UNIQUE JOURNAL OF MEDICAL & HEALTH SCIENCES (UJMHS)
UNIVERSITY OF PORT HARCOURT

VOLUME 1 NUMBER 3

ISSN: 2992-5282 (PRINT)

ISSN ONLINE:

Telephone: +234-9094503574, +234-8033103959, +234-8033301011

Aims of the journal

Unique Journal of Medical & Health Sciences (UJMHS), a publication of the School of Graduate Studies of the University of Port Harcourt is an open peer-reviewed and open-access international journal that aims to publish original research articles, reviews and short communications, opinions and editorials in the areas of medical, pharmaceutical and allied health sciences. It accepts for review and the publication of traditional full research reports such as short communications, protocols, pilot studies and pre-protocols, etc. so far, they are novel, technically correct, and scientifically motivated. The submission of useful reports of negative research findings are acceptable for review.

Scope of the journal

Subject matters considered in this journal include studies in clinical areas like immunology, anaesthesia, cardiovascular medicine, complementary medicine, dentistry and oral medicine, pathology, toxicology, pharmacology and therapeutics, dermatology, respiratory medicine, rheumatology, drugs and medicines, ear, nose and throat/otolaryngology, emergency medicine, infectious diseases, neurology, nutrition and metabolism, obstetrics and gynaecology, endocrinology, gastroenterology, genetics, geriatric medicine, haematology, oncology, ophthalmology, paediatrics, psychiatry, radiology, renal medicine, pharmacognosy (phytochemistry), pharmaceutical microbiology and biotechnology, pharmaceutics/pharmaceutical technology and industrial pharmacy, clinical pharmacy and management, sexual health, urology, epidemiology, ethnic studies, health policy, occupational health, medical education, legal and forensic medicine, environmental medicine and public health, medicine development and safety testing, drug legislation and safety.

Indexing

A dedicated journal indexing team is working to include all of our journals in reputed indexing services, journal evaluation services catalogue and reference citations. The Journal will be abstracted in the following services: Index Copernicus, Publons**,** Chemical Abstracts Service, Google Scholar, Citefactor**,** WorldCAT **,** ResearchGate**,** Academia, HINARI**,** Analytical sciences digital library

Publication Fee

Nigeria: Authors are required to pay a non-refundable Article Processing Charge (APC) of N10,000. As soon as the manuscript is accepted for publication, authors are thereafter expected to pay a publication fee of N20,000.

Foreign: Authors are required to pay a non-refundable Article Processing Charge (APC) of $30. As soon as the manuscript is accepted for publication, authors are thereafter expected to pay a publication fee of $70.

All payments should be made to:

Account Name: Anti-Plagiarism
Account Number: 1100236423
Bank: U & C Micro-Finance

Manuscript structure

The manuscript should be written in English with a simple layout. The text should be prepared in a single column format. Bold face, italics, subscripts, superscripts etc. can be used.

The text, excluding the abstract, if required, can be divided into numbered sections with brief headings. Starting from introduction with section 1. subsections should be numbered (for example 2.1 (then 2.1.1, 2.1.2, 2.2, etc.), up to three levels.

Note:

1. Case Reports should follow the structure of Abstract, Introduction, Presentation of Case, Discussion, Conclusion, Acknowledgements, Competing Interests, Authors' Contributions, Consent (where applicable), Ethical approval (where applicable), and References plus figures and/or tables. Abstract (not more than 250 words) of the Case reports should have the following sections: Aims, Presentation of Case, Discussion and Conclusion. Only Case Reports have word limits: Papers should not exceed 2000 words, 20 references or 5 figures. Other Type of papers have no word limits.
2. Review papers may have different headings of the sections and are exempted from following these suggestions.
3. Research Papers and Short Notes should follow the structure of Abstract, Introduction, Materials and Methods, Results and Discussion, Conclusion, Acknowledgements, Competing Interests, Authors' Contributions, Consent (where applicable), Ethical approval (where applicable), and References plus figures and/or tables.)

BRIEF GUIDELINES

Title Page

The title page should contain a brief title, the name(s) of the author(s) and their affiliations. The title should be without any abbreviations, and it should enlighten the contents of the paper. All affiliations should be provided with a lower-case superscript letter just after the author's name and in front of the appropriate address.

The name of the corresponding author should be indicated along with telephone and fax numbers (with country and area code) along with the full postal address and e-mail address.

Abstract
The abstract should be concise and informative. It should not exceed 300 words in length. It should briefly describe the purpose of the work, techniques and methods used, major findings with important data and conclusions. Different sub-sections, as given below, should be used. No references should be cited in this part. Generally, non-standard abbreviations should not be used, if necessary, they should be clearly defined in the abstract, at first use.

Keywords
Immediately after the abstract, about 4-8 keywords should be given. Use of abbreviations should be avoided, only standard abbreviations, well known in the established area may be used, if appropriate. These keywords will be used for indexing.

Abbreviations

Non-standard abbreviations should be listed, and the full form of each abbreviation should be given in parentheses at first use in the text.

Introduction

The author(s) are required to provide factual background, a clearly defined problem, a proposed solution, a brief literature survey, the scope and justification of the work done.

Materials and methods

The author(s) should give adequate information to allow the experiment to be reproduced. Already published methods should be mentioned with references. Significant modifications of published methods and new methods should be described in detail. This section will include sub-sections. Tables & figures should be placed in the text. Tables and figures should be presented as per their appearance in the text. It is suggested that the discussion about the tables and figures should appear in the text before the appearance of the respective tables and figures. No tables or figures should be given without discussion or reference in the text.

Tables should be explanatory enough to be understandable without any text reference. Double spacing should be maintained throughout the table, including table headings and footnotes. Table headings should be placed above the table. Footnotes should be placed below the table with superscript lowercase letters.

Each figure should have a caption. The caption should be concise and typed separately, not on the figure area. Figures should be self-explanatory. Information presented in the figure should not be repeated in the table. All symbols and abbreviations used in the illustrations should be defined clearly. Figure legends should be given below the figures.

Some guidelines for medical papers:
Randomized controlled trials should follow the CONSORT (Consolidated Standards of Reporting Trials) guidelines (http://www.consort-statement.org).
Case reports, case series, cross-sectional and other observational studies should follow the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines (http://www.strobe-statement.org). If the detailed methods are explicitly stated in the manuscript for single case studies, STROBE may be avoided.
Authors producing systematic reviews and meta-analyses should follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (http://www.prisma-statement.org).

Results & Discussion

Results should be clearly described in a concise manner. Results for different parameters should be described under subheadings or in a separate paragraph. Table or figure numbers should be mentioned in parentheses for better understanding.

The discussion should not repeat the results but provide a detailed interpretation of the data. This should interpret the significance of the findings of the work. Citations should be given in support of the findings. The results and discussion part can also be described as separate, if appropriate.

Tables & Figures

Tables & figures should be placed inside the text. Tables and figures should be presented as per their appearance in the text. It is suggested that the discussion about the tables and figures should appear in the text before the appearance of the respective tables and figures. No tables or figures should be given without discussion or reference inside the text.

Tables should be explanatory enough to be understandable without any text reference. Double spacing should be maintained throughout the table, including table headings and footnotes. Table headings should be placed above the table. Footnotes should be placed below the table with superscript lowercase letters.

Each figure should have a caption. The caption should be concise and typed separately, not on the figure area. Figures should be self-explanatory. Information presented in the figure should not be repeated in the table. All symbols and abbreviations used in the illustrations should be defined clearly. Figure legends should be given below the figures.

Guideline for Reporting P values:

P is always italicized and capitalized.

i) Correct expression: ($P = .05$). Wrong Expression: ($P < .05$) unless $P < .001$.
ii) The *P* value should be expressed to 2 digits whether or not it is significant. If $P < .01$, it should be expressed to 3 digits.
iii) When rounding, 3 digits is acceptable if rounding would change the significance of a value (eg, $P = .049$ rounded to .05).
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.

Competing Interests

Declaration of competing interests is compulsory. All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. If no such declaration has been made by the authors, reserve to assume and write this sentence: “Authors have declared that no competing interests exist.”.

TABLE OF CONTENTS

13. Quantifying Total Body Decomposition of Pig (Sus Scrofa) Remains in a Port Harcourt (Choba) Region.
    Adheke, O. M. and Didia, B. C.

14. Patient Safety Culture among Clinical Staff in Hospitals in Nigeria: A Systematic Review.
    Kenneth, K. Queen; Onuoha, U. Stanislaus; and Dimkpa, B. Mary.

15. Assessment of health care data processes and infrastructure at the University of Port Harcourt Teaching Hospital.
    Onuoha, U. Stanislaus; Kenneth, K. Queen and Dimkpa, B. Mary

16. Service Availability, Health System Readiness and Quality of Life (Qol) of Type Ii Diabetic Patients in Ghana
    Christine Ahiale

17. Quality of Nursing Services and Patients' Satisfaction at the University of Uyo Teaching Hospital, Uyo, Akwa-Ibom State.
    Akpan, J. Church; Daprim, S. Ogaji and Sunny R. Iqwe

Awareness of cervical cancer, human papillomavirus and self-sampling for cervical cancer screening among reproductive age women in a low resource setting.

Omowhara Believe [1*],Ameh Soter[2,3] Banjo Adekunbiola[4]

[1]Department of Epidemiology, University of Port Harcourt School of Public Health, Rivers State, Nigeria.

[2]Department of Community Medicine, University of Calabar, Cross River State, Nigeria.

[3]Lown Scholars Program, Department of Global Health and Population, Harvard T.H. Chan School of Public Health, Boston, MA, USA.

[4]College of Medicine, Lagos University Teaching Hospital, Lagos State, Nigeria.

*Corresponding Author: Omowhara Believe, Email:illeligibelieve@yahoo.com

ABSTRACT

Background: Cervical cancer is a disease of public health importance affecting many women and contributing to avoidably high levels of cancer morbidity and mortality in Nigeria. In spite of the relative ease of prevention, the incidence is on the increase. A key reason is the lack of awareness and knowledge of the disease. This study aimed to evaluate the awareness of cervical cancer (CC), human papillomavirus (HPV) and self-sampling (SS) among women in a rural Nigerian community.

Method: Study design was pre-post quasi-experimental, carried out among adult women in Orhuwhorun community in Udu Local Government Area (LGA) of Delta State. Multi-stage sampling technique was used to recruit 230 women from May to June 2021. Data were collected by semi structured, self- or interviewer- administered questionnaire. Data analysis was done with SPSS v. 25.0.

Result: Two hundred and thirty women of mean age 41.08 years (SD ± 8.45) were enrolled .The level of awareness of cervical cancer, HPV and SS was 18.7%, 14.8% and 0.9% respectively.

Conclusion: The awareness of cervical cancer, HPV and SS was low among rural women in Delta State. It is, therefore, imperative that cervical cancer awareness campaigns among this populace be heightened.

Keywords: Cervical Cancer, Human Papillomavirus, Awareness.

Introduction

Cervical cancer is the third most frequent cancer in women worldwide, with 569,847 new cases and 311,365 deaths projected in 2018 (Arbyn et al., 2020). Around 80% of cases are found in low- and middle-income countries (LMICs), with Sub-Saharan Africa bearing the heaviest burden (Beddoe, 2019). After breast cancer, cervical cancer is the second most common

malignancy among Nigerian women (Jedy-Agba et al., 2012). Nigeria was rated tenth in the world for cervical cancer burden, with a mortality rate of 22.9 fatalities per 100 people (Akarolo-Anthony et al., 2014). According to reports, almost 48 million women in Nigeria are at risk of cervical cancer, with 17,550 women diagnosed each year, 9, 659 women dying each year, and 26 women dying every day (Ali, Makata, & Ezenduka, 2016). This is quite concerning, as it has evolved into a serious public health concern in poorer countries. The condition has a significant impact on women in their productive years, with related morbidity and mortality (Akintayo et al., 2013).

Infection with the human papillomavirus (HPV) is the most major risk factor for cervical cancer (Kashyap, Krishnan, Kaur, & Ghai, 2019). HPV 16 or 18 is responsible for approximately 66.9% of invasive cervical malignancies (Orah & Banjo, 2018). HPV prevalence is predicted to be 11.7 percent worldwide and 24 percent in Sub-Saharan Africa (Bruni et al., 2015). However, less developed nations account for over 12% of all malignancies in females, accounting for around 85% of the global HPV burden (WHO, 2016). In Nigeria, HPV prevalence ranges from 10% in Port Harcourt (Tamunomie, Ikechukwu, & Bassey, 2016) to 26.3 percent in Ibadan(Thomas et al., 2004) and 37 percent in Abuja (Akarolo-Anthony et al., 2014).

Despite the seriousness of HPV infection and cervical cancer, many studies in Sub-Saharan Africa, particularly Nigeria, have revealed a lack of knowledge and awareness about the disease (Arrossi, Maceira, Paolino, & Sankaranarayanan, 2012; McCusker et al., 2013; Al-Darwish et al., 2014;; Dodd et al., 2014; Gana, Oche, Ango, Raji, & Okafoagu, 2016; Abiodun et al., 2017; Ebu, Amissah-Essel, Asiedu, Akaba, & Pereko, 2019; Olubodun, Odukoya, & Balogun, 2019).

Methods

Study Location

Orhuwhorun community in Udu Local government area (LGA), one of the 15 rural LGAs in Delta State was our study location. Delta State is one of nine states in the Niger Delta region of Nigeria. It was estimated from the 2006 census figures that Udu LGA has a population of 142,480 including Orhuwhorun. Orhuwhorun has grown to be the second prominent and fast developing town in the Udu LGA due to the establishment of Delta Steel Company housing complex built in the 1970s for its workers. There is a general hospital in Otor-Udu but no functional gynecology unit to access cervical cancer screening services.

Study Design and Population

This pre-post quasi-experimental study was conducted on 230 asymptomatic women between 30 to 65 years of age who were resident in Orhuwhorun community. HPV testing is recommended by World Health Organization (WHO) for women over 30 years of age due to the transient nature of HPV infections in younger women. Women who were pregnant, experiencing monthly menstrual flow, had history of hysterectomy and mental illness were ineligible to participate.

Sample Size Determination

The sample size was determined by using the formula for comparing two proportions (because it was a sub study from a two proportion study). A minimum sample size of 207 was determined, after adjusting for 10% non-response and 230 participants were enrolled. The level of significance was set at 5% ($\alpha = 0.05$) and the power of the study was set at 80% = 0.84.

Sampling Method

A multistage sampling technique was used to select 230 participants. The first stage involved selecting Udu LGA from the 15 rural LGAs in Delta State by a simple random method. The second stage involved selection of Orhuwhorun from the 10 wards in Udu by a simple random sampling technique. The third stage involved selecting five streets in Orhuwhorun community

from 15 major streets. In the final stage, systematic sampling was employed to select one out of every two households in the chosen streets with an eligible participant. In the houses where there are more than one eligible female, balloting was used to select a participant.

Study Procedure

The leadership of Orhuwhorun community were duly informed on the purpose and protocol of the research. Recruited participants were invited to the community health center, self- or interviewer-administered questionnaire were given out to respondents to complete, in order to assess the baseline level of awareness of HPV, cervical cancer and self-sampling for HPV testing. **Data Collection Instrument**

The data collection tool was a semi-structured questionnaire reviewed by a panel of experts for face and content validity. The questionnaire was both self-administered and interviewer-administered. It was divided into four sections. Section A was on socio-demographic characteristics including age, educational level and marital status. Section B consisted of 10 closed-ended questions related to awareness and knowledge of HPV. Section C comprised of five closed-ended questions on awareness and knowledge of cervical cancer and screening while Section D consisted of 3 closed-ended questions on awareness and knowledge of self-sampling as a screening tool for HPV testing. Level of awareness was ascertained by the proportion of respondents who ticked YES to the question “have you ever heard of HPV, cervical cancer and self-sampling?”

Data Analysis

Relevant data were coded and entered into Microsoft Excel. Statistical analyses was conducted using IBM SPSS statistics version 25 (IBM Corp., Armonk, NY, United States). Descriptive statistics (numbers and proportions) were used to report the sociodemographic characteristics

of the women. Using questionnaire data, we calculated frequencies to describe level of awareness of cervical cancer, HPV and self-sampling.

Ethical Considerations

Approval for this research was obtained from the ethics and research committee of the University of Port Harcourt (UPH/CEREMAD/REC/MM73/014) prior to commencement of the study. **Results**

A total number of 230 questionnaires were administered to recruited women and all 230 were returned completed, giving a response rate of 100%. Table I shows that the mean age of respondents was 41.08 ± 8.45 years**,** 112 (48.7%) were within 30 and 39 years, 76 (33%) were within 40 and 49 years, 34 (14.8%) were within 50 and 59 years while 8 (3.5%) were within 60- and 65-years age group. Most of the respondents were married 209 (90.9%), 12 (5.2%) were single, 4 (1.7%) were separated while 5 (2.2%) were widows. The majority 222 (96.5%) of them were Christians, 5 (2.2%) practiced Islam, while 3 (1.3%) were traditional worshippers. The table also shows that 102 (44.3%) had only completed their secondary school education, 78 (33.9%) had attained tertiary level of education, 42 (18.3%) stopped at primary school while 8 (3.5%) did not go to school. The majority 165 (71.7%) of the respondents were artisans, 40 (17.4%) were civil servants, 14 (6.1%) were health workers while 11 (4.8%) were full time housewives.

Socio-demographic characteristics of respondents

Table 1: Age, and Marital Status distribution among respondents

Characteristics	Frequency (n=230)	Percentage (%)
Age years		
30 – 39	112	48.7
40 – 49	76	33.0

50 – 59	34	14.8
60 – 65	8	3.5
Total	**230**	**100**
Mean age	***41.08 ± 8.45years***	
Marital Status		
Single	12	5.2
Married	209	90.9
Separated	4	1.7
Widows	5	2.2
Total	**230**	**100**
Religion		
Christianity	222	96.5
Islam	5	2.2
Traditional Worshippers	3	1.3
Total	**230**	**100**
Educational Level		
None	8	3.5
Primary	42	18.3
Secondary	102	44.3
Tertiary	78	33.9
Total	**230**	**100**
Occupation		
Civil servant	40	17.4
Health Worker	14	6.1
House wife	11	4.8
Artisan	165	71.7
Total	230	100

Table 2: Level of awareness of HPV among respondents

Characteristics	Frequency (n=230)	Percentage (%)
Have you ever heard of HPV?		
No	196	85.2

Yes	34	14.8
Total	230	100.0

Table 2 reveal that majority 196 (85.2%) of the study population have never heard of human papillomavirus while 34(14.8%) have heard of it.

