for their assessment of mother's fundal height ( $p: 0.020$ ), but their gender had no statistical significance for this variable ( $p: 0.258$ ). The respondents' place of work showed no significant difference with some variables in their postpartum physical assessment, counselling, and care with all  $p$ -values  $> 0.05$  for both research centres. In conclusion, midwives showed high level of postpartum care to the mothers and their new-born babies. Based on this, recommendation among others was that concerted efforts should also be made to recruit more Midwives in these two tertiary hospitals and to motivate them through regular training and retraining on postpartum care best practices.*

**Keywords:** Midwives, Postpartum Care, Tertiary Education Hospitals

### **Introduction**

Globally, midwives provide postpartum care and support to women right from the inception of pregnancy to the end of breast feeding, (Peters et al., 2021). These services and support provided by the midwives could be pivotal to the overall outcome and experiences of women during pregnancy, labour and childbirth, (Hildingsson et al., 2021); hence the roles of midwives in providing high quality postpartum care cannot be overemphasized. The postpartum period that usually begins from the time of delivery of a baby to when the mother's body is restored to pre-pregnancy state could last between six to eight weeks, (Lopez-Gonzalez & Koppapapu, 2022). This period, particularly the first few weeks, is critical to the health and general wellbeing of both the mother and her newborn.

Postpartum care has been described as the care given to the mother and her newborn baby immediately after the birth until six to eight weeks post-delivery in order to assess, identify, give support and counseling on infant breastfeeding, nutrition, immunization, safer sex and family planning, (Rose & Janet, 2018). This care is crucial for both the mother and her child and the postpartum period is a very important time for reflection, relieving of the birth experiences, a time to adjust to the new roles and accommodation of the new member to the family. Care during postpartum period provides opportunities for the midwife to check how the mother and baby are doing, provides support for breast feeding, and enables the health workers to detect and manage any problems early.

Physical assessment during the postpartum period includes checking for excessive bleeding, uterine contraction, fundal height, temperature, blood pressure, micturition and urinary continence, bowel function, healing of perineal wound, headache, fatigue, back pain, perineal hygiene, breast pain, swelling or tenderness, uterine tenderness, lochia, use of prophylactic antibiotics in perineal tear to prevent infection, amongst others, (Khanal et al., 2014). Physical assessment provides data for relevant counseling and information during the postpartum period. Information and counseling services during the postpartum period encompasses the physiology of puerperium danger signs, healthy timing and spacing of pregnancies, family planning, maternal nutrition, breast care and personal hygiene, assessment of client's understanding, emotional support, interpersonal care/rapport and documentation, (Kearns et al., 2016a). The outcome of high-quality information and counseling services is usually manifested in overall patients' satisfaction, (Okonofua et al., 2017). The quality of care is one of the major determinants of the patient's satisfaction; (Ogu et al., 2017); but the care provided to the patients, however highly assessed in terms of the economic, clinical or other providers-related criteria, are short of the ideal, if the patient feels dissatisfied after all, (Sacks et al., 2017). In Nigeria an extensive review of the literature showed a dearth of research data on the content and quality of postpartum care, even though care is routinely provided for women. However, several important indicators such as mortality indices reported from recent studies raise concern about its quality and effectiveness, consequently the question of quality and coverage. It becomes, therefore necessary to study the postpartum care provided by midwives in tertiary health institutions in Nigeria. This study seeks to assess the postpartum care provided to parturient women by midwives in tertiary hospitals in Anambra State, Nigeria.

With these clearly abysmal Nigeria health indices as it relates to maternal and neonatal morbidity and mortality, there is urgent need for a concerted efforts targeted at reducing maternal and neonatal deaths and morbidity during pregnancy, childbirth and postpartum period. These deaths could be reduced through the provision of adequate and quality postpartum care by midwives during labour and childbirth. This study therefore is to assess the postpartum care provided by midwives to parturient women in tertiary hospitals in Anambra State, Nigeria. The providing of postpartum care by midwives to women during labour and childbirth has not been adequately researched in our university teaching hospitals in Anambra state. Such studies are necessary to document practices in the standard of care, determine the challenges to effective postpartum care and to obtain data to support the development of evidence-based postpartum care best practices in our health care system. Based on the series preceding background, the purpose of this study was to postpartum care by midwives among mothers in two tertiary hospitals in Anambra State.



## **Objectives**

1. Determine the physical assessment midwives conduct for mother and baby during the postpartum care in Anambra State tertiary Hospitals.
2. Assess the information and counseling midwives provide to mothers during the postpartum period.

## **Research questions**

The following research questions were asked as a guide in this study:

1. What physical assessment do midwives conduct for mother and baby during the postpartum care in Anambra State tertiary Hospitals?
2. What information and counseling do the midwives provide to mothers during the postpartum period?

## **Hypotheses**

Similarly, the following hypotheses were formulated to guide the study;

1. There is no significant difference between the expected and observed postpartum physical assessment conducted by midwives in Anambra State tertiary hospitals.
2. There is no significant difference between the expected and observed postpartum information and counselling provided by midwives in Anambra State tertiary hospitals.

## **Methodology**

Descriptive cross sectional survey design was used for this study. This study was conducted in the two tertiary Hospitals in Anambra State; Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi and Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) Awka: the only two tertiary health institutions at the highest level of healthcare services in the state and also used for research, education/training of healthcare professionals and referral centres. The population for this study comprised of 300 midwives providing postpartum care in Anambra State tertiary hospitals at the time of conducting this study which is based on clinic registers, and 370 for the Nnewi and Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, (COOUTH) Awka according to the result survey of 2021.

## **Sampling Procedure/Sample size Determination**

The sample size for the study comprised of 340 participants comprising of midwives and mothers. This sample was drawn using convenient sampling method.

The questionnaire instrument for data collection was adapted from the structured questionnaire titled "Midwives Postpartum Care Questionnaire (MPCQ)". The questionnaire for the postpartum mothers was adapted from a questionnaire tool used by other researchers for a similar study, (Varghese & Rajagopal, 2012). The questionnaire instruments were presented in two sections: A and B. Section A consisted of items on socio-demographic/personal data of the respondents while section B were on items reflecting the study objectives. Section B of the instrument for the midwives was structured on the modified 4-point Likert scale of: strongly agree (SA), agree (A); disagree (D); and strongly disagree (SD) rated as scores of 4, 3, 2 and 1 for positively skewed items and 1, 2, 3 and 4 for negatively skewed items. Similarly for the postpartum mothers' questionnaire, section B was also structured on the modified 4-point Likert scale of: Strongly satisfied (SS), satisfied (S), Unsatisfied (US), and strongly unsatisfied (SU) rated as scores of 4, 3, 2 and 1 for positively skewed items and 1, 2, 3 and 4 for negatively skewed items. The research instrument was

given to the project supervisor and other senior lecturers in Department to make necessary corrections and selected staffs to scrutinize. Ethical clearance for the study was obtained from the ethical committee of the University of Port Harcourt. Permission to conduct the study was obtained from the Chief Medical Director in Charge of the tertiary Hospitals. The questionnaires were administered on the study participants by direct delivery and retrieval approach over a period of five postnatal clinic days and five working days to cover mothers in the ward and those in postnatal clinic in each hospital.

### Method of Data Analysis

Descriptive statistics were computed for the demographic variables of the respondents; (age, gender, professional rank, hospital, years of work experience, etc.). Specifically, data analyses were done using the descriptive statistics of simple frequency, mean and percentages as well as inferential statistics of t-test, and spearman ranking correlation. The null hypotheses were tested using Chi-square inferential statistic at 0.05 level of significance using the STATA software package (Students free edition).

### Result

**Table 1:** Demographic Characteristics of the Respondents

Variables	Frequency	Proportion (%)
<b>Workplace</b>		
*NAUTH, Nnewi	168	51.1
**COOUTH, Awka	161	48.9
Invalid/missing values	11	0.0
<b>Total</b>	<b>340</b>	<b>100.0</b>
<b>Age in Years Mean Age: 40.4 (SD: ± 9.9) years</b>		
20 - 29 Years	42	12.5
30 - 39 Years	136	40.4
40 - 49 Years	77	22.8
50 Years and above	82	24.3
Invalid/missing values	3	0.0
<b>Total</b>	<b>340</b>	<b>100.0</b>
<b>Gender</b>		
Male	40	12.0
Female	294	88.0
Invalid/missing values	6	0.0
<b>Total</b>	<b>340</b>	<b>100.0</b>
<b>Qualification</b>		
Diploma	143	56.1
Degree	183	43.9
Invalid/missing values	14	0.0
<b>Total</b>	<b>340</b>	<b>100.0</b>

**Research Question One:** What physical assessment do midwives conduct for mother and baby during the postpartum care in Anambra State tertiary Hospitals?

**Table 2:** Responses on Physical Assessment Provided by the Midwives during Postpartum Care

Variable / Respondents' Location	SA	A	D	SD
Number of Responses n (%)				
<b>Physical Assessment of Postpartum Mothers</b>				
<b>Fundal height for contraction/involution</b>				
NAUTH, Nnewi	110 (33.7%)	44 (13.5%)	4 (1.2%)	3 (0.9%)
COOUTH Awka	111 (34.1%)	51 (15.6%)	3 (0.9%)	0 (0.0%)
Invalid / missing values				14 (0.0%)
<b>Total</b>				<b>340 (100%)</b>

Temperature	NAUTH Nnewi	110 (33.4%)	50 (15.2%)	1 (0.3%)	0 (0.0%)
	COOUTH Awka	116 (35.3%)	51 (15.5%)	0 (0.0%)	1 (0.3%)
Invalid / missing values					11 (0.0%)
Total					<b>340 (100%)</b>
Skin colour for anaemia	NAUTH, Nnewi	108 (32.9%)	44 (13.4%)	8 (2.5%)	0 (%)
	COOUTH Awka	108 (32.9%)	57 (17.4%)	2 (0.6%)	1 (0.3%)
Invalid / missing values					12 (0.0%)
Total					<b>340 (100%)</b>
Vital parameters 4-hourly within 48 hours after childbirth	NAUTH, Nnewi	113 (34.3%)	57 (17.4%)	18 (5.5%)	0 (0.0%)
	COOUTH Awka	86 (26.1%)	54 (16.4%)	1 (0.3%)	0 (0.0%)
Invalid / missing values					11 (0.0%)
Total					<b>340 (100%)</b>
Complaints (Head ache, Fatigue, Back pain, Uterine tenderness)	NAUTH Nnewi	78 (23.7%)	70 (21.3%)	10 (3.0%)	3 (0.9%)
	COOUTH Awka	99 (30.1%)	65 (19.8%)	4 (1.2%)	0 (0.0%)
Invalid / missing values					11 (0.0%)
Total					<b>340 (100%)</b>
Full Clinical Examination	NAUTH, Nnewi	112 (34.7%)	40 (12.4%)	4 (1.2%)	0 (0.0%)
	COOUTH Awka	112 (34.7%)	53 (16.4%)	1 (0.3%)	1 (0.3%)
Invalid / missing values					17 (0.0%)
Total					<b>340 (100%)</b>
Assessment of New Born Babies:					
Examine Umbilical stump	NAUTH, Nnewi	116 (35.3%)	43 (13.1%)	2 (0.6%)	0 (0.0%)
	COOUTH Awka	114 (34.7%)	54 (16.4%)	0 (0.0%)	0 (0.0%)
Invalid / missing values					11 (0.0%)
Total					340 (100%)
Examine Babies for Sepsis and Jaundice	NAUTH, Nnewi	117 (35.6%)	38 (11.6%)	5 (1.5%)	1 (0.3%)
	COOUTH Awka	114 (34.8%)	51 (15.6%)	2 (0.6%)	0 (0.0%)
Invalid/missing values					12 (0.0%)
Total					<b>340 (100%)</b>

**Hypotheses One:** There is no significant difference between the expected and observed postpartum physical assessment conducted by midwives in Anambra State tertiary hospitals.

**Table 3:** Chi-square analysis of significant difference between the expected and observed postpartum physical assessment conducted by midwives in Anambra State tertiary hospitals

Independent Variable	Dependent Variable	$\chi^2$ Value	*df	Calculated p-value***
Work Place	4-hourly check of vital parameters 48 hours after birth	18.8145	2	0.000
Work Place	Check mother's complaints (head ache, fatigue, etc.	8.1029	3	0.044
Age	Fundal Height Check for contraction/involution	28.3114	15	0.020
Age	Assessment of Mothers' Complaints	37.5235	15	0.001
Age	Assessment of Baby's Umbilical Stump	23.4222	10	0.009
Gender	Assessment of mothers' Temperature	11.8295	3	0.008
Gender	Assessment of Mothers' Skin Colour for anaemia	14.6898	3	0.002
Gender	Full Clinical Examination of Mothers on Discharge	8.4579	3	0.037
Gender	Assessment of Baby for Sepsis and Jaundice	15.3454	3	0.004
Qualification	4-hourly check of vital parameters 48 hours after birth	8.4760	2	0.014
Qualification	Full Clinical Examination of Mothers on Discharge	8.5539	3	0.036
Qualification	Assessment of Baby's Umbilical Stump	6.6819	2	0.035

The results of the Persian  $\chi^2$  statistical tests for the respondents' work place against their responses to these key variables are summarized in the table above. For mothers' physical assessment, there were statistically significant differences between the respondents' work place and the provision of physical assessment of four-hourly checking of vital parameters of

postpartum mothers 48 hours post-delivery: (Persian  $\chi^2=18.8145$ ,  $p=0.000$ ); as well as for their checking of postpartum mothers' complaints such as head ache, fatigue, back pain, uterine tenderness; (Persian  $\chi^2=8.1029$ ,  $p=0.044$ ) at the 95% confidence interval ( $p=0.05$ ). For the remaining four variables under this domain there were no statistical difference between their work place and other variables under the physical assessment domain as the respective p-values were higher than the set p-value of 0.05.

For the physical assessment of the new born babies; the responses of the respondents did not show any statistical difference between their work place and their performance of the two variables: the calculated p-values for both variables were higher than 0.05.

Their responses also showed statistically significant differences between the respondents' age and their physical assessment of mothers' fundal height for contraction and involution; assessment of mothers' complaints of headache, fatigue; as well as assessment of new born baby's umbilical stump as

**Research Question Two:** What information and counseling do the midwives provide to mothers during the postpartum period?

**Table 4:** Responses on Postpartum Counselling, Information and Health Education by Midwives

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
Number of Responses n (%)				
Mothers Receive Adequate Orientation in the Ward				
NAUTH, Nnewi	70 (21.4%)	67 (20.6%)	21 (6.4%)	2 (0.6%)
COOUTH Awka	91 (27.8%)	71 (21.7%)	5 (1.5%)	0 (0.0%)
Invalid / missing values				13 (0.0%)
Total				340 (100%)
Mothers are Counselling on Adherence to				
Prophylactic medications				
NAUTH, Nnewi	69 (21.0%)	70 (21.3%)	22 (6.7%)	0 (0.0%)
COOUTH Awka	82 (24.9%)	83 (25.2%)	3 (0.9%)	0 (0.0%)
Invalid / missing values				11 (0.0%)
Total				340 (100%)
Mothers Receive Information on Family Planning				
Methods				
NAUTH, Nnewi	70 (21.3%)	57 (17.3%)	29 (8.8%)	5 (1.5%)
COOUTH Awka	119 (36.2%)	48 (14.6%)	1 (0.3%)	0 (0.0%)
Invalid / missing values				11 (0.0%)
Total				340 (100%)
Mothers are Educated on Use of Insecticide-Treated				
Nets				
NAUTH, Nnewi	79 (24.3%)	64 (19.7%)	14 (4.3%)	1 (0.3%)
COOUTH Awka	116 (35.7%)	49 (15.1%)	1 (0.3%)	1 (0.3%)
Invalid / missing values				15 (0.0%)
Total				340 (100%)
Mothers Educated on Continuous Home Care				
NAUTH, Nnewi	93 (28.3%)	59 (17.9%)	8 (2.4%)	1 (0.3%)
COOUTH Awka	112 (34.0%)	52 (15.8%)	2 (0.6%)	2 (0.6%)
Invalid / missing values				11 (0.0%)

Total					340 (100%)
Mothers informed on Immunization Schedule					
		108 (32.9%)	47 (14.3%)	6 (1.8%)	0 (0.0%)
NAUTH,Nnewi		112 (34.2%)	52 (15.8%)	3 (0.9%)	0 (0.0%)
	COOUTH Awka				
Invalid / missing values					12 (0.0%)
Total					340 (100%)
Mothers are Counselling on Continuous Breastfeeding					
		87 (27.1%)	65 (20.2%)	8 (2.5%)	0 (0.0%)
NAUTH,Nnewi		89 (27.7%)	64 (19.9%)	6 (1.9%)	2 (0.6%)
	COOUTH Awka				
Invalid / missing values					19 (0.0%)
Total					340 (100%)
Mothers are Counselling on Proper Nutrition					
	NAUTH,Nnewi	96 (35.3%)	54 (13.1%)	8 (0.6%)	0 (0.0%)
		101 (34.6%)	57 (16.4%)	3 (0.0%)	0 (0.0%)
	COOUTH Awka				
Invalid / missing values					21 (0.0%)
Total					340 (100%)
Mothers are Counselling on Proper hygiene					
		93 (29.4%)	55 (17.4%)	9 (2.9%)	0 (0.0%)
NAUTH,Nnewi		86 (27.2%)	66 (20.9%)	5 (1.6%)	2 (0.6%)
	COOUTH Awka				
Invalid / missing values					24 (0.0%)
Total					340 (100%)

**Hypothesis Two:** There is no significant difference between the expected and observed postpartum information and counselling provided by midwives in Anambra State tertiary hospitals.

**Table 5:** Chi-square analysis of significant difference between the expected and observed postpartum physical assessment conducted by midwives in Anambra State tertiary hospitals

Independent Variable	Dependent Variable/number of respondents**	Persian $\chi^2$	*df	Cal p-value*
Work Place	Mothers Receive Adequate Orientation in the Ward (n=327)	14.5581	3	0.002
Work Place	Counselled on Adherence to Prophylactic Medications (n=329)	16.5223	2	0.000
Work Place	Mothers Receive Information on Family Planning (n=329)	44.4797	3	0.000
Work Place	Mothers Educated on Use of Insecticide-Treated Nets (n=325)	20.0445	3	0.000
Gender	Mothers Receive Adequate Orientation in the Ward (n=334)	8.0673	3	0.045
Gender	Mothers are Educated on Continuous Home Care (n=334)	10.8527	3	0.013
Gender	Mothers are Counselling on Continuous Breastfeeding (n=326)	17.4180	3	0.001
Gender	Counselled on Hygiene especially Hand Washing, (n=321)	14.8380	4	0.001
Age	Mothers Receive Adequate Orientation in the Ward (n=335)	30.9626	15	0.009
Age	Counselled on Adherence to Prophylactic Medications (n=337)	33.4694	10	0.000
Qualification	Mothers Receive Adequate Orientation in the Ward (n=324)	10.2279	3	0.017
Qualification	Mothers Receive Information on Family Planning (n=326)	12.8108	3	0.005
Qualification	Mothers Educated on Use of Insecticide-Treated Nets (n=322)	9.0806	3	0.028
Qualification	Mothers Received Nutrition Counselling (n=316)	6.1095	2	0.047
Experience	Mothers Receive Adequate Orientation in the Ward (n=329)	33.4439	12	0.001
Experience	Counselled on Adherence to Prophylactic Medications (n=330)	30.1280	8	0.000
Experience	Inform Mothers on Immunization Schedule (n=329)	23.8307	8	0.002

From the analysis in the table, all the items had a critical value less than alpha of 0.05. This means that it was agreed that midwives irrespective of work place, gender, Age, qualification and experience have provided all the information listed above to mothers after delivery. However, since the observed (calculated) p-value for the dependent variables tested in this domain were less than set p-value of 0.05 the null hypothesis was rejected and the alternate hypothesis accepted. Thus, also means that there is a significant difference between the expected and observed postpartum information and counselling provided by midwives in Anambra State tertiary hospitals.

### **Discussions of findings**

The respondents included in this study were predominantly females with male to female ratio of 1:8. The male to female ratio among Midwives vary globally according to the socio-cultural and geographical divides: ranging from 1 : 12.1 in the USA, (ZIPPIA, 2022), 1 : 9 in the European WHO region, (World Health Organization, 2020); to as high as 1 : 39 in a recent survey in the USA, (Likis & King, 2020). The male to female ratio reported in this study is comparable to the ratio in the WHO European region; but it is lower than the ratios reported in the USA. This may be due to the differences in the level of acceptance of male Midwives by parturient mothers in the study centres compared to the developed country of the USA where there may be more resistance to the services of male Midwives among postpartum mothers. The acceptability of the services of male Midwives by women during labour and childbirth is a subject of ongoing debate across the globe, (Shavai & Chinamasa, 2015). Traditionally, Midwifery evolved as, nearly exclusively, a feminine profession deriving richly from the experiences and intuition of women who took care of themselves during pregnancy and through observing other women in childbirth. In the African and most other cultures, pregnancy, delivery, and childbirth are managed exclusively by traditional birth attendants who were mostly older, more experienced women until the 16th century when midwifery became a profession incorporating younger women. First male midwives joined the midwifery profession in about the 20th century, but there were problems with prepartum mothers being asked to undress to be examined before a male midwife. Most cultures consider it as a taboo for males to attend to women during labour and childbirth, though all those things appear to be changing with modernism, (Shavai & Chinamasa, 2015). A structured and systematic process is applied in the providing of services to achieve the goals of postpartum care globally. Most standard guidelines and recommendations for best practices in postpartum care propose and promote the three domains of services during postpartum care by midwives, namely: (a): Physical assessment of postpartum mothers and their new born babies by midwives; (b): Counselling, health education and communication provided to the postpartum mothers by the midwives; and (c): Postpartum care and support and referrals / linkages.

These domains of postpartum care recommended by the World Health Organization was adopted in this study to assess the postpartum care provided by midwives in the study centres. Each domain has composite outcome variables that were assessed during this study in the two tertiary hospitals used in this study. In the domain of the physical assessment of postpartum mothers and their new born babies by midwives, the participating Midwives showed overall high level of postpartum care in both centres. The least provided physical assessment services by the respondents were assessment of the postpartum mother's vital signs four-hourly within the 48 hours after childbirth and the physical assessment of the postpartum mother for complaints such as head ache, fatigue, back pain, and uterine tenderness as summarized in table 3. The main focus of this study was to assess the postpartum care provided by Midwives in the study centres to postpartum mothers and their new born babies. The relevant

hypotheses were therefore tested to determine this. The findings of this study as summarized in tables 4, 6 and 8 showed statistically significant differences between the respondents' work place (study centres), and the postpartum services provided to the mothers and their new born babies by midwives. Hence the three null hypotheses were rejected and the alternative hypotheses were accepted. Specifically, in the Postpartum Physical Assessment Domain, there were statistically significant differences between the respondents' work place (i.e., the study centres) and the two outcome variables of four-hourly 'assessment of postpartum mothers' vital parameters 48 hours after birth: ( $\chi^2=18.81$ ,  $df = 2$ ,  $p=0.000$ ) as well as 'assessment of mothers' complaints of (headache, fatigue, uterine tenderness)' ( $\chi^2=8.10$ ,  $df=3$ ,  $p=0.044$ ). The relative proportion of the respondents for this outcome variable in COOUTH Awka which: 141, (42.9%) was lower than those in NAUTH Nnewi, 188 (57.1%). However, 18 (5.5%) of the respondents at NAUTH, Nnewi and only 1 (0.3%) from COOUTH, Awka stated they disagreed to providing this postpartum physical assessment to postpartum mothers. Similarly, for the 'Assessment of Mothers' Complaints, of (headache, fatigue, uterine tenderness)' ( $\chi^2=8.10$ ,  $df=3$ ,  $p=0.044$ ) as shown in table 2: the relative proportion of respondents for this outcome variable in COOUTH Awka, 161 (49.9%) was lower than those in NAUTH Nnewi, 168 (57.1%). However, 13 (3.9%) of the respondents at NAUTH, Nnewi and only 4 (1.2%) of the respondents from COOUTH, Awka stated they disagreed/strongly disagreed to providing this postpartum physical assessment to postpartum mothers. The difference observed in the providing of this postpartum physical assessment by the midwives in the respective study centres could be attributed to the fact that the respondents in the COOUTH, Awka centre were more diligent in providing this service. It could also be due to more hospital management support to those Midwives at COOUTH, Awka whereby only 20 (6.3%) in this study centre, compared to the 64 (20.0%) from NAUTH, Nnewi disagree/strongly disagree to having adequate management support for postpartum care in their respective hospitals. In addition, under the Postpartum Physical Assessment domain, there was a statistical significance difference between the gender of the respondents and their performance of 'Full Clinical Examination of Mothers on Discharge' ( $\chi^2=8.460$ ;  $df =3$ ;  $p=0.037$ ). This observed difference may be as a result of postpartum mothers' resistance to being examined by male Midwives, (Shavai & Chinamasa, 2015); considering the fact that there were 40 male Midwives respondents in this study.

For the Postpartum Counselling, Information, and Health Education Domain: there were statistically significant difference between the respondents' work place and these four outcome variables viz: (i): 'Mothers receive adequate orientation in the ward: ( $\chi^2=14.56$ ,  $df=3$ ,  $p=0.002$ ); (ii): 'Mothers counselled on adherence to prophylactic medications: ( $\chi^2=16.52$ ,  $df=2$ ,  $p=0.000$ ); (iii): 'Mothers receive information on family planning, ( $\chi^2=44.4797$ :  $df=3$ ,  $p=0.0000$ ); (iv): 'Mothers educated on use of insecticide-treated nets, ( $\chi^2=20.04$ ,  $df=3$ ,  $p=0.0000$ ). Mothers receive adequate orientation in the ward: the relative proportion of respondents for this outcome variable in COOUTH, Awka; 167 (51.1%) was slightly higher than those in NAUTH Nnewi, 163 (49.9%). However, 22 (7.0%) of the respondents at the NAUTH, Nnewi and only 5, (1.5%) of the respondents at the COOUTH, Awka stated they disagreed/strongly disagree to providing this postpartum counselling, information and health education to postpartum mothers. Similarly, for the 'Mothers counselled on adherence to prophylactic medications outcome variable as shown in table 5, the relative proportion of respondents for this outcome variable in COOUTH, Awka, 168 (51.1%) was higher than those in NAUTH, Nnewi, 161 (48.9%). However, 22 (6.7%) of the respondents at NAUTH, Nnewi and only 3 (0.9%) of the respondents from COOUTH, Awka stated they disagreed/strongly disagreed to providing postpartum counselling, information and health education to postpartum mothers. For the outcome variable 'Mothers receive

information on family planning: only 1 (0.3%) from COOUTH, Awka disagreed to providing this intervention compared with the 34 (10.3%) from the NAUTH, Nnewi who disagreed/strongly disagreed to providing this service to postpartum mothers. On the outcome variable: 'Mothers educated on use of insecticide-treated nets: only 2(0.6%) of the respondents from the COOUTH, Awka; compared to 15 (4.6%) from the NAUTH, Nnewi disagreed/strongly disagreed to providing this vital postpartum counselling. For the rest of the outcome variables within this domain, namely: 'Mothers are educated on continuous home care'; 'Mothers are informed on immunization schedule'; 'Mothers are Counselling on Continuous Breastfeeding' 'Mothers are Counselling on Proper Nutrition'; and 'Mothers are counselled on proper hygiene; there were no statistical significance differences among the respondents in both work places / study centres. For the Core Postpartum Care, Support and Referrals Domain there were statistically significant difference between the respondents' work place and the following three outcome variables: 'Linkages for Further Postpartum Care;  $\chi^2=23.33, df=4, p=0.000$ ); 'Ensure exclusive breastfeeding is initiated' ; ( $\chi^2=9.02, df=3, p=0.029$ ) and 'Ensure mother/baby stay in facility 24 hours or more'  $\chi^2=17.54, df=3, p=0.001$ ). For the outcome variable of 'Linkages for Further Postpartum Care' the relative proportion of respondents for this outcome variable in COOUTH, Awka, 159, (50.5%) was slightly higher than those in NAUTH, Nnewi 156 (49.5%). However, 27 (8.6%) of the respondents at the NAUTH Nnewi, and only 8 (2.5%) of the respondents at the COOUTH, Awka stated they disagreed/strongly disagree to providing this core postpartum care and support/linkage services to postpartum mothers. Again this might be due to the respondent midwives at COOUTH, Awka reporting more diligence in providing postpartum care in this domain than those at the NAUTH, Nnewi. Similarly, for the outcome variable: 'Ensure Exclusive Breastfeeding is Initiated' (n=319); as shown in table 7, the relative proportion of respondents for this outcome variable in COOUTH, Awka, 159 (49.8%) was slightly lower than those in NAUTH, Nnewi 160 (50.2%). However, 11 (3.4%) of the respondents at NAUTH, Nnewi and only 2 (0.6%) of the respondents from the COOUTH, Awka stated they disagreed/strongly disagreed to providing this core postpartum intervention to postpartum mothers. For the outcome variable 'Ensure Mother/Baby Stay in Facility 24 Hours or More; only 8 (2.5%) from COOUTH, Awka disagreed to providing this intervention compared with the 11 (3.4%) from the NAUTH, Nnewi who disagreed/strongly disagreed to providing this service to postpartum mothers.

On the outcome variable: 'Mothers Educated on Use of Insecticide-Treated Nets: only 2(0.6%) of the respondents from the COOUTH, Awka; compared to 15 (4.6%) from the NAUTH, Nnewi disagreed/strongly disagreed to providing this vital postpartum counselling. For the rest of the outcome variables within this domain, namely: 'Midwives maintain Privacy During Postpartum'; 'Midwives Respects Mothers' Beliefs / Preferences'; 'Midwives Ensure Early Mother-Child Skin Contact' 'Midwives enable Rooming-In for Mother and Child'; and 'Midwives ensure Exclusive Breastfeeding on Demand' there were no statistically significant differences among the respondents in both work places / study centres at the 95% confidence interval ( $p=0.05$ ). The difference observed in the providing of this postpartum physical assessment by the Midwives in the respective study centres could be because of more diligence among the respondents in the COOUTH Awka centre in providing this service. It could also be as a result of more hospital management support to those Midwives at COOUTH, Awka where only 20 (6.3%) compared to the 64 (20.0%) from NAUTH, Nnewi who stated they disagree/strongly disagree to having adequate management support for postpartum care in their respective hospitals.



## **Conclusion**

Midwives included in this study appear to provide high quality postpartum care in the respective teaching hospitals. Moreover, the respondent postpartum mothers overall high level of satisfaction with most of the three domains of postpartum care assessed in this study. There is need to support midwives to maintain the provision of postpartum best practices through adequate management support, training, retraining and providing enough Midwives. Further research is required to describe the differences in the satisfaction of the mothers with postpartum care in the two tertiary hospitals as it relates to the attitudes of the midwives to postpartum mothers during the postpartum care contacts.

## **Limitations to the study**

The process of this research was constrained by the problems of data collection for the study as most of clinic days fall within sit-at-home saga in Anambra State.

## **Recommendations**

The following recommendations were made.

1. It is recommended that adequate management support should be provided to the Midwives in both centres to help them discharge their professional responsibilities of providing a comprehensive postpartum package to achieve the best postpartum outcomes for mothers and their new born babies.
2. Concerted efforts should also be made to recruit more Midwives in these two tertiary hospitals and to motivate them through regular training and retraining on postpartum care best practices

## **Implication for Practice**

The study has health implications for proper handling of post-natal mothers in the health care institutions. The results implies that health authorities will sustain their level of awareness while the health professional will sustain their level of care in proper post-natal.

## **Contribution of Author**

Both authors confine total contribution to the paper all-round, beginning with the study conception and design, data collection, analysis and interpretation of results.

## **Conflict of interest**

Prior to the commencement of the investigation, the researcher has no special interest. Hence, the outcome of the findings is wholly accepted.

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# **The Attitude, Perception, and Knowledge of Malaria Prevention and Treatment among Caregivers of Under-Five Children in Umuahia North, Abia State, Nigeria**

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## **Abstract**

*To enhance the effectiveness of control interventions geared toward malaria, it is vital to expand the understanding of basic features that govern the caregiver's perception of malaria preventive measures. This study aimed to investigate the attitude, perception, and knowledge of caregivers living in Umuahia North, Nigeria on the prevention as well as the treatment of malaria in children under-five. Quantitative community-based cross-sectional research conducted in two communities of Umuahia North L.G.A. The study involved a face-face interview with a structured questionnaire. Two wards of Umuahia Local Government Area (Umule and Umukabia) were randomly selected for interview and 100 caregivers were interviewed. Many of the respondents had completed secondary school (67%) while more than half had no paid employment (76%).*

*A significant association was reported between Caregiver's age and malaria perception ( $p=0.025$ ). No association was recorded between employment and knowledge of malaria, education and caregiver's attitude towards malaria, education and caregiver's knowledge of malaria, or education and caregiver's perception. The study revealed that there is still some wrong attitude among caregivers of under-five although caregivers of under five years demonstrated a high awareness of malaria some still do not have comprehensive understanding of the disease. There was also some level of misinformation about malaria. There is need to intensify education as well as awareness of malaria amongst caregivers of under-five as they are more vulnerable to malaria.*

**Key concepts:** Attitudes, assessment, caregiver, knowledge, malaria, perception.

## **Introduction**

Nigeria is among the six countries the hardest hit by malaria in Africa, thus malaria is endemic throughout Nigeria (WHO, 2021). In 2020, of the 96% of death due to malaria globally, Nigeria was placed first among the six countries with the highest mortality rate (WHO, 2021). Half of the Nigeria grown-up population suffers a minimum of one episode of malaria whereas under-five children may experience malaria four to five times annually. Malaria in Nigeria causes up to 11% maternal death and about 30% under-five mortality (FMoH, 2009).

Having recognized malaria as a threatening health issue, many studies have been documented on malaria prevalence among a different group of people both in Nigeria and globally by public health experts. It is estimated that between 2019 and 2020, malaria cases increased from 213 million to 228 million while estimated death rate also increased from 534,000 to 602 in African region. This has made Malaria to become one of the leading public health issue in Africa and contributing about 95% disease burdens to the world malaria cases (WHO, 2021). According to World health organization review, under-five children are more

vulnerable and affected by malaria. Around 96 percent of malaria-related deaths were predicted to occur in Africa in 2020, with 80 percent of those deaths occurring in children under five (WHO, 2020). In Nigeria, malaria accounts for more than 60% outpatient visit while more than 132 billion naira is yearly lost on cost of treatment as well as loss in man-hours (FMoH, 2009). An estimated 300,000 children die yearly in Nigeria because of malaria, with more than 25% infant mortality (children under the age of one) and 30% mortality of under-five children and about 11% maternal mortality. About 50% of Nigeria populace suffers not less than one episode of malaria whereas under-five children suffer 2 to 4 attacks of malaria yearly. This is as a result of the lower level of their immunity (NMCP, 2008).

Malaria-related complications and mortality in children under-five is a significant health issue in Nigeria. In Nigeria, children under five experiences at least 25–30 percent of the country's annual malaria-related mortality. It is said that a child dies in every 30 seconds as due to malaria leading to 70% of death in children under-five (Oladipo et al., 2022). According to reports, malaria primarily affects newborns, young children, and young pregnant women, especially those who reside in remote regions with poor access to quality medical services.(Kilama, 2005).

In Nigeria, there is not enough documentation on the depth of caregiver's knowledge as well as what they do when their under-five goes down with malaria. Most of the studies previously done on malaria are based on pregnant women as well as facility-level while not much has been done among the caregiver who is at the community level. Therefore, this study assessed the socio-demographic factors of caregivers that could contribute to influencing their receipt of malaria treatment and prevention in under-five children in Umuahia north Abia state Nigeria.

## **Method**

### **Study Population and Setting**

This study is a community-based cross-sectional descriptive research, thus there is neither clinical trials nor experimental interventions (Burns & Grove, 2011). The descriptive attributes of this design help to uncover the depth of caregivers' knowledge about malaria prevention and treatment for their children under five in Umuahia, North L.G.A. Data collection was done with the use of a structured questionnaire. The questionnaire items include socio-demographic characteristics, perception about malaria treatment and prevention, treatment given to children who had fever perceived by the caregivers to be malaria. The Pearson's chi-square was used to check for association between two categorical variables at 0.05 significant level and at 99% confidence level.

### **Ethical Considerations of the Study**

Approval for this research was secured from the Ethics Approval Committee of Ministry of Health (MoH) in Abia as well as the University of Roehampton. Informed consent was also obtained from caregivers of under-five children.

## **Results**

A total of 100 caregivers were interviewed; 50 from Umukabia community and 50 from Umule community. Caregivers' KAP of malaria infection in their children under-five could be influenced by social-demographic factors. The demographic factors in the study includes: sex, age, educational status, employment status and are presented in Table 1. Data collected

shows more females (84.2%) took part in the study. Most of participants were majorly aged 31-40 years (54.5%) while very few were above age 50 (5.9%). Over half of the caregivers 54.5% were of the age group of 31-40 years. Age showed a significant influence on caregivers' perception of malaria ( $\chi^2=31.484$ ,  $df=18$  and  $p=0.025$ ).

Most of the participants had completed secondary school (67%) whereas only very few did not attend school (4%). The data shows that most of the respondents had primary education. No statistically significant association between education and caregiver's perception ( $\chi^2=24.145$ ,  $df=18$  and  $p=0.150$ ). In like manner, most of the caregivers had completed primary education (67%). Education did not show any influence on caregiver's attitude regarding malaria ( $\chi^2=13.011$ ,  $df=15$  and  $p=0.601$ ). Therefore, there is not enough indication to propose an association between education and caregiver's attitude of malaria. Based on this result, there is no association between education and caregiver's attitude. In addition, education did not show influence on caregiver's knowledge of malaria ( $\chi^2=9.711$ ,  $df=18$  and  $p=0.941$ ). There is not enough evidence to suggest a relationship between education and caregiver's knowledge.

Majority of the respondents were not employed (67%) while most of them were farmers. Majority of the participants had no paid employment (76%). Employment did not show any influence on caregiver's knowledge regarding malaria  $\chi^2=5.609$ ,  $df=12$  and  $p=0.934$ . Therefore, there is not enough evidence to propose an association between education and caregiver's knowledge of malaria. Based on this result, there is no association between employment and caregiver's knowledge of malaria.

Knowledge, awareness as well as perception to malaria is presented in table 2. All respondents in this study have heard about malaria infection. However, majority (80%) stated that malaria could be gotten through mosquito bites while a few respondents (10%) stated that malaria could be contracted by drinking dirty water (Table 2). Only two percent reported not knowing how malaria was contracted. More than half of the respondents (59%) lived 11-20 kilometres away from the facility while few (3%) lived very far (40 kilometres) away from health facility.

Table 1: Social Demographic Characteristics of Respondents.

Demographic Characteristic	N	%
Sex		
Male	15	14.9
Female	85	84.2
Age (years)		
<30	26	25.7
31-40	55	54.5
41-50	13	12.9
>50	6	5.9
Highest Educational Level Attained		
Primary	10	10.0
Secondary	67	67.0
Higher	19	19.0
No school	4	4.0
Employment Status		
Yes	24	24.0
No	76	76.0
	51	

Distance from Health Facility		
0-10 kilometers	31	31.0
11-20 kilometers	59	59.0
30-40 kilometers	7	7.0
> 40 kilometers	3	3.0

**Table 2: Beliefs associated with the contraction of malaria**

Transmission mechanism	N	%
Mosquito bite	80	80.0
Witchcraft	5	5.0
Getting soaked with rain	2	2.0
Drinking dirty water	10	10.0
Dust	1	1.0
Don't know	2	2.0
Total	100	100.0

**Figure 1: Reported symptoms and signs of improve malaria**

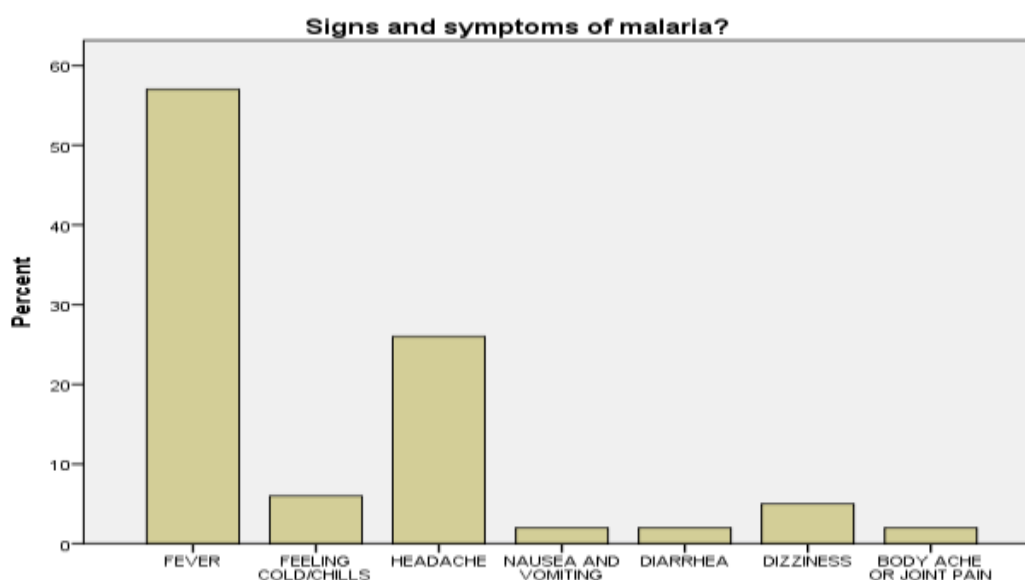


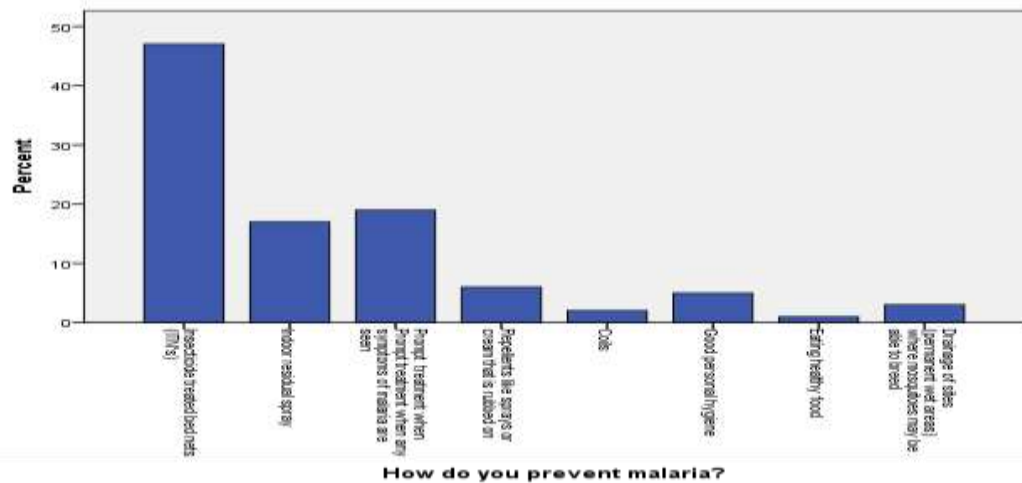
Figure 2 shows the respondents knowledge about the treatment for malaria infection. Approximately two-thirds of caregivers (64%) identified Artemisinin-based combination therapy (ACT) to be the correct malaria treatment. Meanwhile, over 10% of participants reported not knowing the correct treatment of malaria. Other drugs mentioned by the respondents are quinine, aspirin, paracetamol, and fansidar.

Over half of respondents (56%) reported using a mosquito net as a way of preventing malaria. The remaining subjects stated that they do not sleep under a mosquito net. Respondents were provided with a list of possible breeding grounds, and asked to answer Yes or No to the listed places mosquitoes breed. Nearly 90% of respondents indicated that mosquitos breed in stagnant water; three quarters (75%) of respondents reported mosquitoes as breeding close to rivers, and 77% said mosquitoes breed in dwellings where there is poor hygiene.

For response to malaria prevention method, majority (89%) of respondents said that malaria could be prevented. Close to 50% of our respondents shows that Insecticide-treated net could be used to prevent malaria infection while eating heavy food recorded the least method of malaria prevention among our studied population (Figure 3).



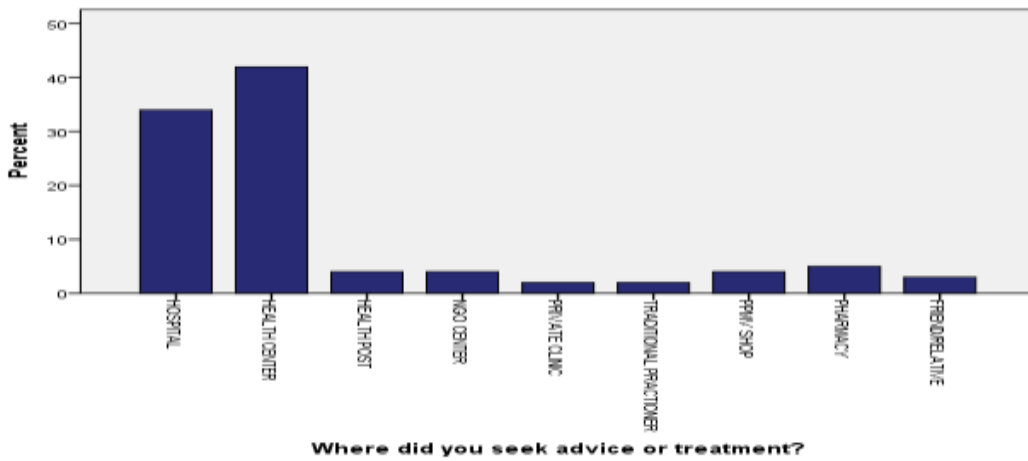
**Figure 2: Responses on correct treatment of malaria**



**Figure 3: Malaria Preventive measures**

**Care Seeking Behavior and Attitude of Caregivers for their Under-Five Children**

Our result showed that 97% under-five children had fever while only 3% did not experience fever. The majority (n=89) sought for advice when their child got sick while (11%) did not seek advice from any source. 42% of our studied participants sought treatment from Health-care center followed by hospital while 2% consulted traditional practitioner (Figure 4). Other sources where advice or treatment was sought include NGO center, private clinic, pharmacy, and friend/relations.



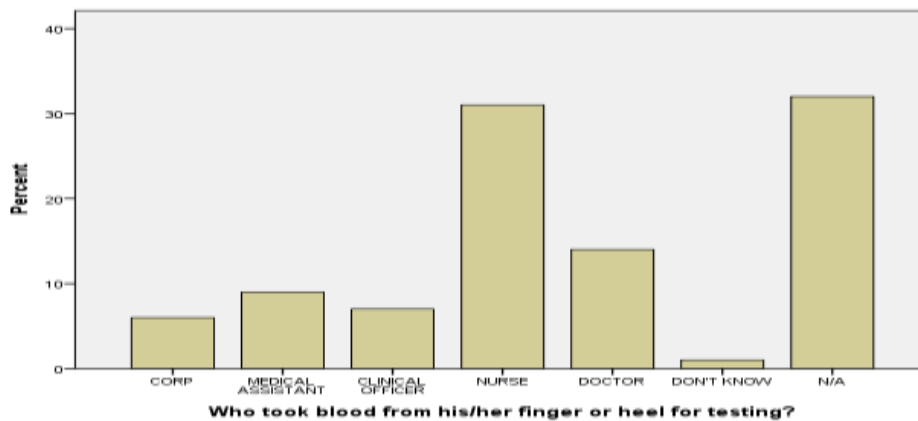
**Figure 4: Source of Treatment**

While in health-care center to seek medical care, our result showed that 66% of our respondents confirmed that blood was collected from the child heel or finger for testing while 33% of them did not agree to collection of blood from the heel or finger of their child. Meanwhile, 32% of blood collection was done in both hospital and health center while only one percentage of our respondent blood collection was done in health post (Table 3).

**Table 3: Description of locations where blood was taken for testing**

Where was blood taken from his/her finger for testing?	N	%
Hospital	32	32.0
Health center	32	32.0
Health post	1	1.0
Don't know	2	2.0
N/A	33	33.0
Total	100	100.0

**Figure 5: Chart showing personnel that conducted the test**



The result of medical test was not shared with more than half (58%) of our respondents while only 4% were not aware if the result of the test was supposed to be shared with them (Table 4)

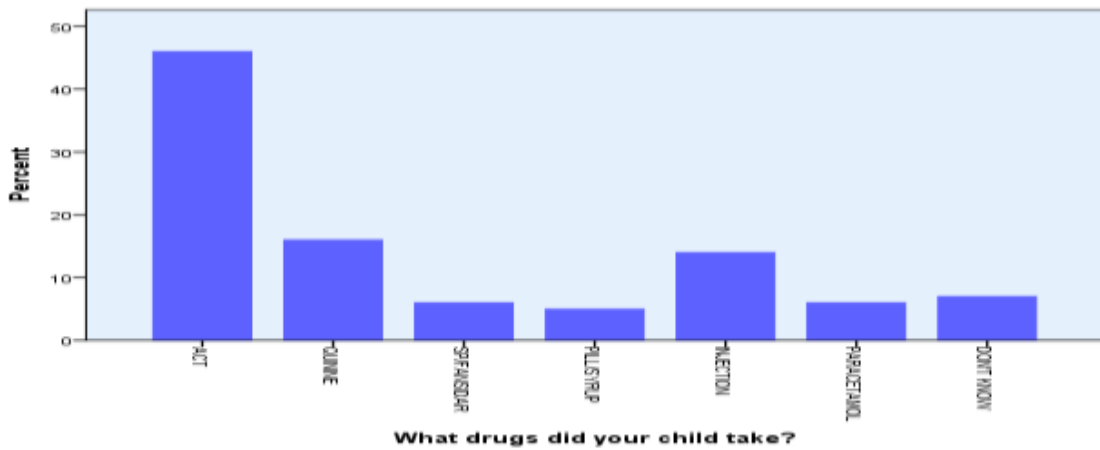


**Table 4: A**

Was the blood test result shared with you?	N	%
YES	58	58.0
NO	6	6.0
DON'T' KNOW	4	4.0
N/A	32	32.0
Total	100	100.0

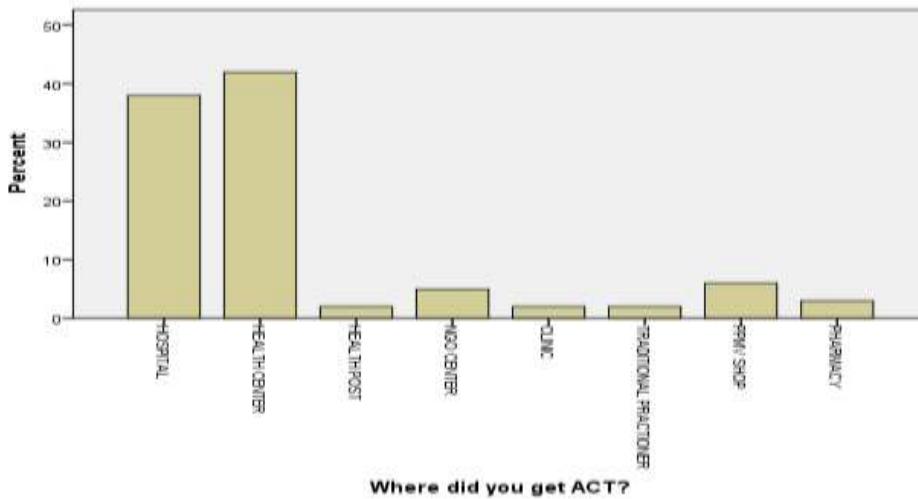
**RESPONSE ON TEST RESULT AND TREATMENT**

Out of the one hundred participants, 56% of them tested positive to malaria infection while 7% were negative. After drug prescription, 93% of the respondents agreed to administration of the drugs as prescribed while 6% of them did not give anything to the child. Drugs administered to children from our study respondents are shown in figure 6. Most of the children were given ACT (46%), followed by quinine while 7% of our respondents don't know the actual drug of choice (Figure 6).



**Figure 6: Drugs taken by children**

When asked the source of the ACT, 42% of our respondents obtained their ACT from the health center, followed by hospital while health post recorded 2%. Other sources of ACT were clinic, NGO centre, traditional practitioner and pharmacy (Figure 7). A large percentage of our respondents sought treatment same day (39%) or a day after (40%) the onset of fever while 6% of them sought treatment three days or more after the onset of fever (figure 8).



**Figure 7: Sources of ACT**

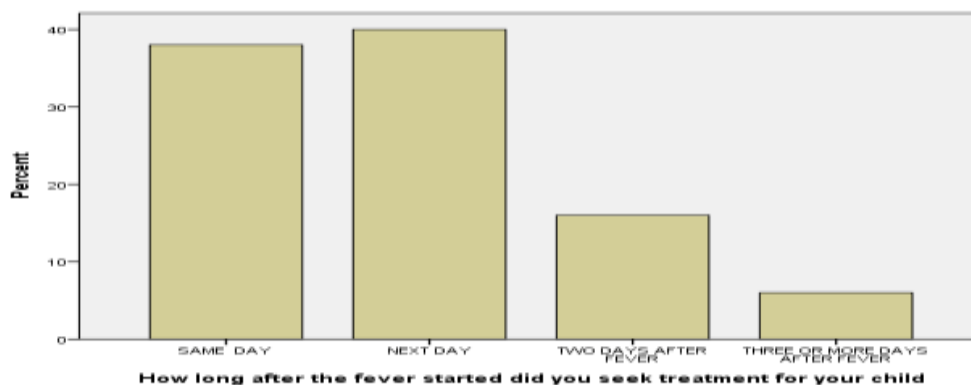


Figure 7: Assessing treatment after onset of fever

### Discussion

The level of Knowledge, Attitude, and Practice (KAP) amongst caregivers of under-five towards malaria prevention and treatment was evaluated in this research. From the findings, the most of the respondents were female (85%) and fell within the age of 31-40 years. The majority of the participants had attained secondary education (67%) whereas more than half had no paid employment (76%). Also, a majority of the respondents lived 11-20 kilometers from a health facility. It is contended that distance to a health facility could influence health seeking behavior. It has been reported in a study conducted in Nigeria that caregivers of children under-five delay in going to seek appropriate malaria treatment as a result of distance to health facilities (Idowu et al., 2008).

The KAP of malaria, as well as its treatment and prevention, were assessed to be very high among the study respondents. This is in consensus with previous similar studies conducted in western Nigeria (Adedotun et al., 2010). This also agrees with a similar study carried out in Lagos Nigeria (Iriemenam et al., 2011) but different from the findings of other similar studies carried-out in southern Ethiopia (Deressa et al., 2004) and Ghana (Adongo et al., 2005). All the respondents reported having heard of malaria. This was not unanticipated as Umuahia North is a malaria endemic area and as such, it is anticipated that the populace of such city which suffers from malaria regularly should have a good understanding of the disease, this was in agreement with other similar studies conducted in India (Chovatiya et al., 2013).

This study revealed that the participants had a good understanding of the symptoms and signs of malaria. Most of the respondents mentioned fever as a symptom of malaria, and this is consistent with the report of other studies carried-out in Nigeria (Okwa et al., 2011) and across other countries (Joshi & Banjara, 2008). There was also a good understanding of the use of bed net as a malaria preventive measure among the participants though only 56% said they use a bed net. This high level of awareness of mosquito net as a preventive measure is similar to the report of a study conducted in Malawi (Masangwi et al., 2012) and Ethiopia (Kaliyaperumal & Yesuf, 2009). The remaining 44% said they don't sleep under mosquito net even though they had it; instead, they used it for farming. This latter group could be at danger of suffering from malaria infection because they are not prepared to prevent it. It is quite bothersome to know that in spite of the dangerous consequences and nature of malaria, some of the members of Umuahia North do not know of the multi-dimensional issues of malaria. This goes to show that some caregivers' knowledge of malaria is yet to be perfect as there exist some misconception and wrong perception (Fatungase et al., 2012). The use of a health center for treatment was consistently high; this could be because of the government

strategy of constructing a health facility in every ward of Abia State. An exciting discovery of this study is that only 2% of the participants mentioned to have sought treatment from traditional healers. This is consistent with a research previously carried out in Nigeria (Jombo et al., 2010). The findings in this research show that there is a high level of awareness on the cause of malaria and also the use of LLIN as a means of preventing malaria among caregivers of under-five. The findings show that some caregivers still had the wrong perception of the cause as well as prevention.

On Malaria prevention, most of the respondents indicated that malaria is preventable. This is comparable to other studies documented. In a study carried-out in Tanzania, it was revealed that 42.5% said they do not know how malaria can be prevented although 32.5% indicated mosquito net as a preventive measure (Dinho et al., 2009). In another study carried out in Abeokuta, Nigeria on home management practice and perception of malaria, it was reported that most of the respondents used mosquito coils (74%) while non-used ITNs (Idowu et al., 2008).

Respondents' level of knowledge of ITNs as a malaria prevention means was higher compared to the other measures listed. The preventive measures which were top of the list are ITNs 47%, prompt treatment 19% and indoor residual spray 17%. However, drainage of water which could be said to be one of the very significant measures in controlling the breeding of mosquito was mentioned by only 1%. This is in consensus with the report of the study organized and implemented on knowledge of malaria and LLIN use in central Côte d'Ivoire rural community (Ouattara et al., 2011) but disagrees with the research on a community's KAP of malaria control and prevention choices in anti-malaria association intervention conducted in zones of Amhara national regional State, Ethiopian.

Misconception of the treatment and prevention of malaria still exist among caregivers of under-five, enhancing the understanding about the transmission and need of using the control and preventive measures which are available by the caregivers as well their household. Educational and awareness messages have to be culturally sensitive and should be focused on existing affirmative behaviors and beliefs.

The study had some limitations. The first is that this study is cross-sectional research conducted in Umuahia North alone; therefore, the findings cannot apply to the whole country. Another limitation is that as a result of the use of a structured questionnaire which does not give participants the chance to fully express their view on questions queried, qualitative study could be repeated to get more information from caregiver.

### **Conclusion**

Many of the caregivers know fever, headache as well as cold as the symptoms of malaria. Some level of misconception of malaria was also seen; thus, there is need to intensify malaria education and awareness among caregivers of under-five as they are more vulnerable to malaria.

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## Health Care Seeking Behaviour of Adult Diabetic Patients in Abia State, Nigeria

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### Abstract

*A chronic metabolic disorder called diabetes mellitus is defined by several risk factors, and in low-resource nations, a lack of understanding about the condition contributes to an increase in the prevalence of the illness.*

*According to NDC, diabetes is one of the serious, debilitating, non-communicable diseases are found in different continents. Type 1 diabetes (T1D), and type 2 diabetes (T2D), are the main types of diabetes globally, However, other types of diabetes include monogenic diabetes (MD), diabetes caused by diseases of the exocrine pancreas, diabetes linked to endocrine disorders, and drug and chemical-induced diabetes. This study evaluated the knowledge, attitude, and practices toward diabetes mellitus using a self-administered, semi-structured questionnaire in two local government areas in Abia State, Southeastern Nigeria. A total of 232 respondents were recruited for the study. 131 (56.6%) were males, while 100 (43.1%) were females. The majority of the respondents, 171 (73.9%), had poor knowledge of diabetes, while the knowledge about the accurate fasting sugar level was inadequate among the studied population. Although 221 (96.1%) of all the respondents were aware of diabetes, there was a significant difference in the practices among the under 30 years and above 30 years age groups ( $P < 0.001$ ) in the studied population. Sequel to this, there is a need for an educational intervention study to bridge the gap among the studied population.*

**Keywords:** *Diabetes mellitus, Knowledge, Practices*

### Introduction

Diabetes mellitus is one of the serious, debilitating, non-communicable diseases (NCDs) found in different continents. It is also described as a chronic endocrine disorder, with an abnormal increase in blood glucose. The disease is often illustrated by modified metabolism of carbohydrates, lipids, and proteins, resulting from defects in insulin secretion, insulin action, or both which is accompanied with a risk of vascular and renal diseases (Azeez et al., 2021). When diabetes is not controlled early enough, it often results in nerves damage or modification (Neuropathy) which affects up to 50% of diabetic patients; a major long term damage to the eyes (retinopathy) which, most time, cause total or partial blindness in adults; kidney dysfunction or failure (nephropathy), causing up to 20% death in diabetic patients, and cardiovascular and cerebrovascular diseases (Azeez et al., 2021; Iweka et al., 2020).

Of all the diabetes recorded worldwide, type 2 diabetes (T2D) constitutes over 90% and it has become one of the leading public health concerns in different parts of the world (Onu et al.,

2021; Williams et al., 2020). T2D occurs as a result of defect in insulin secretion and diminishing of insulin action in hepatic and peripheral tissues. T2D is characterized by insulin resistance and dysfunction. Types 2 diabetes has been linked with series of multiple genetic mutations. For type 2 diabetes, glucotoxicity and lipotoxicity has been linked with gradual lowering of insulin secretion by decreasing the amount of insulin secretory granules which is located in the pancreas (Ibrahim et al., 2021). The cause of the increase in the prevalence of type 2 diabetes is being traced to the life-style and the manner in which individual takes care of what they consume and their physical fitness (Saeedi et al., 2019).

The occurrence of the disease is unabated as it continues to impact on the lives and well-being of individuals, families, and societies. In low and medium income countries, diabetes is one of the leading causes of renal failure; lower limb amputations are common with people diagnosed with diabetes compared to no-diabetic patients (Ugwu et al., 2019). Visual impairment and blindness are also associated with people diagnosed with diabetes. Cardiovascular related diseases are becoming pronounced and one of the leading causes of death for people living with diabetes in developing countries (Ipingbemi et al., 2021; Saeedi et al., 2019).

The report by International Diabetes Federation (IDF) stated that the global occurrence of diabetes increased from 285 million in 2009 to 463 million in 2019 and it is projected to rise by another 10.9% to 700.2 million in 2045 in adult (International Diabetes Federation, 2019; Saeedi et al., 2019). In the aged, the occurrence of the disease is expected to rise by an average of 19% with an estimate of 195.2 million and 276.2 million by 2030 and 2045 respectively, with a mortality estimate of 4.2 million (Sinclair et al., 2020). In Africa, an estimate of close to 20 million adults are affected, 4.7 million people are estimated to be living with diabetes in Nigeria, this number will exceed 5.0 million by the year 2030 if the current trend is maintained (Godman et al., 2020; Ipingbemi et al., 2021).

Diabetes education involves teaching people all the needed knowledge and skill in the management of the disease. It includes, monitoring of blood glucose level, quantity and nature of food consumed, physical activities, weight management, attitude to smoking and other personal skills in the management of the disease (Rashed et al., 2016). Health seeking behaviour on the other hand involves all forms of action taken by a patient towards finding a solution to an ailment or its amelioration. It is often influenced by socio-cultural, economic and environmental factors together with the availability of health care provider. It also combines the effort of the individual, family and the community at large for a good medical outcome (Oberoi et al., 2016). Diabetes education is gradually becoming more of self-management; a patient is expected to maintain good self-care behaviour which includes exercise, proper adherence to medication prescribed, nutrition, and managing other skills developed by an individual (Chinenye & Young, 2013). Educators are therefore expected to play their roles by providing the necessary information to their patients.

In Nigeria, approximately 80% of patient's hospital bill either comes from personal savings or good spirited members of the family, thereby, making hospital bills, a heavy burden on such individual and the immediate family members (Ogbera, 2014; Okoronkwo et al., 2016). Financing medical bills from personal income or from the income of a member of the immediate or extended family is not an easy task and this increase the cost of living for many people involved. Though the price of fasting blood sugar test is less than one thousand naira in the country, many people still find it difficult in accessing this health check-up, either due

to the decrease in individual's income or ignorance (Adeloye et al., 2017). Though there is National Health Insurance scheme (NHIS) in Nigeria, only few people have access to the scheme. Therefore, if patients could hardly access health check-up due to low income earning, it could be more difficult to afford medications (Awodele & Osuolale, 2015; Das et al., 2018). In Nigeria, only secondary and tertiary health care institutions are involved in the management of diabetic patients and accessing these two health care centers is difficult because the numbers of consultants with such specialty's skill are limited; hence, the few ones are over stretched.

Other challenges include: socio-economic problems and complication which arises as a result of poor health care seeking behaviour of many people. As a result of these hindrances, many diabetic patients in Nigeria have resorted to the use of alternate medical health care, such as application of faith and traditional methods. These alternate medical methods, however, comes with some negative consequences, such as poor diagnosis and management, inaccurate drug measurement and adherence. The resultant effect is that, after failing to obtain the desired results from these non-orthodox approaches to health care, they develop complications and present late to the mainstream health facilities, at which point their conditions have become more difficult to manage. In addition, the on-going national activities by the Diabetes Association of Nigeria (DAN), Federal Ministry of Health (FMOH), and the Endocrine and Metabolism Society of Nigeria (EMSON) in the improvement and management of diabetes has not produced the desired results (Godman et al., 2020).

Furthermore, there is a paucity of data on the level of knowledge, awareness, practices related to and management of diabetes in Nigeria. Most studies have only attempted to estimate the prevalence of the disease in the country while a few have explored the prevalence of the risk factors in the general population (Arugu & Maduka, 2017). There is dearth of information as regards health seeking behaviour, knowledge and awareness of diabetes in communities of Umuahia North, Abia State, Southeastern, Nigeria. This study aims to examine the knowledge, attitude, and practice among adults diagnosed with Type 2 diabetes across Umuahia North Local Governments Areas (LGA), Abia State, Nigeria.

## **Methods**

### **Study Design**

This study was conducted from October 2021 to June 2022. Using a baseline-end line design, this investigation determined the effectiveness knowledge, attitude, and practice based on healthcare seeking behaviour in patients with Type 2 diabetes.

### **Study Population and Sampling**

A total of 246 participants were randomly selected for this study. The study population consists of adults between 18 years and above, who are resident in the selected communities of Umuahia North, Abia State, Southeastern, Nigeria. They were diagnosed with diabetes and during a community outreach and consent was sought to take part in the study. A convenience sampling approach was used to enroll those who come down with high sugar and/or high blood pressure and referred to a health. Trained data collectors were used to enrolled participants one month after the referral.

### **Sampling Technique**

A catchment area was defined as an area in the Primary Sampling Unit (PSU) where the project was carried out. Four communities were randomly selected from four wards in



Umuahia North Local Government Area (LGA). The center of the community was sort and used as starting point. A direction (North, South, West, or East) of the starting point was randomly selected and data collection took place following the right hand rule in that particular direction until the last house on that street was reached and then data collection continue in the next street until the target sample size in the catchment area of the communities was met.

The first structures after the direction have been selected serves as the first structure while the corresponding structures follow. For a structure with more than one household, the right hand rule was also used. If the structure has more than one household (a group of people who usually live together and “eat from the same pot”), the household to begin from, was selected using the right hand rule. Every second household was visited to ensure wide coverage of the catchment area. Once successful calls (interview) were made, the interviewer leaves the entire dwelling structure completely. Not more than two eligible respondents (male or female aged 18 years and above) were randomly interviewed depending on the population density of a household except in a clustered location. While no gender quotas were set, calls were alternated between males and female to prevent a skew towards any gender. In a clustered location, such as a marketplace or a joint, 10% of the total estimated population of eligible respondents were randomly selected and interviewed.

### **Study Tool**

A self-administered, semi-structured questionnaire was carried out while personal interview was done for respondents that are not literate. The questionnaires was designed in English language for ease of administration for literate respondents or interpreted to the respondent’s indigenous language and completed with the aid of the interviewer for those who may not be able to complete it by themselves (Garcia et al., 2001).

**Inclusion Criteria:** Participants were resident aged 18 years and above from whom informed consent is obtained and who were willing to participate in the study

**Exclusion Criteria:** Residents less than 18 years old and those who were unable to provide the appropriate information were excluded from this study.

### **Data Analysis**

Questionnaires were checked for errors or omissions at the end of each day and data were subsequently entered and stored in a password secured computer to ensure confidentiality. SPSS version 22.0 was utilized to generate the tables and the results of statistical analysis. Chi-square test was used to investigate associations between awareness of the disease and socio-demographic characteristics of respondents, practices related to the disease. P-values less than 0.5 were considered as statistically significant.

### **RESULTS**

Out of the 232 respondents, 131 (56.6%) were males while 100 (43.1%) were females. More than a third, 35.1% of the respondents were below 30 years of age, 33 (14.2%) were aged between 31-40 years, 64 (26.3%) were between the ages of 41 and 50 years as at their last birthday. A larger proportion of the respondents (139, 59.9%) had secondary education, 15 (6.5%) had primary education while 64 (27.6%) had a higher education. Generally, the percentage of respondent with poor knowledge of diabetes is high in this study. The socio-demographic characteristics of the respondents are shown in table 1.

**Table 1: Relationship between respondents' socio-demographic characteristics and Diabetes knowledge**

Variable (N=232)	Frequency	Percentage	Diabetes knowledge categories			X <sup>2</sup> (p-value)
			Good (%)	Fair (%)	Poor (%)	
Gender						5.72 (0.057)
Male	131	56.5	0 (0.0)	28 (21.4)	103 (78.6)	
Female	100	43.1	2 (2.0)	31 (31.0)	67 (67.0)	
No response	1	0.4	-	-	-	
Age at last birthday (years)						16.00 (0.014)
Under 30	35	35.1	0 (0.0)	12 (34.3)	23 (65.7)	
31 – 40	33	14.2	1 (3.0)	14 (42.4)	18 (54.5)	
41 – 50	61	26.3	1 (1.6)	17 (27.9)	43 (70.5)	
Over 50	103	44.4	0 (0.0)	16 (15.5)	87 (84.5)	
Highest level of education attained						17.295 (0.008)
No education	11	4.7	0 (0.0)	3 (27.3)	8 (72.7)	
Primary education	15	6.5	0 (0.0)	6 (40.0)	9 (60.0)	
Secondary education	139	59.9	1 (0.7)	22 (15.8)	116 (83.5)	
Higher education	64	27.6	1 (1.6)	26 (40.6)	37 (57.8)	
No response	3	1.3	-	-	-	
Employment status						6.93 (0.031)
Employed	142	62.1	2 (1.4)	28 (19.7)	112 (78.9)	
Unemployed	88	37.9	0 (0.0)	30 (34.1)	58 (65.9)	
No response	2	0	-	-	-	

The proximity of the nearest health facilities to the respondents' respective residences is shown in Table 2. In total, 67 (28.9%) of the respondents stated that the nearest health facility to their residence is within 10km and a similar proportion (27.2%) mentioned that the nearest health facility to their residence is within 21 & 30km from their residence. More than half of the respondents (131, 56.5%) preferred accessing healthcare from a government clinic or hospital, while 93 (40.1%) preferred private clinic as their source of healthcare while only 7 (3.0%) preferred accessing health services from traditional healers as shown in Table 2.

**Table 2: Proximity of Health Services, Preferred Sources & Frequency of Health Services Utilization among respondents**

Variable (N = 232)	Frequency	Percent
Distance of residence from nearest health facility		
0-10 kilometers	67	28.9
11-20 kilometers	89	38.4
21-30 kilometers	63	27.2
More than 30 kilometers	11	4.7
No response	2	0.9
Preferred source of healthcare		
Private clinic	93	40.1
Government clinic or hospital	131	56.5
Traditional healers	7	3.0
No response	1	.4
Frequency of routine healthcare		
Once a year	107	46.1
Twice a year or more	80	34.5
Once in the past five years	26	11.2
Never in the past five years	18	7.8
No response	1	0.4

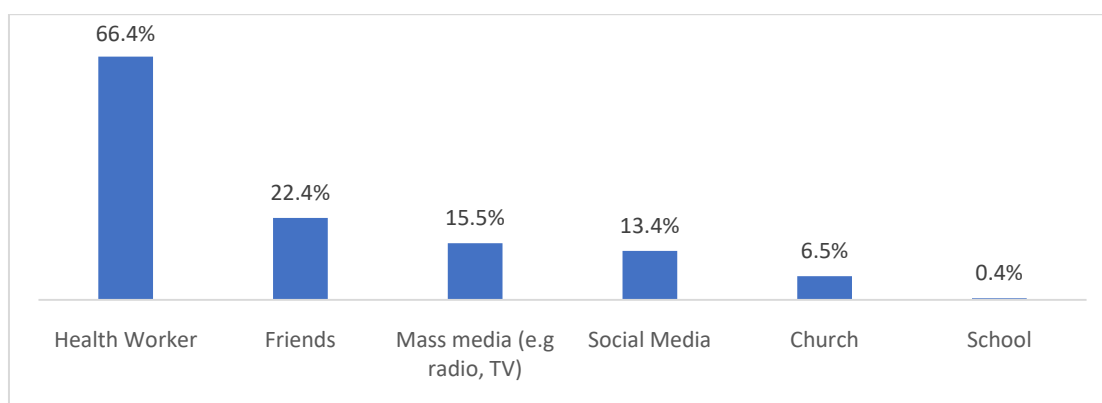
Majority of the respondents, 202 (71.1%) indicated that eating too much sugar and other sweet foods is a cause of diabetes, 153 (65.9%) stated that insulin is produced by the kidney and 172 (74.1) also stated that diabetes is curable. About a quarter of the respondents did not know whether a fasting blood sugar level of 210mg/dl is too high while 55 (23.7%) stated that an insulin reaction is not caused by too much food while 136 (58.6%) stated otherwise. Majority (188, 81.0%) indicated that testing of their urine is the best way to check their diabetes while 38 (16.4%) each believed neither did not agree nor were unsure. Almost all the respondents (223, 96.1%) stated that the way they prepare their food is important as the food and majority (208, 89.7%) mentioned that a diabetic diet consists mostly of special foods. Table 3 further shows the respondents responses to the knowledge questions on diabetes.

Health workers were the major source of information among the respondents as 66.4% of them obtained information about the medical condition through this source. Only 6.5% obtained information about diabetes from a church while 22.4% obtained information about it from their friends and 15.5% through mass media such as radio or TV (Figure 1).