Table 3: Level of awareness of cervical cancer among respondents

Characteristics	Frequency (n=230)	Percentage (%)
Have you ever heard of cervical cancer?		
No	187	81.3
Yes	43	18.7
Total	230	100.0

Table 3 show that majority 187(81.3%) of the respondents have never heard of cervical cancer while 43(18.7%) have heard.

Table 4: Level of awareness of self-sampling for HPV testing among respondents

Characteristics	Frequency (n=230)	Percentage (%)
Have you ever heard of self-sampling?		
No	228	99.1
Yes	2	0.9
Total	230	100.0

Table 4 show that virtually all 228(99.1%) of the respondents have never heard of self-collection of vaginal samples for HPV testing while only 2(0.9%) have heard

Discussion

Awareness of Cervical Cancer, Human papillomavirus and Self-sampling

The majority of respondents in our survey were not aware of cervical cancer (CC) as only 18.7% of rural women reported they had heard of the disease. Numerous studies have been conducted globally on CC awareness. A research among women residing at the urban slums of Old Hubli Karnataka, India, showed that only about 7.5% of the respondents had heard about CC(Bathija, Mallesh, & Gajula, 2016) and 10.2% awareness among Beninese women(Barrow, Onikan, Nzoputam, & Ekholuenetale, 2020), which is far lower than what was found in our

study. It is worthy of note that although most studies found high CC awareness level, significant knowledge gaps still existed in some aspects. In two urban slums of Mumbai India, 37.7% of the study participants were aware of CC(Naik, Donta, Nair, & Mali, 2017), 29% in Kenya (Sudenga, Rositch, Otieno, & Smith, 2013), 42.2% in Ethiopia (Chaka, Sayed, Goeieman, & Rayne, 2018),43% in Saudi Arabia (Dhaher, 2019), 47.8% in Zambia (Simaubi & Ngoma, 2013), 50.6% in Northwest Ethiopia (Tesfaye, Bhagavathula, Gebreyohannes, & Tegegn, 2019), 51.3% in Pakistan (Riaz, Manazir, Jawed, Ali, & Riaz, 2020), 53.3% in Nepal (Johnson et al., 2014) and South Africa (Hoque, 2013), 57% in Ghana (Drokow et al., 2020), 57.8% in Cameroon (Nkfusai et al., 2019), 64.2% in Burkina Faso (Sawadogo, Gitta, Rutebemberwa, Sawadogo, & Meda, 2014), 69% in Tanzania (Moshi, Vandervort, & Kibusi, 2018), 70.7% in Upper East Region of Ghana (Ziba, Baffoe, Dapare, Shittu, & Antuamwine, 2015), 74% in Cambodia (Touch & Oh, 2018), 79.4% in Oman (Nasar, Waad, Atheer, & Nasra, 2016), 81% in Zimbabwe (Fitzpatrick et al., 2020), 84% in Democratic Republic of Congo (Ali-Risasi, Mulumba, Verdonck, Vanden Broeck, & Praet, 2014), 84.6% in Mozambique (Bardají et al., 2018), 86% in Uganda (Nakibuule, 2014), 91.6% in Gabon (Assoumou et al., 2015)and 100% among female undergraduates in Botswana (Tapera et al., 2017).

Several Nigerian studies have been carried out on CC awareness. The finding from our study was higher than 10% (Balogun, Odukoya, Oyediran, & Ujomu, 2012) and 12.8% (Olubodun et al, 2019) reported among urban slum dwellers in Lagos but lesser than 22.6% reported in Ogbomoso (Abiodun et al., 2017), 26% in Abuja (Nnodu et al., 2010), 28.4% in Maiduguri (Omotara, Yahya, Amodu, & Bimba, 2013), 36.3% in Ekiti (Emanuel et al., 2015), 42.7% in Southeast (Ifediora & Azuike, 2018) , 44.2% in Lagos (Amu, Ndugba, & Olatona, 2019), 47% in Abuja (Modibbo et al., 2017), 48.1% in Benin city (Oh et al., 2015), 50.9% in Jos (Hyacinth, Adekeye, Ibeh, & Osoba, 2012), 52 in Oyo (Bammeke & Ndikom, 2014), 53.9% among undergraduates in Northern Nigeria (Iliyasu, Abubakar, Aliyu, & Galadanci, 2010), 64.3% in

Osun (Akanbi, Iyanda, Osundare, & Opaleye, 2015), 66.9% in Kaduna (Ahmed, Sabitu, Idris, & Ahmed, 2013), 85.9% in Enugu among female health workers (Ugwu, Obi, Ezechukwu, Okafor, & Ugwu, 2013), 95.4% among medical students in University of Lagos (Adejuyigbe, Balogun, Sekoni, & Adegbola, 2015) and 100% among nurses in Abakaliki (Ifemelumma et al, 2019).

This present study demonstrated that the level of awareness of HPV (14.8%) was very poor among rural women in Delta State.Much higher awareness levels were observed in some studies. In Thailand, HPV awareness of 64.6% was reported(Karisani, Aminimoghaddam, Kashanian, Baradaran, & Moradi, 2021), 64.5% in Minnesota(Zhu et al., 2022), 61% in Pakistan among health professionals (S. F. Ali et al., 2010), 72.9% in a national survey among US adults(Thompson et al., 2020), 95.3% among college students in South Carolina(Kasymova, Harrison, & Pascal, 2019),83.3% in Italyamong undergraduates (Cocchio et al., 2020) and 53% in Kazakhstan (Issa et al., 2021).

However, some researchers from Asian and other African countries found slightly higher HPV awareness levels compared to our result. In China, HPV awareness was 29.9%(He & He, 2020), 30% in Uganda (Nakibuule, 2014), 25% in Northern Tanzania (Henke et al., 2021), 23% in Cameroon (Nkfusai et al., 2019), 27% in Senegal (Massey et al., 2017), 33% in Mozambique (Bardají et al., 2018), 18% in Syria (Alsaad, Shamsuddin, & Fadzil, 2012), 18% in Kenya (Rositch et al., 2012) and 15.4% in Nepal (Johnson et al., 2014). Extremely low HPV awareness were reported as 4.7% in Morocco (Mouallif et al., 2014), 7% in Edmouton (Kraut et al., 2021), 8% in Gabon (Assoumou et al., 2015), 8.5% in Burkina Faso (Sawadogo et al., 2014), 10.7% in the Bahamas (George, Roberts, Brennen, Deveaux, & Read, 2020) and 12% in Zimbabwe (Fitzpatrick et al., 2020).

Our finding was comparable with 14% in Abuja(Nnodu et al., 2010) but lesser than 22.0% in Southeast (Ifediora & Azuike, 2018), 29% in Sokoto (Kehinde et al., 2019), 31% in

Makurdi(Eka, Hembah-Hilekaan, Ojabo, Utoo, & Swende, 2018), 35.5% among female undergraduates in Northern Nigeria (Iliyasu et al., 2010), 43.5% in Enugu (Bisi-Onyemaechi, Chikani, & Nduagubam, 2018), 54.5% in Ibadan (Arulogun & Maxwell, 2012), 85% among female nurses in LUTH (Okunade, Sunmonu, Osanyin, & Oluwole, 2017), 85.4% among medical students in University of Lagos (Adejuyigbe et al., 2015), and 86.4% among nurses in Abakaliki(Ifemelumma et al., 2019).

Furthermore, a South African study revealed 95.8% (Eche & Vermaak, 2022) of the respondents have never heard about self-sampling which is consistent with our finding of 99.1% rural women not being aware of self-sampling approach to cervical cancer screening.In a family medicine clinic in Edmonton, Canada only 7% of the women reported being previously aware of HPV self-sampling (Kraut et al., 2021). The extremely poor level of awareness of self-sampling may be due to it being a relatively new approach to cervical cancer screening and yet to be implemented in cervical screening programmes in Nigeria

Conclusion

The disparity in levels of awareness found in these studies can be attributed to the difference in study population. Our study population were rural women with minimal educational qualifications, which could have accounted for the poor awareness. It is expected that studies among health workers and urban women with higher economic status would report high levels of awareness of the disease. Unexpectedly, majority of the research in Africa showed high CC awareness, and can be attributed to the increased health education campaigns. It is imperative that cervical health education and sensitization be continuous in order to breach the gap in awareness and knowledge among the populace.

Funding

No grant was obtained for this research

Competing Interests

The authors have no competing interest.

Authors Contributions

All authors made contributions to this work.

References

Abiodun, A. B., Oluwasola, T. A., Durodola, A. O., Ajani, M. A., Abiodun, A. D., & Adeomi, A. A. (2017). Awareness and perception of risk for cervical cancer among women in Ogbomoso, Nigeria. *Tropical Journal of Obstetrics Gynaecology, 34*(3), 218-223.

Adejuyigbe, F. F., Balogun, B. R., Sekoni, A. O., & Adegbola, A. A. (2015). Cervical cancer and human papilloma virus knowledge and acceptance of vaccination among medical students in Southwest Nigeria. *African Journal of Reproductive Health, 19*(1), 140-148.

Ahmed, S. A., Sabitu, K., Idris, S. H., & Ahmed, R. (2013). Knowledge, attitude and practice of cervical cancer screening among market women in Zaria, Nigeria. *Nigerian medical journal, 54*(5), 316.

Akanbi, O. A., Iyanda, A., Osundare, F., & Opaleye, O. O. (2015). Perceptions of nigerian women about human papilloma virus, cervical cancer, and HPV Vaccine. *Scientifica, 2015*.

Akarolo-Anthony, S. N., Famooto, A. O., Dareng, E. O., Olaniyan, O. B., Offiong, R., Wheeler, C. M., & Adebamowo, C. A. (2014). Age-specific prevalence of human papilloma virus infection among Nigerian women. *BMC public health, 14*(1), 1-7.

Akintayo, A., Olowolayemo, R., Olomojobi, O., Seluwa, G., Akin-Akintayo, O., & Fasubaa, O. (2013). Awareness of cervical cancer and its prevention among young women in Ekiti state, south-west Nigeria. *Tropical Journal of Obstetrics Gynaecology, 30*(2), 83-90.

Al-Darwish, A. A., Al-Naim, A. F., Al-Mulhim, K. S., Al-Otaibi, N. K., Morsi, M. S., & Aleem, A. M. (2014). Knowledge about cervical cancer early warning signs and symptoms, risk factors and vaccination among students at a medical school in Al-Ahsa, Kingdom of Saudi Arabia. *Asian Pacific Journal of Cancer Prevention, 15*(6), 2529-2532.

Ali-Risasi, C., Mulumba, P., Verdonck, K., Vanden Broeck, D., & Praet, M. (2014). Knowledge, attitude and practice about cancer of the uterine cervix among women living in Kinshasa, the Democratic Republic of Congo. *BMC women's health, 14*(1), 1-13.

Ali, C., Makata, N., & Ezenduka, P. (2016). Cervical cancer: a health limiting condition. *Gynecology Obstetrics, 6*(378), 2161-0932.10003.

Ali, S. F., Ayub, S., Manzoor, N. F., Azim, S., Afif, M., Akhtar, N., . . . Uddin, N. (2010). Knowledge and awareness about cervical cancer and its prevention amongst interns and nursing staff in Tertiary Care Hospitals in Karachi, Pakistan. *PloS one, 5*(6), e11059.

Alsaad, M. A., Shamsuddin, K., & Fadzil, F. (2012). Knowledge towards HPV infection and HPV vaccines among Syrian mothers. *Asian Pacific Journal of Cancer Prevention, 13*(3), 879-883.

Amu, E., Ndugba, S., & Olatona, F. (2019). Knowledge of cervical cancer and attitude to cervical cancer screening among women in Somolu Local Government Area, Lagos, Nigeria. *Journal of Community Medicine*

Primary Health Care, 31(1), 76-85.

Arbyn, M., Weiderpass, E., Bruni, L., de Sanjosé, S., Saraiya, M., Ferlay, J., & Bray, F. (2020). Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *The Lancet Global Health, 8*(2), e191-e203.

Arrossi, S., Maceira, V., Paolino, M., & Sankaranarayanan, R. (2012). Acceptability and uptake of HPV vaccine in Argentina before its inclusion in the immunization program: a population-based survey. *Vaccine, 30*(14), 2467-2474.

Arulogun, O. S., & Maxwell, O. O. (2012). Perception and utilization of cervical cancer screening services among female nurses in University College Hospital, Ibadan, Nigeria. *Pan African Medical Journal, Vol. 11*(1).

Assoumou, S. Z., Mabika, B. M., Mbiguino, A. N., Mouallif, M., Khattabi, A., & Ennaji, M. M. (2015). Awareness and knowledge regarding of cervical cancer, Pap smear screening and human papillomavirus infection in Gabonese women. *BMC women's health, 15*(1), 1-7.

Balogun, M., Odukoya, O., Oyediran, M., & Ujomu, P. (2012). Cervical cancer awareness and preventive practices: a challenge for female urban slum dwellers in Lagos, Nigeria. *African Journal of Reproductive Health, 16*(1).

Bammeke, O. A., & Ndikom, C. M. (2014). Awareness and attitudes of women towards cervical cancer screening in Oyo state, Nigeria. *African Journal of Midwifery Women's Health, 8*(2), 91-97.

Bardají, A., Mindu, C., Augusto, O. J., Casellas, A., Cambaco, O., Simbine, E., . . . Sevene, E. (2018). Awareness of cervical cancer and willingness to be vaccinated against human papillomavirus in Mozambican adolescent girls. *Papillomavirus Research, 5*, 156-162.

Barrow, A., Onikan, A., Nzoputam, C. I., & Ekholuenetale, M. (2020). Prevalence and determinants of cervical cancer awareness among women of reproductive age: evidence from Benin and Zimbabwe population-based data. *Applied Cancer Research, 40*(1), 1-13.

Bathija, G. V., Mallesh, S., & Gajula, M. (2016). A study on awareness of cervical cancer among women of reproductive age group in urban slums of old Hubli, Karnataka, India. *Int J Community Med Public Health, 3*(9), 2579-2583.

Beddoe, A. M. (2019). Elimination of cervical cancer: challenges for developing countries. *cancer medical science, 13*.

Bisi-Onyemaechi, A. I., Chikani, U. N., & Nduagubam, O. (2018). Reducing incidence of cervical cancer: knowledge and attitudes of caregivers in Nigerian city to human papilloma virus vaccination. *Infectious agents cancer, 13*(1), 1-6.

Bruni, L., Barrionuevo-Rosas, L., Albero, G., Aldea, M., Serrano, B., Valencia, S., . . . Muñoz, J. (2015). Human papillomavirus and related diseases in the world. *Summary report, 20140822*.

Chaka, B., Sayed, A.-R., Goeieman, B., & Rayne, S. (2018). A survey of knowledge and attitudes relating to cervical and breast cancer among women in Ethiopia. *BMC public health, 18*(1), 1-8.

Cocchio, S., Bertoncello, C., Baldovin, T., Fonzo, M., Bennici, S. E., Buja, A., . . . Baldo, V. (2020). Awareness of HPV and drivers of HPV vaccine uptake among university students: A quantitative, cross-sectional study. *Health social care in the community, 28*(5), 1514-1524.

Dhaher, E. A. (2019). Knowledge, attitudes and practices of women in the southern region of Saudi Arabia regarding cervical cancer and the pap smear test. *Asian Pacific Journal of Cancer Prevention, 20*(4), 1177.

Dodd, R. H., McCaffery, K. J., Marlow, L. A., Ostini, R., Zimet, G. D., & Waller, J. (2014). Knowledge of human papillomavirus (HPV) testing in the USA, the UK and Australia: an international survey. *Sexually transmitted infections, 90*(3), 201-207.

Drokow, E. K., Zi, L., Han, Q., Effah, C. Y., Agboyibor, C., Sasu, E., . . . Sun, K. (2020). Awareness of cervical cancer and attitude toward human papillomavirus and its vaccine among Ghanaians. *Frontiers in Oncology, 10*, 1651.

Ebu, N. I., Amissah-Essel, S., Asiedu, C., Akaba, S., & Pereko, K. A. (2019). Impact of health education intervention on knowledge and perception of cervical cancer and screening for women in Ghana. *BMC public health, 19*(1), 1-11.

Eche, M. T., & Vermaak, K. (2022). Knowledge, attitude and practice of female university students regarding human papillomavirus and self-sampling in KwaZulu-Natal, South Africa: a cross-sectional survey. *BMC women's health, 22*(1), 1-14.

Eka, P., Hembah-Hilekaan, S., Ojabo, A., Utoo, B., & Swende, T. (2018). Awareness and knowledge of human papillomavirus, cervical cancer and human papillomavirus vaccines, and acceptance of human papillomavirus vaccination among female undergraduate students on a University Campus.

Emanuel, G. O., Adesola, B. O., Oluwole, K. A., Mathew, A. S., Toyin, E. O., & Aishatu, O. (2015). Awareness and practice of cervical cancer screening among women accessing care in a rural tertiary hospital in Nigeria. *Clin Med Res, 4*(4), 120.

Fitzpatrick, M., Pathipati, M. P., McCarty, K., Rosenthal, A., Katzenstein, D., Chirenje, Z., & Pinsky, B. (2020). Knowledge, attitudes, and practices of cervical Cancer screening among HIV-positive and HIV-negative women participating in human papillomavirus screening in rural Zimbabwe. *BMC women's health, 20*(1), 1-10.

Gana, G., Oche, M., Ango, J., Raji, M., & Okafoagu, N. (2016). Effect of an educational program on awareness of cervical cancer and uptake of Pap smear among market women in Niger State, North Central Nigeria. *Journal of Public Health Epidemiology, 8*(10), 211-219.

George, C., Roberts, R., Brennen, D., Deveaux, L., & Read, S. E. (2020). Knowledge and awareness of Human Papillomavirus (HPV) and HPV vaccines among Caribbean youth: the case of the Bahamas. *Human Vaccines Immunotherapeutics, 16*(3), 573-580.

He, L., & He, J. (2020). Attitudes towards HPV self-sampling among women in Chengdu, China: A cross-sectional survey. *Journal of medical screening, 27*(4), 201-206.

Henke, A., Kluge, U., Borde, T., Mchome, B., Serventi, F., & Henke, O. (2021). Tanzanian women s knowledge about Cervical Cancer and HPV and their prevalence of positive VIA cervical screening results. Data from a Prevention and Awareness Campaign in Northern Tanzania, 2017–2019. *Global health action, 14*(1), 1852780.

Hoque, M. E. (2013). Awareness of cervical cancer, Papanicolau's smear and its utilization among female, final year undergraduates in Durban, South Africa. *Journal of cancer research therapeutics, 9*(1), 25.

Hyacinth, H. I., Adekeye, O. A., Ibeh, J. N., & Osoba, T. (2012). Cervical cancer and pap smear awareness and utilization of pap smear test among Federal civil servants in North Central Nigeria.