**Table 3: Knowledge of Diabetes among respondents**

S/N	Questions	Response*		
		Yes (%)	No (%)	Don't know (%)
1	Eating too much sugar and other sweet foods is a cause of diabetes	202 (87.1)	24 (10.3)	5 (2.2)
2	The usual cause of diabetes is lack of effective insulin in the body	186 (80.2)	14 (6.0)	31(13.4)
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	190 (81.9)	12 (5.2)	29 (12.5)
4	Kidneys produce insulin	153 (65.9)	31 (13.4)	46 (19.8)
5	In untreated diabetes, the amount of sugar in the blood usually increases	206 (88.8)	10 (4.3)	15 (6.5)
6	If I am diabetic, my children have a higher chance of being diabetic	184 (79.3)	22 (9.5)	25 (10.8)
7	Diabetes can be cured	172 (74.1)	35 (15.1)	24 (10.3)

8	A fasting blood sugar level of 210mg/dl is too high	158 (68.1)	13 (5.6)	60 (25.9)
9	The best ways to check my diabetes is by testing my urine	188 (81.0)	20 (8.6)	23 (9.9)
10	Regular exercise will increase the need for insulin or other diabetic medication	153 (65.9)	38 (16.4)	38 (16.4)
11	There are two main types of diabetes: Type 1 (Insulin-dependent) and Type 2 (Non-insulin-dependent)	174 (75.0)	17 (7.3)	40 (17.2)
12	An insulin reaction is caused by too much food	136 (58.6)	55 (23.7)	40 (17.2)
13	Medications is more important than diet and exercise to control my diabetes	160 (69.0)	47 (20.3)	24 (10.3)
14	Diabetes often causes poor circulation	182 (79.4)	19 (18.2)	30 (12.9)
15	Cuts and abrasions on diabetics heal more slowly	207 (89.2)	8 (3.4)	16 (6.9)
16	Diabetics should take extra care when cutting their toenails	219 (94.4)	4 (1.7)	7 (3.0)
17	A person with diabetes should cleanse a cut with iodine and alcohol	187 (80.6)	9 (3.9)	34 (14.7)
18	The way I prepare my food is as important as the food I eat	223 (96.1)	5 (2.2)	3 (1.3)
19	Diabetes can damage my kidneys	198 (85.3)	9 (3.9)	24 (10.3)
20	Diabetes can cause loss of feeling in my hands, fingers and feet	183 (78.9)	12 (5.2)	36 (15.5)
21	Shaking and sweating are signs of high blood sugar	161 (69.4)	26 (11.2)	44 (19.0)
22	Frequent urination and thirst are signs of low blood sugar	152 (65.5)	33 (14.2)	46 (19.8)
23	Tight elastic hose or socks are not bad for diabetes	129 (55.6)	45 (19.4)	56 (24.1)
24	A diabetic diet consists mostly of special foods.	208 (89.7)	14 (6.0)	8 (3.4)



**Fig. 1: Source of Information about Diabetes**

Majority of the respondents engage in activities that can potentially prevent or control diabetes as shown in Table 5. Specifically, 171 (73.7%) of the respondents engages in 30 to 60 minutes of physical activity daily; among these, 153 (89.5%) were at least 30 years old while the rest were below age 30 years ( $X^2 = 11.37$ , p-value = 0.001). Also, 182 (78.4%) of the respondents checks their blood sugar regularly (at least once yearly), out of which 159 (87.4%) were at least 30 years and 12 (23.6%) were less than 30 years old ( $X^2 = 4.50$ , p-value = 0.034)

**Table 4: Practice of Diabetes Prevention & Control related activities among respondents**

Variable	Total (%*)	< 30 (%**)	>30 (%**)	X <sup>2</sup> (p -value)
Engages in daily 30-60 mins physical activity (e.g. Brisk walking, house activities, climbing staircase)	171 (73.7)	18 (10.5)	153(89.5)	11.37 (0.001)
Checks blood sugar regularly (at least once in a year)	182 (78.4)	12(23.6)	159(87.4)	4.50 (0.034)
Avoids refined sugar/sugary foods	167(72.0)	16(9.6)	151(90.4)	15.01(<0.001)
Controls body weight	150(64.7)	14(9.3)	136(90.7)	10.46 (0.001)

*Proportion of total respondents*      *\*\*Proportion within sub-group*

### Discussion

This study determined the significant characteristics that are peculiar to the knowledge, attitude and practices regarding persons leaving with type 2 diabetes who are attending health care centres in Abia State, South-Eastern, Nigeria. A good knowledge through education regarding diabetes can cause a drastic change in the lifestyle of patients thereby enabling good glycemic control (Yosef et al., 2021). Furthermore, an adequate knowledge of the vulnerable groups and their characteristic would enable public health practitioners to plan an efficient health education intervention programme.

Out of 232 recruited participants, 170 (73.7%) had poor knowledge of diabetes. This findings was higher than 60% recorded among diabetic patients attending University of Nigeria teaching hospital, Enugu State (Anakwue et al., 2019). The knowledge of diabetes is generally low irrespective of sex, educational level, age or employment status among diabetic patients in this study. This observation aligns with a study conducted by Aniedi et al. (2020) in Uyo, South-South, Nigeria, where close to 80% of the recruited participants had poor knowledge of diabetes, but in deviance to a study carried in a southwestern city, where close to 90% of the respondent knew about diabetes (Osiberu et al., 2021). The poor knowledge recorded among our studied population could be due to inadequate diabetic education which is common in most underdeveloped or developing countries (Masood et al., 2016; Shah et al., 2009).

Prompt and easy access to health facilities is one of the major factors to be considered when seeking health care. If the health facility is too far from the place of residence, discouragement in seeking health care could be witnessed (Das et al., 2018). Approximately 40% of our respondents indicated that health facilities are between 11 and 20 km from their place of residence while another 27.2% travelled for close to 30 km before finding an appropriate health facility. The moment a health care centre is found several miles away, there is a higher probability that there would be low patronage by potential patients. They will either look for an alternative to conventional health care or postpone their appointment date. This is in agreement with similar studies in other countries (Amadi et al., 2019; Liu et al., 2018). A large percentage of our participants preferred government clinics/hospital or private clinics while only 3.0% visit traditional healers for treatment. This is in tandem with previous studies. The higher percentage of our respondents seeking government health facilities for medical care could be due to a paucity of funds. Meanwhile, the amount charged by government hospitals is low compared to private clinics. Although there is a health insurance scheme in Nigeria; however, the number of the enrollee is generally low compared to the total population of Nigerians (Ipingbemi et al., 2021). Therefore, patients pay for

medical bills out-of-pocket which is not comfortable for the majority of them (Okoronkwo et al., 2016). In some African countries, the use of alternate and traditional medicine in the management of diabetes is gradually gaining ground (Chetty et al., 2022). Though traditional medicine is faced with the issue of quantification among other limitations; a few of our respondents (3.0%) visited the traditional clinics for diabetes health care, perhaps due to affordability and the ease with which it is accessed (Chetty et al., 2022).

The awareness of diabetes among our study participants was found to be high, the majority of the respondents (71.1%) agreed to the fact that the disease could be caused by eating too much sugar and other sweet food materials while a larger percentage (65.9%) were also of the opinion that insulin is produced by the kidney. Close to 75% of our respondents said diabetes is curable; about a quarter of our study participants are not aware of the accurate fasting sugar level during the process of diagnosis. This forms a knowledge gap in the management and diagnosis of diabetes among our study groups. This present finding is consistent with similar studies in Pakistan and Zimbabwe where the awareness about diabetes is high but the knowledge, attitude and practices among them were generally poor (Gillani et al., 2018; Mufunda et al., 2018). The inaccurate understanding of the screening practices among our studied population requires good attention. American Diabetic Association defined self-management education as the process of providing adequate knowledge and skill regarding self-care, management of the crisis, and an informed quality lifestyle (Adebisi et al., 2009; Goyal et al., 2020; Le et al., 2021). When the knowledge about diabetes management is low, the capacity of the patient to use a self-management approach is impaired. Unlimited access to diabetic education, on the other hand, will enable the patient to practice self-care management, embrace a healthy lifestyle, and have good feeding habits. In addition, adequate knowledge about diabetes would enhance prompt physical activities and neglect a sedentary lifestyle (Murata et al., 2003).

Good diabetes management practices such as physical exercise, checking the blood sugar levels, and avoidance of sugar or sugary foods were some of the effective ways of managing diabetes. A significant difference was observed among our respondents (under 30 years and 30 years and above) in the following: physical activities ( $X^2 = 11.37$ ,  $p$ -value  $< 0.001$ ), blood sugar check ( $X^2 = 4.50$ ,  $p$ -value  $= 0.034$ ), sugary foods ( $X^2 = 15.01$ ,  $p < 0.001$ ) have been reported by similar studies (Ezeani et al., 2019; Ezema et al., 2019). A higher percentage of physical activities, regular blood sugar checks, and avoidance of sugary food recorded among participants (30 years and above) could be a result of adequate knowledge and practice among the age group. On the other hand, the low level of physical activities, regular blood sugar checks, and avoidance of sugary foods among participants below 30 years old is an indication of inadequate/lack of knowledge about the method used in the management of diabetes. This, if unchecked could lead to an increase in the percentage of under-aged patients developing an advanced stage of diabetes among the studied population and its environs. In conclusion, this study showed poor knowledge about diabetes, the screening procedure, and inadequate knowledge about some aspects of diabetes management among our studied population. Therefore, we recommend a longitudinal study to assess educational intervention among the studied population.

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**Prevention of Non-Communicable Diseases in Nigeria, Policies and Guidelines:  
A Review**

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**Abstract**

*Non-communicable diseases (NCDs), which include cardiovascular diseases (CVDs), cancer, chronic obstructive pulmonary disease (COPD), diabetes, and mental illness, have surpassed communicable disease mortality and morbidity in low- and middle-income countries (WHO, 2012). The purpose of this work is to conduct an in-depth review of Nigeria's NCD national policies and guidelines in accordance with the World Health Organizations (WHO) NCD best Buy interventions.*

**Methods:** A descriptive case study methodology was used in accordance with Walt and Gilson's framework for policy analysis (Walt et al., 2008). The study involved a search of online databases such as Google Scholar, Science Direct, PubMed for articles, national guidelines, and policy documents. Additionally, government institutions were contacted to obtain relevant documents.

**Results:** The documents reviewed attest that Nigeria has long recognized NCDs as a significant public health issue in Nigeria has developed policies, guidelines, protocols as well as technical documents to direct the prevention and control of NCDs in the country through the Federal Ministry of Health. The NMSAP was comprehensive and adhered to all WHO-recommended measures for the prevention and control of NCDs. The NSAP 2015 and the National Tobacco Control Act 2015 were also prepared completely, with the latter eventually becoming WHO - FCTC compliant. Nigeria, in line with other countries and the WHO's recommendation, has taken a multi-sectoral approach to the prevention of NCDs. However, major gaps in Nigeria's NCD interventions were observed.

**Conclusion:** In Nigeria, policies and guidelines to prevent and control NCDs must be strengthened by the government at all sectors, besides, non-health sectors must be encouraged for a holistic overview.

**Keywords:** *Non-communicable diseases (NCDs), low-and-middle income countries, prevention, policies.*

**Background**

Non-communicable diseases (NCDs) are chronic, non-contagious diseases that, if not prevented or adequately controlled, can result in long-term debilitation and disability. NCDs disproportionately affect highly productive populations, imposing a significant

socioeconomic burden and undermining national development (FMoH, 2015). NCDs are now the leading cause of disability and death worldwide, rapidly eclipsing communicable disease-related mortality and morbidity in low- and middle-income countries (FMoH, 2019).

Annually, 15 million people between the age of 30 to 69 years die of an NCD; over 85 percent of these "premature" deaths occur in low- and middle-income countries. Cardiovascular diseases account for the majority of NCD deaths, accounting for 17.9 million people per year, followed by cancer (9.0 million), respiratory diseases (3.9 million), and diabetes (1.6 million) (WHO, 2018). Non-communicable diseases (NCDs), primarily cardiovascular diseases, cancer, chronic respiratory diseases, diabetes, and mental illness, now pose a significant threat to human health and development. In 2016, 57 million people died, with NCDs accounting for 41 million of these deaths. NCDs accounted for 71% of all deaths worldwide in 2015, resulting in cumulative economic losses of US\$7 trillion over the next 15 years and the impoverishment of millions (3). This sum far outweighs the annual intervention fund (US\$ 11.2 billion), aimed at reducing the NCD burden (From Burden to "Best Buys": Reducing the Economic Impact of Non-Communicable Diseases in LMICs) (FMoH, 2019). If left unchecked, NCD-related mortality and disease burden will continue to rise (WHO, 2012).

The rapid growth of NCDs is a major health challenge for global development, endangering economic and social development, as well as the lives and health of millions of people. According to Di Cesare et al. (2013), the primary determinants of the global burden of NCDs are behavioral, dietary, environmental, and metabolic. Tobacco use and exposure to secondhand smoke; an unhealthy diet (foods high in fat, salt, and sugar); insufficient physical activity; and harmful alcohol consumption are all behavioral risk factors for NCDs (Di Cesare et al., 2013). While the majority of behavioral risk factors are preventable and modifiable (Igumbor et al., 2012), access to medicines, including complementary and alternative medicine, remains critical for combating the NCD epidemic (Kamvura et al., 2022; Lam So et al., 2015; Mondal & Van Belle, 2018). To address the rising prevalence of NCDs, the WHO took the lead, and then most countries, including Nigeria, developed legislation, strategic action plans, policies, and guidelines aimed at ultimately reducing the prevalence of NCDs.

### **NCDs in Nigeria**

Nigeria is undergoing a demographic and epidemiological transition, accompanied by an increase in risk factors for non-communicable diseases (NCDs). According to the WHO's 2016 NCD Country Profile report, NCDs were estimated to account for approximately 617,300 deaths in Nigeria, accounting for 29 percent of total deaths (WHO, 2019). Injuries accounted for 8% of these, followed by cardiovascular diseases at 11%. Premature mortality as a result of NCDs, defined as the probability of dying between the ages of 30 and 70 years as a result of the major NCDs, is 22% (FMoH, 2019).

The Federal Ministry of Health in Nigeria has agreed and adopted a list of major NCDs. These include cardiovascular diseases (such as hypertension, coronary heart disease, and stroke); cancer; diabetes mellitus; sickle cell disease; chronic respiratory diseases (CRDs); mental, neurological, and substance use disorders (MNSDs); violence and road traffic injuries; and oral health disorders (OHDs) (FMoH, 2015). Other NCDs in Nigeria include deafness and hearing loss, blindness, violence and injury, including road traffic accidents, oral health conditions such as Noma, and disability.

Nigeria is a signatory to the 2011 United Nations political declaration on the prevention and control of NCDs, the May 2013 World Health Assembly Global Action Plan for the Prevention and Control of NCDs 2013-2020, and the September 2015 United Nations 2030 agenda for sustainable development goals, which included a specific goal of reducing premature deaths from NCDs. Juma et al. (2018) conducted a comprehensive analysis of multi-sectoral action in the development of non-communicable disease prevention policies in five African countries, including Nigeria (FMoH, 2014). Oladepo et al. (2018) examined Nigeria's tobacco control policies in terms of multi-sectoral action (Ndinda & Hongoro, 2017). Additionally, Abiona et al. (2019) published an analysis of Alcohol Policy in Nigeria: Cross-sectoral Action and Integration of WHO "best-buy" interventions. This work aims to conduct a review of Nigeria's policies, guidelines, and strategic action plans for the prevention and control of NCDs in order to identify the gaps and impediments that have hampered their implementation.

### **Country Profile**

Nigeria is located on Africa's west coast and covers an area of 923,768 square kilometers. It is located between latitudes 40° and 140° North of the equator and 20° to 140° East of the Greenwich Meridian. The country is composed of 36 States and the Federal Capital Territory of Abuja, with a total of 774 Local Government Areas (LGAs) (FMoH, 2019).

### **Methods of data collection**

The descriptive case study methodology was used in accordance with Walt and Gilson's framework for policy analysis. The study began with a scoping review, which involved conducting an electronic search of online databases such as Google Scholar, Science Direct, and PubMed for articles, national guidelines, and policy documents that were not limited by language or date. Additionally, we examined several low- and middle-income countries' NCD policies, including those in South Africa, Kenya, Ethiopia, Cameroon, and Malawi. The documents were retrieved from government ministry websites and offices, as well as from some development partners, including the NCDs Division, the FMoH, the WHO, and the World Diabetes Foundation (WDF). Twelve policy documents and statements, strategic plans, program plans, guidelines, and protocols, eight reports, and ten journal articles were included in the review.

### **Results**

#### **Nigerian Government Interventions in Non-communicable Diseases**

In Nigeria, the NCD Control Programme, which is now a division within the Federal Ministry of Health, was established in 1989 with the mandate to serve as the response/coordinating point for NCD intervention in the country through prevention, early diagnosis, and control, as well as the formulation of policies and guidelines for NCDs (FMoH, 2015). From 1990 to 1992, a national survey on NCDs was conducted to ascertain the prevalence of major NCDs in Nigeria, their risk factors, and health determinants. Additionally, documents for health professionals on the management of NCDs were developed, as well as health education materials (FMoH, 2015). The annual commemoration of NCD-related Global Days through a variety of activities such as press briefings, awareness campaign rallies, sensitization workshops/seminars for the general public and school children, etc. has made a significant contribution to increasing public awareness of NCDs and their risk factors.

## **Guidelines, Protocols, and Technical Packages on Non-communicable Diseases in Nigeria**

Nigeria has developed guidelines, protocols, and technical documents to direct the prevention and control of NCDs in the country through the Federal Ministry of Health. Among them are the following:-

### **National Multi-sectoral Action Plan for Preventing and Controlling Non-communicable Diseases (2019–2025):**

The National Multi-Sectoral Action Plan (NMSAP) for the Prevention and Control of Non-Communicable Diseases (NCDs) in Nigeria 2019–2025 serves as a strategic guide for Nigeria's seven-year national response to NCDs. The WHO Tools for National Multi-sectoral Action Plans for the Prevention and Control of Non-Communicable Diseases serve as a guide for developing the NMSAP (NCD MAP Tool). The document is consistent with the National Health Strategic Development Plan II (2018–2022) (NHSDP II), the Sustainable Development Goals (SDGs) 2015–2030, and the Economic Recovery and Growth Plan (ERGP) (2017–2020). This document establishes a framework for reducing morbidity and mortality associated with non-communicable diseases (NCDs) within the context of Nigeria's broader health system (FMoH, 2019).

### **National Strategic Action Plan for the Prevention and Control of Non-communicable Diseases:**

This document is intended to provide the government and all relevant stakeholders with a framework for developing and implementing programs and interventions that address NCDs in areas other than health. It will last five years (2016 - 2020). The strategic plan of action adopts an integrated approach to tackling the four major NCDs namely: cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes rather than focusing on the individual diseases (FMoH, 2015).

### **National Nutritional Guideline for the Prevention, Control, and Management of Non-communicable Diseases:**

This guideline is intended to provide information and knowledge about proper nutrition, which is critical for the prevention and management of non-communicable diseases (NCDs). It is not a policy paper, but rather a collection of policy possibilities, and hence lacks a clearly established implementation framework. Additionally, its development process excluded a broader range of stakeholders and actors, particularly from the food and beverage industries (Federal Republic of Nigeria, 2015).

### **National Sickle Cell Disease (SCD) Control and Management Guidelines:**

The paper contains guidelines for the management of certain clinical issues and protocols for a variety of therapeutic procedures in order to promote uniformity and standardization of care across disciplines. The Federal Ministry of Health developed the guideline with the assistance of relevant development partners and other stakeholders (Oladebo et al., 2018)

### **Nigeria Tobacco Control Act 2015:**

The Act contained legislation and policies aimed at protecting current and future generations of Nigerians and residents of Nigeria from the devastation caused by the use of or exposure to tobacco or tobacco products, as well as exposure to tobacco or tobacco produce smoke (Ndinda & Hongoro, 2017). The Act also aimed to carry out Nigeria's obligations under the World Health Organization's Framework Convention on Tobacco Control and other related

treaties to protect citizens against tobacco or tobacco product-related harms in the promotion of health and other human rights (FMoH, 2012).

### **Nigeria's Policy Status on Prevention of Non-communicable Diseases**

NCD prevention and control policies in Nigeria are concentrating on the following areas: NCD prevention, tobacco control, alcohol control laws, food and nutrition security and policy, salt legislation, and physical activity. This is consistent with WHO recommendations for best buys (Ndinda & Hongoro, 2017). Nigeria has created a number of NCD preventive initiatives that focus on the primary risk factors for NCDs. Legislation, detailed strategies and action plans, and executive orders comprise the policies. The majority of these policy texts have a well-defined division of duties between government arms and different levels of health care, as well as a well-articulated implementation structure. It's worth noting that while Nigeria has tobacco control legislation, food and nutrition security and policy, a nutrition action plan, and a national NCD strategic and action plan, it lacks alcohol control, salt control, and physical activity legislation, which are among the WHO's best buy interventions (FMoH, 2014).

### **Tobacco Control Legislation**

According to reports, tobacco consumption has increased in Nigeria (FMoH, 2014). Tobacco use is a significant risk factor for the development of non-communicable illnesses (NCDs). According to the 2012 Global Adult Tobacco Survey (GATS), 5.6 percent (4.7 million) of Nigerian people aged 15 years or older used tobacco products at the time of the survey (10.0 percent of men and 1.1 percent of women). Additionally, 3.7 percent of Nigerians consume tobacco now, while 2.9 percent are daily smokers (FMoH, 2014).

Nigeria's first attempt at tobacco control was purely commercial in nature. Tobacco control was included in a revenue allocation instrument on licensing and regulating tobacco importation - Section 6 of the 1951 Nigeria Order in Council (Alli, 2020; Nwhator, 2012). Nigeria made its first significant attempt to limit tobacco use in the interest of public health in 1990, when the Military administration enacted the Tobacco Smoking (Control) Decree 20, 1990 (Federal Republic of Nigeria, 1990). The degree was modified to an Act ("Tobacco Control Act CAP T16") following the establishment of democracy in 2000, with no changes to its content (Drope, 2013). According to a 2008 WHO investigation (Nwhator, 2012; WHO, 2008), the strategy was ineffective and poorly administered. This necessitated the drafting of the "National Tobacco Control Bill 2009," also known as "A Bill for an Act to Repeal the Tobacco (Control) Act 1990 Cap T16 Laws of the Federation and to enact the National Tobacco Control Bill 2009." The National Assembly passed the law but the then-President refused to sign it (Ndinda & Hongoro, 2017). The Federal Ministry of Health drafted a version of the bill and submitted it as an Executive Bill to the Federal Executive Council and Senate for approval. The measure passed by the Senate and was signed into law by the President on 27th May 2015 as the "National Tobacco Control Act" (Ndinda & Hongoro, 2017).

### **Legislation concerning alcohol**

Nigeria is one of the most alcoholic African countries. Nigeria is ranked 27th in the world in terms of adult alcohol consumption (age 15+) in liters per year (WHO, 2014). The costs of alcohol-related damage have been quantified in terms of health and socioeconomic indicators (Shield et al., 2013). In the country, alcohol use is the leading cause of traffic accidents (FRSC, 2007). The World Health Assembly's (WHA) global call to address the growing

alcohol-related problems caused by harmful consumption became necessary in 2005 as a result of the recognition that many countries, including Nigeria, lacked alcohol policies (Dumbili, 2014).

Nigeria has yet to adopt national laws on alcohol control, which may be related to the vested interests of key alcohol industry actors. However, the president has approved the imposition of a new excise levy on alcoholic beverages (FMoH, 2019). The Federal Road Safety Act 2007, the 2013 and 2015 National Policy and Strategic Plan of Action on Non-communicable Diseases, and the National Multi-sectoral Action Plan for Prevention and Regulation of NCDs are the three primary national documents that address alcohol control.

The 2015 National Policy and Strategic Plan of Action on Non-Communicable Diseases identified six actions to curb harmful alcohol use. They include the following objectives: "to discourage alcohol use among women; to prevent underage alcohol consumption; to discourage drinking toxic local brew; to prevent the consumption of illegally brewed and distributed alcoholic beverages; to prevent driving or operating machinery while impaired by alcohol; and to identify and manage alcohol use disorders" (Abiona et al., 2019). These national documents fall short of the WHO's 'best buy' interventions for harmful alcohol consumption control because they include just one of the 'best buys', which restricted access to retailed alcohol to prevent underage alcohol use. However, according to the WHO's global alcohol report on Nigeria (WHO, 2016), Nigeria has a policy in place for excise taxes on alcoholic drinks and advertising restrictions dubbed "17:59," but this policy is not included in the national policies we analyzed. By contrast, some African nations, including Cameroon, South Africa, Kenya, and Malawi have national alcohol control policies (Juma et al., 2018; Ndinda & Hongoro, 2017) that have aided in the prevention and control of NCDs.

### **Security and Policy in Food and Nutrition**

Nigeria's National Policy on Food and Nutrition establishes an overarching framework for addressing the several facets of food and nutrition reform. The Policy emphasizes the importance of governmental and private sector cooperation and that eradicating hunger and improving nutrition are a common duty shared by all Nigerians (FMB & NP 2016).

### **Action Plan on Nutrition**

Anecdotally, it appears that Nigeria's food consumption pattern is fast shifting toward unhealthy diets, with an increase in processed foods rich in salt, sugar, and trans-fats (FMoH, 2019). A poor diet leads to the development of non-communicable diseases (NCDs). Consumption of proteins, fruits, and vegetables is low in Nigeria, whereas excessive consumption of salt and refined carbohydrates is prevalent. Excessive salt consumption is a recognized risk factor for cardiovascular disease (CVD) in Nigeria (FMoH, 2015). Recognizing the critical role of nutrition in NCD prevention, control, and management, the Federal Ministry of Health of Nigeria produced the National Nutritional Guidelines for Non-communicable Disease Prevention, Control, and Management in October 2014 (Federal Republic of Nigeria, 2015). The text is intended to serve as a guideline for developing policy alternatives, not as a policy, and hence does not include strategic action and implementation plans. Although there is supporting legislation under the NAFDAC Act to support additional/new rules on reformulation to reduce salt and substitute trans-fats and saturated fats in industrially manufactured foods with unsaturated fats (FMoH, 2019). Several literatures suggested increased intake of fruits and vegetables could decrease in onset of NCDs, especially risk of developing oral cancer, oesophagus cancer and colorectal cancer.



Furthermore, consumption of high fibre diet and foods rich in vitamin A and vitamin C helps in the prevention of NCDs (Habib & Saha, 2010; Tiwari et al., 2022; Wallace et al., 2020).

### **Physical Activity**

Physical inactivity is well recognized as a major risk factor for non-communicable diseases (NCDs) such as cardiovascular disease, cancer, and diabetes (Ndinda & Hongoro, 2017; Rampal, 2017). According to the Nigerian Report Card on Physical Exercise for Children and Youth, between 30.3 and 74.6 percent of Nigerian children and adolescents aged 5 to 25 years engage in some type of physical activity, but not enough to benefit their health while 80% of working-class individuals did not reach the WHO's recommended daily physical activity level (FMoH, 2015). The NSAP stated in Objective 4, section 5, that program will be implemented to address risk factors for NCDs, which include physical inactivity; however the document failed to outline specific actions and strategies to do this. The NMSAP incorporated and addressed all of the WHO's 'best buys' initiatives for physical activity promotion.

### **Control of physical inactivity**

The research identified several beneficial effects of physical activities. For instance, physical activities protect against stroke, cardiovascular diseases, and diabetes (Smith et al., 2020). Furthermore, it also reduces the risk associated with a cancerous growth in the breast and colon (Haskell et al., 2007; Lugo et al., 2019; Tucker et al., 2019). Although there appears not to be a consensus regarding the number of physical activities, however, WHO guidelines regarding physical activities noted that at least half an hour of moderate-intense physical activity on most days of the week or an equivalent of at least 150 minutes per week is recommended for every adult (WHO, 2010). Recommended physical activities include jogging, bicycling, swimming, etc.

### **Government Role in Control of NCDs**

Governments at all levels have the responsibility of playing a major role in the control of NCDs in their country. for example, In Malawi, the government collaborated with professionals, such as nutritionists, health educators, nurses, clinicians, and health surveillance assistants in providing adequate information required for the prevention and control of NCDs (Adeyi et al., 2007; Lupafya et al., 2015). World Health Organization's InterHealth programme –aimed at modifying the levels of major risk factors of NCDs in the community through an integrated approach to health maintenance and promotion, has been successfully implemented in developed countries like Finland, Cyprus, Malta, Russia and USA (Nissinen et al., 2001). The success recorded from the programme is been replicated in underdeveloped and developing countries such as Nigeria, Tanzania, Sri Lanka, and Thailand (Dowse et al., 1995; Nissinen et al., 2001; Tian et al., 1995; Uusitalo et al., 1996). WHO collaborated with the head of government of these countries in initiating this programme for the purpose of controlling NCDs.

### **Implementation, monitoring, and evaluation**

The NMSAP and NSAP both provide thorough plans for implementation, monitoring, and assessment. The multi-sectoral approach was also used in the implementation framework, but without involving the private sector, which is the primary actor. This suggests that non-government actors' involvement in implementation phases and activities may be quite limited.

### **Challenges of the Policies**

Nigeria's policies, Strategic Action Plans, and Guidelines for NCD Prevention have been extensively established, particularly the NMSAP. However, the policies have encountered significant obstacles throughout the implementation phase. Among these difficulties are the following:

**Inadequate resources:** The NMSAP is quite broad in that it encompasses and addresses all of the WHO's 'best purchase' interventions. If the plan is implemented properly, the plan's objectives will be met. However, it has been observed that financial allocation has been extremely limited, and in most cases, funding for NCD intervention has been quite limited. While the government frequently depends on NGOs and development partners to launch and implement programs addressing NCDs, this effort may never be sufficient. Out-of-pocket expenditures for health care are a constraint on these policies.

**Lack of political will:** The political stalemate that preceded the passing of the National Tobacco Control Act 2015, owing to undue external influence from major tobacco industry players and the government's desire to increase tobacco income, justified the Act's postponement. Nigeria signed the United Nations General Assembly's Political Declaration in 2011; however a lack of political will has been the primary cause for the lack of money to fulfill the multi-sectoral pledges.

**The quarrel over Policy mandates coordination:** Government ministries, departments, and parastatals have diverse opinions on who should coordinate an action plan, much more so when budgetary resources for such action plans are anticipated. Here, the conflict becomes more about "who will manage the money" than "who will carry out the strategy." Additionally, there is disagreement about whether line ministry, department, or parastatal should be responsible for implementing specific action plans. For instance, the Ministry of Information may argue that it is better equipped to conduct mass sensitization and awareness campaigns on NCDs than the Ministry of Health. As a result, passage of a measure prohibiting alcohol advertising proved complex and contentious, and the idea was finally dropped (Ndinda & Hongoro, 2017).

### **Significant impediments to NCD prevention and control in Nigeria**

Nigeria has experienced significant obstacles in the fight against NCDs throughout the years. There are both health-related and non-health-related issues that cause difficulties:

- Inadequate utilization of current evidence to inform policy and service delivery decisions;
- Inadequate surveillance and data management systems for non-communicable diseases;
- Inadequate capture of NCDs by the National Health Management Information System;
- A dearth of current, nationally representative data on NCDs;
- Inadequate support from both local and international sources for NCD control and prevention;
- Inadequate coverage of NCDs in the NHIS benefits package and basic healthcare supply budget
- Inadequate coverage of NCDs medications and commodities on the Essential Medicines List;
- Inadequate integration of NCDs and current communicable disease health services;
- A lack of measures addressing physical inactivity, bad eating habits, and dangerous alcohol;

- Slow progress toward creating laws implementing some provisions of the 2015 National Tobacco Act (Federal Republic of Nigeria, 2015).

### **Discussion**

According to the documents reviewed, Nigeria has long recognized NCDs as a major public health issue. The Federal Ministry of Health's NCDs section has been able to offer supervision and policy direction for NCDs initiatives across the country. Nigeria ratified the WHO Framework Convention on Tobacco Control (FCTC) treaty on 20 October 2005, making us a party to the Convention and so obligated to create and execute tobacco control laws in accordance with the WHO FCTC. In this context, on 26 May 2015, the National Tobacco Control Bill was prepared and signed into law (FMOH, 2015). Nigeria has produced policies, strategic action plans, and recommendations for the prevention and control of NCDs, and this study aims to assess their breadth, substance, and priority activities in comparison to WHO's 'best buy' NCD therapies.

Nigeria created a National Multi-sectoral Strategic Action Plan for NCD Prevention and Control in 2019 with help from WHO. The plan includes a defined governance and coordination system to supervise NCD policy involvement outside the health sector. The NMSAP was comprehensive and adhered to all WHO-recommended measures for the prevention and control of NCDs. The NSAP 2015 and the National Tobacco Control Act 2015 were also prepared completely, with the latter eventually becoming WHO - FCTC compliant. The primary gaps in Nigeria's NCD interventions include the lack of laws and regulations on alcohol restriction, sodium regulation, and physical activity (Ndinda & Hongoro, 2017).

The WHO-recommended method of many sectors is beneficial for coordination and has been promoted as a necessary component of effective multi-sectoral strategic action (Rasanathan et al., 2017). However, active participation and coordination of relevant government sectors in policy formation and execution has been challenging due to a number of reasons impeding the NMSAP's attainment of its objectives. Additionally, it was obvious that important players from the private sector, including NGOs and development partners, were excluded from both policy design and implementation, despite the fact that their responsibilities were allocated in the implementation framework.

The policies omitted specifically identifying financing sources. There was no established procedure or protocol to ensure that the three branches of government made budgetary allocations for NCDs. There is no nationally stated quota, percentage of the budget, or specific health budget that should be devoted to NCDs, and there is no mechanism for enforcing it. Additionally, the budget lacked detailed plans for NCD surveillance. Attempts have also been made to integrate NCDs into Primary Health Care (PHC), but with limited success.

While the NMSAP mentions UHC, achieving a reduction in NCD prevalence and mortality will be impossible without fully implementing UHC and operationalizing the Basic Healthcare Provision Fund. The policies and guidelines made no mention of fundamental health financing issues such as adequate health insurance coverage and out-of-pocket spending reduction. The guidelines did not adequately capture workplace policies that promote healthy work environments and physical activity.

At the implementation level, some of the priority activities require policy formation and legislation (as with alcohol control, physical activity policy, salt regulation, and regulation of additives and sweeteners in processed foods), which have not yet been completed. The National Tobacco Control Act 2015 has been implemented slowly due to a delay in creating rules to enforce some provisions of the Act.

As more Nigerians, particularly in urban areas, rely on eateries and fast food as their primary source of edible food, it is also necessary to formulate policies and develop structures to regulate the activities of these food industries in terms of nutritional profile improvement. It is vital to emphasize here that the general implementation of NCDs preventive and control interventions has been extremely inadequate leaving only the NGOs and development partners whose financing is very modest and confined with the few activities which in most cases are not sustained.

There is also a very wide gap between the substance of these policy papers and the level of understanding of important participants in the document on their responsibilities and contributions as prevention and control of NCDs. This loophole is visible in health sectors and non-health sectors equally. Though the capacity building of health personnel is defined as a priority activity, the degree of its execution is concerning.

### **Conclusion**

Nigeria has made laudable efforts to create policies and guidelines for the prevention and control of NCDs. The difficulty though resides in its capacity to stay on track in its deployment. Inadequate funding and political will have been identified as some of the policies' impediments. As a result, it is critical that measures are put in place to address this challenge on a multi-sectoral level. The following is recommended:

- Political structures at the national and state levels must exist to oversee implementation. Additionally, committees at the national and state assemblies must be established to oversee the implementation of NCD policy.
- Budgetary allocations comparable to those available for communicable illnesses such as AIDS must be made for the execution of NCDs policy.
- A body or the Federal Ministry of Health's NCDs division should be empowered to operate as a national coordinating and supervision structure comparable to National Action for the Control of AIDS (NACA) and appropriately supported to coordinate multi-sectoral action plans on NCDs.
- Improving the quality of processed and other foods through cooperation between the food industry and governments to promote product reformulation toward a more nutritious nutritional profile for processed foods.
- Promoting a physically active work environment by ensuring that exercise equipment is readily available in the workplace.

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# Effectiveness of a Community Volunteer-Driven Intervention in Improving Childhood Immunization Coverage in Rural Communities of Rivers State

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## ABSTRACT

**Background:** Immunization is a cost-effective public health strategy that saves about three million children's lives worldwide each year.

The study aimed to determine the effectiveness of a community volunteer-driven intervention on childhood immunization coverage and status in rural communities of Rivers State.

**Methods:** A randomized controlled educational intervention for caregivers with children 0 to 6 weeks in rural communities of Rivers State. Through a multistage sampling method, 368 caregivers were enrolled and randomized into intervention or control groups and followed for 9 months.

The intervention group received structured immunization education, while the control group did not receive any. Data were collected with a pretested, semi-structured questionnaire administered by interviewers and analyzed with SPSS version 25. The Chi-Square test was used for statistical significance with the level of significance at  $p \leq 0.05$  at a 95% confidence interval.