Ifediora, C. O., & Azuike, E. C. (2018). Knowledge and Attitudes towards cervical cancer and its prevention among teenage secondary school. *Health, 68*, 80.

Ifemelumma, C., Anikwe, C., Okorochukwu, B., Onu, F., Obuna, J., Ejikeme, B., & Ezeonu, O. (2019). Cervical cancer screening: assessment of perception and utilization of

services among health workers in low resource setting. *International journal of reproductive medicine, 2019*.
Iliyasu, Z., Abubakar, I., Aliyu, M., & Galadanci, H. (2010). Cervical cancer risk perception and predictors of human papilloma virus vaccine acceptance among female university students in northern Nigeria. *Journal of Obstetrics Gynaecology, 30*(8), 857-862.
Issa, T., Babi, A., Issanov, A., Akilzhanova, A., Nurgaliyeva, K., Abugalieva, Z., . . . Alibekova, R. (2021). Knowledge and awareness of human papillomavirus infection and human papillomavirus vaccine among Kazakhstani women attending gynecological clinics. *PloS one, 16*(12), e0261203.
Jedy-Agba, E., Curado, M. P., Ogunbiyi, O., Oga, E., Fabowale, T., Igbinoba, F., . . . Koechlin, A. (2012). Cancer incidence in Nigeria: a report from population-based cancer registries. *Cancer epidemiology, 36*(5), e271-e278.
Johnson, D. C., Bhatta, M. P., Gurung, S., Aryal, S., Lhaki, P., & Shrestha, S. (2014). Knowledge and awareness of human papillomavirus (HPV), cervical cancer and HPV vaccine among women in two distinct Nepali communities. *Asian Pacific Journal of Cancer Prevention, 15*(19), 8287-8293.
Karisani, N., Aminimoghaddam, S., Kashanian, M., Baradaran, H. R., & Moradi, Y. (2021). Diagnostic accuracy for alternative cervical cancer screening strategies: A systematic review and meta-analysis. *Health Care for Women International*, 1-40.
Kashyap, N., Krishnan, N., Kaur, S., & Ghai, S. (2019). Risk factors of cervical cancer: a case-control study. *Asia-Pacific journal of oncology nursing, 6*(3), 308-314.
Kasymova, S., Harrison, S. E., & Pascal, C. (2019). Knowledge and awareness of human papillomavirus among college students in South Carolina. *Infectious Diseases: Research Treatment, 12*, 1178633718825077.
Kehinde, K. K., Ogbeide, M. E., Fagbule, O. F., Isola, T. O., Precious, A. K., Lawal, I. K., . . . Chidebere, O. (2019). Knowledge of HPV, HPV-induced cancers, and HPV vaccine among a sample of freshmen in a northwestern Nigeria monotechnic. *International Journal of Medical Research Health Sciences, 8*(12), 110-115.
Kraut, R. Y., Manca, D., Lofters, A., Hoffart, K., Khan, U., Liu, S., . . . Babenko, O. (2021). Attitudes Toward Human Papillomavirus Self-Sampling in Regularly Screened Women in Edmonton, Canada: A Cross-Sectional Study. *Journal of lower genital tract disease, 25*(3), 199-204.
Massey, P. M., Boansi, R. K., Gipson, J. D., Adams, R. M., Riess, H., Dieng, T., . . . Glik, D. C. (2017). Human papillomavirus (HPV) awareness and vaccine receptivity among Senegalese adolescents. *Tropical Medicine International Health, 22*(1), 113-121.
McCusker, S. M., Macqueen, I., Lough, G., MacDonald, A. I., Campbell, C., & Graham, S. V. (2013). Gaps in detailed knowledge of human papillomavirus (HPV) and the HPV vaccine among medical students in Scotland. *BMC public health, 13*(1), 1-7.
Modibbo, F., Iregbu, K., Okuma, J., Leeman, A., Kasius, A., de Koning, M., . . . Adebamowo, C. (2017). Randomized trial evaluating self-sampling for HPV DNA based tests for cervical cancer screening in Nigeria. *Infectious agents cancer, 12*(1), 1-9.
Moshi, F. V., Vandervort, E. B., & Kibusi, S. M. (2018). Cervical cancer awareness among women in Tanzania: an analysis of data from the 2011-12 Tanzania HIV and Malaria Indicators Survey. *International journal of chronic diseases, 2018*.
Mouallif, M., Bowyer, H. L., Festali, S., Albert, A., Filali-Zegzouti, Y., Guenin, S., . . . Ennaji, M. M. (2014). Cervical cancer and HPV: awareness and vaccine acceptability among parents in Morocco. *Vaccine, 32*(3), 409-416.

Naik, D., Donta, B., Nair, S., & Mali, B. (2017). Awareness of sexually transmitted infections and cervical cancer among women in urban slums of Mumbai, Maharashtra, India. *Int J Community Med Public Health, 4*(2), 400-404.

Nakibuule, C. (2014). Knowledge, attitudes and practices regarding cervical cancer among women and men in Kampala City, Uganda.

Nasar, A., Waad, A., Atheer, A., & Nasra, A. (2016). Awareness of cervical cancer and Pap smear testing among Omani women. *Asian Pacific Journal of Cancer Prevention, 17*(11), 4825.

Nkfusai, N. C., Cumber, S. N., Anchang-Kimbi, J. K., Nji, K. E., Shirinde, J., & Anong, N. D. (2019). Assessment of the current state of knowledge and risk factors of cervical cancer among women in the Buea Health District, Cameroon. *The Pan African Medical Journal, 33*.

Nnodu, O., Erinosho, L., Jamda, M., Olaniyi, O., Adelaiye, R., Lawson, L., . . . Isu, N. (2010). Knowledge and attitudes towards cervical cancer and human papillomavirus: a Nigerian pilot study. *African Journal of Reproductive Health, 14*(1).

Oh, H., Kim, B.-S., Seo, S.-S., Kong, J.-S., Lee, J.-K., Park, S.-Y., . . . Kim, M. (2015). The association of uterine cervical microbiota with an increased risk for cervical intraepithelial neoplasia in Korea. *Clinical Microbiology Infection, 21*(7), 674. e671-674. e679.

Okunade, K. S., Sunmonu, O., Osanyin, G. E., & Oluwole, A. A. (2017). Knowledge and acceptability of human papillomavirus vaccination among women attending the gynaecological outpatient clinics of a university teaching hospital in Lagos, Nigeria. *Journal of Tropical Medicine, 2017*.

Olubodun, T., Odukoya, O. O., & Balogun, M. R. (2019). Knowledge, attitude and practice of cervical cancer prevention, among women residing in an urban slum in Lagos, South West, Nigeria. *Pan African Medical Journal, 32*(1).

Omotara, B. A., Yahya, S. J., Amodu, M. O., & Bimba, J. S. (2013). Assessment of the knowledge, attitude and practice of rural women of northeast Nigeria on risk factors associated with cancer of the Cervix. *Health, 2013*.

Orah, N. O., & Banjo, A. A. (2018). Prevalence and distribution of high risk human papillomavirus subtypes in invasive cervical cancer in South-West Nigeria. *Annals of Tropical Pathology, 9*(2), 106.

Riaz, L., Manazir, S., Jawed, F., Ali, S. A., & Riaz, R. (2020). Knowledge, perception, and prevention practices related to human papillomavirus-based cervical cancer and its socioeconomic correlates among women in Karachi, Pakistan. *Cureus, 12*(3).

Rositch, A. F., Gatuguta, A., Choi, R. Y., Guthrie, B. L., Mackelprang, R. D., Bosire, R., . . . Farquhar, C. (2012). Knowledge and acceptability of pap smears, self-sampling and HPV vaccination among adult women in Kenya. *PloS one, 7*(7), e40766.

Sawadogo, B., Gitta, S. N., Rutebemberwa, E., Sawadogo, M., & Meda, N. (2014). Knowledge and beliefs on cervical cancer and practices on cervical cancer screening among women aged 20 to 50 years in Ouagadougou, Burkina Faso, 2012: a cross-sectional study. *The Pan African Medical Journal, 18*.

Simaubi, M., & Ngoma, M. (2013). Cervical cancer awareness and uptake of pap-smear services among women above 18 years of age. *Medical Journal of Zambia, 40*(1), 19-23.

Sudenga, S. L., Rositch, A. F., Otieno, W. A., & Smith, J. S. (2013). Knowledge, attitudes, practices, and perceived risk of cervical cancer among Kenyan women: brief report. *International Journal of Gynecologic Cancer, 23*(5).

Tapera, R., Manyala, E., Erick, P., Maswabi, T. M., Tumoyagae, T., Letsholo, B., & Mbongwe, B. (2017). Knowledge and attitudes towards cervical cancer screening

amongst university of Botswana female students. *Asian Pacific Journal of Cancer Prevention, 18*(9), 2445.

Tesfaye, Z. T., Bhagavathula, A. S., Gebreyohannes, E. A., & Tegegn, H. G. (2019). Knowledge and awareness of cervical cancer and human papillomavirus among female students in an Ethiopian university: a cross-sectional study. *International journal of preventive medicine, 10*.

Thomas, J., Herrero, R., Omigbodun, A., Ojemakinde, K., Ajayi, I., Fawole, A., . . . Munoz, N. (2004). Prevalence of papillomavirus infection in women in Ibadan, Nigeria: a population-based study. *British journal of cancer, 90*(3), 638-645.

Thompson, E. L., Wheldon, C. W., Rosen, B. L., Maness, S. B., Kasting, M. L., & Massey, P. M. (2020). Awareness and knowledge of HPV and HPV vaccination among adults ages 27–45 years. *Vaccine, 38*(15), 3143-3148.

Touch, S., & Oh, J.-K. (2018). Knowledge, attitudes, and practices toward cervical cancer prevention among women in Kampong Speu Province, Cambodia. *BMC cancer 18*(1), 1-8.

Ugwu, E., Obi, S., Ezechukwu, P., Okafor, I., & Ugwu, A. (2013). Acceptability of human papilloma virus vaccine and cervical cancer screening among female health-care workers in Enugu, Southeast Nigeria. *Nigerian journal of clinical practice, 16*(2), 249-252.

Zhu, X., MacLaughlin, K. L., Fan, C., Jacobson, D. J., Jenkins, G. D., Jacobson, R. M., & Finney Rutten, L. J. (2022). Awareness of HPV Testing and Acceptability of Self-sampling for Cervical Cancer Screening Among Women in Minnesota. *Journal of general internal medicine, 37*(6), 1565-1568.

Ziba, F., Baffoe, P., Dapare, P., Shittu, S., & Antuamwine, B. (2015). Awareness and knowledge level of cervical cancer among women of reproductive age in Bolgatanga municipality. *Journal of Medical Biomedical Sciences, 4*(2), 1-6.

QUALITY OF MATERNITY CARE SERVICES AS PERCEIVED BY MOTHERS

IN SELESTED HEALTH CENTRES IN RIVERS STATE.

By

[1]Chuku, Francisca,
[2]Dr. Joel Aluko,
[3]Dr. Abigail Horsfall

[1]+234-8037106166,
[2]+234-8060633244,
[3]+234-8037082294
[1]chukufranca@gmail.com,
[2]joelforfavour@gmail.com,
[3]abigailhorsefall@uniport.edu.ng

[1 & 3]Department of Nursing, African Centre of Excellence For Publ;ic Health and Toxicological Research, University of Port Harcourt, Nigeria.

[2]Department of Nursing, University of Illorin, Kwara State, Nigeria.

Abstract

The general aim of the study was to assess the quality of maternity care services as perceived by care consumers (mothers) in selected Health Centres in Rivers State. The specific objectives were to assess the quality of care during ante natal and post natal period. The study was a descriptive cross-sectional design. The sample comprised of 312 respondents. Data were collected using questionnaire. Statistical analysis results from the care consumers showed that 1640 representing 54.6% of responses were majority indicating that the quality of antenatal care rendered to women was rated as "fair". 372 responses representing 23.92% noted that intra-partum care was "*very good"* while 465 representing 29.90% adjudged that quality of post natal care rendered to women was "fair the in selected Health Centers in the Rivers. In conclusion, although with the above perception, it was evident that the services provided in the health care facility is not adequate. Hence, the researcher recommends improvement on the services rendered.

Keywords: Maternity Care, Mother, Quality.

Introduction

Maternal and child health care is of very great importance to the family, health care givers and the society at large. Achieving pregnancy by a woman and delivering a child are things of joy to the woman herself, the husband and the extended family members. But the death of either the pregnant woman or her baby or both of them bring sorrow to the husband, family members and significant others. Over the years there have been maternal and child health care programmes and activities in both formal and informal settings as well as in public and private health institutions. Despite the availability of maternal and child health care services, about 810 women died everyday in 2017.

(WHO, UNICEF & UNFPA). Also, about 2.4million newborns died in the first month of life (WHO, 2020). Hence, the question; what is the quality of health care given to mother and child from the period of pregnancy to child delivery to six weeks after child delivery at the centers where these cares are given. In developed countries, 98% of all women receive prenatal care and 94% give birth under the supervision of skilled healthcare practitioners with timely access to appropriate emergency treatment if complications arise, (Olusoji, Olumide&Oluwatosin 2013). The quality of health care given to mother and child is bound to vary from one health care providing facility to another as well as from one environment to another. For instance, the quality of health care provided by government owned health care facility will not be the same as the one provided in the private facility. Also, the quality of care provided in Nigeria (a developing country) will vary with that provided in United State of America (a developed country). Source (big assumption)

Observation by Chimarroke and Frederick (2017) and Okonofua and Ogu (2017) revealed that there have been high maternal and child morbidity and mortality in Nigeria which is 814 per 100,000 live births (WHO 2017). This could be largely related to inadequate skilled birth attendants (SBAs), poor equipment, clients' attitude, caregivers' attitudes, belief system, cultural background, poor community sensitization and mobilization, level of education and perceptions of mothers. Furthermore,Izugbara and Wekesah (2016) identified some factors that hinder quality maternal health care services in Nigeria to include; shortage of skilled health personnel, limited accessibility, availability and affordability of existing health services, poor budgetary allocation, corruption, weak referral systems, poor regulation, and co-ordination of health services.

Moreso, Nnebue (2011), considered some key determinants of quality care and they are as follows; the availability of basic supplies and equipment, Technical competence of the care givers, Interpersonal skills, The quality of facilities, and infrastructures, others includes linkage of other health services, and good referral system. Improvement of the quality of health care services to women and their babies is quite necessary in the world of today where positive outcome is the yearning and aspiration of every woman and her family. Continuous training of the health care personnel and provision of facilities has proven to have a great reduction of maternal and child mortality rates to some extent.

In a study by Emelumadu, Onyeonoro, Ukegbu, Ezema, Ifeadike&Okezie (2014), on perception of quality of maternal health care services among woman utilizing antenatal services in selected primary health care facilities in Anambra State, Southeast Nigeria, shows good quality of maternal health care services and highlights the need of formal maternal health care services. The study was guided by Donabedian model for quality care. Which considered the existence of three essential factors in assessing quality of care, the three categories are: "structure", "process", "outcome". Several studies have been carried out on quality of maternal health care services; none has been carried out in the selected birth centres. Maternal health care services are quite vital to mothers and pregnant woman. Many pregnant women or mothers do patronize Traditional Birth Attendants (TBAs), faith clinics, and herbal homes etc. Two incidences of women who registered with the orthodox facility but lost their lives while

giving birth with the unskilled birth attendant prompted the researcher to carry out this study.

Several studies suggest that the low patronage of formal health care services by Nigerian woman during antenatal period, delivery and post-natal period is their perceived nature of the health facilities as having low quality of care. This could be evident by the number of maternal mortality, which refers to death due to complications from pregnancy or childbirth of 295, 000 every day globally as recorded in 2017 (WHO 2019). The increase in the rate of maternal mortality in some parts of the globe could be related to inequalities in accessing quality maternal health care services (WHO 2019). This could be related to the fact that; every pregnancy carries risk and some are riskier than others; despite that pregnancy is a physiologic process. These risks and complications could be identified if good quality maternal care services are provided. Pregnant woman in remote and poor areas are least likely to receive quality health care services. This is most common in areas with limited numbers of SBAs especially the underdeveloped and developing countries (WHO 2015).

Several studies have been done on quality maternal care services; none has been carried out in the setting of the study. To this end, the researcher assessed the quality of maternity care services as perceived by (mothers) consumers in selected health centres in Rivers State. Hence, embarking on this study or research is justified .Therefore; the result that will be gotten from this research will contribute to the body of knowledge on the subject matter as well as help in the improvement of quality maternal health care services. The study aimed at examining the maternity care services as perceived by the consumers (mothers) in selected health centers in Rivers State.

In specific terms, the objectives were, to access the quality of antenatal care , intra partum and post natal care rendered in the selected health centres. The study also provided answers to some research questions, such as the quality of care during ante natal, intra partum and post-partum. The following research questions guided the study.

1. What is the quality of antenatal care rendered to women in the selected health centres in Rivers State?
2. What is the quality of intra partum care rendered to women in the selected health centres in Rivers State?
3. What is the quality of post natal care rendered to women in the selected health centres in Rivers State?

The following hypotheses also guided the study;

1. There is no significant influence of educational qualification of care consumers on their perception of quality maternal care services.
2. Age has no significant influence on the perception of care consumers on the quality of maternal care services.

Methodology

Research Design

This study adopted a descriptive cross-sectional survey design. The population for the study was from the records of all care recipients that attended maternal care clinic of the selected health care facilities in Emohua, Ikwerre and Obio/Akpor Local Government Areas of Rivers East Senatorial District of Rivers State. Sample determination was done using Taro Yamene's formula as cited in Ojo (2012) with a calculated sample of 312 respondents representing the population.

Research Area

The study was carried out in East Senatorial District Rivers State. The state is one of the south states of Nigeria with attendant maternal issues which prompted the researcher to carry out the study in the area.

Eligibility Criteria

Only mothers who attend the facilities for services such as ante natal and post natal. Women who visit the facilities for other services were excluded.

Ethical consideration.

In view of the above, application for ethical approval was written to the Research Ethics Committee ACE-PUTOR University of Port Harcourt approval was given. Similarly a letter of introduction of the researcher was written by Dr. Faith Diorgu ACE-PUTOR MSc. Midwifery Coordinator, University of Port Harcourt to the Permanent Sercretary Rivers State Primary Health Care Management board, to enable the researcher gain access to the selected health centres.

Data Collection

The instrument for data collection was a pretested questionnaire developed by the researcher. The questionnaire which was self-administered by the researcher comprised of two (2) sections; section A was basically for demographic data, while section B was comprised of questions to elicit information from the research variables; qualities of maternity during ante-natal and post natal period. The instruments were validated by experts. Reliability was done using test re-test method. Data were analyzed using descriptive statistics involving means standard deviation, item by item analysis and ANOVA.