**Results:** The vaccine coverages were higher in the intervention group than in the control group. Oral Polio vaccine 3rd dose and Pentavalent vaccine 3rd dose coverages were the highest, 165 (95.4% respectively) while Inactivated Polio 2nd dose coverage was the lowest in both groups. There was a statistically significant improvement in the immunization status of the children, 121 (69.9%) children had up-to-date vaccination in the intervention group compared to 77 (46.4%) in the control group ( $X^2=21.67$ ,  $p=0.001$ ).

**Conclusion:** Structured immunization education by trained community members significantly improved childhood up-to-date vaccination by 23.5% (69.9%-46.4%) and also improved vaccine coverage. The intervention is recommended for improving immunization uptake and child survival in rural communities.

**Keywords:** Immunization, community volunteers, immunization coverage, Rivers State.

**Introduction.** The prevention of two to three million child deaths worldwide each year from vaccine-preventable diseases (VPDs) through immunization is a cost-effective public health strategy for child survival (World Health Organization [WHO], 2013).

The goal of childhood immunization coverage is 90% coverage at the national level and 80% in every district with all vaccines by 2020, according to the Global Vaccine Action Plan (GVAP 2011-2020) (WHO, 2013).

A child is deemed fully immunized if he or she has received the Bacillus Calmette Guerin (BCG) vaccine (which protects against tuberculosis), three doses of the Diphtheria, Pertussis, and Tetanus toxoid (DPT) vaccine (which protects against whooping cough, diphtheria, and tetanus), at least three doses of the Oral Polio Vaccine (OPV), and one dose of the measles vaccine. Five visits are required for all of these vaccinations within the first year of life, including the doses given at birth. (WHO, 2012).

A WHO estimate from 2019 predicted that 19.4 million infants globally would not have received the necessary vaccines. Ten low- and middle-income nations, including Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Myanmar, Nigeria, Pakistan, and the Philippines, are home to more than 60% of these infants (WHO, 2022). Additionally, the third dose of diphtheria, tetanus toxoid, pertussis-containing antigens (DTP3), or measles vaccination was missed by an estimated 187 million and 201 million children, respectively (WHO, 2019).

Global immunization coverage has remained at about 85%, and creative interventions are required to address the final 15% (i.e., the last mile) because this subpopulation represents a group of people who are disproportionately at risk of contracting diseases that are preventable by vaccines (WHO, 2019).

Major international organizations renewed their focus on increasing immunization coverage and developing the Global Vaccine Action Plan (GVAP) during the decade 2010-2019, which was designated as the Vaccine Decade (WHO, 2013). A critical part of GVAP is the understanding that supply-side and demand-side inadequacies must be addressed (WHO, 2013).

To ensure that children in the world's most remote areas have access to immunizations, substantial progress has been accomplished. However, due to several demand-side barriers, children continue to receive insufficient vaccinations (WHO, 2019).

Globally, 14% of children who are not fully immunized live in Nigeria (WHO, 2013). The low immunization coverage in Nigeria, where more than 3.2 million infants under the age of one are unimmunized, along with refusal and non-compliance to the immunization schedule, are a few factors contributing to the country's VPD epidemics (WHO, 2013).

According to the 2018 National Demographic and Health Survey of Nigeria, 31% of children in Nigeria had received all recommended immunizations and in Rivers State, 39.2% received all basic vaccines, 28.5% received all age-specific vaccines and 11.0% had no vaccination (National Population Commission [NPC] & ICF Macro, 2019).

Low immunization coverage in Nigeria is attributed to a lack of political will, social support, funding, and active community participation (FMOH, 2011).

Organizing immunization sessions in difficult-to-reach areas, adding new vaccines to the immunization schedule, improving the vaccine delivery system, and supplemental immunization activities like National, State, and Local immunization campaigns are among the supply-side issues that the majority of immunization interventions in low- and middle-income countries, like India and Nigeria, aim to address (Pramanik et al., 2015).

However, researchers have shown that community-based interventions, in particular, on the demand side, have a considerable positive impact on the increase of childhood immunization coverage in low- and middle-income countries (Johri et al., 2015; Oyo-Ita et al., 2011).

The two main issues addressed in this study are low childhood immunization coverage and no or poor effect of interventions especially those that are not community volunteer-driven.

Since the Alma-Ata Declaration, the engagement of volunteers, traditional leaders, religious leaders, village health workers, and other Community Oriented Resources Persons (CORPs) in the provision of primary healthcare services has greatly been emphasized (Federal Ministry of Health, 2010).

Limited information exists about the effectiveness of a community-volunteer-driven intervention in improving immunization coverage and status in rural communities of Rivers State.

This study was therefore aimed at assessing the effectiveness of a community volunteer-driven intervention in improving immunization coverage and status in rural communities of Rivers State.

## **Methodology**

**Study Areas.** The study was carried out in Emohua and Etche Local Government Areas (LGAs) of Rivers State. These LGAs are in the Rivers East Senatorial District. Rivers State is one of the thirty-six (36) states of the Federal Republic of Nigeria and is in the south-south geopolitical zone of the country.

**Research Design.** The study design was a randomized controlled trial, using educational intervention for caregivers with children aged 0 to 6 weeks, delivered to them by trained community volunteers, and the effectiveness of the intervention on immunization coverage of the children assessed at 9 months of age.

**Study Population.** The study participants were caregivers with children aged 0 to 6 weeks. The 6-week age limit was chosen to ensure that the intervention was implemented on or before the first dose of the pentavalent vaccine was administered to the child.

**Inclusion criteria.** (A) Community Volunteers. (1) adult male or female (2) had full permission from the spouse if married (3) chosen and accepted by the community (4) understands the culture and traditional practices of the community (5) can read and write (6) has a source of income (7) willing to offer voluntary service (Tobin-West & Briggs, 2015).

(B) Caregivers. (1) All caregivers living in the two LGAs and having children 0 to 6 weeks old (2) caregivers must reside within the two LGAs throughout the study (3) caregivers must have consented to participate in the study.

**Exclusion criteria.** (1) Caregiver with children having significant co-morbidity such as Sickle Cell Disease, or other serious illnesses such as pneumonia, measles, otitis media, etc. (2) Caregivers who are mentally retarded or physically unable to respond to the questionnaires (Tobin-West & Briggs, 2015).

**Sample Size Determination.** The minimum sample size “n” for the study was determined using the formula for comparing two proportions (Wang & Chow, 2007). Using a pre-intervention coverage of 53% (UNICEF, 2017) to detect a change of 15% (68% fully vaccinated children at post-intervention); at a power of 80%; 5% significant level; and a non-response rate of 10%, the minimum sample size calculated for each group was 181 but 184 was used to give a total of 368 caregivers for both groups.

**Selection of Community Volunteers.** The number of community volunteers selected for each study group was eight (8) to make a total number of sixteen (16) volunteers for the two groups. The eight (8) volunteers were decided upon using a study on malaria (Tobin-West & Briggs, 2015).

**Sampling Method.** The caregivers were selected using a multi-stage sampling technique. The first stage was the selection of the Rivers East Senatorial District and the selection of Emohua and Etche LGAs by simple random sampling through balloting.

The second stage was the selection of 4 Primary Health care facilities from each LGA by purposive sampling method with the assistance of the Medical Officers of Health in charge of the LGAs.

The third stage was the random selection of 46 caregivers from the immunization register of each health facility as it was easier to select those children aged 0 to 6 weeks from the register.

In the fourth stage, the list of caregivers was given to the trained community volunteers who approached the caregivers in their households to verify they met the inclusion criteria.

**Randomization.** A total of 837 caregivers were assessed for eligibility. Four (4) PHCs were selected from each LGA to give a total of 8 PHCs. 469 of these caregivers were excluded, of which 348 did not meet the inclusion criteria and 121 did not give their consent to participate. The remaining 368 caregivers were then assigned randomly to either the intervention group or the control group using a simple 1:1 allocation. The subjects were numbered from 1 to 368 and the WinPepi (Windows Programme for the Epidemiologist) version 11.65 statistic software unstratified balanced randomization function was used to generate the allocation sequence. There was allocation concealment as the caregivers were not aware of which group, they belonged to until after the allocation.

**Community volunteers.** Eight (8) community volunteers were selected for each study group using a study on malaria (Tobin-West & Briggs, 2015). Each PHC facility screened and selected ten (10) volunteers from its catchment communities from which two (2) volunteers were selected randomly through balloting to give a total of sixteen (16) community volunteers. The sixteen community volunteers were randomly assigned to either the intervention or control group by balloting.

Since the intervention was educational, there was no blinding of the caregivers and the community volunteers. However, the investigators were blinded to the exposure status of the caregivers.

**Data collection instrument.** The tool for data collection was a pre-tested, interviewer-administered semi-structured questionnaire with open and closed-ended questions adapted

from a study on maternal characteristics and immunization status of children in North Central of Nigeria (Adenike et al., 2017). The questionnaire had four (4) sections. Section 1 was on the sociodemographic profile of the caregivers and their children. Section 2 was on the knowledge of caregivers on immunization/vaccination. Section 3 was on barriers to routine immunization services and section 4 was on the practice of immunization. The same questionnaire was used post-intervention.

**Study Procedure.** To increase validity, the study was conducted by the researcher with the assistance of eight research assistants who received two days of training in interviewing methods and accurate record keeping. The assistants were able to communicate in the local languages. For better understanding, the study participants were interviewed in their homes using English (and, where necessary, their native language or Nigeria Pidgin English, also known as Nigeria creole).

A community guide was hired by the teams in each community to help with the work. The study was conducted in three phases namely pre-intervention, intervention, and post-intervention (evaluation) phases over ten months (15th of March 2021 to the 21st of January 2022).

**The Pre-intervention phase** involved the pre-testing of the research questionnaire, training of research assistants, selection of community volunteers, caregivers of children aged 0 to 6 weeks, and a baseline survey to assess the sociodemographic attributes of the caregivers as well as their knowledge and practice of immunization, and the barriers to routine immunization services. Three weeks were spent on the pre-intervention phase.

**For the intervention,** eight (8) community volunteers who were part of the intervention arm received a 3-day structured health education training on immunization from the research team. The chosen caregivers were later trained by the trained volunteers. Lectures, role-playing, interactive sessions, and demonstrations all made up the training. Teaching materials included child health cards and posters on diseases that can be prevented by immunization. The training sessions lasted six (6) days (3 days each for the caregivers and the volunteers).

The training for the eight (8) community volunteers and caregivers in the control group focused on general health promotion, including oral rehydration therapy and growth monitoring as indicated in the child health card.

At post-intervention, when each child became 9 months old, the intervention was assessed. With the assistance of a list of the caregivers and the baseline ages of the children, the community volunteers assigned to the two groups were able to determine when the children would be 9 months old. Using the same questionnaire from the baseline survey, assessments were made for both the intervention and control groups. The outcome measures of the study were the effectiveness of the community volunteers in improving immunization coverage and immunization status of children aged 0 to 6 weeks post-intervention.

**Data Management.** The study team manually sorted the data from the baseline and post-intervention surveys, checked daily for mistakes and inconsistencies, and asked questions in multiple ways.

The information was cleaned in Microsoft Excel 2019 (Microsoft, Redmond, Washington, DC, USA), and exported to IBM SPSS Version 25.0 (IBM, Armonk, New York, USA). The

data set was instantly backed up on an external device after being revalidated using the built-in validation features of IBM SPSS Version 25.

The data from the study were analyzed with the IBM SPSS statistics Version 25. Univariate analysis was performed and the data were presented as frequency tables. Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as percentages. The Student t-test of independent sample means for continuous variables and the Pearson Chi-square ( $\chi^2$ ) test for statistical significance were used to compare the Groups' pre-and post-intervention. At a 95% Confidence Interval, a p-value of less than 0.05 was considered statistically significant.

**Ethical approval.** Ethical approval was obtained from the Ethics Committee of the University of Port Harcourt. Permission was obtained from the Medical Officers of Health in charge of Emohua and Etche local government areas. Informed consent was obtained from heads of households, community volunteers, and caregivers with children 0 to 6 weeks old. Verbal consent was obtained where written consent was not possible.

**Results.** Most caregivers were mothers (83.2% intervention group: 80.4% control group) with a mean age of  $30.2 \pm 7.9$  years (intervention group) and  $31.9 \pm 10.1$  years (control group). Most of the children were males (72.3% intervention group: 65.8% control group) with a mean age of  $22.6 \pm 9.3$  days (intervention group) and  $22.2 \pm 8.6$  days (control group).

Most caregivers were Christians (83.7% intervention group: 87.0% control group); married (54.9% intervention group: 37.0% control group); mainly farmers (37.0% intervention group: 36.4% control group); had secondary education (46.2% intervention group: 53.8% control group)

**Table 1. Vaccines coverage for children 0 to 6 weeks at post-intervention**

Characteristics	Intervention group n <sub>1</sub> =173		Control group n <sub>2</sub> =166	
		Percent (%)		Percent (%)
<b>Vaccines given</b>				
Oral Polio 0	88	50.87	76	45.78
Oral Polio 1	164	94.80	121	72.89
Oral Polio 2	158	91.33	110	66.27
Oral Polio 3	165	95.38	102	61.45
BCG	154	89.02	129	77.71
Hepatitis B	72	41.62	51	30.72
Penta 1	163	94.23	127	76.51
Penta 2	158	91.33	116	69.88
Penta 3	165	95.38	103	62.05
Pneumococcal conjugate vaccine (PCV)-1	163	94.23	121	72.89
Pneumococcal conjugate vaccine (PCV)-2	156	90.17	124	74.70

Pneumococcal conjugate vaccine (PCV)-3	164	94.80	110	66.27
Inactivated Polio 1	144	83.24	75	45.18
Inactivated Polio 2	69	39.88	38	22.89
Measles 1	127	73.41	114	68.67
Yellow fever	157	90.75	123	74.10

Antigen-specific vaccine coverage as in table 1 was higher in the intervention group than in the control group. In the intervention group, OPV3 and Penta 3 coverages were the highest at 165 (95.4% respectively), while BCG coverage was the highest at 129 (77.7%) in the control group.

**Table 2. Immunization status of under-fives**

Immunization Status	Intervention group n <sub>1</sub> =173		Control group n <sub>2</sub> =166		$\chi^2$ (p-value)
	Percent (%)		Percent (%)		
Up-to-date	121	69.94	77	46.39	21.67 (0.001) *
Partially vaccinated	42	24.28	61	36.75	
Not vaccinated	10	5.78	28	16.87	

**Statistically significant (p<0.05);  $\chi^2$ =Chi-Square.**

The immunization status of the children was significantly higher in the intervention group, 121 (69.9%) were up-to-date with immunization compared to 77 (46.4%) in the control group ( $X^2 = 21.67$ , P=0.001).

**Discussion.** The higher vaccine coverages in the intervention group are attributed to the immunization education training received by the caregivers in their local languages. So, they understood the importance of childhood immunization better than the control group. The Penta 3 coverage in the intervention group agreed with the 98.3% coverage reported in a similar study in Enugu, Nigeria although Enugu is an urban area (Tagbo et al., 2014). The Penta 3 coverage was higher than the 72.1% coverage for all the 3 doses of the DPT/Hepatitis B vaccine in the intervention group as reported by Owais et al. (2011) in low-income communities of Karachi, Pakistan which showed an improvement in DPT-3/Hepatitis B vaccine completion rates by 39%.

The Penta 3 coverage (which is a proxy indicator for immunization coverage) in this study was above the recommended national coverage of 90% and district coverage of 80% according to the GVAP. This agreed with the coverage reported in Haryana, in rural India in which community volunteers acting as mobilizers helped significantly (P<0.001) to improve the proportion of children who received DPT3 in the post-intervention cohort (Shankar et al., 2010).

OPV 0 and Hepatitis B vaccine coverages were low in both groups. The coverages for these vaccines which are administered at birth may be because most caregivers delivered the index child at home, and so, the children missed early immunization. This high level of home delivery was also reported in Russia village of Jos North, Nigeria in which home delivery was estimated to be 40 to 45% (Envuladu et.al., 2013).

IPV2 had the lowest coverage in both groups though the coverage was higher in the intervention group than in the control group. The low coverage may be due to a lack of awareness of a second dose of IPV by health workers and caregivers. This finding agreed with that of a community engagement study that reported poor maternal knowledge of newly introduced vaccines would make mothers miss out on subsequent immunization series (Oyo-Ita et al., 2016).

The 69.9% of children with up-to-date immunization in the intervention group despite the specific immunization education was a reflection of the very low-literacy population of the rural communities of Rivers State. The 69.9% immunization coverage was slightly higher than the estimated 68.0% coverage that was used in the sample size determination of this study.

The 69.9% coverage was slightly lower than the 72.0% of infants who had up-to-date immunization in the community-based study in Karachi, a low-income, low-literacy setting, in Pakistan (Owais et al., 2011).

The up-to-date coverage agreed with the 68.9% full immunization coverage reported by Sengupta et al. (2016) in a community-based immunization outreach intervention aimed at increasing access to and improving utilization of preventive healthcare for migrant urban slums of Ludhiana, India.

The up-to-date coverage also agreed with the findings of Glèlè-Ahanhanzo et al. (2019) in a study in the Democratic Republic of Congo which reported that full vaccine coverage was significantly higher in the “test” health area for all the antigens. Full vaccination coverage was 69.4% in the “test” health area versus 31% in the “control” health area, with a 4.7 times greater chance of being fully vaccinated in the “test” health area.

The finding of this study was higher than that reported by Oyo-Ita et al. (2021) on the effects of engaging communities in decision-making and action through health education training of traditional and religious leaders to improve vaccination coverage in Cross Rivers State, Nigeria. The study reported an up-to-date vaccination coverage of 52%, 48% partially vaccinated, and 5% unvaccinated in the intervention group and found no evidence of an impact on the proportion of children who are up-to-date with vaccination but the intervention was effective in improving the timeliness of Penta3 and measles vaccination and the odds of completing pentavalent vaccination increased by about twice.

The 69.9% up-to-date coverage was higher than that reported by Oleribe et al. (2017) who conducted a quantitative analysis of the 2013 National Demographic Health Survey (NDHS) dataset and reported that 22.1% had full vaccination, and 29% never received any vaccination.

The study findings were also higher than the findings reported by Adeloye et al. (2017) that the proportion of fully immunized children in Nigeria was 34.4% with the South-south zone having the highest at 51.5% and the North-west the lowest at 9.5%. In Ethiopia, Lakew et al. (2015) reported full immunization coverage of 24.3 %.

The study showed an improvement in the immunization status of children in rural communities of Rivers State from 39.2 % for all basic vaccines (NDHS, 2018) to 69.9% as reported in other similar studies (Oleribe et al., 2017; Owais et al., 2011; Oyo-Ita et al., 2021). The focused nature of the intervention and the fact that it was delivered by community members who understand the sociocultural characteristics of the caregivers contributed to the



success of this educational intervention in enhancing the health-seeking behaviours of caregivers.

Furthermore, compared to the control group that received no immunization education, the intervention group that received the targeted immunization education was more likely to understand, retain, and modify its behaviour.

**Limitations of the study.** There was no blinding of the community volunteers and the caregivers as the intervention was educational. However, this did not significantly affect the outcome as the investigators assessing the outcome post-intervention were blinded to the exposure status of the caregivers.

**Conclusion.** The use of trained community volunteers to provide structured health education training on childhood immunization to caregivers significantly improved childhood immunization coverage and status. There was a significant improvement in up-to-date immunization in the intervention group compared to the control group by 23.5% (69.9%-46.4%).

The findings of the study are important for improving immunization coverage and child survival in rural communities of Rivers State.

**What this study adds.** This study has added to the evidence base on active community participation in the implementation of community-based interventions for improving health services including immunization in rural communities of Rivers State.

**Authors' contributions.** Nduye C.T. Briggs conceptualized, planned, collected the data for the study, and prepared the manuscript.

Charles I. Tobin-West also conceptualized, planned the study, interpreted the results, and proofread the manuscript.

Oluseye Babatunde also interpreted the results and made useful inputs to the manuscript. All the authors read and approved the final version of the manuscript.

**Conflict of interest.** The authors declare no conflict of interest.

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# **Compositional Analysis of Breast Milk Samples of Nursing Mothers Resident in Ibaa, Emohua Local Government Area Rivers State**

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## **ABSTRACT**

*Human milk is the optimal source of nutrients for infants for the first 6 months of life, breast milk provides core required nutrients which include proteins, lipids, carbohydrates and minerals. Bioactive factors, especially immunological factors, protect infants from invading microorganisms. Breast milk has a standard composition of 87% of water, 3.8% of fat, 1.0% of protein and 7% of carbohydrate which is majorly in the form of lactose. Breast feeding also provides many other short terms and long-term benefits to infants. The aim of the study was to assess the nutrient composition of breast milk collected from nursing mother's resident in Ibaa. The research adopted a cross sectional study design, thirty (30) breast milk samples were collected from consenting nursing mothers., by self-milking with the nipples well inserted into the bottles after a proper wash and biochemical test was performed. A laboratory analysis was conducted for specific nutrients such as total protein, albumin, minerals elements (calcium, potassium, chloride and magnesium), and lipids (total cholesterol, triglyceride, high density lipoprotein) using mass spectrometry and gas chromatography. Descriptive statistics based on mean and standard deviation were employed, ANOVA was used to test the hypothesis. The findings of the study revealed that the lipid profile, protein and albumin and mineral elements composition of breast milk collected from nursing mother's resident in the Ibaa community were significant at 0.05 level of significance. Therefore, breastfeeding mothers should be encouraged to breastfeed their infants exclusively for the first six months of their child's life because this practice reduces the risk of death from infectious diseases by 88% and reduces the likelihood of death as a dose-dependent effect when compared to partial breastfeeding.*

**Keyword:** *breast milk, breast milk composition, Nutrient, Nursing, Mothers.*

## **1. Background to the study**

Human breast milk, produced by mothers who are healthy and well-nourished, is considered to be the optimal diet for infants who are developing normally. Breast milk is a complete source of nutrition for infants who have not yet reached the age of six months; however, it also contains a wide range of other substances, such as stem cells, hormones, complex sugars,

exosomes, and nucleic acids (such as miRNA), whose function and utility are still being studied; these substances are still being researched. Breast milk is a complete source of nutrition for infants who have not yet reached the age of six months (Casavale et al., 2019).

Human milk, on the other hand, has a dynamic composition that can change from feeding to feeding, from time of day to period of the day, and even between mothers of the same population and mothers of different populations. This is in contrast to infant formulae, the composition of which is fixed. Infant formulae have a defined composition that is determined by rigid standards for the impacts on an infant's health. Human breast milk has a composition that is constantly changing. This dynamic shift in composition may be influenced by a number of factors, including genetics and the environment, the baby's gender (Powe et al., 2010), the mother's health status (Powe et al., 2010), and the mother's way of life, including her feeding habits. Powe et al., (2010), found that the baby's milk composition changed depending on the mother's infection status (Ballard and Morrow, 2013). There are still a number of factors that might influence the composition of breast milk, including the stage of development of the newborn, such as preterm or term, the kind of milk (foremilk or hindmilk), and whether or not the milk is transitional (colostrum or mature milk), amongst others (Underwood, 2013).

Fluids found in living organisms, such as human breast milk, have a high degree of complexity and are constantly changing. They are made up of a wide variety of essential components, including carbohydrates and proteins, as well as vitamins and minerals. Food that isn't actually food can contain non-nutritive bioactive components such as cells, immunoglobulin (Ig), cytokines and chemokines, hormones, and growth factors. These are only some of the components that can be detected. The combination of nutritive and non-nutritive components found in human milk facilitates a more rapid maturation of the immune system. This not only strengthens the body's defences against infection and inflammation, but it also encourages the growth of internal organs, the colonisation of microbiota, and overall well-being in newborns. (Dror and Allen, 2018).

Lactocytes, which are milk-producing cells that line the alveoli of the mammary gland, are the source of many of the essential elements found in human milk. Some are gained through food sources, while others are obtained through maternal reserves. Even though human milk is highly conserved as a whole, specific vitamins and fatty acids in human milk require additional care from the mother's diet in order to keep their nutritional worth. This is the case even though human milk is highly preserved (Ballard and Morrow, 2013). Approximately 87–88% of human breast milk is composed of water, while the remaining 124g/L is made up of solid macronutrients. These macronutrients include approximately 1 percent (8–10 g/L) protein, 7 percent (60–70 g/L) carbohydrates, and 3.8 percent (35–40 g/L) fat (Boquien, 2018). This cuisine also contains significant amounts of a wide variety of minerals, some of which include calcium, phosphorus, magnesium, potassium, sodium, and selenium (Boquien, 2018).

Because human milk contains health-promoting properties, it is recommended by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) that infants be breastfed exclusively for the first six months of their lives, and then that they be given complementary nutrition until they are two years old or older if both the mother and the child require it (WHO/UNICEF, 2003).

According to the findings of numerous studies, breastfeeding is beneficial for both mothers and their newborn infants (American Academy of Pediatrics, 2012). In the year 2002, the World Health Organization and the United Nations Children's Fund (UNICEF) came together and created the "Global Strategy for Infant and Young Child Feeding." The approach was established in order to refocus the attention of the world on the impact that feeding patterns have on the health and survival of newborns and young children (World Health Organization and United Nations Children's Fund, 2003). Consumption of human milk has been shown to have a significant impact on the development of the immune system in infants and children (Le Doare et al., 2018), in addition to the formation of the digestive tract and the maintenance of its health (Ho et al., 2018). Hassiotu and Geddes, (2014) [Hassiotu and Geddes] It was shown that human milk feeding has a dose-dependent impact, and that longer periods of exclusive breastfeeding are associated with improved health outcomes for both the breastfeeding woman and her kid (Vitora et al., 2016).

Infants who are given human milk are less likely to develop conditions such as diabetes type I and type II, overweight and obesity, hypercholesterolemia, and allergic diseases like sudden infant death syndrome. Sepsis, necrotizing enterocolitis, and other gastrointestinal tract infections, respiratory tract infections, otitis media, and bacterial meningitis are also less likely to develop in these infants. The newborn is protected from a variety of infections and ailments by human milk, including those that have been discussed previously (Lehmann, et al., 2018). In addition, breastfeeding protects the mother by lowering the risk of breast and ovarian cancer, boosting bone mineralization to pre-pregnancy levels, reducing the risk of postpartum haemorrhage, and enhancing uterine involution (Hollis, et al., 2015). These benefits can be found in the research published by (Hollis, et al., 2015).

Despite the enormous long and short term benefits for mothers and their newborns, breast milk can be contaminated with persistent toxicants such as heavy metals and poly aromatic hydrocarbons (Van den Berg et al., 2017). These toxicants may affect health in a direct or indirect manner by interacting with microbiomes in the infant's gut (Indumathi, et al., 2013). During the course of a woman's lifetime, these potentially dangerous compounds can be transferred from the mother's body to an unborn child or an infant who is being breastfed (Lehmann et al., 2018). In addition to having an effect on the human body's metabolic, immunological, and endocrine systems (especially after an exposure while the foetus is still in the womb ), these dangerous compounds are capable of having a wide range of other consequences on the human body (Garwolińska, et al., 2018).

Soot (Black) has contaminated the environment in the Niger Delta region of Nigeria as a consequence of activities such as the burning of bushes, the discharge of industrial effluents, and dense vehicular emissions. This soot has the potential to enter human systems as a result of its contamination of the food chain. Because of the widespread prevalence of this issue in recent years, immediate action is required in order to resolve the situation (Kulinich, & Liu, 2016). When it enters the human body, it has the potential to be passed on from mother to child through the placenta or while the child is being breastfed if the mother is pregnant. As a consequence of this, a study is currently being carried out in order to investigate the nutrient composition of breast milk obtained from nursing mothers in the Ibaa community located inside the Emohua local government area of Rivers State. This is why the researcher seeks to investigate the Composition of Breast Milk Collected from Nursing Mothers Resident in Ibaa, Emohua Local Government Area Rivers State.

## **Aim and Objectives of the Study**

### **Aim**

The aim of the study was to assess the composition of breast milk collected from nursing mothers resident in Ibaa community in Emohua local Government Area of Rivers State.

### **Specific Objectives**

The study has the following specific objectives to;

- i. determine the protein and albumin composition of breast milk collected from nursing mothers resident in the Ibaa community.
- ii. determine the lipid profile of breast milk collected from nursing mothers resident in the Ibaa community.
- iii. determine the mineral elements composition of the Breast milk samples collected from nursing mothers resident in Ibaa community.

### **Research Questions**

1. To what extent is the protein and albumin composition of breast milk collected from nursing mothers resident in the Ibaa community?
2. To what extent is the lipid profile of breast milk collected from nursing mothers resident in the Ibaa community?
3. To what extent is the mineral element composition of the Breast milk samples collected from nursing mother's resident in Ibaa community?

### **Research Hypotheses**

H<sub>01</sub>: There is no significant protein and albumin composition in the breast milk collected from nursing mother's resident in the Ibaa community.

H<sub>02</sub>: There is no significant lipid profile in breast milk collected from nursing mother's resident in the Ibaa community.

H<sub>03</sub>: There is no significant mineral element composition in the Breast milk samples collected from nursing mother's resident in Ibaa community.

## **2.0 Methodology**

### **Research Design**

This research was conducted using a cross-sectional study design. Designs for research investigate new ideas and emerging occurrences as they emerge in their natural environments (Akpabio & Ebong, 2010). Investigation into new knowledge can yield responses to research questions, but more importantly, it helps to control inconsistencies (Asita, 2012). This design is well planned to evaluate the composition of breast milk collected from nursing mother's resident in Ibaa community in Emohua local Government Area of Rivers State.

### **Population of the study**

The population of this study consisted of nursing mothers in Ibaa community. A pilot study revealed that there are 502 nursing mothers in Ibaa community.

### **Sample and Sampling Technique**

Sample size can be defined as a representative fraction of a population that is eventually studied and the result obtained is used in making generalisations about the entire population. Sample size refers to the number of elements included in the sample (Brink et al., 2006).

Sampling refers to the procedure used to choose a fraction of people, events, behaviours, or other components with which to carry out a study to gather information on the event of interest (Burns and Grove, 2005). Thus, the sample size for this study was derived using the convenient non-probability sampling method. A total of thirty (30) Nursing mothers' resident in the Ibaa community aged 18 years and above were engaged for the study.

### **Data Collection**

The instrument used for this study was a questionnaire developed by the researcher and laboratory test kits for analysis of macronutrients (protein and albumin), lipid profile (Cholesterol, triglycerides and high density lipoprotein), some electrolytes (sodium, potassium, chlorides, magnesium) The questionnaire consisted of two sections targeted at obtaining the socio-demographic data and obstetric history (age, occupation, parity, gravidity and Lactation Stage) of the respondent. The instrument for the laboratory analysis will include Micropipettes, Water bath, microscope, Bijou bottle, Glass Test tubes, Quality control, Spectrophotometer, Chemistry/Electrolyte auto analyzer, Distilled Water, Reagents. Data for the study was obtained from the participants through a medical outreach program that was organised by the Centre of public health and toxicological research University of Port Harcourt in which the researcher and some of her colleagues were part. Full medical and obstetric history were taken, and physical examination performed. Then the respondent's breast milk samples were collected into sterile polyethylene bottles by self-milking with the nipple well inserted into the bottles after a proper wash.

### **Data Analysis and Presentation**

Statistical calculations were done using excel 2010 statistical software. All Data are expressed as mean  $\pm$  standard deviation. Using 1- way analysis of variance (ANOVA) and the level of significance difference was determined using LSD (Least significant difference) post-hoc analysis.  $P < 0.05$  was significantly different.

### **Ethical Consideration**

A letter of introduction was sent from Africa Centre of Excellence for Public Health and Toxicological Research (ACE-PUTOR), University of Port Harcourt to the community leaders seeking permission to carry out the research in the community. An acceptance letter was anticipated and gotten from the community leaders through the chairman community development committee. Consent was properly sought from the respondents and confidentiality of information was assured to all respondents and same maintained. An ethical approval was also obtained from the University of Port Harcourt Research Ethical Committee to validate the research.

### **Data Presentation**

A total number of thirty (30) breast milk samples were collected from mothers in Ibaa community of Rivers State into sterile polyethylene bottles by self-milking with the nipple well inserted into the bottles after a proper wash and biochemical test was carried out. The generated data was presented and analysed in the subsequent sub-heading below.

### **Biochemical parameters of the sampled breast milk**

In this part we present the laboratory results of the various biochemical parameters, and mean values of our variables.



**Research Question 1:** To what extent is the protein and albumin composition of breast milk collected from nursing mothers resident in the Ibaa community?

**Table 1: Concentration of Breast Milk Protein**

Age Range	Albumin (35 - 52 g/L)	Protein ( 66 - 83 g/L)
18-25	13.58 ± 3.29 <sup>a</sup>	32.92 ± 7.24 <sup>a</sup>
26-30	14.36 ± 1.63 <sup>a</sup>	32.00 ± 3.58 <sup>a</sup>
31-36	14.00 ± 2.00 <sup>a</sup>	37.50 ± 5.00 <sup>a</sup>
37 and above	13.33 ± 1.53 <sup>a</sup>	30.67 ± 4.04 <sup>a</sup>

Values are mean ± standard deviation (SD). Values in the same column with same superscript symbols are not significantly different at P<.05.

Determining the protein and albumin composition of breast milk collected from nursing mothers resident in Ibaa community are shown in Table 1, Mothers between the age range of 26 and 30 had a high Albumin content (14.36 ± 1.63) in their breast milk compared to other age bracket, more so mothers between the age range of 31 and 36 have a high protein content (37.50 ± 5.00) in their breast milk compared to other age range. Conversely our means sharing the same superscript are not significantly different from each other (P<0.05). Values are arithmetic means ± SDs. n = 30, Concentration of Breast Milk composition collected from nursing mothers resident in Ibaa community, with means in a row without a common superscript letter differ, P < 0.05.

**Research Question 2:** To what extent is the lipid profile of breast milk collected from nursing mothers resident in the Ibaa community?

**Table 2: Plasma Lipid Profile of the Breast Milk**

Age Range	Total Cholesterol (< 5.2 mmol/L)	HDL cholesterol (> 0.9 - 1.1 mmol/L)	Triglyceride (< 2.3 mmol/L)	LDL cholesterol (< 3.0 mmol/L)	VLDL cholesterol (0.1-1.7mmol/L)
18-25	1.27 ± 0.29 <sup>a</sup>	0.15 ± 0.10 <sup>a</sup>	0.35 ± 0.10 <sup>a</sup>	0.39 ± 0.06 <sup>a</sup>	0.16 ± 0.06 <sup>a</sup>
26-30	1.50 ± 0.35 <sup>a,b</sup>	0.12 ± 0.04 <sup>a</sup>	0.40 ± 0.10 <sup>a</sup>	0.45 ± 0.05 <sup>a</sup>	0.19 ± 0.04 <sup>a,b</sup>
31-36	1.73 ± 0.30 <sup>a,c</sup>	0.10 ± 0.00 <sup>a</sup>	0.20 ± 0.08 <sup>a</sup>	0.57 ± 0.05 <sup>a</sup>	0.09 ± 0.04 <sup>a,b,c</sup>
37 and above	1.07 ± 0.12 <sup>a</sup>	0.1 ± 00 <sup>a</sup>	0.27 ± 0.058 <sup>a</sup>	0.32 ± 0.03 <sup>a</sup>	0.41 ± 0.43 <sup>d</sup>

Values are mean ± standard deviation (SD). Values in the same column with same superscript symbols are not significantly different at P<.05

Determining Plasma Lipid Profile of the Breast Milk with Reference Ranges, are shown in Table 2, Mothers between the age range of 31 and 36 had a higher total cholesterol (1.73 ± 0.30) in their breast milk compared to other age bracket, more so mothers between the age range of 18 and 25 had a high HDL cholesterol level of mean ± standard deviation (0.15 ± 0.10) in their breast milk compared to other age range. The triglyceride concentration differed in all age group with the highest level (0.40 ± 0.10) within the age bracket of (26-30 years). Nevertheless, LDL cholesterol level was for the most part high in the age bracket of 31-36 with a mean ± standard deviation of (0.57 ± 0.05).

Finally, the VLDL cholesterol level of the breast milk samples in the age bracket of 37 and above was higher (0.41 ± 0.43) in comparison to other age ranges. Means sharing the same superscript are not significantly different from each other (P<0.05), however different

superscripts are placed in a mean which are significantly different from one another in a column. Values are arithmetic means  $\pm$  SDs.  $n = 30$ , Plasma Lipid Profile of the breast milk samples collected from nursing mothers were total cholesterol, HDL cholesterol, Triglyceride, LDL cholesterol, and VLDL cholesterol respectively.

**Research Question 3:** To what extent is the mineral element composition of the Breast milk samples collected from nursing mothers resident in Ibaa community?

**Table 3: Mineral Element Concentration of the Breast Milk**

Age Range	Magnesium (0.7 - 1.1 mmol/L)	Sodium (135 -145 mmol/L)	Potassium (3.5 - 5.5 mmol/L)	Calcium (2.2 - 2.6 mmol/L)
18-25	1.27 $\pm$ 0.17 <sup>a</sup>	61.00 $\pm$ 7.22 <sup>a</sup>	4.80 $\pm$ 0.47 <sup>a</sup>	5.28 $\pm$ 0.88 <sup>a</sup>
26-30	1.30 $\pm$ 0.20 <sup>a</sup>	64.10 $\pm$ 11.66 <sup>a</sup>	4.98 $\pm$ 0.29 <sup>a</sup>	5.26 $\pm$ 0.93 <sup>a</sup>
31-36	1.28 $\pm$ 0.21 <sup>a</sup>	71.00 $\pm$ 10.98 <sup>a</sup>	5.05 $\pm$ 0.50 <sup>a</sup>	5.70 $\pm$ 1.37 <sup>a</sup>
37 and above	1.50 $\pm$ 0.10 <sup>a</sup>	55.33 $\pm$ 10.02 <sup>a</sup>	4.93 $\pm$ 1.01 <sup>a</sup>	6.37 $\pm$ 0.55 <sup>a</sup>

Values are mean  $\pm$  standard deviation (SD). Values in the same column with same superscript symbols are not significantly different at  $P < .05$

Determining Mineral Element Concentration of the Breast milk samples collected from nursing mothers resident in Ibaa community, are shown in Table 3, Mothers between the age range of 37 and above had a high magnesium content (1.50  $\pm$  0.10) in their breast milk compared to other age bracket, more so mothers between the age range of 31 and 36 had a high sodium content (71.0  $\pm$  10.98) in their breast milk compared to other age range. The potassium concentration differed slightly in all age groups with the highest concentration in the age bracket of (31-36 years), Finally, the concentration intake in the age bracket of 37 and above was higher (6.37  $\pm$  0.55) in comparison to other age ranges. However our means sharing the same superscript are not significantly different from each other ( $P < 0.05$ ). Values are arithmetic means  $\pm$  SDs.  $n = 30$ , mineral element concentration of breast milk samples collected from nursing mothers were magnesium, sodium, potassium and calcium respectively.

**Hypothesis**

**Hypothesis 1:** there is no significant protein and albumin composition in the breast milk collected from nursing mothers resident in the Ibaa community.

**Table 4:** ANOVA of lipid profile in breast milk collected from nursing mothers resident in the Ibaa community.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34.333	3	11.444	2.826	.065
Within Groups	81.000	20	4.050		
Total	115.333	23			

Table 4, shows the ANOVA result of protein and albumin composition in the breast milk collected from nursing mothers resident in the Ibaa community. The result revealed the value of F is 11.444, which is significant at  $p$ -value of .065. This means the composition in the breast milk collected from nursing mothers resident in the Ibaa community is significant.

**Hypothesis 2:** there is no significant lipid profile in breast milk collected from nursing mothers resident in the Ibaa community.

**Table 5:** ANOVA of lipid profile in breast milk collected from nursing mothers resident in the Ibaa community.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35.667	2	17.833	6.688	.017
Within Groups	24.000	9	2.667		
Total	59.667	11			

Table 5 shows the ANOVA result of lipid profile in breast milk collected from nursing mothers resident in the Ibaa community. The result revealed the value of F is 6.688, which is significant with at *p*-value of 0.017. This means the lipid profile in breast milk collected from nursing mothers resident in the Ibaa community is significant.

**Hypothesis 3:** there is no significant mineral element composition in the Breast milk samples collected from nursing mothers resident in Ibaa community.

**Table 6:** ANOVA of lipid profile in breast milk collected from nursing mothers resident in the Ibaa community.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.161	2	15.631	4.182	.098
Within Groups	04.000	9	3.260		
Total	19.161	11			

Table 6 shows the ANOVA result of mineral elements composition in the Breast milk samples collected from nursing mothers resident in Ibaa community. The result revealed the value of F is 4.182, which is significant with at *p*-value of 0.098. This means the mineral elements composition in the Breast milk samples collected from nursing mothers resident in Ibaa community are significant.

## Discussion

### Mineral Element Concentration of the Breast Milk

The findings that Vahter and Palm obtained were validated by this study (2018) Research on human milk trace elements is still relevant to human breastfeeding and public health because of the significance of micronutrient intake in early life for both individual and community health. There was not a single population that, regardless of their geographic location, consistently demonstrated higher or lower quantities of the essential components found in human milk. This was the case for all of the populations studied. Zinc, iron, and copper showed either little or no change between populations, in contrast to calcium and manganese, which showed significant shifts. It's possible that this is because the physiological processes that zinc, iron, and copper use to prevent severe micronutrient deficiencies are all the same. Trace elements may be present in many populations, but the amounts that they make up may vary greatly depending on factors such as food and the surrounding environment. Lipoproteins are the primary source of energy for a child, and human breast milk (HBM) contains a significant amount of these energy-rich molecules. All of the necessary fatty acids, such as alpha-linolenic acid (ALA), linoleic acid, and long-chain polyunsaturated fatty acids, can be obtained through the HBM (LCPUFAs). These fatty acids are essential for the body to be able to carry out its myriad of various biological tasks (PUFA). There are two types of

long-chain polyunsaturated fatty acids known as arachidonic acid and docosahexaenoic acid. Both of these types of acids play a significant part in the development of the neurological system and the immune system, respectively. The rapid accumulation of DHA, AA, and a variety of other polyunsaturated fatty acids (PUFAs) in the brains of infants has been linked to the development of the visual, cognitive, and motor systems in these individuals. The only way to gather knowledge of a baby's health and development as well as its long-term repercussions is to investigate the composition of the HBM during the first month of life. This is the only time when this information can be obtained.

### **Concentration of the Protein and Albumin Composition of Breast Milk Samples**

This finding was in support of Lonnerdal and Erdmann (2017) they believed that breast milk contains hundreds of intact proteins and are diverse in their level of concentration. The major proteins of human milk are a casein identical to bovine beta-casein, alpha-lactalbumin, lactoferrin, immunoglobulin IgA, lysozyme, and serum albumin. The necessary amino acid pattern of human milk closely resembles that discovered to be best for human newborns. Possible specific activities of milk proteins and enzymes other than as a source of amino acids, are as yet entirely theoretical. The primary sugar of human milk is lactose but 30 or more oligosaccharides, all containing terminal Gal-(beta 1,4)-Glc and varying from 3--14 saccharide units per molecule are also present. To conclude, a rise in the proportion of immunoglobulins, lactoferrin and serum albumin, and a decrease in the proportion of caseins and  $\alpha$ -lactalbumin are noted during weaning. Conversely, changes in protein concentration and composition in the 96 hr postpartum indicate a major drop in the rate of secretion of immunoglobulins, which corresponds with an increase in the rate of secretion of caseins and  $\alpha$ -lactalbumin.

### **Plasma Lipid Profile of the Breast Milk**

Studying the lipid profile of breast milk from a sample of 30 different moms has yielded some fascinating findings. A wide range of lipid types can be found in milk, as seen in Table 3. The findings of this study are consistent with prior research that examined the milk's lipid and glyceride compositions. Cholesterol levels in human milk range from 90 to 150 mg/L, whereas just 4 mg/L are found in baby formula, according to Rodriguez and Fontecha (2010). Milk fat globule lipids appear to be a significant source of both free and esterified cholesterol, based on this research. To build cell membranes, cholesterol plays a critical function in forming bile acids, lipoproteins and vitamin D, as well as the hormones and oxysterols that regulate cholesterol, lipids and glucose levels. It is also incorporated into large amounts of myelin in the nervous system during times of rapid brain development. There is an association between breastfeeding and an increased plasma level of total cholesterol and low-density lipoprotein cholesterol in breastfed babies. Breastfed neonates had a threefold lower rate of endogenous cholesterol synthesis than formula-fed infants because the rate of synthesis is inversely related to the daily cholesterol supply assessed in mg/kg body weight. Preformed cholesterol, which was identified in breastfed neonates but not in formula-fed infants, may be the reason for this. Researchers found that the amount of cholesterol in a newborn's diet has an effect on both the rate at which endogenous cholesterol is produced and how much cholesterol the newborn has in his or her system as a whole. When compared to infants fed breast milk, those provided low-cholesterol and low-phytoestrogen formulas, and those fed soy formula, those fed soy formula have the lowest fractional synthesis rate despite the absence of cholesterol. Because dietary cholesterol was added to the soy-based infant formula, the rate of cholesterol production in infants was altered to the same extent as it did in infants given formula manufactured from cow's milk. Even though the soy-based mix was

free of cholesterol, this was nonetheless the case. Adults who were nursed as infants had lower levels of total cholesterol and low-density lipoprotein cholesterol than those who were fed formula. In both cases, this was the case for the kinds of cholesterol in question. A 5% reduction in the prevalence of cardiovascular disease in the general population might be achieved by merely 30% of infants being exclusively breastfed. Adults would see a 0.15 mmol/L drop in blood cholesterol as a result of this.

### **Conclusion**

Recent findings on nutritive and bioactive proteins in breast milk support the WHO recommendations that breastfeeding should be continued during the first year and beyond. Infant formula manufacturers should eliminate all high-protein formulas from the market. New formulas for infants should be low in protein, in particular follow-up formulas and growing-up milks. Protein quality in formulas (amino acid profiles) should be closer to that in breast milk. Before bioactive proteins are added to infant formulas, safety and efficacy tests must be provided by formula manufacturers.

Human Breast Milk is a highly complex system of various bioactive components. It is the most suitable source of nutrients for infants and is indispensable in the formation of early immunity. Each component positively affects human health, such as early human immunity and disease prevention, independently and directly, and also exerts health effects via various interactions. Many bioactive components in Human Breast Milk have not yet been identified, and knowledge of their role remains at the animal model or research level. Nevertheless, various bioactive components of Human Breast Milk are expected to be useful in the diagnosis and treatment of diseases.

### **Limitations**

This study was limited by breastfeeding mothers not willing to give their breast milk. It was also limited by finance and time. But irrespective of the constraints, the researcher was able to carry out the research.

### **Recommendation**

- i. Breastfed children are less prone to a variety of acute and chronic diseases, including otitis media, acute diarrhoea, lower respiratory tract infections, sudden infant death syndrome (SIDS), inflammatory bowel disease (IBD), juvenile leukaemia, obesity, asthma, and atopic dermatitis because all of the biochemical parameters tested were within the normal range.
- ii. Breastfeeding mothers should be encouraged to breastfeed their infants exclusively for the first six months of their child's life because this practice reduces the risk of death from infectious diseases by 88 percent and reduces the likelihood of death as a dose-dependent effect when compared to partial breastfeeding.
- iii. To enable unprecedented investigation of Human Breast Milk and extended research on its different health consequences, there should be an increase in the sophistication and integration of new analytical tools such as next-generation sequencing.

### **Implication for Practice**

The findings of the study will provide information on the consumption safety status of the breast milk sample and the health implications of environmental exposure on both the nutrient and non-nutrient contents of the breast milk of nursing mothers resident in Ibaa community.

### Contribution of Authors

The authors contributed equally to the success of the research.

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The funding of this study was done by the researcher.

### Conflict of Interest

There was no conflict of interest.

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## **Patterns and Determinants of Academic Stress among Students attending Tertiary Institutions in Rivers State, Nigeria**

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### **Abstract**

*Education comes with a lot of pressure. This pressure could arise from studying, school assignments, sitting for examinations and finding an equilibrium for extracurricular activities. Students could suffer from academic stress if there is a negative reaction to these events. Academic stress, if not properly managed, could be detrimental to the mental health and well-being of students in tertiary institutions. There has been limited focus on the level of academic stress among students attending tertiary institutions in Rivers State. Considering the global pattern of academic stress among students in tertiary institutions, it is imperative to investigate the level of academic stress and its determinants among students attending tertiary institutions in Rivers State. This cross sectional study was conducted among 873 students attending tertiary institutions in Rivers State and the level of academic stress was assessed using the Academic Stress Scale 40. Data were analysed using Statistical Package for Social Sciences version 25. Chi square and multivariate binary logistic regression analyses were used to identify the risk factors of developing academic stress with a p value of  $\leq 0.05$ . The results showed that 87.4% of the students experienced low academic stress, 10.3% experienced moderate academic stress and 2.3% experienced high level of academic stress. Paternal education of secondary and below ( $p < 0.001$ , 95% C.I.: 1.67-4.58), maternal education of secondary level and below ( $p < 0.001$ , 95% C.I.: 1.47-3.90) and being from a monogamous family ( $p < 0.001$ , 95% C.I.: 1.40-7.14) were the risk factors for developing high level of academic stress. In conclusion, the level of academic stress among students in tertiary institutions can be reduced by designing interventions targeted at vulnerable students while taking into consideration the role of family demographics.*

**Keywords:** *Academic Stress, Tertiary Institutions, Rivers State*

## **Introduction**

Stress is the way humans react both physically and mentally to changes, events, and situations in their lives (Saleh Baqutayan, 2015). People experience stress in different ways and for different reasons (Bhatti et al., 2010). The reaction is based on the perception of an event or situation (Gaspar et al., 2016). A person is in distress when a situation is viewed negatively or having the feeling of being overwhelmed, oppressed or out of control, while eustress is the positive form of distress, and positive view of an event or situation (Kundaragi & Kadakol, 2015).

Stressors are demands made by the internal or external environment that upset balance, thus affecting physical and psychological well-being and requiring action to restore balance (Xu & Chi, 2013). However, they differ from the degree of severity and duration of stress; what is stressful for one individual may not be a stressor for another (Prabu, 2015).

Academic stress is the anxiety and stress that come from schooling and education (Prabu, 2015). There is often a lot of pressure that comes along with pursuing education and in particular, a tertiary degree. Tertiary education necessitates significant personal effort in the form of studying, completing assignments and tests, as well as individual and group laboratory work, among other forms of learning (Puig Lagunes et al., 2020). There is the stress of doing all of the work, balancing the time and finding time for extra-curricular activities. Academic stress is particularly difficult for school students, many of whom are living away from home for the first time (Prabu, 2015).

Globally, there have been reports of academic stress among students of tertiary institutions (Oku et al., 2015; Puig Lagunes et al., 2020). A study conducted in Brazil showed that about 52% of the students experienced academic stress (Lipp et al., 2020). In a similar study in South America, the prevalence of academic stress among students was about 40% in 2015 (Bassols et al., 2015). The pattern of academic stress was reported by Torales et al in Paraguay, South America, in 2022 and 47.4% of the participants reported low/moderate stress while 5.2% exhibited severe stress (Torales et al., 2022).

Across Asia, studies have shown that students experience varying degrees of stress. In China, a report showed that 32.5% of students experienced low stress, 41.3% experienced medium stress and 26.2% of the students experienced high levels of stress in 2021 (Zhan et al., 2021). In India, about 49% of the students exhibited a high level of stress due to career and job factor (Goyal et al., 2021), while in Bangladeshi in 2021, the pattern of stress among students ranged from 6% to 80% (Sarwar, 2021).

In Europe, students in tertiary institutions have been shown to exhibit various forms of stress. A report in France suggested that an estimated 13.8% of students experienced stress in 2014 (Saïas et al., 2014), while 87% of students experienced mild to severe stress in Italy in 2022 (Bert et al., 2022).

Academic stress is also prevalent among students of tertiary institutions across Africa. A study in South Africa in 2014 reported that about 78% of the students experienced academic stress (Naidoo et al., 2014). In a report in Ghana, over 90% of the students experienced some form of academic stress (Edjah et al., 2020), while in Egypt, about 82.7% of the students showed symptoms of academic stress (Abed & Abd-Elraouf, 2022).



In Nigeria, the education system is faced with so many challenges, ranging from poor funding, inadequate infrastructure and brain drain amongst others (Jacob & Musa, 2020). All these could serve as stressors for students seeking higher degrees in the country. Adequate attention has not been given to the level of academic stress experienced by students in tertiary institutions. In northern Nigeria, a report in Kano in 2016 stated that 59.8% of the students experienced high stress (Asani et al., 2016). In a study in Delta State, Southern Nigeria, an estimated 42.4% of the students experienced academic stress (Omogbiya et al., 2020). In Rivers State, there is a paucity of data on the level of academic stress experienced by students in tertiary institutions.

The determinants of academic stress among students have been reported in several studies. This varies mainly from individual, family, school type to course of study factors. Being at a younger age was reported by (Onolemhenhen & Enokela, 2020) While Jia and Loo in 2018 observed that females were prone to academic stress more than their male counterparts (Jia & Loo, 2018), Aihie and Ohanka reported that academic stress was more prevalent among males (Aihie & Ohanaka, 2019). Being in a relationship, working for so many hours, living in a shared accommodation, having a high body mass index (Lee et al., 2016), and being in lower year of study (Aedh et al., 2015) have been identified as risk factors for experiencing academic stress. Other factors includes; faculty of the students, being in a higher level of study, being a (Aihie & Ohanaka, 2019), being at a younger age (Onolemhenhen & Enokela, 2020), high education level of the father education, high level of mothers education (Azhar et al., 2013), peer pressure and family structure (Funmilola & Adesokan, 2021) .

Academic stress could negatively affect the performance and general well-being of students (Edjah et al., 2020; Selvi & Rajaprabha, 2020). Students experiencing academic stress may find it difficult to excel in their academic pursuits (Yovita & Asih, 2018).

The objective of the study is to determine the pattern and determinants of academic stress among students attending tertiary institutions in Rivers State, Nigeria.

### **Methodology**

This study was a descriptive cross-sectional study carried out among students attending tertiary institutions in Rivers state. The state houses over nine tertiary institutions of learning (Wey-amaewhule et al., 2020).

The sample size was calculated using Cochran sample size formula (Cochran, 1973)

$$n = \frac{Z^2 pq}{e^2}$$

Where n = sample size to be obtained, Z = Standard normal deviate = 1.96 at 5% significance level e = margin of precision (5%), P = 42.4% which is the prevalence of academic stress among students in Delta State (Omogbiya et al., 2020) and q=1-p = 0.58 . The minimum sample size to conduct this study was 843 after adjusting a design effect of 2 and 10% non-responses.

All students who attend tertiary institutions in Rivers State were included in this study. However, students who were too ill to respond and students who were away on industrial attachments were excluded from this study.

A multistage sampling technique was used to select participants in this study. First, three institutions were selected by a simple random sampling technique from the list of all tertiary institutions in Rivers State. Next three faculties were selected by a simple random sampling technique from the list of all faculties in the selected tertiary institutions. In the third stage, three departments were selected by simple random sampling from the list of all departments. Finally, participants were selected by a systematic sampling method in each of the selected departments.

The study instrument comprised of a semi-structured interviewer-administered questionnaire that captured the social-demographic characteristics and the Academic Stress Scale (ASS 40)

The research assistants who assisted in the data collection were adequately trained in the use of Open Data Kit (ODK) and data collection methods for a period of one week.

The data was downloaded from the ODK server and uploaded into Statistical Package for Social Sciences (SPSS) version 25 for analysis. The data were described in means and proportions. The level of academic stress was determined by scoring the responses of each item on the ASS 40 scale. A score of 0 was assigned to the response “no stress”, a score of 1 was assigned to the response “slight stress”, a score of 2 was assigned to the response “moderate stress”, a score of 3 was assigned to the response “high stress” and a score of 4 was assigned to the response “extreme stress”. The maximum possible score was 160, a total stress score of 0-79 was considered low stress, 80-110 was classified as moderate stress and a score of 111 and above was classified as high stress. The variables were dichotomized into two categories. The level of stress was dichotomized by merging high and moderate stress into high academic stress. Chi square analysis was used to determine the relationship between variables at P-value  $\leq 0.05$ . Statistically significant variables were further subjected to a binary logistic regression analysis.

## **Results**

The result shows that 455(62.1%) were from UNIPORT, 400(45.8%) were males, 757(86.7%) were between the age of 21-25 years, 313(35.9%) were in their third year of studies, 635(72.7%) resides on campus, 430(49.3%) live with their parents and 770(88.2%) of the respondents parents were alive. (Table 1).

Also, 547(70.8%) of the respondents father had tertiary level of education, 564(69.7%) of the respondents mother had tertiary education, 775(88.8%) were raised by both parents, 593(67.9%) belonged to a monogamous family and 616(70.6%) of the respondents were the first to second child. (Table 2).

Furthermore, 20(2.3%) of the respondents experienced high academic stress, 90(10.3%) experienced moderate academic stress and 763(87.4%) experienced no academic stress. (Figure 1).

The type of tertiary institution was significantly associated with the level of academic stress ( $p < 0.001$ ). More University students experienced high stress level than the ones who did not (85.5% vs 68.5%). Conversely fewer students from polytechnic experienced low level of academic stress than the ones who experienced high level of academic stress (31.5% vs 14.5%). Also, the age group of the respondents was significantly associated with the level of academic stress with a p-value of  $< 0.001$ . More students below the age of 22 years

experienced low level of academic stress than the ones who experienced high level of academic stress (64.2% vs 44.5%), while more students over 22 years experienced high academic stress than the ones who experienced low academic stress (55.5% vs 35.8%). The level of father education showed a significant relationship with the level of academic stress ( $p < 0.001$ ), fewer of the respondents whose fathers had tertiary education experienced high level of academic stress than the ones who did (39.3% vs 74.9%), while more of the respondents whose fathers had secondary level of education and below experienced high level of academic stress than the ones who experienced low level of academic stress (59.1% vs 26.5%), The mothers level of education showed a significant relationship with the level of academic stress ( $p < 0.001$ ), more respondents whose mothers had tertiary education experienced low level of academic stress than the ones who experienced high level of academic stress (73.5% vs 40.9%), while more respondents whose mothers had secondary level of education and below experienced high level of academic stress than the ones who experienced low level of academic stress (59.1% vs 26.5%).( Table 3).

Furthermore, the nature of up-bring was significantly associated with the level of academic stress with a p-value of  $< 0.001$ , fewer of the respondents who were raised by both parents experienced high level of academic stress compared to the ones who experienced low level of academic stress (78.2% vs 90.3%), while more of the respondent who were either raised by a single parents or their people experienced high level of academic stress than did ones who experienced low level of academic stress (21.8% vs 9.7%). The number of sibling the respondents have was significantly associated with the level of academic stress ( $p < 0.001$ ), fewer of the respondents who had between 1 to 4 sibling experienced high level of academic stress than the ones who experienced low level of academic stress (56.4% vs 76.5%), while more of the respondents whose had 5 or more siblings experienced high level of academic stress than the ones who experienced low level of academic stress (43.6% vs 23.5%). The family background showed a significant relationship with the level of academic stress with of p-value of  $< 0.001$ , more of the respondents from monogamous homes experienced high level of academic stress than the ones who experienced low level of academic stress (90.0% vs 64.7%),. Conversely, fewer of the respondents who came from a polygamous background experienced high level of academic stress when compared to the ones who experienced low level of academic stress (10.0% vs 35.3%). (Table 4).

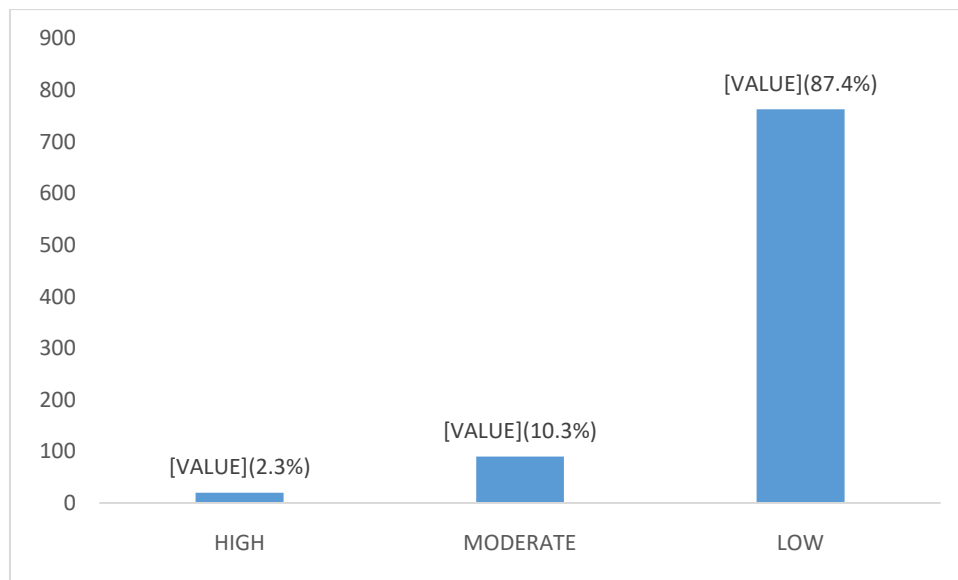
In the multivariate binary logistic regression analysis, students whose fathers had secondary education and below were 2.76 folds more likely to experienced academic stress when compare to students whose father had tertiary level of education. Also, students whose mothers had secondary education and below were 2.39 folds more likely to experienced high academic stress when compare to students whose mothers had tertiary education and students who were from a monogamous family were 3.16 folds more likely to experience high academic stress when compared to students from a polygamous family. (Table 5).

**Table 1: Social Demographic Characteristics**

<b>Variable</b>	<b>Frequency (n=873)</b>	<b>Percent (%)</b>
<b>School</b>		
Uniport	455	52.1
RSUT	162	18.6
Amadi Poly	256	29.3
<b>Sex</b>		
Male	400	45.8
Female	473	54.2
<b>Age group</b>		
<20	77	8.8
21-25	757	86.7
26-30	37	4.2
Over 30	2	0.2
<b>Mean±SD</b>	21.9±2.2	
<b>Level of study</b>		
100/ND1	279	32.0
200/ND2	149	17.1
300/HND1	313	35.9
400//HND2	95	10.9
500	19	2.2
600	18	2.1
<b>Residence</b>		
On campus	238	27.3
Off campus	635	72.7
<b>Living Status</b>		
Lives alone	149	82.9
Live with spouse/Family members	329	37.7
Live with parents	430	49.3
<b>Parents alive</b>		
None	61	7.0
Mother only	39	4.5
Father only	3	0.3
Both Parents	770	88.2

**Table 2: Social Demographic Characteristics (continued)**

Variable	Frequency n=873	Percent (%)
<b>Father education n=773</b>		
Tertiary	547	70.8
Secondary	179	23.2
Primary	21	2.7
No education	26	3.4
<b>Mother education n=809</b>		
Tertiary	564	69.7
Secondary	178	22.0
Primary	61	7.5
No education	6	0.7
<b>Who raised you</b>		
Both Parents	775	88.8
Single parents	23	2.6
Sibling	3	0.3
Relative	7	0.8
Others	65	7.4
<b>Family nature</b>		
Monogamy	593	67.9
Polygamy	280	32.1
<b>Birth Position</b>		
Ist-2nd	616	70.6
3rd-4th	206	23.6
5th and above	51	5.8



**Figure 1: Level of Academic Stress**

**Table 3: Factors associated with Academic Stress**

Variable	Academic Stress		X <sup>2</sup> (P-value)
	No stress n(%)	Stressed n(%)	
<b>School type</b>			
University	523(68.5)	94(85.5)	13.254(<0.001)*
Poly technic	240(31.5)	16(14.5)	
<b>Sex</b>			
Male	357(46.8)	43(39.1)	2.295(0.130)
Females	406(53.2)	67(60.9)	
<b>Age group</b>			
≤22years	490(64.2)	49(44.5)	15.755(<0.001)*
>22 years	273(35.8)	61(55.5)	
<b>Level of study</b>			
≤ Third Year	650(85.2)	91(82.7)	0.454(0.500)
>Third Year	113(14.8)	19(17.3)	
<b>Residence</b>			
On campus	201(26.3)	37(33.6)	2.579(0.108)
Off campus	562(73.7)	73(66.4)	
<b>Parents alive</b>			
None/One parent	82(10.7)	21(19.1)	6.432(0.011)
Both parents	681(89.3)	89(80.9)	
<b>Father education</b>			
Tertiary	512(74.9)	35(39.3)	48.047(<0.001)*
None/Prim/Sec	172(25.1)	54(60.7)	
<b>Mother education</b>			
Tertiary	526(73.5)	38(40.9)	41.441(<0.001)*
None/Prim/Sec	190(26.5)	55(59.1)	

Variable	Academic Stress		X <sup>2</sup> (P-value)
	No stress n(%)	stress n(%)	
<b>Father occupation</b>			
High/Intermediate	528(77.3)	69(76.7)	0.018(0.892)
Low	155(22.7)	21(23.3)	
<b>Mother occupation</b>			
High/Intermediate	537(75.0)	69(74.2)	0.028(0.866)
Low	179(25.0)	24(25.8)	
<b>Raised by</b>			
Both parents	689(90.3)	86(78.2)	14.170(<0.001)*
Single parents/others	74(9.7)	24(21.8))	
<b>Parents children</b>			
1-4	584(76.5)	62(56.4)	20.340(<0.001)*
5 and more	174(23.5))	48(43.6)	
<b>Family type</b>			
Monogamy	494(64.7)	99(90.0)	28.147(<0.001)*
Polygamy	269(35.3))	11(10.0)	
<b>Birth position</b>			
Ist to 3rd	405(72.8)	42(70.0)	0.220(0.639)
4 <sup>th</sup> and above	151(27.2)	18(30.0)	

**Table 4: Factors associated with Academic Stress (continued)**

**Table 5: Multivariate logistic regression analysis of the determinant of Academic Stress**

Variable	p-value	AOR (95% C.I.)
<b>School type</b>		
University	0.154	1.64(0.83-3.26)
Polytechnic <sup>R</sup>		
<b>Age group</b>		
>22 years	0.907	0.97(0.59-1.59)
≤22 years <sup>R</sup>		
<b>Raised by</b>		
Single parents/Others	0.224	1.85(0.69-5.01)
Both parents <sup>R</sup>		
<b>Fathers education</b>		
Secondary/Primary/none	<0.001	2.76(1.67-4.58) *
Tertiary <sup>R</sup>		
<b>Mothers education</b>		
Secondary/Primary/none	<0.001	2.39(1.47-3.90) *
Tertiary <sup>R</sup>		
<b>Number of siblings</b>		
>4	0.146	1.44(0.88-2.35)
≤4 <sup>R</sup>		
<b>Nature of family</b>		
Monogamous	0.006	3.16(1.40-7.14) *
Polygamous <sup>R</sup>		

**\*Statistical significance R Reference category**

### Discussion of Findings

The study showed that most of the students experienced low academic stress, some experienced moderate academic stress and few experienced high academic stress. A higher level of academic stress was reported by Oku et al., (2015) in Cross Rivers State among medical students and Asani et al., (2016) in Kano State. The level of academic stress in this study was also lower than what was observed by Edjah et al., (2020) in Ghana and (Bert et al., (2022) in Italy. A similar pattern of academic stress was reported by Saías et al., (2014) among students in France.

The level of paternal education was a significant determinant of the pattern of academic stress using the p-value and 95% CI approach. High levels of academic stress were more prevalent among students whose fathers did not acquire tertiary education. This may be because students whose fathers did not acquire tertiary education may not understand how tense the school environment is and may not be able to provide support to their wards on coping strategies to overcome some of these challenges. Azhar et al., 2013 also reported that high paternal education was associated with better academic performance.

The level of maternal education was significantly associated with the level of academic stress. A High level of academic stress was more prevalent among students whose mothers did not acquire tertiary education. In Nigeria, the level of education correlates with the amount of salary, hence respondents whose mothers had a lower level of education may not be able to support their wards in all that is needed to ensure a more comfortable school environment, hence predisposing the students to a high level of academic stress. Higher maternal education was associated with reduced academic stress in a study by Azhar et al., 2013.

The nature of the family background was a significant determinant of experiencing high level of academic stress. A high level of academic stress was more prevalent among students from monogamous families. This may be because monogamous families may not have enough members to support the students mentally and financially, unlike polygamous families which are usually characterised by a larger household members, thus they have more people to turn to in times of academic distress. Funmilola & Adesokan, (2021) reported that family structure has an influence on student's susceptibility to academic stress.

### Conclusion & Recommendation

Academic stress is prevalent among students of tertiary institutions in Rivers State. Students whose parents do not have tertiary education and those from a monogamous background should explore other support mechanisms that will enable them to better manage academic stress. Furthermore, the management of tertiary institutions should regularly organise seminars on academic stress management for students in tertiary institutions, in addition to implementing interventions targeted at vulnerable students.

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## Central Corneal Thickness among Primary Open Angle Glaucoma Patients in a Southern Nigerian Tertiary Hospital- Preliminary Result

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### Abstract

*Background/Objective:* This was a preliminary finding in a prospective study of Primary Open Angle Glaucoma (POAG) patients undergoing various forms of treatment at the Glaucoma Clinic of University of Port Harcourt Teaching Hospital, Nigeria from August 2021 to July 2022. Glaucoma is an optic neuropathy with the death of retinal ganglion cells as its final pathogenetic pathway. It is the leading cause of irreversible blindness world-wide. The objective of this study was to determine the central corneal thickness of patients diagnosed with glaucoma. *Materials and Methods:* Clinical assessment of patients combined with findings from clinical records were used to obtain relevant data from the respondents. *Results:* Out of 393 POAG patients recruited into this study representing 84.5% of the total number of glaucoma patients seen during the same period. The mean age of the subjects was  $56.5 \pm 12.4$  years with age range of 37 to 96 years. Male-female ratio was 1.6:1. The thinnest mean CCT was  $521.2 \pm 22.2$   $\mu\text{m}$  and the thickest mean CCT was  $540.4 \pm 10.8$   $\mu\text{m}$ . There was no statistically significance between the mean central corneal thickness between both genders ( $p = 0.127$ ). However, most of the participants in this study had thin central corneal Average intraocular pressure (IOP) was  $17.8 \pm \text{SD } 5.1$  mmHg. One hundred and thirty-five subjects ( $n=135$ ; 34.4%) had high intraocular pressure ( $\geq 22\text{mmHg}$ ) while 258 (65.6%) subjects had IOP within the normal range of 11.0 mmHg to 21.0 mmHg. This difference was not statistically different ( $p=0.914$ ). Two hundred participants ( $n = 200$ ; 51%) had positive family history of glaucoma while in 67 (17%), there was no family history of glaucoma among their relatives. One hundred and twenty-six ( $n=126$ ; 32%) had no knowledge of their ocular family history. *Conclusion:* Thin central corneal thickness is a feature of primary open angle glaucoma. Early detection of POAG through community-based case screening for CCT could help in reducing the scourge from POAG.

**Keywords:** Central corneal thickness, Primary Open Angle Glaucoma; Southern Nigeria.

### Introduction

Glaucoma is the second leading cause of blindness after cataract and the commonest cause of irreversible blindness world-wide (Quigley et al., 2010; Abdul et al., 2009). Primary Open Angle Glaucoma is the prominent cause of irreversible blindness in Nigeria - accounting for 15 - 20% of blindness in Nigeria (Ashaye 2010). Individuals of African ancestry are more affected by Primary open angle glaucoma than their Caucasian counterparts possibly due to genetic predisposition and more likely to have worse progression and prognosis (Allingham et al., 2009).

Clinically, Primary Open Angle Glaucoma is usually asymptomatic until it progresses to irreversible blindness and most patients in Africa have inadequate knowledge of the disease, resulting in their late presentation for clinical evaluation and treatment. In addition, there is often reluctance in the acceptance of medical and surgical intervention among African populations (Nazir et al., 2018; Fan et al., 2010; Fingert 2011).

Central corneal thickness (CCT) is one of the most heritable human traits and thin central corneal thickness (CCT) has been implicated as one of the risk factors in POAG. Most individuals of African ancestry have thinner CCT and have worse disease progression and visual field damage (Medeiros et al., 2012; Wang et al., 2014; Aghaian, et al., 2004; Kyari et al., 2013).

It has been reported that there may be 40 - 50 percent structural axonal loss before any significant functional change is detected in the pathogenesis of glaucoma (Stone et al., 2012). Most ophthalmologists consider that blindness from POAG can be prevented if the pre-symptomatic stages are detected early and corresponding adequate treatment instituted. There is therefore a need to improve on the methods of early diagnosis by being able to identify the phenotypic characteristics of POAG to enhance preclinical screening, early diagnosis and treatment of individuals at risk.

The detection of individuals of African descent with thin central corneal thickness could therefore be a screening tool for POAG. The knowledge and identification of the pattern of the CCT among POAG patients will be invaluable tool in the early diagnosis of the disease and thereby, leading to overall improvement in the management of POAG. This study therefore, investigates the central corneal thickness of POAG patients attending the Glaucoma Clinic of the University of Port Harcourt Teaching Hospital in Southern Nigeria.

## **Materials and Methods:**

### **Ethical Statement:**

Ethical approval to conduct this study was obtained from the Ethics Committee of University of Port Harcourt. This study adhered to the tenets of the Declaration of Helsinki on study involving human subjects. Study participants' informed consents were obtained. Participation was absolutely voluntary. Participants were free to opt out at any stage of the study without victimization. All information obtained from the participants of this study was treated with utmost confidentiality. No personal identification (names, clinic number) was stored electronically. There was no health risk to the participants of this study. Benefits to the participants included free reading glasses, ocular assessment and counseling.

### **Study Area:**

This study was carried out in the Glaucoma Unit of University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria. Consenting consecutive confirmed glaucoma cases between August 2021 and July 2022 were recruited into the study.

### **Study Design:**

This was a preliminary result of an on-going prospective case-control study of 393 POAG patients attending the Glaucoma clinic of the University of Port Harcourt Teaching Hospital and 393 non-glaucoma patients. The study was carried out between August 2021 and July 2022.