Results

Response Rate

Care Consumers Demographic Analysis

Table 1: Number, Frequency and simple Percentage of Care Consumers Educational Qualification

Care Givers Educational Qualification	F	Percentage

Primary	23	7.40%
Secondary	221	71.06%
Tertiary	67	21.54%
Total	**41**	**100%**

Research Question One: What is the quality of antenatal care rendered to women in the selected health facilities in the East Senatorial District of Rivers State?

Table 2: Showing respondent and percentage level of the quality of antenatal care rendered to women as perceived by the care consumers.

S/N	Quality Of Antenatal Care	Poor	Fair	Good	Very Good	Excellent
1	Concern shown by doctor to your complaints	2	179	11	54	65
2	Attention, concern and care of the care givers to patients	0	176	13	48	74
3	Availability of doctors to attend to patient's condition in the facility	3	182	13	31	82
4	Information given by doctors to patients or their relations	0	179	11	38	83
5	Coordination and teamwork among all health workers who provided care	0	194	7	30	80
6	Attention, concern and care of other Health Workers to patients	2	151	10	33	115
7	Competence and skill of health worker(s) who attended to you during ante natal care	1	186	8	26	90
8	Health workers' response to your calls during ante natal care	0	195	3	22	91
9	Information given by Nurses and other Health workers to patients or their relations	2	198	6	32	73
	Grand Responses Frequency	**10**	**1640**	**82**	**314**	**753**
	Percentage	**0.35 %**	**58.59 %**	**2.93 %**	**11.22%**	**26.91%**

The table above showed that 10 of the grand total respondents representing 0.35% of the sample population perceived that the attitude of health care givers during antenatal and childbirth visit is poor. 1640 of the grand total respondents representing 58.59% perceived that the attitude of health care givers during antenatal and childbirth visit is fair. 82 of the grand total respondents representing 2.93% perceived that the attitude of health care givers during antenatal visit is good. 314 of the grand total respondents representing 11.22% perceived that the attitude is very good While 753 of the grand total respondents representing 26.91% perceived that the attitude is excellent. From the grand frequency, it is seen that 1640 responses were recorded as "*fair"* meaning that the quality of antenatal care rendered to women during antenatal and childbirth visit as perceived by care consumers is fair.

Research Question Two: What is the quality of intra partum care in the selected health facilities in the East Senatorial District of Rivers State?

Table 3: Simple percentage analysis of the quality of intra partum care in the selected health facilities in the Rivers-East Senatorial District of Rivers State as perceived by care consumers.

S/N	Intra partum Care	Poor	Fair	Good	Very Good	Excellent
1	Nature of the delivery room; clean and adequate.	75	90	48	40	58
2	Consent and observation of Privacy and confidentiality during vagina examination.	33	40	69	90	79
3	Health workers response to calls, emotional support and back rub / massage during labour and child birth.	31	98	87	52	43
4	Health workers Periodic checks of the blood pressure, fetal wellbeing, extent of cervical dilatation.	49	50	79	95	38
5	Perineal care/ guiding of the baby during childbirth.	18	60	69	95	69
	Grand Responses Frequency	**206**	**338**	**352**	**372**	**287**
	Percentage	**13.24%**	**21.73%**	**22.63%**	**23.92%**	**18.45%**

The table above showed that 206 of the grand total responses representing 13.24% of the sample population perceived that the attitude of health care givers during antenatal and childbirth visit is poor. 338 of the grand total respondents representing 21.73% perceived that the attitude of health care givers during antenatal and childbirth visit is fair. 352 of the grand total respondents representing 22.63% perceived that the attitude of health care givers during antenatal and childbirth visit is good. 372 of the grand total responses representing 23.92% perceived that the attitude is very good while 287 representing 18.45% perceived that the attitude is excellent. From the grand frequency, it is seen that 372 responses were recorded as "*very good"* meaning that the quality of intra partum care in the selected health facilities in the Rivers -East Senatorial District of Rivers State as perceived by care recipient is that it is very good.

Research Question: What is the quality of post-partum care in the selected health facilities in the East Senatorial District of Rivers State?

Table 4: Shows simple percentage analysis if the quality of post-partum cares in the selected health facilities in the East Senatorial District of Rivers State as perceived by care consumers.

S/N	Post-partum care	Poor	Fair	Good	Very Good	Ex
1	Management of third stage, such as delivering of the placenta and control of bleeding.	65	97	74	50	25
2	Effective and efficient communication between care givers and the woman (and her companion)	56	84	73	80	18
3	Breastfeeding and bonding initiated few minutes after delivery.	59	103	44	61	44
4	Urinalysis, Blood pressure and abdominal palpation for involution.	72	83	52	60	44

5	Immediate care of the new born such as provision of warmth, sucking of mouth and nose etc.	84	98	43	58	28
	Grand Responses Frequency	**336**	**465**	**286**	**309**	**159**
	Percentage	**21.61**	**29.90**	**18.39**	**19.87**	**10.23**

The table above showed that 336 of the grand total responses representing 21.61% of the sample population perceived that the quality of post-partum care during antenatal and childbirth visit is poor. 465 of the grand total response representing 29.90% perceived that the quality of post-partum care during antenatal and childbirth visit is fair. 286 of the grand total responses representing 18.39% perceived that the quality of post-partum care during antenatal and childbirth visit is good. 309 of the grand total responses representing 19.87% perceived that the quality of post-partum care is *very good* while 159 representing 10.23% perceived that the quality of post-partum care is *excellent*. From the grand frequency, it is seen that 465 responses were recorded as "*fair"* meaning that the quality of intra partum care in the selected health facilities in the Rivers-East Senatorial District of Rivers State as perceived by care recipient is fair

HYPOTHESES TESTING

Discussion of Findings

The analysis in tables 5 shows respondent and percentage level of the quality of antenatal care rendered to women as perceived by the care consumers. The result appeared as follows: that 10 of the Grand Total (GT) respondents representing 0.3% perceived as poor, 1640(58.59%) fair, 82 (2.93%) good, 314 (11.22%) very good, while 753(26.91%) excellent. From the grand frequency, it is seen that 1640 responses were recorded as "*fair"* meaning that the quality of antenatal care rendered to women during antenatal visit as perceived by care consumers is fair. This could be closely related to the study done by Amukugo (2020), which stated that negative attitude of the health personnel was identified as a detrimental factor in the quality of health

care. Care givers analysis response are: 39 of the GT (10.57%) poor, 36 (9.76%) fair,72(19.51%) good, 150(40.65%) very good, while 72 (19.51%) excellent. From the grand frequency, 150 responses were recorded as *very good,* meaning that care givers perceived their attitude as very good. This is in line with (Yadav, A 2016; Hamal et al 2020), which states that respectful, courteous and, empathetic attitude of staff are considered as key in women's decision of health care facility.

From research question two, which State that, what is the quality of intra partum care in the selected health facilities in the Rivers-East Senatorial District of Rivers State as perceived by care consumers? The result appeared as follows: that 10 of the Grand Total (GT) 206 (13.24%), poor,388 (21.73%) fair, 352 (22.63%) good, 372 (23.92) very good, while 287 (18.45%) excellent. From the grand frequency, it is seen that 372 responses were recorded as "*very good"* meaning that the quality of intra partum care in the selected health facilities is very good.

Meanwhile, from the table, the response are as follows: 31 GT(15.12%) poor, 28(13.66%) fair, 21(10.24%) good, 29 (14.15%) very good, while 96 (46.83%) excellent. From the grand frequency, it is seen that 96 responses were recorded as "*excellent"* meaning that the quality of intra partum care in the selected health facilities is as perceived by care givers is excellent. This contradicts the study carried out in Malani by (Machira & Palamuleni 2018) which reported that the quality of care given during child birth was much lower compared to the care they received during ANC

Conclusion

Maternal care services were to a large extent well taken care of, this is evidenced by the availability of the care givers, their attitude, timely services, and improvement in the quality of care. Adequate infrastructure and certain basic amenities like water and electricity supply.

However, it was discovered that majority of these facilities lacked adequate essential items for the management of labour which implies that the facilities were not well equipped. The study shows that a lot still needs to be done in equipping health facilities across the state.

Limitations to the study

The process of this research was constrained by the problems of data collection for the study as some care givers were on off duty when the researcher visited their institution.

Recommendations

Based on the findings in this study, the following recommendations were made;

- The government and other stakeholders prioritize removing and eliminating financial obstacles to proper maternal care.
- Essential services should be made accessible to encourage women to continue receiving treatment.

Implication for Practice

The study has health implications that health care providers will have more will power to deliver quality maternity care. They will also sustain their level of awareness.

Contribution of Author

All authors designate in this study (Chuku, Francisca, Dr. Joel Aluko & Dr. Abigail Horsfall) confirm total contribution to the paper all-rounded beginning the study conception and design, data collection, analysis and interpretation of results.

Conflict of interest

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

Contribution to Knowledge

The findings of the study is of great importance as it contribute immensely to existing knowledge by exposing the quality of maternal care services in selected health centres. The study also identified some aspects that are lacking both on the part of health care workers and the health system factors. From the study, it is deduced that there is need for skill improvement on the part of the health workers and the medium for acquiring these skills should be both personal effort of health workers to seek for learning platform as well as health system providing and training for the health workers on the use of health facilities so as to improve the quality of care rendered to patients.

REFERENCES

Chimaraoke O Izugbara and Fredrick wekesah (2018). What does quality maternity care mean in a context of medical pluralism? Perspective of women in Nigeria. Health policy and planning, volume 33, Issue1, January 2018, pyes 1-8, retrieved on the 10th of August 2018, https: // doi. Org /10.1093 / haepol/c2×13.

Emelumadu, O., Onyeonoro ,U., U. Ukegbu ,A.,U. Ezema, N.,N. Ifeadike, C., O. Okezie, O., K.(2014). Perception of Quality of Maternal Health Care Services Among Women Utilizing Antenatal Services in Selected Primary Health Care Facilities in Anambra State, South East Nigeria. *Nigeria Medical Journal* 2014 Mar.; 55(2): 148-155.

Okonofua, F., Ogu, R., Aghor, K. et al(2017). Qualitative assessment of women's satisfaction health care in referred hospitals in Nigeria. *Reprod health* 14, 44(2017). https://doi. org/10.1186/512978-017-0305-6. Retrieved on the 4th of August 2021.

Olusoji ,J E, Olumide,A & Oluwatosin ,O (2013).An Assessment of maternity care services in a semi –urban local Government Area inNigeria.http://www.onlineresearchjournals.org/lMMSR

WHO (2019).Essential Interventions. Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health: A global review of the key interventions related to reproductive, maternal, newborn and child Health. Geneva: *WHO 2011*.

Yanagisawa S, Oum S, Wakai S. (2016). Determinants of skilled birth attendance in rural Cambodia.*Trop. Med Int health.11:238 – 255.*

Knowledge of Human Papilloma Virus infections and vaccination among Midwives in University of Port Harcourt Teaching Hospital, Rivers State.

Juliet N. Ikukaiwe[1], Horsfall, Abigail [12], Josephine Gbobbo[12],

[1]The African Centre of Excellence for Public Health and Toxicological Research, University of Port Harcourt, Rivers State
[2]Department of Nursing science, faculty of clinical sciences, University of Port Harcourt, Rivers State

Abstract

Background: Human Papilloma Virus infection is the most common sexually transmitted infection. Persistent infection is with about 70% of all invasive cancer which includes cervical, anal, penile, and oropharyngeal cancers.
Objective: Aimed to determine the level of knowledge of Human Papilloma Virus infections and vaccination among Midwives in University of Port Harcourt Teaching Hospital, Rivers State.
Study design: A descriptive survey design was adopted and convenience sampling technique was used to obtain 203 midwives from a population of 679 Midwives. A self-structured validated questionnaire was used to collect data. Statistical Package for Social Science version 22.0 was used to analyze the data while descriptive statistics of central tendency statistics (mean), percentage and Chi-square test were used.
Result: Findings revealed that 129(64%) knew that HPV is the most common cause of sexually transmitted infection in humans while majority did not know that HPV is a double stranded DNA virus, belonging to Papovaviridae family and are more than 150 types of HPV. Although, 143(70%) knew that HPV is transmitted through skin to skin contact and 123(61%) did not know it can be transmitted without symptoms. Although, 132(65%) knew HPV vaccine is best taken before starting to have sexual activities, 112(55%) did not know that HPV vaccination is taken in two injections doses and given six months apart and 132(65%) did not know HPV vaccine is given to both girls and boys or the names of HPV vaccines. Opinions of the Midwives were favourable with an average mean of 3.13.
Conclusion: The majority of the midwives have moderately low knowledge of HPV infection and vaccination. Their knowledge is often limited and inaccurate. Understanding of human papilloma virus, type of virus and vaccines was greatly lacking. A need for adequate sensitization of the Midwives through print/electronic media, seminars and workshops is needed.

Key words: Human papillomavirus (HPV) Infection, Vaccination, Midwife

1.0 Introduction

Cervical cancer is a significant public health problem among all African women. It is ranked as the eighth most common cancer worldwide and the fourth most commonly occurring cancer in women (World Health Organization {WHO}, 2020). Human papillomavirus (HPV) is the leading cause of cancer mortality among women in sub-Saharan Africa (SSA) (Bhatla &

Singhal, 2020). Human papillomavirus (HPV) is a double-stranded DNA virus that belongs to the Papovaviridae family. It is the most common viral infection that affects the reproductive tract of both men and women, the peak time for the acquiring infection is shortly after becoming sexually active (World Health Organization, 2020).There are almost 200 types of HPV identified, with 40 types affecting the genital tract of humans (Chan et al., 2019). It is a sexually transmitted virus that has been attributed to causing several cancers, including cervical, anal, penile, and oropharyngeal cancer, as well as genital warts and recurrent respiratory papillomatosis (Agyei-Baffour et al., 2020). HPV infection accounts for approximately 5.2% of human cancer's burden worldwide and mostly infects sexually active women and men at some point in their lives repeatedly (World Health Organization, 2020). HPV infections are divided into two groups based on their carcinogenic properties. These two groups include high risk and low risk. Those in high risk include 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 68, and 59. While 53, 66, 70, 73 and 82 are potential high risk. It is proven that HPV 16 and 18 are the most virulent high risk genotypes, causing about 70% of all invasive cervical cancer in the world, while 6 and 11 are low risk (Chan, et al., 2019). The Catalan Institute of Oncology (ICO) Information Centre on HPV and the International Agency for Research on Cancer (IARC) (2019) noted that penetrative sex is not required in the transmission of HPV infection but skin to skin contact is well recognized as mode of transmission with its peak incidence soon after onset of sexual activity. HPV infections could resolve spontaneously without the person necessarily showing the symptoms of the disease. However, persistent infection with specific types of HPV (mostly types 16 and 18) may lead to precancerous lesions and if left untreated may progress to cervical cancer. If the infection is identified early and treated adequately, it is curable (WHO, 2020). According to Bloem and Ogbuanu (2017), the morbidity and mortality caused from cervical cancers could be greatly reduced by the use of vaccines. These vaccines can prevent infection caused by high-risk oncogenic HPV types 16 and 18 and HPV types 6 and 11 that cause anogenital warts have been in use since 2006. According to WHO (2020), there are three vaccines which are now being marketed in many countries today. They include bivalent, quadrivalent, and nonavalent vaccines. They are all highly efficacious in preventing infections with HPV virus types 16 and 18, which are responsible for causing approximately 70% of cervical cancer cases globally (WHO, 2020). It is a well-known fact that Midwives play a vital role in immunization of the public against infectious diseases. Their role influences the uptake and adherence to HPV vaccination schedules by most women. Therefore, Midwives' knowledge is very important as these professionals play a crucial role in disease prevention and health promotion by educating the mothers and general public to promote health and

control diseases. Several studies, from developing countries, have shown the relationship of knowledge of HPV infection and acceptability of HPV vaccination among health care providers. In a study conducted by Gol and Erkin (2016), to determine the knowledge and practices of Nurses on cervical cancer, human papillomavirus and its vaccine, it revealed below the desired level. Also, in a similar study conducted by Ebu, et al. (2021) among nurses and midwives, it revealed a gap in knowledge about cervical cancers risk factors and attitudes towards HPV vaccination. In a study conducted by Chawla et al. (2016) among the healthcare providers in India, it showed lack of awareness about the principal cause, risk factors and symptoms for cervical cancer. Hence this study was aimed to ascertain the knowledge of HPV infection and vaccination among Midwives in University of Port Harcourt Teaching Hospital, Rivers State.

2.0 Methods and Methods

This was a descriptive cross-sectional survey that involved Midwives working at in University of Port Harcourt Teaching Hospital (UPTH), Rivers State. The sample size of 203 midwives was selected from the total population of 679 midwives using convenience sampling. A self-structured questionnaire was used to elicit information on socio-demographic data, knowledge level of Human Papilloma Virus, knowledge on Human Papilloma Virus infection, knowledge on Human Papilloma Virus infection and opinions on HPV vaccination. Statistical Package for Social Science version 22.0 was used and displayed in central tendency statistics (mean) and percentages while Pearson's Chi - square of independence was used to test the hypothesis at a significant level of 0.05.

3.0 Results and Discussions

The result revealed that 100% of the respondents were females. 25% of the respondents were between the age of 21 – 30 years, 45% were between the age of 31 – 40 years, 20% were between the age of 41 – 50 years while 10% were between the age of 51 – 60 years and none were above 61years, 10% of the respondents were single, 79% were married, 6% were divorced while 5% were widows. 25% had RM, 40% had RN/RM and 25% had B.Sc. while 10% had Mmw. 7% of the respondents were Nursing Officers, 23% were senior Nursing Officers, 34% were Principal Nursing Officers, 31% were Chief Nursing Officers and 6% were Assistant Director of Nursing. 84% of the respondents were Christians, 1% were Muslims while 5%

belonged to other religions. 25% of the respondents were Yoruba, 46% were Ibo, and 9% were Hausa while 20% were from other ethnic groups.

Table 3.1: Percentage and frequency of demographic data

Gender	**Frequency**	**Percentage**
Male	0	0
Female	203	100
Age		
21 -30	50	25
31- 40	93	45
41– 50	40	20
51- 60	20	10
61 and above	0	0
Marital status		
Single	20	10
Married	160	79
Divorced	13	6
Widow	10	5
Qualification		
RM	50	25
RN/M	83	40
Bsc	50	25
Mmw	20	10
Designation:		
Nursing Officer	15	7

Senior Nursing Officer	45	22
Principal Nursing Officer	68	34
Chief Nursing Officer	63	31
Assistant Director of Nursing	12	6
Religion		
Christianity	170	84
Muslim	10	5
Others	23	11
Ethnicity		
Yoruba	50	25
Ibo	94	46
Hausa	19	9
Others	40	20

Table 3.2: Level of knowledge towards HPV among Midwives at University of Port Harcourt Teaching Hospital, Rivers State.