### **Calculation of Sample Size:**

Minimum sample size estimation formula for comparing two proportions, is that by Lwanga, SK.et al., (1999):

$$n = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2}{(P_1 - P_2)^2} \{P_1(1 - P_1) + P_2(1 - P_2)\}$$

Where:

- $n$  = minimum sample size in the 2 groups
- $Z_{\alpha/2}$  = standard normal deviate corresponding to 5% level of significance = 1.96

- $Z_{1-\beta}$  = standard normal deviate corresponding to a power of 80% = 0.84
- $P1 = 4.4\% = 0.044$
- $P2 = 1\% = 0.01$
- $P1 - P2$  = the smallest difference between the two groups of scientific or clinical importance which the study would not want to miss

Substituting the values of  $Z_{\alpha/2}$ ,  $Z_{1-\beta}$ ,  $P1$  and  $P2$  in the formula;

$$n = \frac{(1.96+0.84)^2}{(0.044-0.01)^2} \{0.044(1 - 0.044) + 0.01(1 - 0.01)\}$$

$$n = \frac{(2.8)^2}{(0.034)^2} \{0.044(0.956) + 0.01(0.99)\}$$

$$n = \frac{7.84}{0.001156} \{0.042064 + 0.0099\}$$

$$n = 6,782.01 \times 0.051964$$

$$n = 352.4 \approx 353$$

An adjustment is made for non-response rate of 10%. Non-Response Rate (NRR) accounts for households that could be either absent, not accessible, refuse to be surveyed or any other reason that prevent survey team from surveying a selected household.

$$\text{Final Sample Size (N)} = \frac{n}{1-\text{non-response rate}} = \frac{n}{1-10\%} = \frac{n}{1-0.1} = \frac{353}{0.9} = 392.2$$

$\approx 393$  persons in each group.

### Eligibility Criteria:

#### Inclusion Criteria

Patients diagnosed with primary open angle glaucoma who are indigenes of Rivers State.

#### Exclusion Criteria

Subjects with a history of eye surgery prior to diagnosis of glaucoma, cases of secondary glaucoma, angle-closure glaucoma, a history of ocular trauma, or a history of significant use of systemic or ocular glucocorticoids for a period exceeding 6 months (to avoid steroid-responders to increase in intraocular pressure).

### Sampling Method:

Consenting consecutive confirmed cases of primary open angle glaucoma who met the eligibility criteria were recruited into the study. The study was carried out from August 2021 and July 2022. Findings from clinical records and basic ophthalmic examinations were used to obtain data from the respondents. The presenting distant and near visual acuities (VA) were determined using illuminated standard Snellen's and E-tumbling charts at a distance of 6 meters (for distant VA) and at 40 cm for near vision.

Basic ocular examinations (which included evaluation of the eyelids, the globe, cornea, pupil and the lens) were done with the aid of a bright pen touch and slit lamp Topview optics'slit lamp-LS-4. Fundoscopy was carried out with +78D lens. Pupillary dilatation was achieved using Mydriacyl 0.5% after refraction and measurement of the intraocular pressure. Intraocular pressure measurement was determined using Perkin's applanation tonometer (MK2-model), after instilling local anaesthetic agent (1% tetracaine) and fluorescein dye into the conjunctival sac. IOPs was measured in both eyes three consecutive times. The measurements were done with the subjects in sitting position. The mean IOP value was adopted. CCT measurements were obtained with ultrasonic pachymetry (Tomey SP-3000, Tomey Ltd, Japan.) under topical anesthesia with tetracaine 1%. Measurements were obtained three times from the center of the cornea and the average reading was adopted.

All the measurements were carried out by the lead-author to avoid inter-observers' error.

### Sample and Data Analysis

The data obtained were entered into Microsoft Excel sheet, cleansed and later exported to IBM Statistical Package for Social Sciences (SPSS) version 25 software (SPSS) Inc; Chicago, IL, USA for statistical analysis. Relevant data were presented in tables and charts. Statistical significance was performed using Chi square and statistical significance was set at  $p \leq 0.05$ .

### Results:

Three hundred and ninety-three POAG patients constituted the study population representing 84.5% of the total number of glaucoma patients seen during the same period. The mean age of the study population was  $56.5 \pm 12.4$  years. Age range was 37 to 96 years and male-female ratio was 1.6:1. The modal age group was 60 - 69 years with a proportion of 29.8% of the population studied. The difference in the ages of the participants was not statistically significant ( $p = 0.028$ ) [Table 1].

**Table 1: Age -gender distribution of the study population**

Age Group (years)	Male	(%)	Female	(%)	Total	(%)
< 40 – 49	61	(15.5)	20	(5.1)	81	(20.6)
50 – 59	60	(15.3)	48	(12.2)	108	(27.5)
60 – 69	65	(16.6)	52	(13.2)	117	(29.8)
70 – 79	32	(8.1)	16	(4.1)	48	(12.2)
80 – 89	19	(4.8)	10	(2.5)	29	(7.4)
90 & above	4	(1.0)	6	(1.5)	10	(2.5)
Total	241	(61.3)	152	(38.7)	393	(100)

Mean Age =  $56.5 \pm 12.4$ ; Age Range = 37 to 96 years;  $p$ -value = 0.028

### Family History of Glaucoma in the Study Population

Two hundred (n=200; 51%) subjects had positive family history of glaucoma in first degree relatives, while 17% had positive family history of glaucoma among first degree relatives; 32% were unaware of any history of glaucoma in their families [Figure 1].

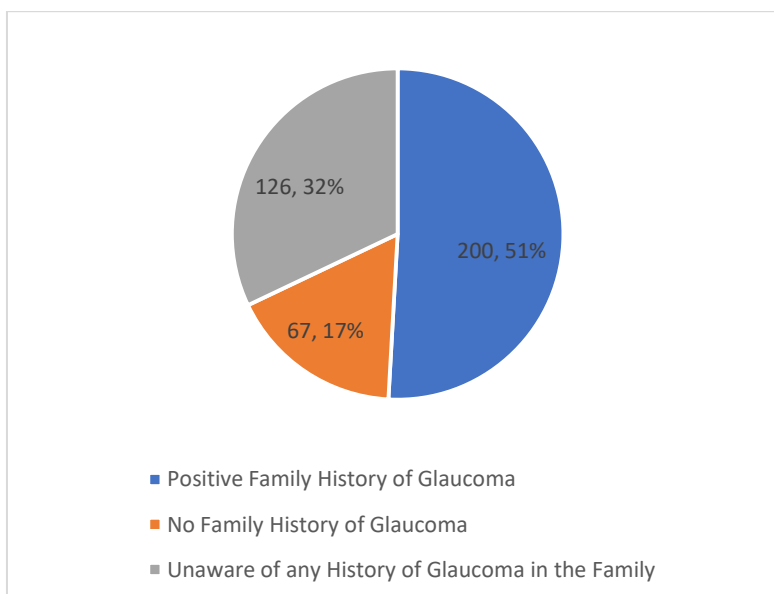


Figure 1: Family History of Glaucoma in the Study Population

**Mean central corneal thickness (CCT) in each age group**

The mean central corneal thickness (CCT) in each age group in the study population is presented in table 2. The thinnest mean CCT ( $521.2 \pm 22.2 \mu\text{m}$ ) was observed in the 60–69-year age group and the thickest mean CCT ( $540.4 \pm 10.8 \mu\text{m}$ ) was noticed in the 90 year and above-old age group. However, the difference in the mean central corneal thickness among the various age groups in this study was not statistically significant ( $p= 0.954$ ) [Table 2].

Table 2: Mean CCT ( $\mu\text{m}$ ) according to age groups in the study population

Age Group (Years)	Mean CCT	SD	Minimum & Maximum	P-value
< 40-49	533.5	$\pm 23.7$	493.6 – 556.2	0.954
50-59	524.8	$\pm 21.1$	468.5 – 533.8	
60-69	521.2	$\pm 22.2$	479.1 -567.3	
70-79	524.7	$\pm 19.6$	490.4 -573.9	
80 – 89	530.9	$\pm 15.5$	499.8 -566.4	
90 & above	540.4	$\pm 10.8$	539.3 -562.6	

**The distribution of the mean central corneal thickness (CCT) in the study population**

Table 3 shows the mean central corneal thickness (CCT) in the study population. The mean CCT was  $531.5 \pm 5.6\mu\text{m}$ . A total of 322 (81.9%) of the subjects had thin central corneal thickness ( $< 555\mu\text{m}$ ); while 71 (18.1%) had average central corneal thickness of  $\geq 565\mu\text{m}$ . This difference in the central corneal thickness between both genders in the study population was statistically not significant ( $p = 0.127$ ). However, most of the participants in this study had thin central corneal thickness [Table 3].

Table 3: Distribution of the central corneal thickness in the study population

Central Corneal Thickness	Male	(%)	Female	(%)	Total	(%)
Thin CCT ( $< 555\mu\text{m}$ )	205	(52.2)	117	(29.7)	322	(81.9)
Thick CCT ( $\geq 565\mu\text{m}$ )	36	(9.1)	35	(9.0)	71	(18.1)
<b>Total</b>	241	(61.3)	152	(38.7)	393	(100)
	Mean CCT= $531.5 \pm 5.6\mu\text{m}$		p-value 0.127			

**The distribution of the mean Intraocular Pressure (IOP) in the study population**

The mean intraocular pressure (IOP) of the subjects in population was  $17.8 \pm \text{SD } 5.1 \text{ mmHg}$ . One hundred and thirty-five subjects ( $n=135$ ; 34.4%) had high intraocular pressure ( $\geq 22\text{mmHg}$ ) while 258 (65.6%) subjects had IOP within the normal range of 11.0 mmHg to 21.0 mmHg. This difference was not statistically different ( $p=0.914$ ). The highest mean IOP was  $24.4 \pm 3.7 \text{ mmHg}$  and this occurred in 70–79-year age group while the lowest IOP ( $15.2 \pm 2.7 \text{ mmHg}$ ) was recorded among < 40-49 years group (Table 4)

**Table 4: Mean IOP (mmHg) in each Age Group in the Study Population**

Age Group (Years)	Mean IOP	SD	Minimum & Maximum
<40-49	15.2	± 2.7	16.0 – 18.6
50-59	17.9	± 4.1	17.6- 20.4
60-69	21.4	± 4.2	20.2 – 24.2
70-79	22.4	± 3.7	22.2 -24.0
80 – 89	19.6	± 4.4	17.8 – 21.1
90 & above	20.1	± 3.5	

P-value = 0.914

**Discussion:**

In this study, a total of 393 consenting adults with primary open angle glaucoma participated. This constituted 84.5% of the total number of all cases of various types of glaucoma patients seen during the same period. The mean age of the study population was  $56.5 \pm 12.4$  years. Age range was 37 to 96 years and male-female ratio was 1.6:1. The modal age group was 60 - 69 years with a proportion of 29.8% of the population studied. The difference in the ages of the participants was not statistically significant ( $p = 0.028$ ). Our findings in this current study compares well with the study of Kyari et al., in the Nigerian National Blindness and Visual Impairment Survey of 2005-2007. In their study, a sample of 13,591 people aged  $\geq 40$  years, representative Nigerian-nationals: the mean age of the subjects with POAG was  $66.2 \pm 12.3$  years. Working independently and in different periods of time, Murdoch et al., in a study among 1563 people of Hausa/Fulani ethnic extraction of Nigeria; reported that POAG was more prevalent among individuals aged 45 years and older (Murdoch et al., 2001) while Adeoye in South Western region of Nigeria observed that POAG was more prevalent among individuals aged 50 years and older and that POAG accounted for 11.1% of blindness in Nigeria (Adeoye, 2001). These studies of Kyari et al., 2015; Awoyesuku et al., 2012; Murdoch et al., 2001 and Adeoye, 2001 were population-based studies with large sample sizes, independently done at different periods in similar socio-cultural background and similar results.

The central corneal thickness (CCT) is one of the phenotypic features of POAG and it's recognized as an inheritable trait (Choquet et al., 2020; Medeiros et al., 2012; Wang et al., 2014; Toh et al., 2015). In our study, it was observed that the mean central corneal thickness (CCT) in the study population was  $531.5 \pm 5.6\mu\text{m}$ . A total of 322 (81.9%) of the subjects had thin central corneal thickness ( $< 555\mu\text{m}$ ); while 71 (18.1%) had average central corneal thickness of  $\geq 565\mu\text{m}$ . This difference in the central corneal thickness between both genders in the study population was statistically not significant ( $p = 0.127$ ). However, most of the participants in this study had thin central corneal thickness.

Our findings corroborate with the work of Uche et al; who found that the average central corneal thickness (CCT) among black population in Eastern Nigeria was  $527.68 \pm 36.88\mu\text{m}$  (Uche et al., 2021). Some studies suggest that subjects of African descent African have thinner corneas than Caucasians and harbor a higher incidence and prevalence of glaucoma (Aghaian et al., 2004; Wang et al., 2014). CCT affects the accuracy of intraocular pressure (IOP) measurement by applanation tonometry, as thicker cornea requires greater force to flatten a specific area of the cornea (usually 3.06mm as in applanation Goldmann tonometry)



and, conversely, a thinner cornea is more easily flattened, thus a thinner cornea may give rise to a falsely lower IOP than the actual value (Uche et al., 2021).

Different studies in black populations have identified that thinner central corneal correlates with POAG (Beltran-Agullo et al., 2011; Shimmyo et al., 2003). However, it is often difficult to establish and quantify the effect of an isolated factor and its correlation with POAG due to the influence of cofounders. Several multiple studies have shown that blacks have thinner central corneal thickness than their Caucasian counterparts (Leite et al., 2010; Fansi et al., 2009; Haider et al., 2008). Studies have shown that CCT affects IOP readings to the extent of underestimating the true IOP and hence possible undertreatment of blacks' IOP resulting in increased optic nerve damage (Shimmyo et al., 2003; Leite et al., 2010; Fansi et al., 2009).

Another vital risk factor in an individual developing primary open angle glaucoma is a family history of glaucoma. In our study, two hundred (n=200; 51%) subjects had positive family history of glaucoma in first degree relatives, while 17% had positive family history of glaucoma among first degree relatives; 32% were unaware of any history of glaucoma in their families. First degree relatives are members of the nuclear family, but without spouses: Parents, full sibling or child. First degree relatives share approximately 50% of their genes while second degree relatives include an individual's grandparents, grandchildren, uncles. Aunts, nephews, nieces, and half-siblings (Ginsburg, 2008).

In tandem with other studies, positive family history has been identified as a risk factor in Primary Open Angle Glaucoma especially among black populations. This assertion, strongly correlates with risk of developing glaucoma reflecting heritability and/or shared environmental factors (Tielsch et al., 1994; Agbeja-Baiyeraju et al., 2003; Leske et al., 2008). The findings in our study corroborate with other studies among black population (Agbeja-Baiyeraju et al., 2003; Leske et al., 2008). In the Baltimore Eye Survey, it was demonstrated that, the odds of POAG were 18-fold higher with positive family history (Tielsch et al., 1994). Siblings of an affected patient were at the highest risk of developing POAG compared to parents or children (Tielsch et al., 1994).

However, Awoyesuku et al., (2012) in the Port Harcourt Hospital Glaucoma Study, found that 9.6% of glaucoma patients had positive family history. The comparatively low proportion in Awoyesuku et al., study could be attributed to difficulties inherent in eliciting family medical histories from patients in Sub-Saharan Africa. Often times, information concerning family history may be incomplete, infested with bias or lack of familiarity with glaucoma as a diagnosis could make this variable difficult to measure reliably (Banerjee et al., 2013). This difficulty in eliciting family medical history was also encountered in our study, as 32% of the POAG patients were unaware of any incident of glaucoma among their relatives.

In the Baltimore Eye Survey, previously diagnosed individuals reported POAG family history significantly more often than newly diagnosed individuals, suggesting that individuals are less aware of their family history upon initial diagnosis (Tielsch et al., 1994). Recalling and eliciting family medical history (history of glaucoma in one's family could also be a function of his/her educational background). Majority of our subjects had minimal educational training. unlike the participants in the study of Awoyesuku et al., in 2012.

The role of intraocular pressure in the pathogenesis of POAG cannot be overemphasized as currently the only modifiable risk factor of POAG. Many epidemiological, clinical, histopathological, and experimental studies support the role of IOP in glaucoma pathogenesis (Racette et al., 2003). However, what constitutes IOP -inducing glaucoma remains controversial and differs from patient to patient.

The mean intraocular pressure (IOP) of the subjects in our current study was  $17.8 \pm \text{SD } 5.1$  mmHg. One hundred and thirty-five subjects ( $n=135$ ; 34.4%) had high intraocular pressure ( $\geq 22$ mmHg) while 258 (65.6%) subjects had IOP within the normal range of 11.0 mmHg to 21.0 mmHg. This difference was not statistically different ( $p=0.914$ ). The highest mean IOP was  $24.4 \pm 3.7$  mmHg and this occurred in 70–79-year age group while the lowest IOP ( $15.2 \pm 2.7$  mmHg) was recorded among < 40-49 years group.

Eyes with raised IOP are at increased risk of POAG. The risk of developing POAG is up to six times higher in those with ocular hypertension than in those without any risk factors for glaucoma (Leske et al., 2001). In a randomized clinical trial with a total of 1636 participants, Kass et al., observed that the risk of developing POAG in ocular hypertension in the Ocular Hypertension Treatment Study was 9.5% over 5 years.

Elevated IOP is an established risk factor for POAG. The Baltimore Eye Survey found that the risk of optic nerve damage increased with IOP (Sommer et al., 1991), a finding that was also noticed in the Barbados Eye Study (Leske et al., 1995). The Barbados Eye Study showed POAG risk increased 12% for each 1 mmHg increase in IOP (Nemesure et al., 2007) and that  $\text{IOP} > 21$  mmHg imparted 11-fold greater odds of POAG (Leske et al., 1995).

Although, in our study, majority of the patients were already undergoing various treatment for POAG, we still observed a high IOP in 34.4% of our subjects in the glaucoma group. While elevated IOP is a significant risk factor for POAG, it is neither necessary nor sufficient to develop glaucoma.

### **Conclusion**

Thin central corneal thickness is a feature of primary open angle glaucoma. Early detection of POAG through community-based case screening for CCT could help in reducing the scourge from POAG.

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## Leadership Styles and Emotional Support in Tertiary Hospitals in Rivers State, Nigeria.

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### Abstract

The study assessed the link between leadership styles (dimensioned by emotional intelligence leadership and individual consideration) and emotional support in tertiary hospitals in Rivers State. The baseline theory for this study is the Service Quality theory. The philosophical underpinning of the study is positivism, and the research design is cross-sectional survey. Data was collected using questionnaire and the study population is 1,675 medical professionals. the Krejcie and Morgan's table was used to determine a sample size 310 respondents and the sample was proportionally allocated, using the Bowley's (1926) formular. The hypotheses were tested at 0.05 significance level by means of Structural Equation Modelling. The study found that that increase in emotional intelligence, does not necessarily translate to corresponding increase in emotional support, probably due to the positivist tendencies of some health professionals in tertiary hospitals, in Rivers State, Nigeria. Also, the study found that there is a positive and significant relationship between individual consideration and emotional support. Therefore, it is recommended that Management of tertiary hospitals should put in place, mechanisms to enhance individual consideration, by discussing in specific terms who is responsible achieving performance targets, going beyond self-interest for the good of the group, treating others as individuals rather than just as members of a group.

**Keywords:** *Emotional intelligence, Individual consideration leadership, Emotional support.*

### 1. Introduction

The increasing shortage of healthcare providers and healthcare facilities in the contemporary economies, as well as the yearning emphasis for quality healthcare practices have attracted huge scholarship on clinical leadership in the healthcare industry (Shaw, 2007; Institute of Medicine, 2004). Furthermore, the quality of healthcare services delivered to patients is largely influenced by the leadership styles and skills because the subordinate health officers need be involved in the entire delivery process though they often rely on their superiors' instructions about the day-to-day running of the health facilities (Schreuder et al., 2011). Generally, the different leadership styles are autocratic, democratic, and laissez-faire styles; and more recently transformational, individualized considerations, transactional, resonant, and emotional intelligence. Individualized considerations involve the leader understanding the followers' needs and continuously working in close contact to get them develop their full potentials (Avolio et al., 1999); and resonant leadership is based on emotional intelligence, and inspires, coaches, develops, and includes others even in the face of diversity (Boyatzis & McKee, 2005). Given all these alternative leadership styles, Joshi (2019) argued that the healthcare industry still finds it thorny to have a style that could be beneficial and suitable amidst the peculiarity of the challenges they face. Similarly, most of the extant studies

(Cummings *et al.*, 2019; Alloubani *et al.*, 2019; Polit & Beck, 2016; Abdelhafiz *et al.*, 2016) focused their studies on nurses almost to the neglect of other healthcare professionals, such as physicians, physiotherapists, pharmacists, and laboratory scientists. Therefore, this study seeks to close the lacuna in extant literature by critically assessing the nexus between leadership styles and emotional support in tertiary hospitals in Rivers State, Nigeria.

### 1.1 Hypotheses

**H<sub>01</sub>:** There is no significant relationship between emotional intelligence leadership and emotional support.

**H<sub>02</sub>:** There is no significant relationship between individual consideration leadership and emotional support.

## 2. Literature Review

**2.1: Theoretical framework:** The underpinning theory for this study is the Service Quality (SERVQUAL) theory (Parasuraman, Berry & Zeithaml, 1985). Parasuraman, Berry and Zeithaml (1985) argued that SERVQUAL provides a technology that measures and manages service quality (SQ), given that it measures how well a service is delivered, and how it matches predetermined expectations on consistent bases, and hospitals use SERVQUAL instrument to measure potential service quality problems and the model of service quality to help diagnose possible causes of the problem. This Service Quality Theory is relevant to this study as it explains the development of a quantitative yardstick for assessing the quality of a hospital's service by measuring patients' perception or experience of quality.

**2.2.1 Leadership Styles:** Leadership defines the relationship between the individuals who lead and those who take the choice to follow, while it refers to the behaviour of directing and coordinating the activities of a team or group of people towards a common goal (Al-Sawai, 2013). To achieve these goals, Leithwood *et al.* (2006) posit that the manager needs to exploit his emotional and cognitive skills to appropriately motivate the involvement and commitment of all stakeholders.

**2.2.2 Emotional intelligence (EI) leadership:** Emotional intelligent leaders use emotions to effect necessary changes that drive the firm forward; that is, they are proactive in their action by understanding ahead of time the followers' possible emotional reactions to the likely or proposed changes. Emotional Intelligence speaks about the manager's ability to recognize, understand, handle and/or harness his own emotions appropriately, and those of the people around him (Salovey & Mayer, 1990).

**2.2.3 Individualized consideration leadership:** Individualized consideration leadership involves developing the potentials of the followers via using such central indicators as coaching, counselling, teaching, advising, and mentoring (Kirkbride, 2006; Hoffman & Frofst, 2006). In essence, individualized consideration leaders view and treat followers as key contributors to the organization's growth, and pay personal attention to subordinates (Hoffman & Frofst, 2006; Sarros & Santora, 2001; Kirkbride, 2006).

**2.2.4 Emotional Support:** Emotional support refers to how the adopted leadership styles address the issues such as patients' concerns and anxiety, due to uncertainty, fear, finance, among others. Thus, it could be argued that emotional support is the extent to which caregivers pay particular attention to anxiety over the physical, psychological or financial impact of illness on patients and their families.

**2.3 Empirical Review:** Several empirical studies have reviewed the nexus between leadership styles and emotional support. For example, a study on transactional and transformational leadership styles by Al-Mailam (2004), compared public and private sectors in Kuwait in order to ascertain employee’s perception on the effectiveness of leadership styles. The study found transformational leadership style as critical for high degrees of leadership effectiveness. McCue *et al.* (1986) examined leadership styles and effectiveness of junior doctors through both self-assessment and assessment by nurse colleagues and found that people-orientated styles of leadership (encouraging and coaching styles) predominated over what they termed ‘low- relationship’ styles such as delegating and structuring. The study also found that nurses perceived doctors who exhibited people-orientated styles as being more effective. Worringer *et al.* (2020) recently studied 232 medical leaders and found that the predominant styles were ‘dominant’ and ‘conscientiousness’, where the former focused on control over tasks and the environment, directing others and achieving goals, while the latter related to independent working and a preference for working on tasks rather than dealing with people.

**3. 0 Research Methods:** The philosophical bearing of this study is positivism, with suggests epistemological objectivism. Also, the adopted research design is the cross-sectional survey, as data was collected on a one-off basis and the research could not assess the dynamic interplay of the study variables over a period of time. The questionnaire was the instrument for data collection. The accessible population of study is 1,675 qualified medical professionals in tertiary hospitals (UPTH and BMH/RSUTH) in Rivers state, while the sample size was determined using the Krejcie and Morgan (1970) table as a guide, to be three hundred and ten (310). The simple random sampling was adopted to ensure that each member of the population had equal chance of being selected. A total of 310 copies of the instrument were administered, out of which a total of 255 copies were retrieved, representing 82.26% of actual distribution rate. Of the 255 copies of the instrument retrieved, 24 copies, representing 7.74% were not usable due to missing responses. In all, 231 copies of the instrument, representing 74.52% were retrieved and usable. Preliminary analysis revealed that the dataset did not violate the assumptions of parametric statistic (normality, linearity, equality of variance and randomness of sample), thus, the Structural Equation Modelling was deployed to test the hypothesis at 0.05 level of significance, within framework of the CFA (confirmatory factor analysis) model and the structural model.

**Table 1.2: Reliability Statistics**

SN	CONSTRUCT	NO. OF ITEMS	CRONBACH’S STATISTICS	ALPHA
1.	Emotional Intelligence Leadership	7	0.875	
2.	Individual Consideration Leadership	9	0.909	
3.	Emotional Support	5	0.925	

**Source: Researcher’s Desk, SPSS 25.0 Outputs 2022.**

The reliability analysis of the questionnaire reveals that all the constructs had Cronbach’s Alpha values above the threshold of 0.7 as recommended by Nunnally and Bernstein, (1994). This reveals that the instrument is reliable.

**3.1 Measurement Model:** The CFA model was based on the common factor model which postulates that every indicator in a set of observable measures is a linear combination of common factor and a unique factor containing the unique variance (Ukoha, 2010). As suggested by Byrne (2010), standardized regression weight should be greater than 0.5 and



preferably above 0.7, and the benchmark for the goodness of fit indices provided in Hu and Bentler (1999), suggests that acceptable model fit is defined by the following criteria: RMSEA ( $\leq 0.6$ ), SRMR ( $\leq 0.8$ ), CFI ( $\geq 0.95$ ), TLI ( $\geq 0.95$ ), GFI ( $\geq 0.90$ ), NFI ( $\geq 0.95$ ) PCLOSE ( $\geq 0.5$ ).

**Table 3.1: Measurement Model Analysis of Emotional Intelligence**

Model	Chi-Sq(df),	$\chi^2/df$	NFI	TLI	CFI	RMSEA	Variable	Factor Loading Estimates	Error VAR
EI	(9df) =64.322,	7.15	0.92	0.89	0.93	0.163	EI1	0.840	0.52
							EI2	0.894	0.13
							EI3	0.797	0.71
							EI4	0.844	0.63
							EI5	0.367	0.80
							EI6	0.718	0.71

The results of the goodness of fit indices indicated moderate fit to the data for one-factor model (chi-square (9df)=64.322,  $\chi^2/df=7.417$ , RMSEA=0.163, CFI=934, NFI=0.924 and TLI=889). Table 4.1.36 summarized the goodness of fit indices, the factor loading estimates and the error variances. Factor loading estimates revealed that six indicators were strongly related to latent factor -emotional intelligence. The indicators EI1, EI2, EI3, EI4 and EI6 had factor loadings of 0.840, 0.894, 0.794, 0.844, 0.367 and 0.718 respectively and error variances of 0.52, 0.13, 0.71, 0.63, 0.80 and 0.71 respectively. However, indicator EI5 had factor loading of 0.367 and error variance of 0.80. Apart from EI5, all the other freely estimated standardized parameters were statistically significant.

**Table 3.2: Measurement Model Analysis of Individual Consideration**

Model	Chi-Square(df), Significance	$\chi^2/df$	NFI	TLI	CFI	RMSEA	Variable	Factor Loading Estimates	Error VAR
Individual Consid.	(84df) =347.090	4.132	0.958	0.952	0.968	0.111	IC1	0.680	0.46
							IC2	0.516	0.27
							IC3	0.353	0.12
							IC4	0.722	0.52
							IC5	0.874	0.76
							IC6	0.801	0.64
							IC7	0.848	0.72
							IC8		0.870
							IC9		0.861

0.76  
0.74  
**Source:** Amos 24.0 output on research data, 2022

The results of the goodness of fit indices indicated acceptable fit to the data for one-factor model (chi-square (84df)=347.090,  $\chi^2/df=4.137$ , RMSEA=0.111, CFI=0.968, NFI=0.958 and TLI=0.952). Table 4.1.37 summarized the goodness of fit indices, the factor loading estimates and the error variances. Factor loading estimates revealed that seven indicators were strongly related to latent factor -management control systems- and were statistically significant. The indicators IC1-IC9 had factor loadings of 0.680, 0.516, 0.353, 0.722, 0.874, 0.801, 0.848, 0.870 and 0.861 respectively and error variances of 0.46, 0.27, 0.12, 0.52, 0.76, 0.64, 0.72, 0.76 and 0.74 respectively. These parameters are consistent with the position that these are reliable indicators of the construct of individual consideration.

**Table 3.3: Measurement Model Analysis of Emotional Support**

Model	Chi-Square(df), Significance	$\chi^2/df$	NFI	TLI	CFI	RMSEA	Variable	Factor Loading Estimates	Error VAR
Emotional Support	(15df) =67.559	4.504	0.915	0.875	0.925	0.169	ES1	0.808	0.65
							ES2	0.873	0.76
							ES3	0.862	0.74
							ES4	0.822	0.68
							ES5	0.861	0.74

The results of the goodness of fit indices for emotional support indicated moderate fit to the data for one-factor model (chi-square (5df)=67.559,  $\chi^2/df=4.504$ , RMSEA=0.169, CFI=0.923, NFI=0.998 and TLI=0.875). The indicators ES1-ES5 had factor loadings of 0.808, 0.873, 0.862, 0.822, and 0.861 respectively and error variances of 0.65, 0.76, 0.74, 0.68, and 0.74 respectively.

**4.1: Correlations, Convergent Validity and Discriminant Validity:** Construct validity was examined by convergent validity and discriminant validity. As recommended by Scholars (Byrne, 2006; Fornell & Larcker, 1981), to establish convergent validity, the average variance extracted should be greater than 0.5, while to establish discriminant validity, the square root of AVE of each construct must be greater than its correlations with other constructs.

**4.2 Correlations:** Correlations among emotional intelligence leadership, physical comfort and emotional support, are shown in Table 4.1. The correlation coefficients- which were assessed through Pearson’s product moment correlation- indicate that all constructs are significant at the 0.01 levels (2-tailed).

**Table 4.1 Correlations** (\*\*. Correlation is significant at the 0.01 level (2-tailed).

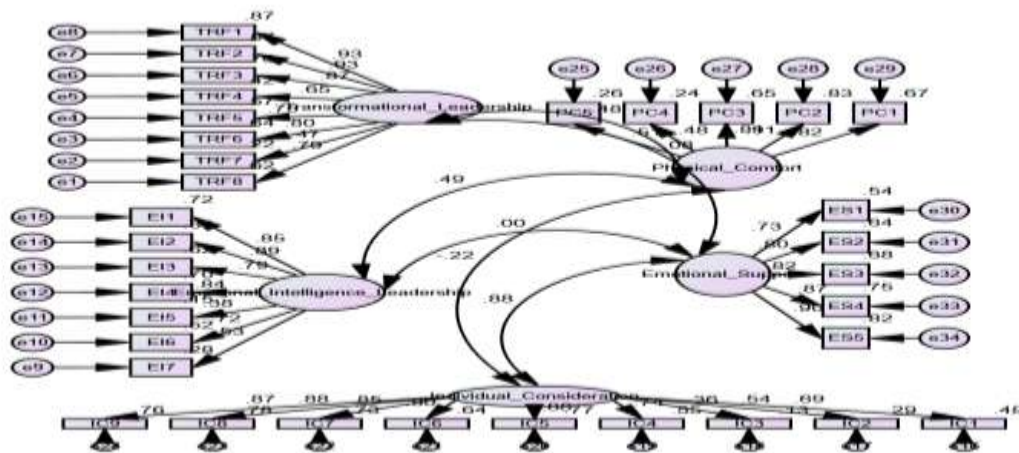
		<b>Correlations</b>		
		EMOTIONAL INTELLIGENCE	INDIVIDUAL CONSIDERATION	EMOTIONAL SUPPORT
EMOTIONAL INTELLIGENCE	Pearson Correlation	1	.763**	.679**
	Sig. (2-tailed)		.000	.000
	N	231	231	231
INDIVIDUAL CONSIDERATION	Pearson Correlation	.763**	1	.691**
	Sig. (2-tailed)	.000		.000
	N	231	231	231
EMOTIONAL SUPPORT	Pearson Correlation	.679**	.791**	1
	Sig. (2-tailed)	.000	.000	
	N	231	231	231

**Table 4.2 Average Variance Extracted (AVE)**

Sub-construct Leadership Styles	Indicators	Estimates	Squared Estimates	Error Variance	AVE	C.R	Square Root of AVE
<b>Emotional Intelligence</b>	EI1	0.84	0.71	0.71	<b>0.672</b>	<b>0.832</b>	<b>0.820</b>
	EI2	0.89	0.79	0.80			
	EI3	0.80	0.64	0.63			
	EI4	0.84	0.71	0.71			
	EI5	Deleted					
	EI6	0.72	0.52	0.52			
	EI7	Deleted					
<b>Sum</b>	<b>5</b>	<b>4.09</b>	<b>3.36</b>	<b>3.37</b>			
<b>Sum squared</b>		<b>16.728</b>					
<b>Individual Consideration</b>	IC1	0.68	0.46	0.46	<b>0.609</b>	<b>0.902</b>	<b>0.780</b>
	IC2	0.52	0.27	0.27			
	IC3	Deleted					
	IC4	0.72	0.52	0.52			
	IC5	0.87	0.76	0.76			
	IC6	0.80	0.64	0.64			
	IC7	0.85	0.72	0.72			
	IC8	0.87	0.76	0.76			
	IC9	0.86	0.74	0.74			
<b>Sum</b>	<b>9</b>	<b>6.71</b>	<b>4.87</b>	<b>4.87</b>			
<b>Sum squared</b>		<b>45.024</b>					
<b>EMOTIONAL SUPPORT</b>	ES1	0.81	0.66	0.65	<b>0.712</b>	<b>0.833</b>	<b>0.844</b>
	ES2	0.87	0.76	0.76			
	ES3	0.86	0.74	0.74			
	ES4	0.82	0.67	0.68			
	ES5	0.86	0.74	0.74			
	<b>Sum</b>	<b>5</b>	<b>4.22</b>	<b>3.56</b>			
<b>Sum squared</b>		<b>17.808</b>					

**4.3 Construct: Convergent Validity:** The results in Tables 4.2 show that all variables have average variance extracted (AVE) values exceeding the 0.50 threshold recommended by Fornell and Larcker (1981). Therefore, with the  $AVE > 0.5$ ;  $CR > AVE$  and the factor loadings  $> 0.7$ , it is necessary and sufficient to conclude that the model, has evidence of convergent validity.

**4.4 Construct: Discriminant Validity:** The values in in Table 4.2 indicate that the square root of AVE of each construct must be greater than its correlations with other constructs. Thus, each construct is empirically and statistically different from other constructs in the study. Therefore, it is sufficient to conclude that the model, has evidence of discriminant validity.



**Figure 1.4 Structural model (linking the hypotheses)**

**Table 4.3: Test of Hypotheses**

S/N	Stage	Hypotheses	Standardized Estimate	Critical Ratio (C.R)	P-value	Remark	Decision
1	EI → ES (Hypothesis 1)	There is no significant relationship between emotional intelligence and emotional support.	0.095	-0.094	0.925	Positive but Not-Significant	Supported
2	IC → ES (Hypothesis 2)	There is no significant relationship between individual consideration and emotional support.	0.770	2.150	0.001	Positive and Significant	Not Supported

**Source:** Amos 24.0 output on research data, 2022. (Tested at 0.05 significance level)

**4.5 Interpretation of Results (Inferential Analysis):** Table 4.3 suggests that emotional intelligence has a positive but not-significant relationship with emotional support in tertiary hospitals in Rivers State, Nigeria ( $\beta=0.095$ , C.R= -0.094,  $p=0.925$ ). Thus,  $H_0:1$  was supported and the alternate hypothesis is rejected. This means that the presence of emotional intelligence, in tertiary hospitals in Rivers State, Nigeria, does not significantly affect emotional support. Thus the findings show as follows: (i) Emotional intelligence does not necessarily ensure emotional support in tertiary hospitals in Rivers State, Nigeria. This may be due to the fact that the medical professionals might be focusing more on objective treatment of the patients, than taking up emotional supportive roles. (ii) Individual consideration drives and enhances the tertiary health workers' capacity to look at problems from many different angles and help others develop their strengths which are key to going beyond self-interest for the good of all.

**Discussion of Findings:** The result shows that there is a positive but not-significant relationship between emotional intelligence and emotional support in tertiary hospitals in Rivers State, Nigeria. This finding synchronizes with McCue *et al.* (1986) who examined leadership styles and effectiveness of junior doctors through both self-assessment and assessment by nurse colleagues, and found that people-orientated styles of leadership (encouraging and coaching styles) predominated over what they termed 'low- relationship' styles such as delegating and structuring. Furthermore, the result shows that there is a positive and significant relationship between individual consideration and emotional support in tertiary hospitals in Rivers State, Nigeria. This implies increase in individual consideration is associated with increase in emotional support. This finding agrees with Worringer *et al.*, (2020) who found that relational leadership was associated with increased patient satisfaction in acute care and home healthcare settings while task-orientated leadership of nursing home ward managers was positively related to family satisfaction with care. These findings further validate the theoretical assertion extracted from the SERVQUAL theory (Parasuraman, Berry & Ziethaml, 1985) which underpins the relationship between users' perception of the quality of service and their actual experience of the quality of the said service.

**Conclusion and Recommendations:** Based on empirical evidences from the study, it is concluded that increase in emotional intelligence, does not necessarily translate to corresponding increase in emotional support, probably due to the positivist tendencies of some health professionals as well as the service pressures in tertiary hospitals. However, higher levels of individual consideration will bring about emotional support in tertiary hospitals, in Rivers State, Nigeria. Thus, it is recommended that medical professionals in tertiary hospitals should improve their level of emotional intelligence, by concentrating attention on dealing with mistakes, complaints, failures and aligning with everyone, and considering the moral and ethical consequences of decisions. Furthermore, Management of tertiary hospitals should put in place, mechanisms to enhance individual consideration, by discussing in specific terms who is responsible achieving performance targets, as well as getting others to look at problems from many different angles.

**Contributions to knowledge:** The study contributes to knowledge by establishing and validating the structural affinity between the dimensions of leadership styles (emotional intelligence leadership and individual consideration leadership) and emotional support in tertiary hospitals in Rivers State, Nigeria.

**Limitations of the Study:** The researcher relied on self-reported measures on participant's perception of leadership styles and patient-centered care in tertiary institutions in Rivers State. According to Podsakoff, MacKenzie, Lee and Podsakoff (2003), self-reports could lead to common method biases.

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## Prevalence of Sexual and Gender-Based Violence: A Comparative Study of Rural and Urban Communities In Rivers State, Nigeria

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### Abstract

**Background:** Sexual and Gender-Based Violence (SGBV) is a major public health challenge and victims are prone to physical, psychological, emotional and social trauma. Global estimates indicate that 1 in every 3 women has experienced at least one form of gender-based violence in their lifetime. According to the UN 2020 report, 30% of women aged 15 to 49 have experienced sexual abuse, with a significant difference between girls and women in urban regions (33%) and rural areas (24%).

**Aim:** This study aimed to determine and compare the prevalence of SGBV in rural and urban communities in Rivers State, Nigeria.

**Methodology:** A total of 746 consenting respondents, 376 rural and 370 urban residents were recruited using a multi-stage sampling technique from Obio/Akpor and Emohua. Participants comprised of youths between 15-35 years who had lived for  $\geq 6$  months in the study area. Pretested semi-structured interviewer-administered questionnaire adapted from the WHO Violence Against Women Instrument was used. The prevalence of SGBV in rural and urban areas was determined and compared using the chi-square test. Statistical significance was set at  $p < 0.05$ .

**Results:** Respondents comprised of 343 (46%) males and 403 (54%) females with a mean age of  $23.88 \pm 6.14$  years from 4 communities. Overall SGBV prevalence of 85.9% and 79.5% among rural and urban residents respectively was observed. This difference was statistically significant ( $\chi^2 = 5.416$ ;  $p = 0.020$ ). There were also statistically significant differences in the prevalence of physical violence (rural-67.3%, urban-58.9%;  $p = 0.018$ ), sexual violence (rural-72.6%, urban-64.9%;  $p = 0.023$ ), socio-economic violence (rural-52.7%, urban-44.9%;  $p = 0.033$ ) and violence due to harmful traditional practices (rural-39.6%, urban-23.2%;  $p < 0.001$ ).

**Conclusion:** SGBV prevalence was remarkably high in this region, but it was higher in rural dwellers compared to urban to their urban counterparts.

**Keywords:** *Sexual and Gender-based violence, domestic violence, Rivers State.*

### Introduction

Sexual and gender-based violence (SGBV) as well as gender-based violence (GBV) are words that are used interchangeably to represent one of the most serious human rights abuses that occur in most countries. GBV has been described as any act that causes or is likely to cause sexual, physical, or mental suffering or harm, such as threats, coercion, or arbitrary deprivation of liberty, whether in public or private life. The World Health Organization (WHO, 2011) defines sexual violence as "any sexual act, attempt to obtain a sexual act,

aggravated sexual pronouncements or advances, or acts to traffic, directed against a person's sexuality using coercion, by any person, irrespective of their connection to the victim, in any setting, including but not limited to home and work." The prevalence of sexual violence is high worldwide (Schwitters *et al.*, 2015; Aguirre *et al.*, 2020; Osuna-Rodriguez *et al.*, 2020; WHO, 2011). Sexual and gender-based violence (SGBV) is defined as any act committed against a person's consent that is based on gender norms and uneven power dynamics (UNHCR, 2022). Domestic violence, politically motivated violence, sexual harassment, intimate partner violence, and workplace violence are all examples of sexual and gender-based violence. According to global estimates, one in every three women has encountered at least one type of gender-based violence in their lifetime (Peitzmeier *et al.*, 2016; Ogum-Alangea *et al.*, 2020), with 35% of girls and women globally having endured physical or sexual abuse (Anca-Ruxandra *et al.*, 2019).

Although several studies on various types of SGBV have considered males as perpetrators of violence, this does not mean that men are not victims of SGBV. Men have been observed to bear the brunt of the negative repercussions of domestic violence (Oladebo *et al.*, 2011). Furthermore, an increasing number of men and boys are being harassed and subjected to psychological and physical violence at the hands of women (Malik & Nadda, 2019). It is estimated that 40 cases of SGBV include violence against males in every 100 cases, however, these are often under-reported (Shakil, 2016). As a result, while women are usually victims of SGBV, men are not fully immune.

SGBV has both immediate and long-term negative impacts on survivors' sexual, physical, and psychological health. Injuries, sexual and reproductive health difficulties such as unplanned pregnancies, abortions, sexually transmitted infections (STIs), unfavourable pregnancy outcomes, mental health disorders such as melancholy, anxiety, post-traumatic stress disorder, and suicides might all have a negative impact on victims (Beyene *et al.*, 2019).

Most nations regulate SGBV propagation by laws meant to combat this social evil, yet perpetrators of the problem have persisted owing to inadequate enforcement and various cultural beliefs and behaviours that promote SGBV by implicitly supporting SGBV (Coker & Richter, 1998). Theories such as the feminist theory, the patriarchal theory, loss of control theory, theory of mutual violence, culture of violence theory, resource theory, social learning theory, evolution theory, sociobiology theory and socio-ecological theory have been used to study and explain SGBV. However, neither of these theories comprehensively accounts for SGBV associated complexities (Brubaker, 2021).

Rural and urban groups have different cultural ideas and customs (Keller, 2012). As a result of disparities in education, employment opportunities, parity, and the number of children living with, and numerous polygamous marriage partnerships among inhabitants of different locations, the frequency of various kinds of SGBV may differ between rural and urban regions.

Therefore, this study aims to determine and compare the prevalence of sexual and gender-based violence in rural and urban communities in Rivers State, Nigeria.

## **Method and Materials**

### **Study design and Study site**

This cross-sectional survey was carried out in two rural and two urban communities in two Local Government Areas (LGAs) of Rivers State, Nigeria. The LGAs were Obio/Akpor and Emohua.

### **Ethical consideration**

Ethical approval was obtained from the ethics committee of the School of Graduate Studies, University of Port Harcourt, Rivers State (UNIPORT) (UPH/CEREMAD/REC/MM73/017). Administrative approval and community entry permission were obtained from various community leaders within the study areas. Written informed consent was obtained from all study participants after carefully explaining the study protocol and its significance. All materials used were de-identified by using randomly assigned research identifiers. The study participants were assured of the privacy and confidentiality of the information they provide.

### **Participants**

Residents between 15-35 years of age in Obio/Akpor and Emohua Local Government Areas were recruited for this study. Based on data from the 2006 census, Obio/Akpo LGA has a total population of 464,789 while Emohua LGA has a total population of 201,901. A sample size of 760 with 380 respondents per group was obtained using the sample size formula for comparison of two proportions with power set at 80%, alpha of 5% and previously reported prevalence of physical violence of 37.2% in rural and 23.5% in urban settings reported in South-eastern Nigeria (Ajah et al., 2014). Study participants were selected using a multistage sampling technique. Simple random sampling using a table of random numbers was used to select one urban and one rural LGA. The random numbers were generated from a sampling frame comprising the list of rural and urban LGAs in the state. Within the LGAs 2 wards were selected by simple random sampling using a sampling frame consisting of all wards within the respective LGAs. In each of the selected wards, a list of communities was drawn to form the sampling frame. Each community constituted a cluster. One cluster was selected per ward, making a total of four clusters. Hence, a total of four communities (two urban communities and two rural communities) were selected. In each of the sampled clusters, the list of households was enumerated. To attain a sample size of 380 youths in urban LGA and 380 youths in rural LGA, 190 households were sampled from each of the four selected communities. For households with more than one eligible youth balloting was used to select one eligible youth per household. A total of seven hundred and sixty (760) participants were recruited for this study, however, due to incomplete entries, 14 respondents dropped out. This represents a compliance rate of 98.2%.

### **Study instrument and Data collection**

An interviewer-administered semi-structured questionnaire adapted from the WHO Violence Against Women Instrument, developed for use in the WHO Multi-Country Study on Women's Health and Domestic Violence against Women was used to collect data in this study. The questionnaire was pretested with the same socio-demographic variables in different locations within the study LGAs. The pretesting was aimed at identifying flaws, removing irrelevant questions and revision questions accordingly. A double entry and random manual check were also used to ensure the validity of the data.

### Method Data Analysis

The data obtained were entered into an excel file and cleaned before exporting into the software, IBM Statistical Product and Service Solutions (SPSS) version 25 for analysis. Data were presented as frequencies and percentages. The differences in proportions between urban and rural were compared for statistical significance using the Chi-square test. Statistical significance was set at 0.05.

The prevalence was measured with at least one “yes” response to every question that made up each section of the questionnaire and a score of “one” was assigned while every “no” response was given a score of zero. A person is said to have experienced any form of sexual and gender-based violence if that person has a score of at least “one” in any of the sections.

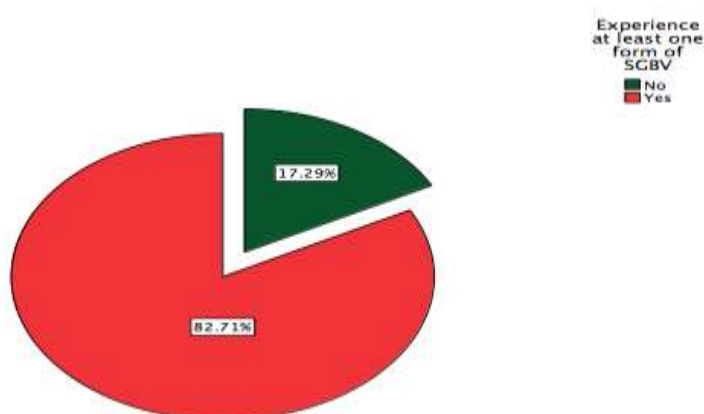
### Result

A total of 746 respondents comprising 343 (46%) males and 403 (54%) females aged 23.88±6.14 years were surveyed from 4 communities in Rivers State. Three hundred and seventy-six (376; 50.4%) of the respondents were surveyed from rural LGAs and 370 (49.6%) from urban LGAs. The preponderant religion, marital status and educational level among the study respondents were Christianity (90.9%), single (68.4%) and Secondary (57.0%) respectively. (Table 1).

**Table 1: Socio-demographic characteristics of respondents**

Variable	Frequency (n)	(n=746)	Percentage (%)
<b>Sex</b>			
Male	343		46.0
Female	403		54.0
<b>Age</b>			
Mean±SD (years)		23.88±6.14	
<b>Place of residence</b>			
Rural	376		50.4
Urban	370		49.6
<b>Religion</b>			
Christianity	678		90.9
Islam	41		5.5
Traditional religion	24		3.2
Others	3		0.4
<b>Marital status</b>			
Single	510		68.4
Co-habiting	62		8.3
Married	139		18.6
Separated	29		3.9
Divorced	4		0.5
Widowed	2		0.3
<b>Level of education</b>			
Non-formal	16		2.1
Primary	34		4.6
Secondary	425		57.0
Tertiary	271		36.3

At least one form of SGBV was reported in most (82.7%) of the study respondents (Figure 1).



**Figure 1: Prevalence of sexual and gender-based violence among study respondents**

There were 85.9% of rural respondents and 79.5% of urban respondents who had experienced at least one form of SGBV, and this difference was statistically significant ( $\chi^2=5.416$ ,  $p=0.020$ ). Also, 67.3% of respondents in rural areas had experienced at least one form of physical violence, as against 58.9% of respondents in urban areas who had experienced the same, and this was statistically significant ( $\chi^2=5.611$ ,  $p=0.018$ ). Experience of at least one form of sexual violence was reported in 72.6% of respondents in rural areas against 64.9% of respondents in urban areas, and this was statistically significant ( $\chi^2=5.204$ ,  $p=0.023$ ). The difference in the prevalence of 59.0% among respondents in a rural area and 56.8% of respondents in an urban area that had experienced at least a form of emotional/psychological violence was not statically significant ( $\chi^2=0.400$ ,  $p=0.527$ ). The difference in the prevalence of socio-economic violence in rural areas (52.7%) and urban areas (44.9%) was statistically significant ( $\chi^2=4.535$ ,  $p=0.033$ ). There was a statistically significant difference ( $\chi^2=23.201$ ,  $p<0.001$ ) in the prevalence of violence due to harmful traditional practices in rural areas (39.6%) compared to urban areas (23.2%). (Table 2).

**Table 2: Prevalence of self-reported experience of sexual and gender-based violence by study respondents**

	Place of residence (n=746)		$\chi^2$	p-value
	Rural (n=376) n (%)	Urban (n=370) n (%)		
The overall prevalence of SGBV	323 (85.9%)	294 (79.5%)	5.416	0.020*
Physical violence	253 (67.3%)	218 (58.9%)	5.611	0.018*
Sexual violence	273 (72.6%)	240 (64.9%)	5.204	0.023*
Emotional/psychological violence	222 (59.0%)	210 (56.8%)	0.400	0.527
Socio-economic violence	198 (52.7%)	166 (44.9%)	4.535	0.033*
Violence due to harmful traditional practices	149 (39.6%)	86 (23.2%)	23.201	<0.001*

\*Statistically significant at  $p<0.05$

### Discussion of Findings

The prevalence of SGBV, defined in this study as the experience of at least one physical violence, sexual violence, emotional/psychological violence, socio-economic violence or violence due to harmful traditional practices, was 82.7%. The SGBV prevalence of 82.7% observed in this present study is higher than previously reported studies conducted in Nigeria, Ethiopia and Uganda that observed SGBV prevalence ranging from 42.30 to 67.70%

(Yaynshet, 2007; Arnold *et al.*, 2008; Iliyasu *et al.*, 2011; Letta *et al.*, 2014, Umana *et al.*, 2014; Mullu *et al.*, 2015; Wandera *et al.*, 2017). This is indicative of a preponderance of SGBV among young adults (15 - 35 years) in Obio/Akpor and Emohua LGAs of Rivers state, Nigeria. Previous studies have attributed the increased prevalence of SGBV in various communities to cultural permissiveness that justifies men's physical aggression against women as well as the patriarchal mindset (Oladepo *et al.*, 2011). This present study, which involved both male and female youths indicate that the tendencies toward SGBV leave both men and women vulnerable to victimization in settings where they are considered minors. Our assumption aligns with the report of Nilsson *et al.* (2008) that minority clan status was associated with several forms of violence victimization and perpetration among men and women.

The higher prevalence of SGBV in this present study conducted in Rivers State, South-south Nigeria, compared to previous reports from Northern Nigeria (Iliyasu *et al.*, 2011) and South-western Nigeria (Umana *et al.*, 2014), and gives credence to the report of Oladepo *et al.* (2011) that South-south residents showed the highest odds of sexual violence compared to South-west, South-east, North-west and North-central residents. This could be an indication of permissive attitudes towards violence that tends to perpetuate violence in various forms including SGBV in the South-south region compared to other regions. Antia and Antia (2009) reported tolerance for intimate partner violence among women in the Niger Delta, which includes Rivers State, and then that of women from the rest of the country. The spate of continued violence and conflict in the Niger Delta may account partly for the observed permissiveness of residents of these regions to violence generally as well as SGBV thereby explaining the increased prevalence of SGBV observed in this present study.

Geography, culture and economy have been previously identified as major determinants of SGBV incidence as well as the impact of SGBV on its survivors (Cross *et al.*, 2020). These factors are also the major distinguishing features between rural and urban settings and may therefore imply differences in occurrence, experience and responses to SGBV among rural and urban residents. This present study found a significantly higher prevalence of SGBV in rural areas compared to urban areas. Our finding is consistent with previous studies where women resident in rural areas were reported to be more likely to have experienced higher rates of intimate partner violence (IPV) compared to women residing in urban areas (Cools & Kotsadam, 2017; Nabaggala *et al.*, 2021). Although our study is different regarding the sexes of the study respondents, there are similarities in our findings regarding rural and urban residences. This further buttresses the impact of rural or urban residence on SGBV prevalence irrespective of the sex of the respondent.

The prevalence of physical violence, sexual violence and violence due to harmful traditional practices were major contributors to the higher prevalence of SGBV in rural residents compared to urban residents in this present study. A Significantly higher prevalence of physical violence in rural residents compared to urban residents observed in this present study corroborates the report of Ajah *et al.* (2014) that physical violence was significantly reported more often by rural women than their urban counterparts. A higher prevalence of physical violence among rural residents compared to urban residents may be explained by the cultural perception that beating, slapping and other forms of physical violence are a form of punishment for erring members of the family particularly when they are minors.

It was previously posited that living in urban regions reduced the likelihood of experiencing sexual violence compared to living in rural regions (Murty *et al.*, 2003; Breiding *et al.*, 2005). This is in line with the observation of this present study. Similarly, in a study conducted in Bangladesh, women living in rural areas were reported to be exposed to sexual violence more frequently than those living in urban areas (Naved, 2013). A Togo-based study also determined that married women living in cities were less likely to experience sexual violence (Ragetlie *et al.*, 2020). The economic differences between the rural and urban areas may explain this result. A study by Alkan & Tekmanli (2021), concluded that poverty, which is prevalent more commonly in rural areas than urban areas, gives rise to domestic stress and therefore, paves the way for violence.

Urban development offers opportunities for access to social and economic resources, assets, corporate assistance and support that may not exist within rural settings. This exerts much pressure on the average urban resident who perceives the need to achieve socio-economic relevance or at the very least blend in socio-economically. There is therefore great competition within urban settings within the limited socioeconomic space, which therefore increases the risk of socio-economic violence within urban areas compared to rural areas. In this present study, the prevalence of socio-economic violence was expectedly higher among urban residents compared to rural residents. This indicates an underlying mounting socioeconomic pressure in urban areas that need to be tackled to douse the spate of socioeconomic violence in these regions.

Rural communities tend to be rigid in their approach to traditional practices compared to urban communities which tend to be more open and liberalized due to the various leanings of their residents and other external influences. This present study observed a higher prevalence of violence due to harmful traditional practices among rural residents compared to urban residents. This difference may be explained by the closed and controlled nature of rural communities compared to urban communities making these rural communities identify traditional practices as a cultural heritage that needs to be protected and passed on through several generations. This attitude may incline rural residents towards excusing and possibly protecting violence due to harmful traditional practices in a bid to ensure that tradition is upheld. This act, therefore, empowers the perpetrators of this form of SGBV leading to its propagation in rural communities compared to urban communities.

### **Conclusion**

In conclusion, there is a higher preponderance of SGBV among rural residents than among urban residents. Also, the overall SGBV prevalence in this region was remarkably high. There is a need to adopt necessary measures like increased enlightenment and advocacy as well as identification and punishment of perpetrators to curtail SGBV among youths in Rivers State, Nigeria.



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**Access to Quality Health Services among Elderly Persons Living in  
Rural Communities of Rivers State, Nigeria**

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**Abstract**

*The ageing of a given population is a common problem confronting many countries of the world-wide. This study examined access to quality health services among elderly persons in some rural communities of Rivers State, Nigeria using a cross sectional study. A total of one hundred and thirty questionnaires were administered to respond while one hundred copies were retrieved due to in appropriate filling. The research questionnaire was designed on a 5-structured scale namely: Always-4 Points, Sometimes-3 Points, often-2 Points, Rarely-1. The results of the study revealed that income dependence of access to quality healthcare among the elderly in the rural communities of Rivers State examined revealed that 24.00% are low-income earners, 33.00% medium income earners and 43.00% are high income earners access quality healthcare in the rural areas. It was observed that 31.00% accessed always, 17.00% accessed very often, 36.00% accessed sometimes while 16.00% rarely accessed quality healthcare in the study area. 27.00% respondents accessed quality healthcare in government hospitals, 25.00% in health Centre's and clinics, 39.00% in private clinics and 9.00% in unorthodox health facilities. 25.00% respondents accessed quality healthcare as professionals, 25.00% skilled, 39.00% semiskilled and 22.00% unskilled respondents had access to quality healthcare in the rural communities studied. The results of education dependence of access to quality healthcare among the elderly respondents examined revealed that 55.00% had primary education, 28.00% secondary education and 17.00% tertiary education. The results of the present study indicated that the healthcare givers of health services were 10.00% doctors, 15.00% nurses, 45.00% pharmacists and 30.00% herbalist in the rural communities examined. The respondents responded that the healthcare services were 22.00% said it was timely, 10.00% equitable, 42.00% integrated while 26.00% said that the quality of healthcare services rendered were efficient. Hence,*

*access to quality healthcare among elderly persons in rural areas of Rivers State Nigeria were poor. The research design used for this work is cross-sectional survey. Primary data was used to collect one hundred (100) questionnaires distributed to respondents of River's state Mean a, standard and Pearson correlation was used to analyze the data. Based on the hypotheses tested, the researcher finds, between income level and access to quality healthcare service to elderly in the hospitals examined, occupation and access to quality healthcare service to elderly in the hospitals examined. level of education and access to quality healthcare service to elderly in the hospitals examined. Based on the research findings, the researcher recommended that, Government should provide community geriatric services to rural communities as most of the elderly may not afford to come to the tertiary hospital as a clinic. Government and non-governmental organization should develop a welfare package for elderly clients.*

**Keywords:** Access, Quality, Healthcare, Elderly, Rural Community.

### **1.0 Introduction**

Health care systems around the world are to promote healthy ageing, to prevent and treat non-communicable diseases and chronic conditions; as well as to expand access to quality long-term and palliative care (WHO, 2018). The access and quality of health services for the elderly people is a great concern for humanity (Dassah *et al.*, 2018). Angela (2017) revealed that quality of health services is an optimal balance between possibilities realized and framework of norms and values. It is the degree to which health services for the individual increase the likelihood of desired health outcome and patient-centred care with current professional knowledge. Most developed countries have accepted the chronological age of 65years and above as a definition of elderly persons (World Health Organization, 2018). There is mobility impairment, reduced bone mineral density etc. thus accepted that the elderly ranges from 65 years and above (Brain, Nick, Stauart and Lan (2018).

Ageing as a progressive accumulation through life of random molecular defects that build up tissues and cell. The United Nations (2017) revealed that 60years and above will be referred as the older populations and it was further classified as young old 60years to 75years, middle old up to 85years and very old to over 85 years. The elderly commonly experience dual health burdens caused by communicable diseases such as malaria, HIV/AIDS, hepatitis, tuberculosis, influenzas, as well as non-communicable diseases as diabetes mellitus, cancer, cardiovascular diseases, chronic respiratory diseases, dementia etc. (WHO, 2018). The majority of the elderly patients are affected because most of them are retired, unemployed and dependent population (WHO, 2018). Contrarily, many elderly patients who can afford to pay their medical bills usually receive geriatric medical treatment trip abroad and related cost with the elderly between 65years and older being at the peak. The proportion of older persons aged 60 years and above make up 12.3% of the global population, and by 2050 that proportion will rise to almost 22%. Sub-Saharan Africa, which has the smallest proportion of elderly and which is ageing slower than the developed regions, is projected to see the absolute size of its older population grows by 2.3 times between 2000 and 2030 (UNDESA, 2015). People are living longer because of better nutrition, sanitation, health care, education, and economic well-being. An ageing population poses numerous social and economic challenges, but the right set of policies can equip society to address these challenges in time (Population Division of the United Nations Department of Economic and Social Affairs (United Nations Department of Economic and Social Affairs: Population Division [UNDESA], 2015).

The elderly of Nigeria like any other country in sub-Saharan African, is increasing rapidly. In Nigeria, those aged 65 years and above (the elderly) make up 3.1% or 5.9 million of the total population of 191 million, which in crude numbers represents an increase of 600,000 during the 5-year period 2012–2017 (Population Reference Bureau, 2012) (National Council on Ageing 2016). The rising numbers of the elderly in Nigeria are among others attributed to the crude mortality rate that is gradually decreasing (Adebowale, Atte, & Ayeni, 2012). Ageing in Nigeria is occurring against the background of socioeconomic hardship, widespread poverty, the HIV/AIDS epidemic, and the rapid transformation of the traditional extended family structure (Adebanjoko & Ugwuoke, 2014). Another cause for the increase in the older segment of the Nigerian population can be found in the declining fertility rate (although still one of the highest in Africa) that has continued to drop since the 1980s. In 2017, the total fertility rate registered at 5.5 compared with 6.8 in 1980 (Population Reference Bureau, 2017; United Nations Population Division & United Nations Statistical Division, 2015). Apart from the decline in fertility, improved health and sanitary conditions have also contributed to the rise in life expectancy. Ageing causes people to be less active, frail, and exposed to more risks of contracting a disease, leading to prejudice or discrimination against the elderly, social isolation, and, sometimes, abandonment (Tanyi *et al.*, 2018).

Access to health care remains a major problem, despite the adoption of universal healthcare coverage (UHC) by member countries of the World Health Organization (WHO) (Jacobs *et al.*, 2012). It has been observed that Nigeria lacks a functional national policy on the care and welfare of older persons. Also, the changing demographics in Nigeria, breakdown of the family structure and absence of a social security system, has posed peculiar challenges to the elderly in Nigeria (Tanyi *et al.*, 2018). Therefore, it is important to make quality health service accessible to the elderly in rural areas of Rivers State. Additionally, there is paucity of information on the access to quality health service in rural areas of Rivers State. It is on this gap in knowledge that this study was designed to examine access to quality of health services among elderly patient in rural areas of Rivers State.

## **2.0 Methodology**

The residents of the selected rural communities in Emohua, and Ikwerre Local Government Areas of Rivers State Nigeria were chosen for this study using a descriptive cross-sectional study design. The study used a random sampling technique in the data collection. It provides detailed information such as the well-being, income, demographic characteristics, employment status, and socioeconomic conditions of individuals. A total of one hundred and twenty questionnaires were administered to the respondents, out of which one hundred were retrieved after data collection. Data collected were analyzed using Statistical Package for Social Sciences (SPSS), Version 24.0. Demographic characteristics of respondents were analyzed using simple percentages while the relationship between access to quality health service and the elderly were analyzed using Pearson correlation coefficient

## **3.0 Results**

### **3.1.1 Distribution of Questionnaire**

A total of one hundred and thirty questionnaires were administered to respond while one hundred copies were retrieved due to in appropriate filling. This represents 76.92 percent response rate.

**Table 3.1: The Percentage Distribution and Collection of Questionnaires**

	Number of Respondents	Number of Questionnaire Administered	Number of Questionnaire Retrieved	Percentage Response (%)
1.	130	130	100	76.92

Source: *Field Survey (2022)*

### 3.2 Socio-demographic Characteristics of Respondents

**Table 3.2.1: Sex Distribution of Respondents**

Sex	No of Respondents	Percentage (%)
Male	55	55.00
Female	45	45.00
<b>Total</b>	<b>100</b>	<b>100</b>

Source: *Field Survey 2022*

From Table 3.1.1 above, 55.00% of the elderly respondents were male while 45.00% were female.

**Table 3.2.2: Age Distribution of Respondents**

Age in Years	No of Respondents	Percentage (%)
50-60	35	35.00
61-70	48	48.00
>71	17	17.00
<b>Total</b>	<b>100</b>	<b>100</b>

Source: *Field Survey 2022*

From Table 3.2 above, 35.00% of the elderly respondents were within the ages of 50-60 years. 48.00% were within 61-70 years while 17.00% were above 71 years.

**Table 3.2.3: Distribution of Respondents by Religion**

Marital Status	No of Respondents	Percentage (%)
Christian	80	80.00
Muslim	4	4.00
Traditional	16	16.00
<b>Total</b>	<b>100</b>	<b>100</b>

Source: *Field Survey 2022*

From Table 3.3 above, 80.00% respondents were Christians, 4.00% Muslims and 16.00% traditional worshippers.

**Table 3.2.4: Distribution of Respondents by Educational Status**

Marital Status	No of Respondents	Percentage (%)
Primary Education	50	50.00
Secondary Education	30	30.00
Tertiary Education	20	20.00
<b>Total</b>	<b>100</b>	<b>100</b>

Source: *Field Survey 2022*

From Table 3.2.4 above, 50.00% of respondents attained primary education, 30.00% attained secondary education while 20.00% attained tertiary education.

**Table 3.2.5: Distribution of Respondents by Occupational Status**

Marital Status	No of Respondents	Percentage (%)
Single	3	3.00
Married	58	58.00
Divorced	14	14.00
Widowed	25	25.00
<b>Total</b>	<b>100</b>	<b>100</b>

*Source: Field Survey 2022*

From Table 3.2.5 above, 3.00% of the respondents were single, 58.00% married, 14.00% divorced, 25.00% widowed.

**Table 3.2.6: Distribution of Respondents by Occupational Status**

Marital Status	No of Respondents	Percentage (%)
Farmer	45	45.00
Trader	25	25.00
Unemployed	20	20.00
Civil Servant	10	10.00
<b>Total</b>	<b>100</b>	<b>100</b>

*Source: Field Survey 2022*

Table 3.2.6 above revealed that 45.00% of respondents were farmers, 25.00 traders, 20.00% unemployed and 10.00% civil servants.

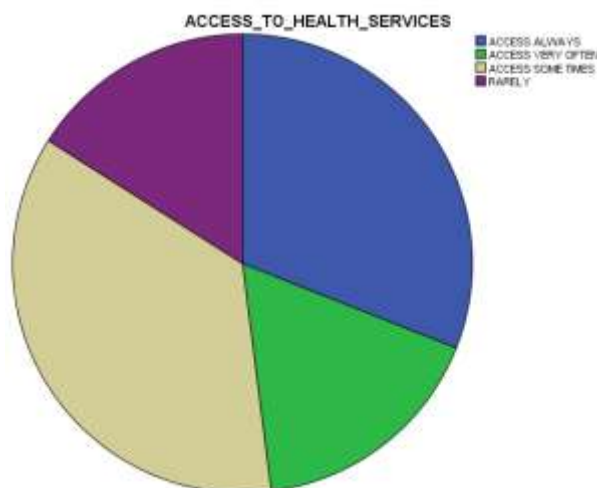
**3.1.1: Percentage Distribution of Access to Quality Healthcare Based on Income**

The results of income dependence of access to quality healthcare among the elderly in the rural communities of Rivers State examined revealed that 24.00% asserted that low income earners, 33.00% medium income earners and 43.00% asserted that high income earners access quality healthcare in the rural areas (Figure 3.1).

**Figure 3.1: Percentage Distribution of Access to Quality Healthcare Based on Income**

**3.1.2: Percentage Distribution of Level of Access to Quality Healthcare Based on Income**

It was observed that 31.00% accessed always, 17.00% accessed very often, 36.00% accessed sometimes while 16.00% rarely accessed quality healthcare in the study area (Figure 3.2).



**Figure 3.2: Percentage Distribution of Level of Access to Quality Healthcare Based on Income**



### 3.3: Percentage Distribution of Level of Access to Quality Healthcare Based on Occupation

It was noted that 25.00% respondents accessed quality healthcare as professionals, 25.00% skilled, 39.00% semiskilled and 22.00% unskilled respondents had access to quality healthcare in the rural communities studied (Figure 3.4).

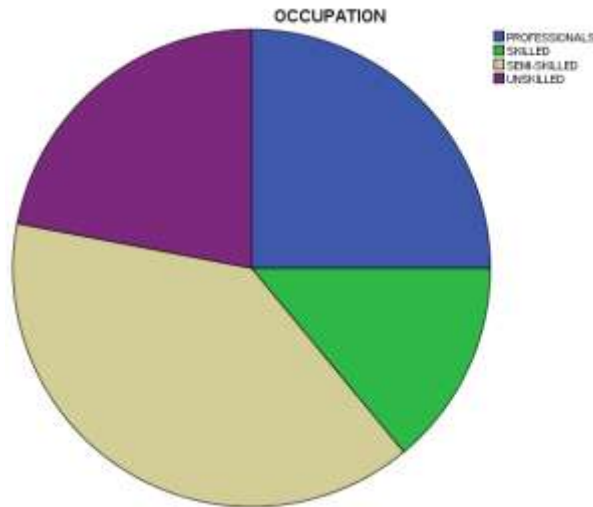


Figure 3.4: Percentage Distribution of Level of Access to Quality Healthcare Based on Occupation

### 3.1.5: Percentage Distribution of Level of Access to Quality Healthcare Based on Level of Education

The results of education dependence of access to quality healthcare among the elderly respondents examined revealed that 55.00% had primary education, 28.00% secondary education and 17.00% tertiary education (Figure 3.5).

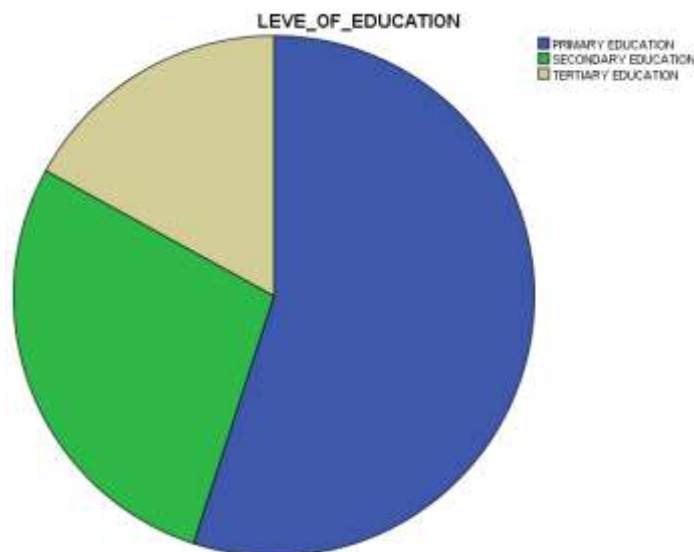


Figure 3. 5: Percentage Distribution of Level of Access to Quality Healthcare Based on Level of Education

**Hypothesis Testing:**

**Hypothesis One:** There is no significant relationship between income level and access to quality healthcare by the elderly patients examined.

To answer the above question and test the significance of the resultant hypothesis, the data gathered from the questionnaires on income level and access to quality healthcare delivery scores were subjected to Pearson Moment Correlation Statistics and the results is presented in Table 3.3.1 below:

**Table 3.3.1: Impact of Income Level on Access to Quality Healthcare Services**

Variables	N	R	r <sup>2</sup>	Sig.
Access to Quality Healthcare	100	.101 <sup>a</sup>	.010	.317 <sup>b</sup>
Income level				

\*\*Significance at 0.05 level of significance for a two test.

The results in Table 3.3.1 shows a correlation coefficient (r-value) of .101 and r<sup>2</sup> (Coefficient of determination) value of .010. The result is that there is a weak positive connection between the level of income and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was .317 which is greater than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was rejected. The result therefore was that there is significant relationship between income level and access to quality healthcare service to elderly in the hospitals examined.

**Hypothesis Two:** There is no significant relationship between occupation and access to quality healthcare by the elderly patients examined.

To answer the above question and test the significance of the resultant hypothesis, the data gathered from the questionnaires on occupation on access to quality healthcare delivery scores were subjected to Pearson Moment Correlation Statistics and the results is presented in Table 3.3.2 below:

**Table 3.3.2: Impact of Occupation Level on Access to Quality Healthcare Services**

Variables	N	r	r <sup>2</sup>	Sig.
Access to Quality Healthcare	100	.164 <sup>a</sup>	.027	.103 <sup>b</sup>
Income level				

\*\*Significance at 0.05 level of significance for a two test.