ITEMS	Yes	%	No	%	Mean	SD
HPV is a double stranded DNA virus	80	39%	123	61%	3.2	.87335
HPV belong to Papovaviridae family	96	47%	107	53%	3.4	.63969
There are more than 150 types of HPV	68	33%	135	67%	3.9	.81750
HPV does not attacks only genital tracts of women	57	28%	147	72%	3.7	.59606
HPV does not causeonly cervical cancer	70	34%	133	65%	3.0	.67445
HPV is transmitted through skin to skin contact	148	73%	55	27%	3.1	.69781
HPV accounts for 90% of cervical cancer	167	82%	36	18%	3.5	.79632

HPV is the most common causes of sexually transmitted infection in humans	129	64%	74	36%	3.3	.87335
HPV cause of genital wart	192	95%	11	5%	3.7	.59606
HPV type 16 and 18 is the type that causes cervical cancer	47	23%	156	77%	3.0	.67445
HPV type 6 and 11 causes genital warts	35	17%	168	83%	3.1	.69781
Having sex at early age increases the risk of having HPV infection	200	99%	3	1%	3.5	.79632
Average	**107**	**53%**	**90**	**47%**	**3.3**	**.72771**

Table 3.2 revealed that 80 respondents representing 39% of the sample knew that HPV is a double stranded DNA virus, while123(61%) did not know, 96(47%) knew that HPV belong to Papovaviridae family while 107(53%) did not know, 68(33%) knew that there are more than 150 types of HPV while 135(67%) did not know, 57(28%) knew that HPV does not attacks only genital tracts of women while 133(65%) did not know. 70(34%) knew that HPV does not cause only cervical cancer. 148(73%) knew that HPV is transmitted through skin to skin contact while 15(27%) did not know, 167 (82%) knew that HPV accounts for 90% of cervical cancer while 74(36%) did not know, 129(64%) knew that HPV is the most common causes of sexually transmitted infection in humans while 74(36%) did not know, 192(95%) knew that HPV causes genital warts while 11(5%) did not know. 47(23%) knew that HPV type 16 and 18 is the type that causes cervical cancer while 156(77%) did not know, 35(17%) knew that HPV type 6 and 11 causes genital warts while 168(83%) did not know and 99% knew that Having sex at early age increases the risk of having HPV infection.

Table 3.3: Level of knowledge towards HPV infections among Midwives at University of Port Harcourt Teaching Hospital, Rivers State.

ITEMS	Yes	%	No	%	Mean	SD
Human papilloma virus infection is a viral infection that affect both men and women	53	26%	150	74%	3.1	.59606

Human papilloma virus infection is a viral infection that causes cervical cancer.	203	100%	0	0	3.0	.67445
HPV infection does not affect only those that are promiscuous	50	25%	153	75%	2.8	.69781
HPV infection cannot affect those that have single sex partners	63	31%	140	69%	2.8	.79632
HPV is transmitted through skin to skin contact	143	70%	60	30%	2.6	.79534
HPV is transmitted through sexual intercourse	203	100%	0	0	2.5	.80459
Most women will acquire the HPV infections within their life	63	31%	140	69%	2.7	.59606
Most genital HPV infections can resolve spontaneously.	60	30%	143	70%	2.5	.80155
People can transmit to their partner even if they don't have symptom	80	39%	123	61%	3.1	.71877
Risk factors include multiple partners, commercial sex workers, homosexuals	203	100%	0	0	2.5	.90797
HPV infection does not always present with visible signs and symptoms	63	31%	140	69%	3.7	.55791
HPV cannot be diagnosed by doing High vaginal swab	81	40%	122	60%	3.1	.91043
HPV infection can be diagnosed by having cervical screening test	203	100%	0	0	3.7	.68157
HPV infection can be cured with antibiotics	120	59%	83	41%	2.8	.83484

HPV does not require any treatment at times	140	69%	63	31%	2.5	.80155
HPV infection cannot be prevented by taking balanced diet	122	60%	81	40%	2.5	.80459
HPV infection can be prevented by HPV vaccination	203	100%	0	0	2.7	.59606
Using condoms reduces the risk of getting HPV	120	59%	83	41%	2.5	.80155
Average	**121**	**59%**	**80**	**41%**	**2.8**	**.74588**

Table 3.3 revealed that 53(26%) knew human papilloma virus infection is a viral infection that affects both men and women while 150(74%) did not know. 153(75%) knew that HPV does not affect only those that are that promiscuous while 50(25%) did not know, 140(69%) knew that HPV infection can affect those that have single sex partners while 63(31%) did not know. 143(70%) knew that HPV is transmitted through skin to skin contact 60(30%) did not know. 100% knew human papilloma virus infection is a viral infection that causes cervical cancer, 63(31%) knew that most women will acquire the HPV infections within their life while 140 (69%) did not know, 60(30%) knew most genital HPV infections can resolve spontaneously while 143(70%) did not know, 80(38%) knew people can transmit HPV to their partner even if they don't have symptoms while 123(61%) did not know. 100% knew risk factors include multiple partners, commercial sex workers, homosexuals, 63(31%) knew that HPV infection does not always present with have visible signs and symptoms while 140(69%) did not. 122(60%) knew HPV cannot be diagnosed by doing High vaginal swab, while 81(40%) did not know.100% knew HPV infection can be diagnosed by having cervical screening test, 120(59%) knew HPV infection cannot be cured with antibiotics while 83(41%) did not know. 140(69%) knew HPV does not require any treatment at times while 63(31%) did not know, 122(60%) knew HPV infection can be prevented by taking balanced diet while 81(40%) did not know.100% knew that HPV infection can be prevented by HPV vaccination, 120(59%) knew that using condoms reduces the risk of getting HPV while 83(41%) did not know.

Table 3.4: Level of knowledge towards HPV vaccination among Midwives in University of Port Harcourt Teaching Hospital, Rivers State.

ITEMS	Yes	%	No	%	Mean	SD
HPV vaccines help to prevent HPV infection	203	100%	0	0	3.12	.47
HPV vaccines prevent all types of cancer	0	0%	203	100%	3.80	.31
HPV vaccine is best taken before starting to have sexual activities	132	65%	71	35%	2.76	.42
HPV vaccination is taken as two injections doses six months apart	91	45%	112	55%	2.71	.65
HPV vaccines is given to all women	91	45%	112	55%	2.71	.65
The HPV vaccine is given to girls and boys	71	35%	132	65%	2.72	.47
Girls should be given the vaccine before they become sexually active	153	75%	50	25%	3.12	.47
The HPV vaccine does not last a life time	62	31%	140	69%	3.01	.15
The HPV vaccine are cervarix and qardasil	71	35%	132	65%	2.58	.42
HPV vaccine is not given to children below 9 years	91	45%	112	55%	2.71	.05
The HPV vaccine is started from 9yrs – 14yrs	127	63%	76	37%	3.46	.12
The HPV vaccine can be given at 26 years	133	66%	70	34%	2.72	.47
The HPV vaccine is given to adults	73	36%	130	64%	3.02	.07
The dose of the 0.5ml and given intramuscularly	132	65%	71	35%	2.41	.15
The HPV vaccines has no adverse effect	132	65%	71	35%	2.38	.42
The HPV vaccine is readily available	43	21%	160	79%	3.41	.65
The HPV vaccine is very expensive	203	100%	0	0	2.72	.47
Average	**106**	**52%**	**97**	**48%**	**2.94**	**0.75**

Table 3.4 revealed that 100% knew HPV vaccines help to prevent HPV infection, 100% knew HPV vaccines does not prevent all types of cancer,132(65%) knew HPV vaccine is best taken

before starting to have sexual activities while 71(35%) did not know, 91(45%) knew that HPV vaccination is taken as two injections doses, six months apart while 112(55%) did not know. 91(45%) knew that HPV vaccines is given to all females while 112(55%) did not know 71(35%) knew that HPV vaccine is girls and boys while 132(65%) did not know. 153(75%) knew girls should be given the vaccine before they become sexually active while 50(25%) did not know 62(31%) knew the HPV vaccine does not last a life time while 140(69%) did not know., 71(35%) knew that the name of HPV vaccines available are cervarix and qardasil while 132(65%) did not know.91(45%) knew that HPV vaccine is not given children below 9 years while 112 (55%) did not know.127(63%) knew the HPV vaccine is started from 9yrs – 14yrs, while 76(37%) did not know. 133(66%) knew the HPV vaccines can be given at 26years while 70(34%) did not know, 36% knew the HPV vaccines is given from 14-30yrs, 135(65%) the dose of the 0.5ml and given intramuscularly while 71(35%) did not know, 132(65%) knew the HPV vaccines has no adverse effect while 71(35%) did not know, 43(21%) answered that HPV vaccine is readily available while 160(79%) answered that HPV vaccines is not readily available. and 100% knew the HPV vaccine is very expensive.

Table 3.5: Opinions of Midwives on HPV vaccination in University of Port Harcourt Teaching Hospital, Rivers State.

ITEMS	SA	A	D	SD	U	Mean	SD
HPV vaccines should be given to all children	73 (36%)	80 (39%)	24 (12%)	26 (12%)	0	3.44	.954
I will voluntarily recommend my child and others to take the vaccine	57 (28%)	70 (34%)	36 (18%)	40 (20%)	0	3.49	.597
It is the fear of having the cancer that discourages people from taking the vaccines	70 (34%)	83 (41%)	30 (15%)	20 (10%)	0	2.90	.654
If the vaccine is included in the immunization schedule it will increase the vaccine uptake	120 (59%)	83 (41%)	0	0	0	3.37	.656

There is risk of developing the HPV infection if vaccinated	40 (20%	31 (15%)	60 (30%)	72 (35%)	0	3.55	.908
If the cost is free it will increase the acceptance of the vaccine	70 (34%)	83 (41%)	30 (15%)	20 (10%)	0	3.48	1.003
The safety of the vaccines is the major concerns of not accepting the vaccination.	70 (34%)	83 (41%)	30 (15%)	20 (10%)	0	2.82	.873
Limited knowledge affect HPV vaccine acceptance	122 (60%)	81 (40%)	0	0	0	2.52	.801
HPV Vaccine use might enhance high risk sexual behaviour	36 (18%)	40 (20%)	57 (28%)	70 (34%))	0	2.61	.852
Average						**3.13**	**.81**

Table 3.5 revealed that 73(36%) of the sample strongly agreed while 80(39%) that HPV vaccines should be given to all children and 24(12%) disagreed while 26(12% also strongly disagreed, 57(28%) strongly agreed while 70(34%) agreed that they will voluntarily recommend their children and others to take the vaccine and 36(18%) disagreed while 40(20%) strongly disagreed, 70(34%)strongly agreed and 83(41%) agreed that it is the fear of having the cancer that discourages people from taking the vaccines and 30(15%) disagreed while 20(10%) disagreed, 120(59%) strongly agreed while 83(41%) agreed that if the vaccine is included in the immunization schedule it will increase the vaccine uptake, 40(20%) strongly agreed while 31(15%) agreed that there is risk of developing the HPV infection if vaccinated and 60(30% disagreed and 72(35%) strongly disagreed.70(34%) strongly agreed while 83(41%) agreed that if the cost is free it will increase the acceptance of the vaccine but 30(15%) disagreed while 20(19%) strongly disagreed, 70(34%) strongly agreed while 83(41%) agreed that the safety of the vaccines are the major concerns of not accepting the vaccination and 30(15%) disagreed while 20(10%) strongly disagreed,122(60%) strongly agreed while 81(40%) agreed that limited knowledge affect HPV vaccine acceptance, 36(18%) strongly agreed while 40(20%) agreed that HPV Vaccine use might enhance high risk sexual behavior and 57(28%) disagreed while 70(34%) disagreed.

Test of Hypothesis

1st hypothesis

H_O=There is no relationship between the knowledge of HPV infection and the qualification of midwives at the University of Port Harcourt Teaching Hospital.

H_i= There is a relationship between the knowledge of HPV infection and the qualification of midwives at the University of Port Harcourt Teaching Hospital.

Calculations of x^2= $\frac{\sum fo-fe}{fe}$

Where x^2 = *Chi-square*

$\sum$ = *Summation*

fo = *Observed frequency*

fe = *Expected frequency*

Table 3.6.1: Relationship between knowledge of HPV infection and the qualification of the midwives regarding the at the University of Port Harcourt Teaching Hospital.

O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
8	12.32	-4.32	18.6624	1.5148
33	22.91	10.09	101.8081	4.4438
7	9.85	-2.85	8.1225	0.8246
2	4.93	-2.93	12.4449	2.5243
28	20.44	7.56	57.1536	2.2962
36	38.03	-2.03	4.1209	0.1084
12	16.36	-4.36	19.0096	1.1620
7	8.18	-1.18	1.3924	0.1702
12	12.32	-0.32	0.1024	0.0083
20	22.91	-2.91	8.4681	0.3696

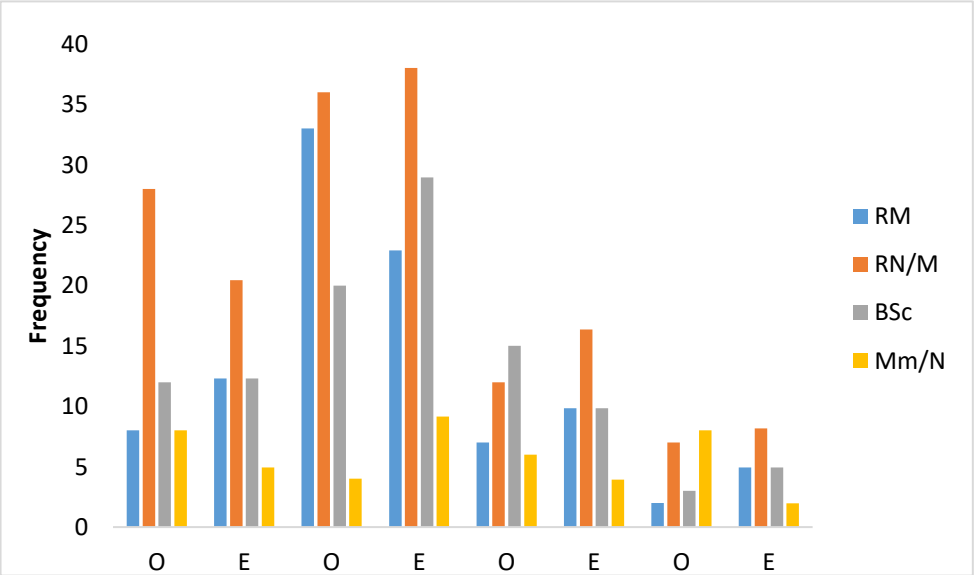
15	9.85	5.15	26.5225	2.6926
3	4.93	-1.93	3.7249	0.7556
2	4.93	-2.93	8.5849	1.7414
4	9.16	-5.16	26.6256	2.9067
6	3.94	2.06	4.2436	1.0771
8	1.97	6.03	36.3619	18.457
				X^2=41.5526

The degree of freedom = (4-1) x (5-1) = 3 x 4=12

The degree of freedom of 12 at a 95% Confidence level is 21.03

Decision rule

Comparing the calculated value and the critical value (from table), the calculated value is greater than the value from the table. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted. So, there is a There is a relationship between the knowledge of HPV infection and the qualification of midwives at the University of Port Harcourt Teaching Hospital.



2nd hypothesis

H_O=There is no relationship between the knowledge of HPV vaccination and designation of the midwives at the University of Port Harcourt Teaching Hospital.

H_i= There is a relationship between the knowledge of HPV vaccination and designation of the midwives at the University of Port Harcourt Teaching Hospital.

Table 3.6.2: Relationship between the knowledge of HPV vaccination and designation of the midwives at the University of Port Harcourt Teaching Hospital.

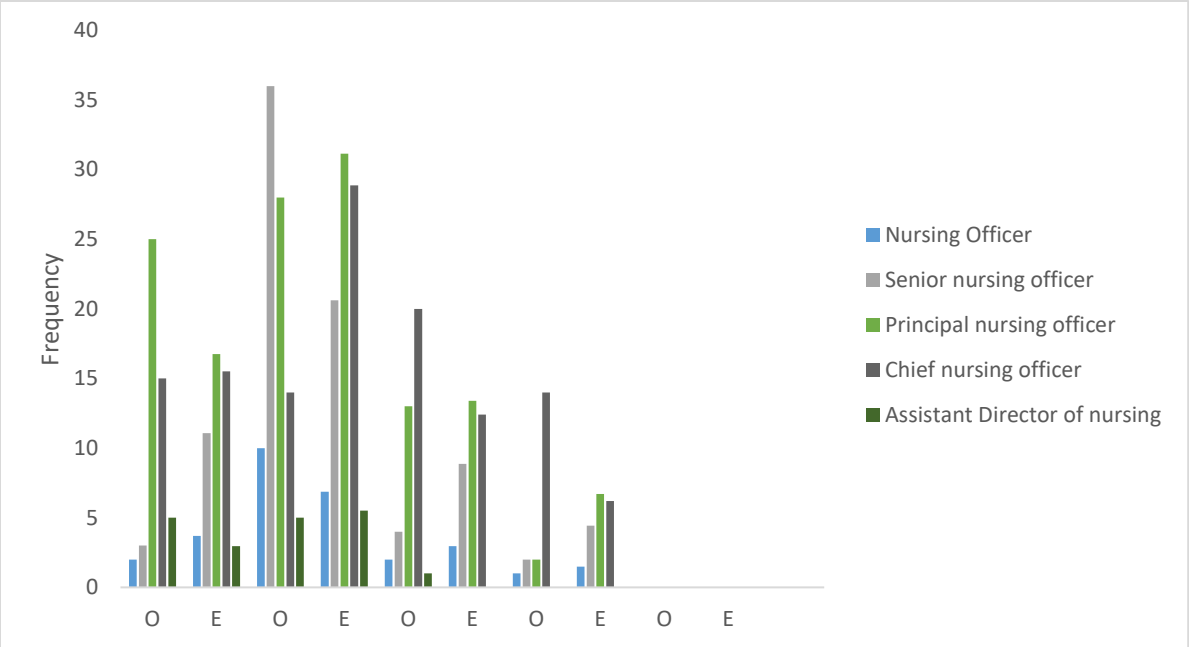
Observed value	Expected value E	O-E	$(O-E)^2$	$(O-E)^2/E$
2	3.69	-1.69	2.8561	0.974
10	6.87	3.13	9.797	1.426
2	2.96	-0.96	0.9216	0.371
1	1.47	-0.47	0.2209	0.150
3	11.08	-8.08	65.286	5.89
36	20.62	15.38	236.54	11.47
4	8.87	-4.87	23.7169	2.67
2	4.43	-2.43	5.9049	1.3329
25	16.75	8.25	68.0625	4.06
28	31.15	-3.15	9.9225	0.3185
13	13.40	-0.40	0.16	0.0119
2	6.70	-4.70	22.09	3.30
15	15.52	-0.25	0.0625	0.0040
14	28.86	-14.86	220.8196	7.6514
20	12.41	7.59	57.6051	4.62
14	6.21	7.79	60.6841	9.77

$X^2 = 57.819$

Decision rule

The degree of freedom is (5-1) (5-1) =4 x 4 =16. So the degree of freedom of 16 at a 95% Confidence level is 26.3 which is the value of chi-square from the table (critical value).