The results in Table 3.3.1 shows a correlation coefficient (r-value) of .164<sup>a</sup> and r<sup>2</sup> (Coefficient of determination) value of .027. The result is that there is a weak positive connection between the occupation and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was .103 which is greater than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was rejected. The result therefore was that there is significant relationship between occupation and access to quality healthcare service to elderly in the hospitals examined.

**Hypothesis Three:** There is no significant relationship between level of education and access to quality healthcare by the elderly patients examined.

To answer the above question and test the significance of the resultant hypothesis, the data gathered from the questionnaires on level of education and access to quality healthcare delivery scores were subjected to Pearson Moment Correlation Statistics and the results is presented in Table 3.3.3 below:

**Table 3.3.3: Impact of Level of Education and Access to Quality Healthcare Services**

Variables	N	r	r <sup>2</sup>	Sig.
Access to Quality Healthcare	100	.473 <sup>a</sup>	.223	.000 <sup>b</sup>
Income level				

\*\*Significance at 0.05 level of significance for a two test.

The results in Table 3.3.1 shows a correlation coefficient (r-value) of .473<sup>a</sup> and r<sup>2</sup> (Coefficient of determination) value of .223. The result is that there is a moderate positive connection between the level of education and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was 0.000 which is less than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was accepted. The result therefore was that there is no significant relationship between level of education and access to quality healthcare service to elderly in the hospitals examined.

#### 4.4 Discussion

The result is that there is a moderate positive connection between the level of education and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was 0.000 which is less than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was accepted. The result is that there is a weak positive connection between the occupation and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was .103 which is greater than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was rejected. The result therefore was that there is significant relationship between occupation and access to quality healthcare service to elderly in the hospitals examined. The result is that there is a weak positive connection between the level of income and access to quality healthcare services to elderly in the hospitals examined. Furthermore, since the significance value of r was .317 which is greater than the chosen (0.05) level of significance, for a two-tailed test, the null hypothesis was rejected

#### Conclusion

The present study revealed that access to quality healthcare among elderly persons in rural areas of Rivers State Nigeria were poor. Few doctors and nurses were the major professional healthcare service delivers encountered while a lager populace examined resorted to herbal interventions. Income level and level of education of the respondents also affected the level of access to quality healthcare among the elderly persons examined.

## Recommendations

Gratuity and pension benefit should be provided to the elderly to boost their income as to pay their medical bills and medications.

1. Government should provide community geriatric services to rural communities as most of the elderly may not afford to come to the tertiary hospital as a clinic.
2. Strengthen the training on geriatric by building up curriculum in the universities and colleges on undertaking courses on gerontology.
3. Provide finance on research towards geriatric medicine.
4. Promote the culture systems and practices that reduce harm and hardship on elderly clients.
5. Emphasis on designing of models of care to meet the needs of elderly clients.
6. Government and non-governmental organization should develop a welfare package for elderly clients

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# Assessment of Knowledge and Adherence to Antenatal Care Documentation Guideline among Midwives in Selected Hospitals in Umuahia, Abia State

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## Abstract

*Antenatal care is comprehensive health supervision of pregnant women from conception to birth by midwives. For efficient documentation of antenatal care, the WHO (World Health Organization) recommended a standard guideline for unified ANC documentation. Inadequate adherence to ANC documentation guidelines results in poor birth outcomes. This study is aimed to assess knowledge and adherence to ANC documentation guidelines among midwives in selected hospitals in Umuahia. A descriptive cross-sectional research design and multistage random sampling technique were used for the study. A sample size of 206 participants was determined using Taro Yamane's formula. The instrument for data collection includes a structured questionnaire and a standard checklist: Pearson Correlation was used to test the formulated hypothesis, while data analysis was done with IBM SPSS version 21. About 97% of the participants are knowledgeable about ANC documentation guidelines, less than 50% of their documentation used the ANC guidelines, and about 25% adhered to the use of ANC documentation guidelines. There was low adherence to antenatal care documentation guidelines despite the midwives having a good knowledge of it. Also, factors like time, inadequate manpower and lack of documentation tools affected the documentation. Adequate training, provision of tools for proper documentation and employment of more midwives are essential to promote adherence to ANC documentation guidelines.*

**Keywords:** *Antenatal Care, Midwives, documentation, Knowledge, adherence.*

## 1. Introduction

The task of midwives to gravid mothers/would-be parents includes providing medical assessments, health, educating them on pregnancy and pregnancy-related issues, labour/delivery, postpartum care and offering social/ psychological support and teaching them about general health issues (Finnbogadóttir et al. 2020). Generally, these duties are essential for enhancing three different aspects: the overall well-being of the child, that of their parents/family and the health of the society at large. Inadequate or incomplete recording cannot be used as evidence that care was given. Documentation is key for effective and quality health care services. Adequate recording provides evidence that care was rendered. There is a saying in Nursing practice that "care not documented was not given" (Marinič 2015). Documentation is an essential tool in Nursing care and becomes an integral part of clinical records, it is synonymous with Nursing and Midwifery practice as it improves quality as well as enhances continuity of care (Mutshatshi et al. 2018). A document is a resource that issues formal details or proof that works as a record. It can also be referred to as a material for communication of information that is used to narrate, clarify, and educate in relating to various characteristics of a thing, organization, program or policy. Generally, documentation is presenting or validating information either as hard copy, soft copy, or as parallel or electronic media like sound record tapes, compact discs etc. Nursing documentation is, therefore, the act of writing down important information about patient care on a client record instrument which may be done either manually or electronically. All documented records of health care services by Nurses can be used as a professional and/ or a legal working tool.

Good record keeping ensures the provision of quality health care services, minimizes harm to clients and reduces cases of litigation. Documentation is very essential in healthcare systems as it ensures consent approval and expectations serve as a decision-making tool in healthcare practice by explaining the responses of both client and care provider. It also promotes continuity in patient care and increases collective knowledge of everyone involved in client care; as well as partnering alongside various employees within the health care facility. Good documentation practices follow standard guidelines which can be modified based on different institutional policies and programs.

Generally, guidelines for documentation consist of an explanation of the basis for certain discovery/detection, assessment techniques, course of action, inquiry/inspection, occasion of execution/management, Observation, distinct outcome, and professional description. In health, documentation looks at taking information about assessment, outcomes, re-assessment process (where applicable), risks, complications and changes. Nursing documentation follows a specific guideline which has five components which include: assessment, diagnosis, planning, implementation and evaluation (Davidson, 2022). Specific guidelines for midwifery documentation include Personal information such as name, age, sex, address occupation, educational level etc. Parity: includes dates of last menstrual period, expected date of delivery, number of previous, pregnancies, live babies, abortions etc. (Langtree and Wood, 2022). Clinical data such as height, weight and vital signs measurement, physical examination: inspection, palpation, auscultation, percussion, Routine investigations e.g., urinalysis, blood check. Some of the characteristics of good documentation are: recorded information must all be relevant, legible, signed and dated, records must be accurate, continuous and kept up to date, and they must be written in plain language for better understanding (jargon should be avoided). Good record keeping protects the program, institution, client and provider. Documentation promotes good health outcomes and improves providers' knowledge and patients' satisfaction.

Moreover, inadequate documentation does not only compromise client care services but also exposes the healthcare provider to several forms of litigation processes which are caused by the bridge in communication that arises from insufficient or inadequate documentation (Marinič 2015). The Nigerian Nursing and Midwifery Council Rules and Regulation iR387 regarding the Acts and Omissions demand that a nurse should maintain understandable and correct accounts of all professional procedures carried out on patients at every given point in time; and if he/she fails to do so, will be charged for an act of professional misconduct. Mathioudakis et al. (2016) observed that inadequate reporting of nursing activities is caused by extended hospitalization of the patients' which also multiplies the rate of deaths of patients. Therefore, low adherence to documentation practices in the nursing profession constitutes a gap in communication and continuity of care among members of the health care team. Insufficient antenatal care documentation removes the patient from the centre of care focus not but grows the risks of litigation and obstructs the process of following up on professional care decision resolutions as well as aborting the purpose of care being rendered to patients. Regardless of all the attempts made by nurse managers to enhance antenatal care documentation, poor reporting practices have become a worldwide problem in government-owned institutions that has regularly been revealed in evidenced based studies carried out by various nurse researchers (Okaisu et al. 2014). Prompt and absolute devotion by health care providers to the agreement of using the recommended guidelines during the first ANC visit was proved to have enhanced the rate of pregnant women's feeling of fulfilment, increase their inspiration to take part in future review antenatal visits, promote the chances of hospital

delivery, with enhanced delivery results (Ejigu Tafere et al. 2018). However, the percentage of patients whose health care providers are wholly devoted to the recommended guidelines at the first ANC visit has been observed to be insufficient low (Bintabara et al. 2019). Many components give rise to the insufficient level of adherence to prenatal care documentation that was planned exclusively for the care of pregnant women that presented no proof of past, present or future obstetric emergencies, clinical problems or other serious issues that are connected to their general wellbeing. In case there is a need to administer care to pregnant mothers with any of the aforementioned health issues, the primary care providers should consider adopting the already accepted policy existing in their institution of care.

Health institutions without established procedures for pregnant mothers with related complications or that wish to update their existing ones should use the WHO Reproductive Health manual. The WHO manual on FANC allows periodic updates to incorporate all relevant research-based information which evolves from different related studies (Akpanah 2011). This approach also helps by reaching women at the threshold of safe motherhood.

Recent observations have shown cases of litigations by patients/relations who were not satisfied with the care received. Nurses/midwives have been implicated in most of these litigations, as a result, either of lack of or poor documentation or not documenting based on hospitals/agencies' guidelines. These problems of documentation may have occurred due to the placement of unskilled and unknowledgeable midwives at the centre of care (for political reasons), lack of materials to record services provided and shortage of manpower. Therefore, the researcher intends to carry out a study to assess adherence to antenatal care documentation guidelines among midwives in selected hospitals in Umuahia, Abia State.

## **2. Methodology**

### **2.1. Study Design**

A descriptive cross-sectional research design was used for the study. This decision intends to examine data from the larger population in a natural setting (Elendu and Umeakuka 2010).

### **2.2. Study Area**

The area of study comprised 4 selected hospitals in Umuahia, Abia state including, Mercy Specialist Hospital, Madonna Catholic Hospital/Diagnostic Centre, Abia Specialist Hospital, Amachara General hospital. Mercy Specialist Hospital is located along Ahiaeke Ndume by Ikot Ekpene Road,,Umuahia North Local Government Area. Abia Specialist Hospital and Madonna Catholic Hospital/Diagnostic Centre are both located along Aba Road, Umuahia North local government area. Amachara General Hospital is located along Umuokpara Road, Umuahia South LGA.

These Hospitals provide specialist maternity services to women from Abia state and its environs alongside Federal Medical Centre, Umuahia. These hospitals receive patients who present themselves voluntarily for care and those who were referred from other local and private hospitals.

### **2.3. Population for the Study**

The population of the study comprises 425 registered midwives practicing or working in the four selected hospitals in Umuahia, Abia State.



### 2.3.1. Inclusion Criteria

- Midwives working in the four selected hospitals in Umuahia.
- Midwives who are working in antenatal clinics, antenatal wards and labour wards during the study at each of the selected hospitals.
- Midwives are willing to participate in the study.

### 2.3.2. Exclusion Criteria

- Midwives who will not consent to participate in the study
- Midwives who do not work in hospitals.

## 2.4. Sampling and sampling technique

A multistage random sampling technique was employed in this study. Firstly, four hospitals in Umuahia, Abia State were selected for the study using a stratified random sampling technique (two government and two private hospitals). While 206 midwives were purposively chosen from the selected hospitals based on the capacity of the facility, staff strength (number of attending midwives) and number of pregnant women they see on each clinic day. Finally, the midwives were randomly selected from each of these four hospitals.

The sample size was determined using Taro Yamane's formula  $n = N \div (1 + N(e)^2)$  (Yamane 1973), 2.5. *Nature /Sources of Data.*

Primary data was collected directly from the 206 participants with the aid of a self-administered questionnaire, and a checklist to assess 20 clients' ANC folders/charts in each of the selected hospitals. Secondary data was gotten from existing literature such as books, journals, periodicals, articles etc.

## 2.6. Method of Data collection/ Instrument

The instrument for data collection was a self-administered structured questionnaire and a checklist. The structured questionnaire was designed to elicit information on the knowledge and practice of antenatal care (ANC) documentation guidelines among midwives in selected government-approved hospitals in Umuahia, Abia State.

The structured questionnaire was self-administered by the researcher and her research assistants on the midwives in Umuahia, while the checklist was used to assess adherence to documentation guidelines in these hospitals. The research assistants were trained on how to approach respondents; the objectives of the study and how to collate filled instrument which was collected on the spot for onward sorting and analysis.

**NOTE:** Knowledge of ANC documentation guidelines:

The knowledge grade was gotten by assigning a score of one (1) to all correct knowledge questions and a score of zero (0) to incorrect knowledge questions. The sum of all the questions was obtained and converted to a percentage with the school grading system (0-39 for poor knowledge, 40-69 for fair knowledge and 70-100 for good knowledge) used to grade the knowledge of the respondents.

### **Adherence to ANC documentation guidelines using checklist:**

This was done by selecting twenty folders from each of the selected hospitals, and scoring them using the checklist based on their documentation of items on each of the five components/contents of ANC documentation guideline. The components were scored as follows:

S/NO	Content	Total Score
1	History taking	80
2	Physical examination	40
3	Laboratory investigation	20
4	Interventions	20
5	Micro- Birth planning and counselling	40
<b>Grand Total</b>		<b>200</b>

The adherence was classified thus: a score less than 100 represented non-adherences, while scores of 100 and above-represented adherence.

### 2.7. Validity/Reliability of Instrument

In other to test the reliability of the instrument, a sample size of 20 midwives (these form about 10% of the study sample) working outside the four selected hospitals in Umuahia was studied using the test-retest method.

The instrument was validated by the researcher's supervisor and two other specialists in the department for face and content validity. Corrections were pointed out made before their final use. 2.8. Data analysis.

#### 2.8.1. Method of Data Analysis

IBMiSPSS version 21 was used to analyze the data generated from this study. SPSS is computer software used in analyzing data because it eases the rigor of ambiguous mathematical calculations and the time spent in the calculation. Data were arranged in tables and Descriptive Statistics (Frequency, percentage, the mean and standard deviation used for all the objectives, while Pearson correlation was used to test the hypothesis with significance judged at 0.05 alpha level.

### 2.9. Ethical Considerations

Written permission was first obtained from the ethical board of the institution of study by the researcher and a letter of introduction was sent to the management of the selected hospitals in Umuahia, Abia State.

## 3. Results

### 3.1. Analysis of results

#### 3.1.1. Background information of respondents

Table 1 Background information of the respondents

Item	Frequency	Percentage
Gender		
Male	10	4.9
Female	196	95.1
Total	206	100
	168	

Age in years 20-29	40	19.4
30-39	123	59.7
40-49	28	13.6
50 and above	15	7.3
Total	206	100
Marital Status Single	35	17.0
Married	152	73.8
Divorced	10	4.9
Widowed	9	4.4
Total	206	100
Educational Qualification		
RM	5	2.4
RN/RM	73	35.4
BNSc	118	57.3
Post-graduate degree	10	4.9
Total	206	100
Work experience in years 1-10	117	56.8
11-20	74	35.9
21-30	15	7.3
Total	206	100

Table 1 presents the background information of the respondents studied. The result showed that the majority (95.1%) of the respondents were females while a few (4.9%) of them were males. More than half (59.7%) of the respondents were between 30-39 years while a few (7.3%) of them were 50 years and above. Many (73.8%) of the respondents were married while few (4.9% and 4.4%) were divorced and widowed respectively. Over fifty-seven per cent (57.3%) of the respondents had postgraduate degrees while a few (2.4%) of them were registered midwives (RM). More than half (56.8%) of the respondents had between 1-10 years of work experience among them while a few (7.3%) of the respondents 21-30 years of work experience among them. *3.1.2. Level of knowledge of ANC documentation guidelines*

Table 2: Knowledge grade of ANC documentation guideline

Knowledge grade	Frequency	Percentage
Fair	10	4.9
Good	196	95.1
Total	206	100

The knowledge grade of ANC documentation guidelines of the respondents is presented in Table 2 above. Findings show that a vast majority (95.1%) of the respondents had a good level of knowledge of ANC documentation guidelines while very few (4.9%) of them had a fair level of knowledge of ANC documentation guidelines.

The response to knowledge questions by the respondents is presented in Table 3 and 4. Over ninety per cent (97.6%) of the respondents were aware of the ANC documentation guide and the importance of ANC documentation guidelines respectively, while a few (2.4%) of them were not aware of the guideline or the importance of the guideline. Facility or elsewhere were the source of ANC documentation guidelines reported by the majority (92.7%) of the respondents while the majority (93.2%) of them know that the ANC documentation guideline contains 5 sections only. Also, the majority (95.1%) of the respondents know that place of residence is a major question at the first visit while many (80.1%) of the respondents also know that detailed history, physical assessment and existing health problems are information to be documented. All (100%) of the respondents know that laboratory investigations carried out are to be documented.

Table 3 Responses to knowledge questions by the respondents

Item	Frequency	Percentage
Awareness of ANC documentation guide		
No	5	2.4
Yes	201	97.6
<b>Total</b>	<b>206</b>	<b>100</b>
Facility or elsewhere as a source of ANC documentation guideline		
No	15	7.3
Yes	191	92.7
<b>Total</b>	<b>206</b>	<b>100</b>
Knowledge of importance of ANC documentation guideline		
No	5	2.4
Yes	201	97.6
<b>Total</b>	<b>206</b>	<b>100</b>
ANC guideline contains 5 sections only		
No	14	6.8
Yes	192	93.2

<b>Total</b>	<b>206</b>	<b>100</b>
Place of residence is a major question on the first visit		
No	10	4.9
Yes	196	95.1
<b>Total</b>	<b>206</b>	<b>100</b>
Detailed history, physical assessment and existing health problems are information to be documented		
No	41	19.9
Yes	165	80.1
Total	206	100
Laboratory investigations carried out are to be documented		
<b>Yes</b>	<b>206</b>	<b>100</b>

The majority (97.6%) of the respondents know that nutritional assessment and education form part of the documentation guideline while the majority (95.1%) of the respondents know that family planning counselling is an integral part of ANC documentation guideline. Many (83%) of the respondents know that only trained midwives effectively use ANC documentation guidelines while some (17%) had the wrong knowledge.

**Table 4 Responses to knowledge questions by the respondents' Contd.**

Item	Frequency	Percentage
Nutritional assessment and education form part of the documentation Guideline		
No	5	2.4
Yes	201	97.6
Total	206	100
Family planning counselling is an integral part of ANC documentation Guidelines		
No	10	4.9
Yes	196	95.1
Total	206	100

Only trained midwives effectively use ANC documentation guidelines

No	35	17.0
Yes	171	83.0
<b>Total</b>	<b>206</b>	<b>100</b>

Majority (97.6%) of the respondents know that nutritional assessment and education form part of documentation guideline while majority (95.1%) of the respondents know that family planning counseling is an integral part of ANC documentation guideline. Many (83%) of the respondents know that only trained midwives effectively use ANC documentation guidelines while some (17%) had the wrong knowledge.

#### 4.33.1. Adherence to ANC Documentation guidelines Among Respondents

Table 5 and 6. Many (71.4%) of the respondents always adhere to ANC documentation guidelines, while a few (7.3%) do not adhere to the ANC documentation guideline while on duty. More than half (68%) of respondents reported that their facility organizes training and retraining on ANC documentation guidelines. In contrast, few (6.8% and 4.9%) reported that their facility rarely and never, organizes training and retraining on ANC documentation guidelines. Many (68.4%) of the respondents always use ANC documentation guidelines on all pregnant women in their facility, while few (7.3%) never use ANC documentation guidelines on all pregnant women there. Most (95.1%) of the respondents always document all the sections on the guideline for each pregnant woman, while a few (4.9%) sometimes document all the sections for each pregnant woman. Most (81.1%) of the respondents always report on the spot, while a few 2.4% and 4.9% rarely and never report on the spot. Also, most (86.9%) of the respondents always wait for a convenient time to report, while a few (5.8%) of the respondents rarely wait for a convenient time to report. Recast the presentation of result

**Table 5 ANC Documentation Practices among respondents.**

Item	Frequency	Percentage
Use ANC documentation guidelines while on duty		
Always	147	71.4
Sometimes	44	21.4
Never	15	7.3
<b>Total</b>	<b>206</b>	<b>100</b>
Facility organizes training and retraining on ANC documentation Guideline		
Always	140	68.0
Sometimes	42	20.4

Rarely	14	6.8
Never	10	4.9
<b>Total</b>	<b>206</b>	<b>100</b>
<hr/>		
Use ANC documentation on all pregnant women in the facility		
Always	141	68.4
Sometimes	50	24.3
Never	15	7.3
<b>Total</b>	<b>206</b>	<b>100</b>
<hr/>		
Document all the sections on the guideline for each pregnant woman		
Always	196	95.1
Sometimes	10	4.9
Total	206	100
Report on the spot		
Always	167	81.1
Sometimes	24	11.7
Rarely	5	2.4
Never	10	4.9
<b>Total</b>	<b>206</b>	<b>100</b>
<hr/>		
Wait for a convenient time to report		
Always	179	86.9
Sometimes	15	7.3
Rarely	12	5.8
<b>Total</b>	<b>206</b>	<b>100</b>

Many (70.4%) of the respondents always record all patients' information in a single book/register whereas a few (12.1% and 8.3%) of them respectively, rarely and never record all patients' information in a single book/register. Some (29.1%) of the respondents always document only risk factors while some (27.2% and 19.9%) of the respondents respectively, rarely and never document only risk factors. Majority (92.7%) of the respondents always make sure reports are clear, concise and eligible while a few (7.3%) of the respondents sometimes make sure reports are clear, concise and eligible. Majority (80.6%) of the respondents always patiently collect data from each client while 2.4% of them rarely patiently collect data from each client. More than half (58.3%) of the respondents reported that

evaluation of documented ANC is always done by supervising midwives in the facility while few (2.4%) of them reported that evaluation of documented ANC is rarely done by supervising midwives in the facility.

**Table 6 ANC Documentation Practices**

Item	Frequency	Percentage
Record all patient's information in a single book/register		
Always	145	70.4
Sometimes	19	9.2
Rarely	25	12.1
Never	17	8.3
<b>Total</b>	<b>206</b>	<b>100</b>
Document only risk factors		
Always	60	29.1
Sometimes	49	23.8
Rarely	56	27.2
Never	41	19.9
<b>Total</b>	<b>206</b>	<b>100</b>
Make sure reports are clear, concise and eligible		
Always	191	92.7
Sometimes	15	7.3
<b>Total</b>	<b>206</b>	<b>100</b>
Patently collect data from each client		
Always	166	80.6
Sometimes	35	17.0
Rarely	5	2.4
<b>Total</b>	<b>206</b>	<b>100</b>
Evaluation of documented ANC is done by supervising midw in theives facility	120	58.3
Always		
Sometimes	81	39.3
Rarely	5	2.4
<b>Total</b>	<b>206</b>	<b>100</b>

### 3.1.4 Extent of adherence to ANC documentation guideline

Table 7 below shows the adherence to ANC documentation guidelines using checklist. The result showed that a greater number, (75%) of the selected hospitals using the checklist had low adherence to the ANC documentation guideline, while only a few, (25%) had medium adherence.

**Table 7 Adherence to ANC documentation guidelines using a checklist.**

Item	Frequency	Percentage
Low (Score less than 100)	3	75.0
Medium (Score 100-150)	1	25.0
Total	4	100

Table 7 above shows the adherence to ANC documentation guidelines using a checklist. The result revealed that majority (75%) of the selected hospitals using the checklist had low adherence scores (score less than 100) while a few (25%) of them had medium adherence to the ANC documentation guideline (Figure 1).



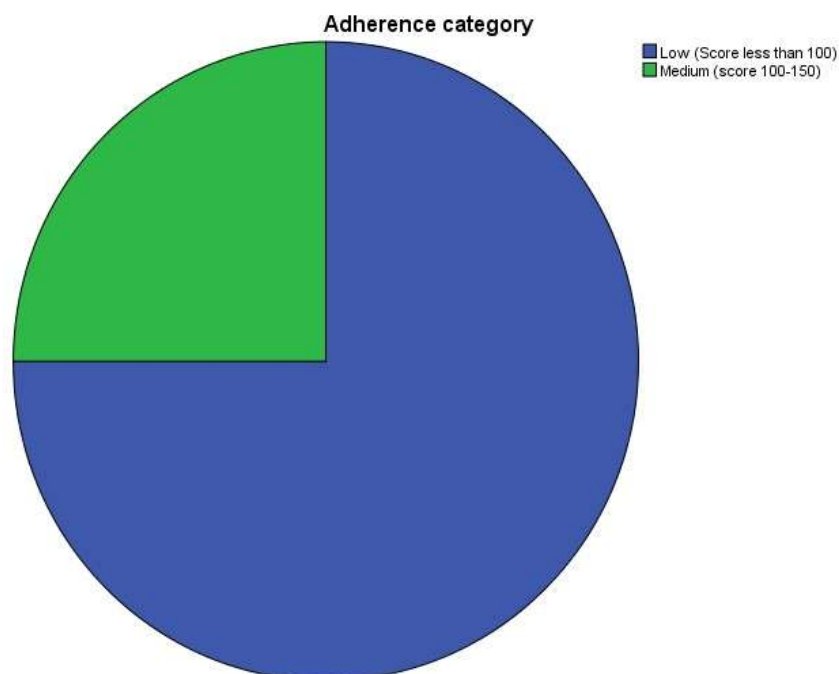


Figure 1 Pie chart of adherence to ANC documentation guideline.

### 3.1.5. Factors affecting Adherence to ANC documentation guidelines

Table 8 factors that affect adherence to ANC documentation guidelines

Item	Frequency	Percentage	Mean ± Std. Dev.
Adequate number of midwives to take care of Clients			3.16±0.79
Strongly agree	6	2.9	
Agree	33	16.0	
Disagree	90	43.7	
Strongly Disagree	77	37.4	
Total	206	100	
Only certified midwives attend to pregnant women in facility			3.48±0.69
Strongly agree	1	0.5	
Agree	20	9.7	
Disagree	64	31.1	
Strongly Disagree	121	58.7	
Total	206	100	
Clients unwillingly give correct health information			3.16±0.69
Strongly Agree	1	.5	
Agree	32	15.5	
Disagree	107	51.9	
Strongly Disagree	66	32.0	
Total	206	100	

Clients' cultural beliefs and practices are considered during ANC services		3.58±0.65
Strongly Agree	6	2.9
Disagree	68	33.0
Strongly Disagree	132	64.1
<b>Total</b>	<b>206</b>	<b>100</b>
Inadequate history is taken and documented during the booking		3.96±0.26
Strongly Disagree	1	.5
Agree	5	2.4
Strongly agree	200	97.1
<b>Total</b>	<b>206</b>	<b>100</b>

The factors that affect adherence to ANC documentation guidelines were presented in Table 9 below. The result revealed that the number of midwives was inadequate to take care of clients, both certified midwives and other nurses who are not certified midwives do attend to pregnant women in the facility, Clients unwillingly give correct health information, and Clients' cultural beliefs and practices are considered during ANC services, and inadequate history is taking and documented during booking were among factor reported by a combined 81.1%, 89.8%, 83.9%, 97.1% and 99.5% of the respondents respectively.

**Table 9 Factors affecting adherence to ANC documentation guidelines.**

Item	Frequency	Percentage	Mean ± Std. Dev.
Documentation of client history is time-consuming			3.29±0.73
Strongly disagree	11	5.3	
Agree	114	55.3	
Strongly agree	81	39.3	
<b>Total</b>	<b>206</b>	<b>100</b>	
Use a partograph to monitor labour			3.94±0.30
Strongly disagree	1	0.5	
Agree	10	4.9	
Strongly agree	195	94.7	
<b>Total</b>	<b>206</b>	<b>100</b>	
Patient's vital signs are monitored and recorded in charts accordingly			3.91±0.40
Strongly disagree	1	0.5	
Disagree	5	2.4	
Agree	5	2.4	
Strongly agree	195	94.7	

<b>Total</b>	<b>206</b>	<b>100</b>
Doppler foetal monitor is readily available for use in facility		3.50±0.74
Strongly disagree	1	0.5
Disagree	131	63.6
Agree	47	22.8
Strongly agree	27	13.1
<b>Total</b>	<b>206</b>	<b>100</b>
Have adequate writing materials for documentation in facility		3.66±0.67
Strongly disagree	6	2.9
Disagree	152	73.8
Agree	43	20.9
Strongly agree	5	2.4
<b>Total</b>	<b>206</b>	<b>100</b>

Other factors reported by the respondents included that documentation of client history was timeconsuming (94.6%), Use of partograph to monitor labour (64.1%), Patients' vital signs are monitored and recorded in their charts accordingly (97.1%), Doppler fetal monitor is not readily available for use in the facility (86.4%), Have inadequate writing materials for documentation in the facility (76.7%).

### 3.1.6 Relationship between knowledge and adherence to ANC documentation guidelines

Table 10: Relationship between knowledge and adherence to ANC documentation guidelines

Item		Adherence to ANC documentation guideline
Knowledge question score	Pearson Correlation	0.771
	Sig. (2-tailed)	0.23
	N	4

Table 10 shows the relationship between knowledge and adherence to ANC documentation guidelines among midwives in the selected hospitals. The result revealed that there is no statistically significant relationship (R= 0.77; P= 0.23), between the knowledge of the midwives on ANC documentation guideline and their adherence to ANC documentation guidelines.

## 4. Discussion

### 4.1. Respondents to background information

The study revealed that the age of the respondents was between 30-39 years. This conforms to the estimated average age of the Nursing and Midwifery workforce in Nigeria which is

said to be between 30-40 years. The promotion of nursing and midwifery training has resulted in a large number of young nurses and midwives joining the workforce. Even though this provides a strong and energetic workforce, experience and quality of service delivery could be affected (Barathi and Prashanthi 2020). This means that these midwives who fall between this age bracket may be practicing with inadequate experience and training in prenatal care. However, this was opposed to the findings of (Abd Elmoneim and Kuppaswamy 2014), which showed that the most common age range of practicing midwives was between 40-49 years; which may mean that this age range had better experience and skills because they have been practicing midwifery for more years than those in this study. Majority of the respondents were females (95.1%) as compared to men (4.9%). These findings could be linked to the history of nursing/midwifery which is traditionally credited as a female-dominated profession (Asamani et al. 2014). This was also supported by the study by (Sama et al. 2017) which observed that a greater number of midwives are females. Nevertheless, the recent influx of male nurses/ midwives is gradually changing the gender ratio in the profession. Also, the study established that most of the respondents were postgraduate nurses who have had between 1-10 years of work experience. The educational level and years of experience of nurses and midwives have been observed to affect the quality of care they render to clients at the unit/ward levels (Seidu et al. 2021). This corresponds to the findings of (Bazirete et al. 2017) which state that midwives' years of professional experience and training is a likely element in enhancing the proper use of partogram in the management of labour and delivery.

#### **4.2. Knowledge of ANC documentation guidelines**

The study showed that a vast majority of the respondents (95.1%) had a good level of knowledge of ANC documentation guidelines. Over 97.6% of the midwives were aware of ANC documentation guidelines and their importance. This means that midwives are knowledgeable and well acquainted with ANC documentation guidelines. This criterion distinguished them as the best group to render maternity care to pregnant women and their unborn babies and/or newborn babies. This is in tandem with the study by (Andualem et al. 2019; Libingi et al. 2019) which concluded that about 73% of midwives were knowledgeable about ANC documentation guidelines and that 70% of them were supervised and monitored for up to 6 months by midwife supervisors. On the other hand, other studies revealed that midwives had poor knowledge of antenatal care documentation (Hassan 2018; Ojong et al. 2016).

#### **4.3. ANC documentation practices among respondents**

This study revealed that many of the respondents (71.4%) always use ANC documentation guidelines while on duty and that more than half of the respondents (68%) reported that their facility organized training and retraining of staff on ANC documentation guidelines. Many of the (64.4%) always use ANC documentation guidelines on all pregnant women in their facility. This conforms to (Abd Elmoneim and Kuppaswamy 2014) observation that (98.21%) of participants usually take a complete history of pregnant women and that about while (67.86%) understood the benefits of laboratory screenings and a greater number of them document health teachings on the importance of nutrition. Also, majority of the respondents (86.9%) always wait for a convenient time to report care rendered. 92.7% of the midwives always ensure that reports are clear, concise and eligible.

Whereas, 80.6% of the respondents always patiently collect data from each client; more than half (58.3%) of the respondents reported that evaluation of documented ANC is always done by supervising midwives in the facility. This was opposed by (Ojong et al. 2016) who stated that midwives have a low practice of antenatal care and that they do not practice based on recommended guidelines. (Adegbore and Omowumi 2021) also stated that midwives' practice of antenatal care documentation guidelines was very low. Also, (Libingi et al. 2019) stated that even though midwives were knowledgeable about ANC documentation guidelines, they performed very low in practice. Meaning that mentoring & supervising the midwives is necessary to enhance their knowledge, Skills and practice of antenatal care documentation guidelines. (Khattak et al. 2016) also stressed the importance of monitoring and evaluating nursing documentation practices.

#### **4.4. Extent of adherence to ANC documentation guideline**

This study showed that all (100%) of the midwives in the selected hospitals were non-adherent to ANC documentation guidelines. This corresponds to the study by (Dyer et al. 2018) which confirmed that guidelines were not adequately adhered to by midwives. (Asamani et al. 2014) also supported this finding.

#### **4.5 Factors that affect adherence to ANC documentation guidelines.**

This study revealed that inadequate number of midwives, unwillingness of the clients to divulge accurate health information and inadequate history-taking/documentation during booking were among the factors reported to affect adherence to ANC documentation guidelines by a combined;

81.1%, 83.9%, and 99.5% of the respondents respectively. Also, the study observed that majority of the respondents reported that client history taking consumes a lot of time (94.6%) and that Doppler fetal monitor was not readily available for use in some of the facilities (86.4%), while others reported not having adequate writing materials for documentation (76.7%). This result corroborates those of (Taiye 2015), and that of (Anggraini et al. 2018), all of whom identified that there were some barriers to effective documentation practice by midwives and that such barriers include; lack of knowledge, increased workload, time constraint and inadequate skilled manpower. Nevertheless, (Sama et al. 2017) argue that there was no evidence that inadequate or lack of knowledge of partograph and inadequate manpower militated against its routine use.

### **5. Conclusions and Recommendations**

#### **5.1. Conclusion**

Antenatal care is the basic care administered to pregnant women and their unborn babies. The quality of antenatal care is determined by healthy maternal and childbirth outcomes. Caring for pregnant women and their unborn babies requires the knowledge, experience and expertise/skills of certified midwives who must be willing to follow the recommended guidelines for documenting care rendered to these mothers and their babies. Effective midwifery practice cannot be carried out without adequate documentation that adheres to the recommended guideline for maternal and childcare. It is important to note that documentation is key to effective and efficient health care practice as it helps in the continuity of care. This study focused on the assessment of knowledge and adherence to antenatal care documentation guidelines among midwives in selected hospitals. Generally, the study revealed that midwives have a good level of knowledge of ANC documentation guidelines and are aware of the contents of the guidelines. The study also revealed that

midwives' practice of documentation was very low and that 100% of the midwives were not adhering to the recommended documentation guidelines. To ensure adherence to the guidelines, midwives working in antenatal clinics and wards should be properly supervised and their documentation practices monitored by supervising midwives. However, the negative attitude of the midwives' regarding documentation was identified as the main hindrance to effective documentation. The study revealed several factors that affect adherence to ANC documentation guidelines by midwives, of which the major ones are lack of manpower and inadequate working materials.

## 5.2. Recommendations

It will be intriguing, however, if this research will be carried out in other towns of Abia as well as other states. The research assessed knowledge and adherence to antenatal care documentation guidelines. It is therefore necessary that health institutions train and retrain midwives to improve their skills and knowledge of antenatal care. Moreover, midwives should be trained on the use of electronic documentation as this works faster and is time-saving.

Midwife managers with years of experience and expertise should rise to the challenge of supervising younger midwives and monitoring their documentation practice as well as correcting where necessary. This will help the midwives to develop their potential and improve their practice of documentation. The result of this study identified inadequate manpower as one of the factors that hindered documentation. Hence, there is a need for the government and employers of labour to recruit more midwives and also improve the condition of service in the health facilities. This will help to curb the challenges of brain drain and reduce the problem of having to recruit and train new staff most of the time.

This study revealed that there were inadequate materials for documenting care in these hospitals. Health care institutions should support midwives in documenting care by providing adequate materials for the care of patients in the hospitals. Midwife leaders should be made part of decision making in management. This will help to make policies that will favor good documentation practices.

Finally, the government should review the salaries of midwives to motivate them to put in their best as well as promote a good attitude towards documentation practice.

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