Therefore, the null hypothesis was rejected, and the alternate hypothesis was accepted. So, There is a relationship between the knowledge of HPV vaccination and designation of the midwives at the University of Port Harcourt Teaching Hospital.



3.2 Discussion of Findings

Level of knowledge towards HPV: Midwives are expected that have in-depth knowledge on issues regarding health and diseases in order to sensitize the general public on preventative measures that could help to promote their health and prevent illnesses. The study revealed that the knowledge of Human papilloma virus among Midwives was relatively low. Majority of the respondents did not know that HPV is a double stranded DNA virus, belongs to Papovaviridae family and are more than 150 types of HPV. Despite the fact that most of the Midwives are well informed that HPV is the most common causes of sexually transmitted infection in humans, transmitted through skin to skin contact, accounts for 90% of cervical cancer and causes genital warts, majority did not know that it also causes other types of cancers apart from cervical cancer, This is similar to a study conducted by Ebu et al. (2021) which demonstrated that the basic knowledge was lacking. Also in a similar in a study by Ezebialu et al.(2017) stated that the knowledge of the aetiology was very poor as well as Concetta et al., (2019) that highlighted the need to supplement nursing students' specific education to improve their knowledge and awareness of HPV infection and vaccination due to their low knowledge of HPV.

Level of knowledge towards HPV infections: The findings of this study revealed that level of knowledge among Midwives was moderately low as they did not have the basic facts about HPV infections. The result showed that majority of the respondents did not know that human papilloma virus infection is a viral infection that affect both men and women and that most genital HPV infections can resolve spontaneously which does not always present with visible signs and symptoms. Despite that all the midwives had optimal knowledge that human papilloma virus infection is a viral infection that causes cervical cancer, transmitted through skin to skin contact and the risk factors were multiple partners, commercial sex workers, homosexual many did not know that HPV infection can also affect those that have single sex partner. This similar result was obtained by Gol and Erkin (2016) which demonstrated that majority of the Nurses did not know risk factors of cervical cancer, signs of cervical cancer and how to protect oneself against cervical cancer. The finding is consistent with studies by Hassan and Awosan (2018) among Nurses in Sokoto, Nigeria, and Desaraju and Kodey (2021) among Nurses' in India which revealed that the Knowledge about cancer etiology and screening was low. In spite of all the Midwives knowing that human papilloma virus infection is a viral infection that causes cervical cancer, majority did not know that most women will acquire the HPV infections within their life and only few knew that people can transmit HPV to their partner even if they don't have symptom. This is similar to the study conducted by Chawla et al. (2016) among the healthcare providers in India, which showed lack of awareness about the principal cause, risk factors and symptoms for cervical cancer. The study by Nancy et al. (2021) on female nurses and midwives, at the Korle-Bu Teaching Hospital in Ghana, also demonstrated gaps in knowledge about cervical cancer risk factors and attitudes towards HPV vaccinations. This is also supported by the study conducted by Gol and Erkin (2016) among Nurses' which revealed that the knowledge of Nurses about risk factors, signs and prevention of cervical cancer were below the desired level. This is also similar to the study conducted among Nurses by Ezebialu et al. (2017) in South-Eastern Nigeria, which demonstrated a fairly good level of awareness of cervical cancer but the knowledge of the aetiology was very poor. Also the study conducted by Hassan and Awosan (2018), among female health-care professionals in Sokoto, Nigeria, proved that less than half of the respondents had good knowledge of HPV infection.

Level of knowledge of HPV vaccination: The result of the study revealed that the Level of knowledge of HPV vaccination among Midwives in University of Port Harcourt Teaching Hospital, Rivers State was Low. This is similar to a study conducted by Hassan and Awosan

(2018), among female health-care professionals in Sokoto, Nigeria, which demonstrated that only a few of the respondents had good knowledge of HPV vaccination, leading to poor uptake of the HPV vaccination. Also in accordance with the study conducted by Genc et al., (2013) on Turkish Midwifery Students, it revealed the relationship between the midwifery student knowledge on HPV and HPV vaccine and their current educational year was significantly poor.The is supported by study conducted by Chawla et al. (2016) among the healthcare providers in India, which revealed significant low knowledge of HPV vaccination.

The findings of the study also revealed that majority did not know the name of HPV vaccine available are cervarix and qardasil. This is similar to study by Makwe and Anorlu (2011) among female nurses at Lagos, Nigeria which showed only a quarter of respondents had heard of the HPV vaccines. This is also similar to a study conducted by Sazali, et al. (2021) among Nurses in Malaysia which revealed that majority of the Nurses were not aware that the Gardasil vaccine could protect against four types of HPV infection.

The findings of this study also revealed average number of the Midwives did not know that HPV vaccine is not given to children below 9 years. This finding is in accordance with the study conducted by Jeyachelvi et al. (2016) on nurses in Kelantan, which demonstrated that the midwives were not aware of appropriate age that the HPV vaccines are given.

The findings of the study also revealed that the HPV vaccines was not readily available and was very expensive. This is in accordance with the study conducted by Zhang et al (2017) among the nursing staff and students in China. It showed that majority were reluctant to get vaccinated because the vaccine was expensive. Also in a study conducted by Nguyen et al. (2020) on perceived barriers to HPV vaccination among adult health workers within Anambra State, revealed perceived barriers to include lack of awareness, vaccine availability/accessibility, cost, and concerns about acceptability.

In spite of the Midwives knowing that HPV vaccines help to prevent HPV infection, majority were deficit in knowledge that HPV vaccines was not given to only females but both boys and girls which was supported by a study conducted by Makwe and Anorlu (2011) among female nurses at Lagos, Nigeria which revealed that only few knew that the vaccines were for the prevention of cervical cancer. Chawla et al. (2016) in their study among the healthcare providers in India, revealed significant low knowledge of HPV vaccination. It was also in line with Nancy et al., (2021) study on female nurses and midwives, in Ghana which demonstrated gaps in knowledge about cervical cancer risk factors and attitudes towards HPV vaccination

Opinions of Midwives on HPV vaccination: The result revealed that the opinions of Midwives on HPV vaccination in University of Port Harcourt Teaching Hospital, Rivers State were that HPV vaccines should be given to all children, and they will voluntarily recommend their children to be vaccinated. The findings of the study is in line with the study conducted by Pelullo and Di Giuseppe (2019) on nursing students' in Italy which revealed that majority of students would be willing to receive the HPV vaccine and recommend the HPV vaccine to others. Also supported by the study conducted by Makwe and Anorlu (2011) among female nurses at Lagos, Nigeria which demonstrated that majority of the nurses expressed a desire to be vaccinated and supported the vaccination of pre-adolescent girls.

This study also revealed that the Midwives were of the opinions that people don't accept vaccine for fear of having the cancer and discourages people from taking the vaccines for fear of safety of the vaccines which was the major concerns. This was in accordance with the study conducted by Jeyachelvi et al.(2016) among nurses in Kelantan, where majority of participants believed that the vaccine is safe but nearly half of them were unsure about efficacy. This is also similar to a study conducted by Sazali, et al. (2021) among Nurses in Malaysia which revealed that some of the Nurses were unsure of its efficacy.

Conclusions

Majority of the midwives have moderately low knowledge of human papilloma virus infection and vaccination which was often limited and inaccurate. Understanding of human papilloma virus, type of virus and vaccines was greatly lacking. Cervical cancer and HPV Infection are health issues of women from developing countries, therefore, in order to reduce the burden of cervical cancer and implementation of vaccination program, knowledge of midwives is required which can be achieved by print and electronic media and organization of workshops/seminars for qualified Midwives to update their knowledge while the curriculum of student Midwives in training can be upgraded to include HPV Infection (causes, management and preventive measures (vaccination). This will enable them adequately sensitized parents on the need to vaccinate their children against human papilloma virus infection before they become sexually active.

References

Agyei-Baffour,P., Asare,M., Lanning,B., Koranteng,A. Millan,C. & Commeh, E (2020) .Humanpapilloma virus vaccination practices and perceptions among Ghanaian healthcare providers. A qualitative study based on multi-theory model. *PLoS ONE,15*(10), 741-749. https://doi.org/10.1371/journal.pone.0240657

Bhatla, N. & Singhal S. (2020). Primary HPV screening for cervical cancer**.***Best Pract. Res. Clin. Obstet. Gynaecol*., *65* (1), 98-108. https://doi.org/10.1016/j.bpobgyn. 2020.02.008

Bloem P., & Ogbuanu, I. (2017).Vaccination to prevent human papillomavirus infections: From promise to practice. *PLoS Med*, *14*(6), https://doi.org/10.1371/journal.pmed. 1002325

Chan, C. K., Aimagambetova, G.,Ukybassova, T., Kongrtay, K., & Azizan, A.(2019).Human papillomavirus infection and cervical cancer: epidemiology, screening, and vaccination-review of current perspectives. *Journal of Oncology*, 2(1), 1687-8450. https://doi.org/10.1155/2019/3257939

Chawla, P. C., Chawla, A, & Chaudhary S.(2016). Knowledge, attitude & practice on human papillomavirus vaccination: A cross-sectional study among healthcare providers. *Indian J Med Res*,144,741-749 https://doi.org/10.4103/ijmr.IJMR_1106_14

Concetta, P., Esposito, M. R. & Di Giuseppe, G(2019). Human Papillomavirus Infection and Vaccination: Knowledge and Attitudes among Nursing Students in Italy. *Int J Environ Res Public Health*.,16(10),1770. https://doi.org/10.3390/ijerph16101770.

Ebu**,**N.I., Abotsi-Foli, G.E.& Gakpo, D.F.(2021).Nurses and Midwives'knowledge, attitudes, and acceptance regarding human papillomavirus vaccination in Ghana: a cross-sectional study. Bio Med *Central of Nursing*, 20 (11).https://doi.org/10.1186/s12912-020-00530-x.

Ezebialu, C. ,Ezebialu, I. , Ezeifeka, G. , Nwobu, R. , Okani, C. & Chukwubuike, C.(2020). Prevalence of Cervical Human Pappillomavirus Infection in Awka, Nigeria. *Journal of Biosciences and Medicines*,(8**)**, 37-47. http://doi.org/ 10.4236/jbm.2020.83005

Ezebialu**,** I.U., Ezenyeaku, C. C., Umeobika, J. C., Ikeako, L. C., Ubboe, G. I., & Ojiyi, C. E. (2017). Knowledge of Cervical Cancer and Its Screening among Female Nurses Working in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, South-Eastern Nigeria. *Journal of Advances in Medicine and Medical Research*, *24*(10), 1-6. https://doi.org/10.9734/JAMMR/2017/38013

Genc, R,E., Sarican, E.S., Turga, A.S, Icke ,S., Sar, D.& Saydam, B.K(2013). Determination of knowledge of Turkish midwifery students about human papilloma virus infection and its vaccines. Asian Pac J Cancer Prev,14(11),6775-8. https://doi.org/10.7314/apjcp.2013.14.11.6775

Gol,I. & Erkin, O.(2016). Knowledge and practices of nurses on cervical cancer, HPV and HPV vaccine in Cankiri state hospital, Turkey. Journal of Pakistan Medical Association, *66* (12), 1621-1626. PMID: 28179702

Hassan, M. & Awosan,K.J. (2018).Knowledge of Human Papillomavirus Infection and Vaccination, and Practices Regarding Human Papillomavirus Vaccination among Female Health-care Professionals in Sokoto, Nigeria. *International Journal* of *Scientific* Study, *6*(5),62-70. http://doi.org/ 10.17354/ijss/2018/225

Jeyachelvi, K., Juwita, S. & Norwati, D.(2016). Human Papillomavirus Infection and its Vaccines: Knowledge and Attitudes of Primary Health Clinic Nurses in Kelantan, Malaysia. *The Asian Pacific Journal of Cancer Prevention*, 17(8), 3983-8. PMID: 27644649

Makwe, C. C. & Anorlu, R.I.(2011). Knowledge of and attitude toward human papillomavirus infection and vaccines among female nurses at a tertiary hospital in Nigeria. *Int J Womens Health*,(3)313-317. https://doi.org/10.2147/IJWH.S22792

Nancy, I. E., Abotsi-Foli, G.E.& Gakpo, D.F.(2021).Nurses and midwives' knowledge, attitudes, and acceptance regarding human papillomavirus vaccination in Ghana: a cross-sectional study. *Bio Med Central of Nursing*, 20 (11). https://doi.org/ 10. 1186/s 12912-020-00530-x.

Nguyen, N.Y., Okeke, E., Anglemyer, A.& Brock, T.,(2020). Identifying Perceived Barriers to Human Papillomavirus Vaccination as a Preventative Strategy for Cervical Cancer in Nigeria. *Annals of Global Health*, *86*(1), 118.http://doi.org/10.5334/aogh.2890

Pelullo, C.P., Esposito, M.R., & Di Giuseppe, G.(2019). Human Papillomavirus Infection and Vaccination: Knowledge and Attitudes among Nursing Students in Italy. *Int J Environ Res Public Health,* 16(10),1770. https://doi.org/10.3390/ijerph16101770.

Sazali, C.S., Shet, D. & Zain, N.M. (2021). Knowledge and attitude towards human papillomavirus infection and vaccinations among Nurses in Hospital Universiti Sains Malaysia. International Journal of Public Health and clinical Sciences,9(4),110-123

The National Cancer Institute (2021).*HPV and Cancer* Accessed from https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer.

World Health Organization (2017).*Summary of the WHO Position Paper on Vaccines against Human Papillomavirus* (HPV).Retrieved from https://www.who.int › pp_hpv_ may2017 _summary

World Health Organization (2018), *Guide to introducing HPV vaccine into national immunization programmes*, Retrieved from http://www.who.int/immunization/ documents/position papers/en/

World Health Organization(2020*). Human papillomavirus vaccines (HPV).*Retrieved from https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-vaccines-(HPV)

Zhang,Y.,Wang,Y., Liu,L., Fan,Y., Liu,Z., Wang ,Y. & Nie,S. (2017), Assessment of the knowledge, attitude and practices about Human Papilloma Virus vaccine among the nurses working in a tertiary hospital in China: A cross-sectional descriptive study. *The Journal of the Pakistan Medical Association*, *67*(2), 209-213

NURSES/MIDWIVES' PERCEPTION OF ADOPTING INFORMATION AND COMMUNICATION TECHNOLOGIES IN MIDWIFERY PRACTICE IN BAYELSA STATE

Aluzu Suoyo
University of Port Harcourt
Aluzusuoyo@gmail.com

ABSTRACT

Information and Communication Technologies (ICTs) has become an important tool for quality health care delivery by nurses all over the world, though its use in Nigeria is still in a very slow progress. The study tried to find out the nurse/midwives'perception of adopting information and communication technologies in midwifery practice in government hospitals in Bayelsa state. A mixed method concurrent triangulation was adopted, with a population comprising of all midwives who are working in government owned health facilities in Yenegoa, Bayelsa state. For the qualitative study, the instrument for data collection was an interview guide and then thematic data analysis was done using Braun and Clarke analysis. Trustworthiness was ensured through, credibility, transferability, confirmability and dependability. For the quantitative study, a questionnaire was distributed using multistage sampling to select 258 respondents. Data was analyzed using the Statistical Product and Service Solutions (SPSS) version 26. 13.6% of the respondents were Registered midwives, 36.8% were both registered nurses and registered midwives. Findings of both qualitative and quantitative study were at par, and it showed that midwives had a positive perception that ICT will help in accurate midwifery practice; there is a high readiness to adopt the use of ICT if the ways that will enhance its adoption is put in place. Also, majority of the respondents 166(64.1%) use ICT for specific health conditions, while 162(62.5%) use it every time at workplace. It was recommended that government should thread with caution on the legal implications that may be involved in the divulging of patients' health history on the internet, and midwives should have confidence that the use of ICT is easy and simple. In conclusion, all resources needed to make available and functional the use of ICT should be put in place.

Keywords: Adoption, Information and Communication Technologies, Midwives, Perception.

Introduction

The use of Information and Communication Technologies (ICT) have speedily advanced over the years in different sectors of human endeavours, and the health sector is not left out. The National Health IT Board of New Zealand has unveiled a strategy to enable an integrated healthcare model that would make a basic set of personal health information accessible electronically to patients and healthcare practitioners in any venue. (Knight et al 2010). According to the World Health Organization, more than half a million women die

each year as a result of difficulties during pregnancy and delivery, a figure that hasn't altered in two decades. (Chib et al 2018). According to the Project Reserves (2021) on the Use of E-Health in Nursing Practice among Cape Coast Nurses, the goal of the research was to find out how many registered nurses in Cape Coast use eHealth. According to the study, the majority of nurses (65.5%) had strong knowledge and more than half of them (67.5%) had positive views regarding eHealth. The majority of respondents (54.9 percent) also indicated a high level of proficiency in the use of ICT in health care delivery. But its use in the care of patient in Nigeria have shown a very slow progress as compared to other developed countries. Though ICT may be used in tertiary and urban situated hospitals, its use in the practice of midwifery is still at the birth stage. Nurses are critical to patient safety, and the quality of the nursing environment and electronic documentation have a favourable impact on patients.

The use of ICTs by nurses can impact their practice, modifying the ways in which they plan, provide, document, and review clinical care (Rouleau et al., 2017).

Healthcare information technology, according to Cassano (2014), started with the computer in the early 1970s and did not gain widespread popularity until individual computers were made accessible towards the end of the decade. Despite computer advancements, true clinical patient care was not considered until far after the turn of the twenty-first century. Individual departments that sought to speed up the process in order to give better results began to employ ICT from administration to clinical applications. The drive for improvement, according to Cassano (2014), was the driving reason for the emergence of computers in healthcare.

Statement of Problem

According to a study by Afolayan et al. (2014), more than 40% of health professionals said they had never used a multimedia projector (63.2%), video camera (61.5%), fax machine (62.6%), photocopier (52.9%), video recorder (51.7%), mobile/land phones (53.4%), video conferencing (70.1%), or Internet searches (41.4%) in the course of their professional duties. The usage of ICT in Nigeria, particularly in Bayelsa state, has been restricted to social communication and other personal uses, with little discussion of its application in midwifery practise. Nurses seem to have minimal capacity in terms of informatics abilities, according to Farzandipour et al. (2020).

Objectives

i. To assess how midwives perceive the use of ICT in midwifery practice in government hospitals in Bayelsa State. quantitative/qualitative
ii. To assess midwives' readiness on the adoption of ICT in midwifery practice in government hospitals in Bayelsa State. quantitative
iii. To assess the adoption/use of this ICT tools in government hospitals in Bayelsa State. quantitative.
iv. To identify midwife related factors that will enhance the adoption of ICT in midwifery practice in government hospitals in Bayelsa State. quantitative/qualitative
v. To identify midwife related factors that hinder the adoption of ICT in midwifery practice in government hospitals in Bayelsa State. quantitative/qualitative
vi. To identify institution-related factors that will enhance the adoption of ICT in midwifery practice in government hospitals in Bayelsa State. Quantitative.

Research Questions

i. How do midwives perceive the use of ICT in midwifery practice in government hospitals in Bayelsa State?

ii. What is the level of midwives' readiness on the adoption of ICT in midwifery practice in government hospitals in Bayelsa State?

iii. What is the extent of adoption/use of ICT tools among midwives in government hospitals in Bayelsa State?

iv. What are the midwife related factors that will enhance the adoption of ICT in midwifery practice in government hospitals in Bayelsa State?

v. What are the midwife related factors that hinder the adoption of ICT in midwifery practice in government hospitals in Bayelsa State?

vi. What are the institution-related factors that will enhance the adoption of ICT in midwifery practice in government hospitals in Bayelsa State?

Hypothesis

1. There is no significant relationship between the perception of midwives and use of ICT in midwifery practice
2. There is no significant relationship between the readiness of midwives and adoption of ICT in midwifery practice.
3. There is no significant relationship between the factors that hinder adoption and the practice of ICT in midwifery practice.

METHODOLOGY

Design and sampling

A mixed method concurrent triangulation was used.

For Quantitative: The study adopted a cross-sectional descriptive study.

For Qualitative: Phenomenological study was used. Phenomenological research is a way of finding meaning or sense of the "lived experience, identifying trends of an experience to gain further depth of understanding".

Multistage Sampling Method was used.

Step one: Simple random sampling method was used to select a particular local government area in Bayelsa where the research was conducted.

Step two: Systematic sampling method was used for step two. All the government owned facilities that attend to maternity cases was listed in a table frame, in an alphabetical order. These facilities for quantitative study was selected in a systematic other.

For the quantitative, the first facility was skipped, and the second picked, and subsequently, every alternate facility in the list was selected.

For the qualitative study, of the remaining four facilities, two was randomly selected

Step three:

For Quantitative: Cardboard sheets of two different colours were cut out (green and red), shuffled, and put in a bag. The number of the pieces of the cardboard sheet was 276 pieces each. Those who picked the green coloured cardboard sheets, and met the inclusion criteria were selected to be the participants of the study. Those who picked the red-cut cardboard sheets were not be part of the study.

For Qualitative: At the two facilities selected, midwives in those facilities were purposively selected for the qualitative study. Those participant who were purposively selected, met some criteria such as; the inclusion criteria, they were willing to make out, at least, 30 minutes of an undivided attention for the interview, and they were in the clinical area.

Data Collection

For Quantitative: The researcher distributed the questionnaire to the respondents on a face to face basis and the retrieval was also on the same day. The researcher went to

each ward/unit on the agreed date and time by the respondents, this was done, to avoid encroaching into their work period. The researcher explained the questionnaire to the respondents, then shared them and gave them ample time to fill in the data. The data collection took between three to four days to complete.

For Qualitative: The duration for the face-to-face in-depth interviews range between 20 - 30 minutes. The interview was conducted at a place that was free from noise and distractions. All sessions were conducted and recorded with a recorder. Digital recordings of all sessions were transcribed verbatim. The transcripts were thematically analyzed in order to identify themes.

Data Analysis

For Quantitative: The data was entered, coded and analyzed with the aid of Statistical Product and Service Solutions (SPSS) version 26. Statistical technique that was used included frequencies, percentages, and other descriptive statistics. (chi-square, descriptive and inferential)

For Qualitative: Braun and Clarke thematic analysis was used. Pre-set coding was used to analyse the data collected. This form of coding allowed the researchers to analyse an entire data set and to identify emergent themes.The researcher got familiarized with the data, used pre-set coding to generate themes. The themes were reviewed A concise, logical and non-repetitive report was made with vivid examples.

Ethical Considerations

A letter of introduction was given by the head of the school – ACE-PUTOR.For the goal of getting ethical clearance and ethical approval, the Ethical Review Board of the University of Port Harcourt and the Ethical Review Board of the Federal Medical Center Bayelsa were contacted. The heads of all the units that were employed for data collecting were also given

formal approval. Prior to data collection, research participants were informed about the nature and aim of the study, with a focus on how their anonymity and the confidentiality of the information they supplied would be ensured. On study instruments, no names or identifying information was gathered, and participants were free to withdraw at any moment. As confirmation of their voluntary involvement, participants were asked to complete the informed consent form.

RESULTS

Findings for quantitative study

Table 1: Perception on the use of ICT in midwifery Practice by nurses/midwives in Bayelsa state

S/N	Item	Mean	Std Dev	Decision
i.	It will help in an accurate midwifery practice	2.67	.65	Positive
ii.	ICT will be dangerous to use for legal reasons	1.89	.85	Negative
iii.	It will shift a midwife focus off the woman to the ICT	1.74	.79	Negative
iv.	It will be a waste of time in healthcare delivery	2.48	.72	Positive
v.	It will complicate delivery because of divided attention	1.73	.90	Negative
	Grand mean	**2.10**	**0.78**	**Positive**

Criterion mean = 2.00. Decision: ≤ 2.00 is negative, ≥ 2.00 is positive

Table 1 showed the perception of nurse/midwives on the use of ICT in midwifery practice. The result showed that overall, the respondents had a positive perception on the use of ICT in midwifery practice as the grand mean of 2.10±0.78 was higher than the criterion mean of 2.00 indicating a good perception. However, the respondents had a positive perception that it will help in accurate midwifery practice but few were of the opinion that it will complicate delivery because of divided attention.

Table 2: Midwives readiness on the adoption of ICT in midwifery practice

S/No	Item	Mean	Std Dev	Decision
i.	If the skill is appropriately taught, it will be adopted	2.71	.57	High
ii.	Attachment of incentive on ICT use will enhance readiness for adoption	2.36	.73	High
iii.	ICT will be readily adopted if ICT and accessories are consistently available and in good working condition	2.29	.81	High
iv.	Will be ready to adopt if litigation due to mistakes are minimized or removed.	2.21	.86	High
	Grand mean	**2.39**	**.74**	**High**

Criterion mean = 2.00. Decision: ≤ 2.00 is low, ≥ 2.00 is High

Table 2 showed midwives readiness on the adoption of ICT in midwifery practice. The overall result showed that, the respondents had a high readiness to adopt the use of ICT in midwifery practice. This is shown as the grand mean of 2.39 ± .74 was higher than the criterion mean of 2.00 indicating a high readiness.

Table 3: Adoption/use of ICT tools in midwifery practice at workplace

S/No	**Item**	YES F(%)	NO F(%)	Decision
i.	Used every time, at workplace	162(62.5)	97(37.3)	High
ii.	Used only during special occasions	111(42.9)	148(57.1)	Low
iii.	Used only for special/specific patients	102(39.4)	157(60.6)	Low
iv.	Used for specific health conditions	166(64.1)	93(35.9)	High
v.	Used only when internet is available	117(45.2)	142(54.8)	Low

Table 3 showed the Adoption/use of ICT tools in midwifery practice at workplace. The result proved that, out of the 260 respondents, majority of the respondents 166(64.1%) use ICT for specific health conditions, followed by 162(62.5%) who use it every time at workplace; then, 117(45.2%) use it only when internet is available, 111(42.9%) use it during special occasions while 102(39.4%) use it only for specific/special patients.

Table 4: Midwife related factors that enhance the adoption of ICT

S/NO	Item	SD	D	A	SA	Mean	Std Dev
i.	A standby instructor	27 (10.4%)	49 (18.8%)	135 (51.9%)	49 (18.8%)	2.79	.86
ii.	Availability of ICT tools	9 (3.5%)	27 (10.4%)	93 (35.8%)	131 (50.4%)	3.33	.79
iii.	Periodic practical seminars/workshop	18	32	98	112	3.16	.89
iv.	Motivational incentives on those that embraced ICT in patient management.	22	70	103	65	2.81	.90
v.	Adequate staffing will help adoption	12	59	106	83	3.00	.85
	Grand mean					**3.02**	**0.86**

Criterion mean = 2.50. Decision: <2.50 is poor, ≥2.50 is good

Table 4 analyzed the midwifes' related factors that enhance the adoption of ICT in midwifery practice. The result proved that the extent to which the use of ICT in midwifery practice can be enhanced is high as the grand mean of 3.02 ± 0.86 was higher than the criterion mean of 2.50, indicating a high extent. This ability to enhance the use of ICT was expressed in the fact that; if there are standby instructors; availability of ICT tools; periodic practical seminars/workshop; motivational incentives on those that embraced ICT in patient management; and adequate staffing.

Qualitative Study Findings

Enhancement of ICT use

The respondents opined that giving of incentives, availability of tools, training will help midwives adopt its use. Of the eight respondents, six agreed that periodic training will help midwives adopt the use of ICT, one respondent said a standby instructor will help, while one participant said the use of both periodic and standby instructor will be of great help

RESPONDENT 1*: "No 1 is the availability of the tools or material to work with. You also need availability of light, steady light source"*

RESPONDENT 2: *"counseling, when you counsel people about the importance of ICT they will be able to have a good knowledge concerning it and that will make them to abide or carry on with the ICT"*

RESPONDENT 3: *"I will say that, a little bit incentive we'll be fine, if the ICT tools are available. if there is constant power generation. These things will work well. if we have instructors teach that will teach this ICT. is not everybody that knows what ICT is. if we have instructors that will put us through it, that will be fantastic".*

RESPONDENT 4: *"first of all you have to encourage the midwife to read further, it is only when they read further that they will be able to understand what is ICT and how to put it in practice".*

RESPONDENT 5*: "training on ICT, different ICT device that will be of importance to the midwife that will help her in dispensing her midwifery services to her clients and patients, training and retraining will help the midwife to adopt ICT into midwifery practice"*

RESPONDENT 6: *"because most of our Midwives we don't have time for this ICT thing, abeg forget about all those things*

but the world is internet-based now, but some of us we don't like going into the internet, to know more about the use of this internet things. So we are afraid what will come out and all that"

Respondent 7***: "About positive influence I can't really say for now because we are not used to ICT device in midwifery in this side of the world, except for digital fetal Doppler, digital thermometer, and then the digital scanning device that you can readily scan a woman that is in labour, to identify if it is (Cephalo-pelvic-disproportion) CPD or not. but I dont know of other ICT devices that will be of positive influence or positive progress to midwifery practice in this our world".***

Discussion of findings/Triangulation of concurrent mixed method study

The respondents in the quantitative study had a positive impression of the use of ICT in midwifery practice, as the grand mean of 2.10±0.78 was greater than the criteria mean of 2.00, suggesting a favourable perception. This result was validated by the outcome of the interview which showed that, all the respondents in the qualitative study perceived that the use of ICT in midwifery is good especially if there is a good network. Seven out of the eight respondents said that it will have a positive influence in the practice of midwifery and they believed that nothing bad will happen if they decide to use ICT in midwifery practice. This study's findings are comparable to those of Irinoye-et al. (2013), who found that nurses' perceptions of IT adoption/use in patient nursing care are mostly favourable. This study's findings are also in line with those of Spiby et al. (2018) found that midwives were generally optimistic about the possibility of video-calling in early labour and the use of visual signals to improve accuracy and trust. With the positive perception confirmed by the two methods, the use of ICT in the practice of midwifery activities will be solidly supported by midwives in

Bayelsa, so the need that birthing centers be properly equipped with varieties of ICT medical gadgets for effective use.

Limitation of the study

Lack of time to enable the research to investigate extent of usage in more remote areas of Bayelsa State.

Non response by respondents on some of the questionnaires.

Fear of identity exposure by respondents, even though they have been assured of anonymity.

Recommendations

Based on the findings, the following recommendations is made

To the government;

They should thread with caution, on the legal implications that may be involved in the divulging of patients' health history on the internet.

They should liaise with individual health facilities to ensure the availability of different kinds of ICT equipment, to ensure a holistic health care approach

To the health institutions

They should organize periodic seminars on the use of ICT in midwifery practice. This will help them unlearn the traditional ways of care and then, relearn ICT oriented midwifery practice.

They should ensure that both human and material resources needed for continuous use of ICT are made available as confirmed by the study that periodic seminars and standby instructors will enhance use.

To the midwives

They should have confidence that the use of ICT is easy and simple

They should embrace change as a necessary tool for healthcare growth.

They should not be afraid of failure, but be ready to subject self for continuous learning.

Application for practice

This application of ICT will be of benefit to the government, hospital management, nurses/midwives, communities and the patients and their families.

The adoption of ICT in patient's management will enhance easy asses of patient's information by the hospital management, thus, allowing for quick and accurate policy decision. The application of ICT in midwifery practice can quickly identify ways of making services quicker to the consumer, thereby saving time and cost for both the individual and the hospital. It will reduce work born-out on the midwives, as many of these ICT equipment enhance in quick service delivery. It will help in the dissemination of health-related information to towns and communities, especially the hard-to-reach areas. It will help both the patient and their families to be involved in their own health care delivery by allowing them to make an informed choice.

Contribution of authors

My supervisors Dr. Anthonia Chinweuba, Dr. Egnr Daniel Ekpah and Mr. Chinameren Eleke contributed greater part of this dissertation.

Findings

Midwives had a positive perception on the use of ICT in midwifery practice; they were ready to adopt it and they showed that having a standby instructor among others will enhance rate of use.

Conflict of Interest

However, the research contradicted with that of Oo, et al. (2021), who claimed that adoption of Electronic Medical Records (EMRs) was modest. The possible reason for the modest use of ICT in this study could be as a result of unavailable ICT. Therefore it means that an environment made conducive for work can produce the stated result. According to Irinoye, et al. (2013), who found that while nurses rated themselves as moderately skilled in

computer use, touch screen, USB/flash drives, CD/DVD ROM, word processing, and Internet use, less than half of them rated themselves as highly skilled or proficient in any of the ICT wares. Despite a high perceived degree of new technology adoption, self-efficacy for new technology adoption was not significantly connected to technology usage**.**

References

Afolayan, O. T., & Oyekunle, R. A. (2014) The availability, accessibility and the extent of ICT usage by health professionals in Ilorin metropolis. *Covenant Journal of Informatics and Communication Technology,* https://journals.covenantuniversity.edu.ng/index.php/cjict/article/view/283

Cassano, C. (2014) The Right Balance – Technology and Patient Care. *HIMSS Resource Center*, https://www.himss.org/resources/right-balance-technology-and-patient-care

Chib, A., Lwin, M. O., Ang., J., Lin, H., & Santoso, F. (2018). Midwives and mobile: using ICTs to improve healthcare in Aceh Besar, Indonesia. *Asian Journal of Communication,* https://www.researchgate.net/publication/233447981_Midwives_and_Mobiles_Using_ICTs_to_Improve_Healthcare_in_Aceh_Besar_Indonesia. 18(4).

Farzandipour, M., Mohamadian, H., Akbari, H., Safari, S., & Jabali, M. S., (2020), SelfAssessment of Nursing Informatics Competencies in Hospitals. *Online Journal of Nursing Informatics Contributors.*

Irionye, O., Ayandiran, E. O., Fakunle, I., & Mtshali, N. G., F. (2013). Nurses' Perception and Barriers to use of Information Communication Technology in a Teaching Hospital in Nigeria. https://pubmed.ncbi.nlm.nih.gov/23851710/

Knight, D., & Stewart, S., (2010), Midwives and Technology: The case from New Zealand. Health Management, Vol. 5. Issue 3-4. https://healthmanagement.org/c/it/issuearticle/midwives-and-technology-the-case-from-new-zealand

Oo, M. H., Htun, M. Y., Win, T. T., Han, Z. M., Zaw, T., &Tun, K. M., (2021). Information and communication technology literacy, knowledge and readiness for electronic medical record system adoption among health professionals in a tertiary hospital, Myanmar: A cross-sectional study. *PLOS ONE*, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0253691

Project Reserve (2021). The Use of E-Health in Nursing Practice among Nurses in Cape Coast.https://www.projectreserve.com/2020/02/use-of-e-health-in-nursing-practice-among-nurses-in-cape-coast.html

Rouleau, G., Gagnon, M., Côté, J., Payne-Gagnon, J., Hudson, E., & Dubois, C. (2017). Impact of Information and Communication Technologies on Nursing Care: Results of an Overview of Systematic Reviews. *Journal of Medical Internet Research*, 19(4), e122. https://doi.org/10.2196/jmir.6686.

Spiby, H., Faucher, M. A., Sands, G., Roberts, J., & Kennedy, H. P. (2018). A qualitative study of midwives' perception on using video-calling in early labour. *Wiley Online Library,* https://onlinelibrary.wiley.com/doi/full/10.1111/birt.12364 Vol 46, Issue 1 doi.org/10.1111/birt.12364

PREVALENCE OF CATASTROPHIC HEALTH EXPENDITURE AMONG THOSE SEEKING HEALTH CARE IN A TERTIARY HEALTH FACILITY IN SOUTH-SOUTH NIGHERIA

* Dr Joshua Uvieroghene **Adjugah.** B.Med.Sc. (Physiology); MBBS; FMCFM; MPH.

Consultant

Department of Family Medicine,

University of Port Harcourt Teaching Hospital, Port Harcourt. Rivers State. Nigeria.

&

Department of Preventive and Social Medicine,

School of Public Health,

University of Port Harcourt, Port Harcourt. Rivers State. Nigeria.

E-mail: uvieadjugah@yahoo.com TEL: +2348033382210

Prof. Patrick Gold **Oyibo.** MBBS; FWACP; MSc; PhD.

Professor

Department of Community Medicine,

Delta State University, Abraka. Delta State. Nigeria.

E-mail: oyibopatrick@yahoo.com TEL: +2348037737600

Dr. I. D. **Alabere.** MBBS; MPH; mni; FMCPH.

Consultant

Department of Preventive and Social Medicine,

University of Port Harcourt, Port Harcourt. Rivers State. Nigeria.

E-mail: ibidaboalabere@yahoo.com TEL: +2348037075635

ABSTRACT

Background: The cost of health care is rising continually and this have consequences on access to care and health care outcomes through the mode of healthcare payment. This study assessed catastrophic health spending effects among health insured and non-health insured patients seeking health care in a tertiary hospital in Rivers state.

Materials and methods: It was a cross-sectional comparative study carried out among health insured and non-health insured patients attending the health insurance and family medicine clinics of the University of Port Harcourt Teaching Hospital (UPTH). Data were collected between 10th January and 29th April 2022 using a pre-tested semi-structured questionnaire. The questionnaire assessed the mode of payment, monthly income, number of persons in household, amount spent on healthcare and food monthly.

Results: A total of 700 respondents were studied with 100% response rate which included 350 health insured and 350 non-health insured, with a mean age of 40.48 ± 8.76. Majority of health insured patients still pay out-of-pocket which stood at 72%, and out-of-pocket payment among the health insured was for co-payment (44%), partial exclusion (40%) and shortage of drugs (16%). Out-of-pocket payment was found to cause catastrophic health expenditure in this study, which at 10% threshold was observed to be 32.6% among health insured and 40.9% for non-health insured; while at 40% threshold it was noted to be 60.6% and 61.7% respectively.

Conclusion: The findings showed that patients attending health insurance and family medicine clinics of UPTH had significant out-of-pocket payment leading to a worrisome catastrophic health expenditure at 10% and 40% thresholds. Policies that would increase citizens health insurance enrolment/participation under a functional and patient friendly national health insurance programme with zero or insignificant out-of-pocket payment should be instituted in Nigeria health care delivery system.

Keywords: Health Insured, Non-Health Insured, Catastrophic Health Expenditure.

INTRODUCTION

There is a worldwide rise in health care cost and this has prompted countries to adopt mode of health care financing which would guarantee that their citizens are not denied access to medical care because of their lack of ability to afford it (WHO, 2010).

Public health care funding is necessary for nations to make meaningful advancement as regards Universal Health Coverage (WHO 2018). Health care financing involves mobilization of funds to health care professional for rendering health care services (Uzochukwu et al 2015). The way a nation funds her health care system is an indication of the health status of the citizens. In Nigeria, health care is financed by tax revenue (government), out-of-pocket (OOP) payment, donor financing and health insurance (Olakunde 2012).

The government of low-income countries are faced with the challenges of lowering the regressive liability of out-of-pocket (OOP) payment on medicals by expanding the health insurance programme which redistributes health care financial risk and lower catastrophic expenditure (WHO, 2010).

The most significant impediments to good health care services in the healthcare sector are cost (Ibiwoye & Adeleke 2008). In Korea, high catastrophic health expenditure was reported by Seung, Yeong, Hyo, Sang, Woorim and Eun-Cheol (2018) to have impacted negatively on the care quality in that country. They emphasized that catastrophic expenditure in health payment was 40% higher than the household's affordability.

Many people who reside within walking distance from healthcare facilities still fail to use its services as they are unable to pay because of the magnitude of poverty in our environment.

Oyibo (2011) in his published article on out-of-pocket payment for health care services at Abakaliki stated that 69% of his respondents who were on OOP payment reported poor quality medical care, while 28% who were on National Health Insurance Scheme (NHIS) had good quality care. And that 63.6% of those with OOP payment had difficulty getting good health care commodities because of financial hardship.

However, Ejughemre (2015) in his study of out-of-pocket spending assessment of patients in a tertiary hospital had a contrary report where 98% of his respondents who were on OOP payment claimed they had good quality services. He however added that the OOP payment plan was a regressive method of payment for health care commodities. The consequences of cost on quality of medical care were worse with chronic illnesses that will require huge fund and frequent hospital visits.

Health insurance perspective to health care financing have the benefit of prepayment for required treatment fee long before illness comes up. Therefore, no patient is denied medication or rejected by healthcare providers because of inability to pay the fee charged for the health care services.

Achieving a beneficial health care financing in Nigeria had been a challenge, which informed the formation of the National Health Insurance Scheme (NHIS) in 1999 with the sole objective

of enhancing health care accessibility and lower the economic stress of out-of-pocket payment for health care services (Olakunde 2012).

Despite the formation of the NHIS, there are still challenges of poor coverage/enrolment, co-payment, shortage of drugs, partial exclusion, health workers negative attitude, delay in pre-payment and others which has resulted to patients non satisfaction, especially as they still do cash payment at the point of service (Eboh, Akpata & Akintoye 2016), which might culminate into possible catastrophic health spending.

AIM

The aim of this study was to comparatively assess the catastrophic health spending among health and non-health insured patients seeking health care in the University of Port Harcourt Teaching Hospital (UPTH).

HYPOTHESIS

The null hypothesis was that there is no relationship between mode of payment and catastrophic health expenditure; while the research hypothesis was that there is a relationship between mode of payment and catastrophic health expenditure.

LITERATURE REVIEW

The frequently used procedures of financing health are tax-based, out-of-pocket payments, donor funding, and health insurance (social and private). However, these techniques are not stand alone, as most national health systems adopt a combination of these various methods. The tax-based health financing method is that in which government funds are the major supplier of health care spending. In overall, the health system is mainly financed from the national government funding and disburses down the line to the states and local government

areas; meanwhile these two lower levels of government generate an average of 20% as income generated within their operations which are gotten from taxes, rates and levies (WHO, 2004). The distribution of national government fund is the function of federal financial agencies which oversees the sharing, and the disbursement ratio allocates 48.5% to the central government, 24% to the next level of government and 20% to the peripheral government, with 7.5% kept for special nationally proposed projects with little flexibility on fiscal policy (WHO, 2004). The federal allocations to states and local government are not earmarked neither do the states and local governments required to provide budget and expenditure reports to the federal government. By implications, the federal government does not have a substantial control on funds allocated for both secondary and primary health services.

Out-of-pocket (OOP) payment in health care is that in which the client make payment at the point of health care service delivery. It is otherwise called user fees, and approximately 70% of health care remittances in Nigeria are made through out-of-pocket. In 2007, OOP payment rosed from 92.7% to 95.9% of private patients' payment in Nigeria (Uzochukwu et al 2015). This was recorded and thought as being the highest in the globe. In a secondary data analysis of OOP expenditure in Nigeria, Aregboshola and Khan (2018) published their findings that in this country, payment for healthcare services is heavily dependent on out-of-pocket and that this mode of healthcare payment does not provide financial risk protection.

In scholarly research in south-south geographical zone in Nigeria, about 15% of households experienced catastrophe and this was attributed to OOP payment, which has also been marked as the domineering method of healthcare spending in third world nations (O'Donnell, van Doorslaer, Rannan-Eliya, Somanathan, Adhikari, Akkazieva et al; 2008). This is a significant barrier at a time when expensive health care service comes up in a household (WHO, 2012). Out-of-pocket payment is one of the significantly known causative factor in poor health care

seeking behaviour globally (Goudge, Russell, Gilson, Gumede, Tollman & Mills 2009) and can lead to unfairness in health care accessibility.

There are two known thresholds for catastrophic health expenditure, which are at the 10% and 40% thresholds. The 10% threshold is when the total health expenditure of 10% or more from the total income is considered as catastrophic health expenditure (Hailemichael, Hanlon, Tirfessa, Docrat, Alem, Medhin, et al; 2019).

The 40% threshold of catastrophic health expenditure is considered the standard as defined by WHO as a total annual out-of-pocket health payment which is 40% higher than the ability of the household to pay (WHO, 2005). This is health expenditure that is equal or greater than 40% of a household income after paying for food, shelter and clothing, it is what is regarded as catastrophic. Subsistence needs in a society is known as the smallest amount of fund for household to support basic life requirements. The basic life needs are food, shelter, and clothing. Non-subsistence income is the extra money left after basic requirements of life have been met in a household. Out-of-pocket payment is noted to be the commonest means of health care spending in Nigeria and it insinuates that households incurred the highest liability of health care cost (Olakunde 2012).

In 1994, the Bamako Initiative was held and it advocated for cost re-distribution and health care users' participation to raise the viability and standard of health care services in Africa and the Nigeria government in 1998 inaugurated the user fee which was the conclusion at Bamako on her health care system (Federal Ministry of Health. 1994)It was then presumed that user fee will raise the health care financial base and likely enhance capacity to strengthen equality in health care (Griffin 1992; World Bank, 1987). However, subsequent available evidence proved otherwise, and indeed the user fees had negative impact on healthcare delivery system in Africa (James, Hanson, McPake, Balabanova, Gwatkin, Hopwood, et al; 2006). There is paucity of research articles on out-of-pocket payment and resultant catastrophic health expenditure

amongst health insured patients. Notwithstanding, Atake and Amendah (2018) in their research in Togo reported that the proportion of insured individuals and families that had health expenditure which were catastrophic varies widely between 3.94% and 75.60%, these variations were mainly attributable to the technique and the threshold used in their calculations. They stated that at the 40% threshold, health care cost represents 60.95% of insured households' total monthly non-food expenditure. They conclusively reported that a significant percentage of insured individuals and families encountered health expenditure that were catastrophic, suggesting gaps in insurance coverage in Togo. The recommendations put forward to limit the impoverishment of insured households with low income include, policies for free or heavily subsidized hospital services should be in place and also, that an equitable health insurance scheme which is affordable without limitations/restrictions for all insured households should be instituted. Mchenga, Chirwa and Chiwaula (2017) in Malawi reported that as they increase the CHE threshold from 10% to 40% in their study of impoverishing effects on health spending, they reported that between 9.37% and 0.73% of families experienced health expenditure which were catastrophic following out-of-pocket payment for healthcare services. They noted that families in the countryside and middle-income family groups were more exposed to health spending which were catastrophic with a greater impact. This study which was based on secondary data from Malawi Integrated Household Survey third edition (HIS – 3) gave a final report which states that the width and breath of poverty in Malawi is directly proportional to size of catastrophic health spending in the country, and they recommended the initiation of a health insurance programme that would lower the occurrence of health spending that were catastrophic particularly at the countryside and middle-income population groups.

Health insurance comprises social health insurance, community-based health insurance or private health insurance. Social health insurance: It is a way of funding health care by

contributing premium to a central pooled fund, that operates within a regulated body of government directives (Olakunde 2012). It is a way of putting health risks together, in order for participating members to get benefits due them at the incidence of any untimely ill-health and funds are made available for the treatment of such ill-health. It is commonly acknowledged that health care need is often highly unexpected and might be very expensive for individual to bear, but can be accommodated relatively by large groups (World Bank, 2013). The National Health Insurance Scheme (NHIS) can comfortably absolve the cost liability of OOP payment for health care needs.

Under the social health insurance, all individual is under obligation to make their individual financial contributions. Government is expected under the law to subscribe for the poorest, vulnerable groups and the unemployed; employers are mandated to also donate a prescribed percentage for the benefit of their employees (Lagarde and Palmer, 2006). In Nigeria, the government set up the National Health Insurance Scheme (NHIS) under Act 35 of 1999 with the sole purpose of getting better accessibility by the citizens to health care and lowering the cost liability of out-of-pocket payment at the time of health care needs. Conceptually, health insured recipients were not meant to make any form of payment at the point of healthcare services except for the 10% of the total cost of prescribed drugs. Health insurance was meant to lessen the catastrophic impacts on household health expenditure, and has remotely generated employment and business investment opportunities from the functions of Health Maintenance Organizations (HMOs) and health care providers managers (Adefolaju, 2014)

The social health insurance programme which involved the formal sector; urban self-employed; rural community; children under-five; physically challenged persons; prison inmates; tertiary institutions and voluntary participants; and armed forces, police and other uniformed services. It is mandatory for workers under the federal government employment to be enlisted into the formal sector social health insurance programme in Nigeria. It has covered approximately 5%

of the Nigeria population, who are mostly workers employed by the federal government. Few states have buy-in into the insurance scheme but their activities are still low; these include Cross-River, Bauchi, Bayelsa, while others like Abia, Enugu, Imo, Gombe, Lagos, Ondo, Oyo, Jigawa, and Kaduna are coming up gradually.

The NHIS expansion have been very slow in getting the reasonable coverage as planned right from when it was inaugurated in 2005. The law establishing the NHIS made it non-compulsory. This had been claimed to be one fact why many Nigeria citizens are not getting the prescribed benefits of the health insurance. Currently, the NHIS mandate is to make enrolment compulsory for both employer of labour and employees so that most Nigerians will benefit from the scheme and aims to enlist all citizens. Given the limitation involving exclusion and partial coverage of the scheme to major life-threatening illnesses and therapies, catastrophic OOP health expenditure may continue to confront insured persons in Nigeria. Other notable challenges of the scheme include; poor government subventions to the health sector (Anyika 2014; Ejughemre 2014); and other issues which is affecting its proficiency in health insurance as noted by various researchers are poor medical facilities, shortage of medical personnel, lack of knowledge and insufficient financial backup (Agba, Ushie & Osuchukwu 2010; Ibiwoye & Adeleke 2008; Mohammed, Sambo & Dong 2011; Sanusi & Awe 2009). Bureaucracy and mismanagement had also been identified as factors negatively affecting the scheme in Nigeria. Considering the robustness of the scheme, these drawbacks according to Onyedibe, Goyit and Nnadi (2012); Eteng and Utibe (2015) had made insured persons still pay for the following; occupational/industrial injuries, radiologic investigations like Computerized Tomography (CT) scan, Magnetic Resonance Imaging (MRI). Others are diseases resulting from epidemics, cosmetic surgeries, open heart surgeries, neuro-surgeries and family planning services.

Community-Based Health Insurance (CBHI): It is a type of private health insurance in which persons, families, or community groups fund or jointly fund the cost of health care and also be

involved in the coordination and management of the community financing the scheme and health care services organization.

The CBHI was mapped out for people dwelling in the rural area and those in the informal economic sector in the society. These are persons who are independent but might not have adequate public, private or employer-sponsored insurance (Uzochukwu, Onwujekwe, Soludo, Nkoli & Uguru 2022). This health insurance engages community participation in their management. Under this scheme, there are still observed obscurity on the issues of equity, quality and efficiency of health care services (Carrin, Waelkens and Criel 2005; Ekman 2004; Jakab & Krishnan 2001). It has been proven in different paper presentations that the very poor find it difficult to enroll into the health insurance even when the charges are small.

A lot of strong and complex institutional capacity, technical knowhow, managerial skills are required in the designing, implementation, management and sustaining CBHI in Nigeria (Onwujekwe, Okereke, Onoka, Uzochukwu, Karigia & Petu 2010). There are some notable factors which have been found or implicated as affecting the low NHIS enrollment rates and these include lack of trust in the organizers or managers of the health insurance scheme, the packages are not attractive, the premium are not affordable and the quality of the care is suboptimal. There are suggestions that would boost enrollment which include awareness raising and government financial support that will guarantee the financial survival of CBHI in Nigeria (Adinma & Adinma 2010; Onwujekwe et al; 2010).

Private Health Insurance (PHI): Private health insurance (PHI) is directly and willingly financed by prepayment among members who are health insured. It is estimated that approximately one million people in Nigeria have been enlisted into the PHI and this is lower than 1% of the population. The PHI include other methods of health care services, like the medical retainer-ship. Medical retainer-ship involves employees of a firm getting health care

services from specified health institutions at a cost to their employers (Obansa & Orimisan 2013)

METHODOLOGY

This was a comparative cross-sectional analytical study carried out on 700 respondents; made up of 350 health insured and 350 non-health insured patients over a 16-week period from 10th January to 29th April, 2022 at the NHIS and Family Medicine clinics of the University of Port Harcourt Teaching Hospital, Port Harcourt. The study population for FMC was 6400 and NHIS was 3200 which was for eight weeks of data collection from Monday to Friday with daily patient load of 160 and 80 respectively, while the calculated sample size was 350 each for both FMC and NHIS. The sample interval was 18 for FMC and 9 for NHIS.

The University of Port Harcourt Teaching Hospital is currently located at Alakahia community, in Obio-Akpor Local Government Area of Rivers State. It is a tertiary healthcare institution with about 800 in-patient beds and also function as a referral centre for other peripheral lower-level health care institutions in and around Rivers State.

Rivers State has 23 Local Government Areas with Port Harcourt as its capital city. The state is at the tropical rain forest belt in the south-south geographical zone in Nigeria with inhabitants' number of 5,185, 400 (National Bureau of Statistics, 2006 census).

Sample size was calculated using a study by Oyibo (2011) at Abakaliki in South-East Nigeria, where it was reported that 28% of the respondents who were on National Health Insurance Scheme (NHIS) had good quality care. Therefore, the prevalence of 28% was used for the sample size calculation in this study. The formula for sample size determination in comparative analytical studies on the study population of out-patients attending the clinics was used (Araoye, 2003).

A pre-tested interviewer administered questionnaire was used on all consented respondents who were selected by systematic sampling method and met the inclusion criteria and are above 18 years, and were not too ill to undergo the study.

This research tool was adopted and adapted from validated quality of care questionnaires used in previous studies [Marcinowicz, Rybaczuk, Grebowski & Chlabicz (2010); Onwujekwe et al (2010) and Webster et al (2011)]. The questionnaire was used to collect data on socio-demographic data, mode of payment, monthly income, number of persons in household, amount spent on healthcare and food monthly.

The data collected were analyzed using the statistical package for social sciences (SPSS), version 20.0 statistical software. Catastrophic health expenditure at 10% threshold were those whose household health care expenditure was equal to or greater 10% of their total monthly income. While catastrophic health expenditure at 40% threshold is those whose household health care expenditure were equal to or greater than 40% of what was left of their total monthly income after subtracting household spending on food.

Results from this study were presented using descriptive statistics in forms of percentages, ratios, frequency distribution tables and charts.

Inferential statistical methods for test of significance included: Chi-square for test of significance for categorical variables.

In this study the level of significance was set at P-value <0.05. Confidence level was at 95%.

Ethical approval for this study was granted by the ethical committee of the University of Port Harcourt and the University of Port Harcourt Teaching Hospital. An informed consent was obtained from the subjects before recruitment for the study.

Confidentiality of respondents was protected as their names, telephone numbers or e-mail addresses were not required in the questionnaire. The questionnaires were numbered. It was

the numbered questionnaires that were given to respondents as they were being recruited on a serial order. A private record of the numbered questionnaire ascribed to a particular respondent was kept by the researcher which helped in retrieving questionnaires and to keep an accurate record of respondents.

RESULTS

A total of 700 questionnaires, comprising of 350 Health Insured and 350 Non-Health Insured were administered, and all were sufficiently completed, and therefore analyzed, giving a response rate of 100 percent.

TABLE 1: Distribution of socio-demographic characteristics of respondents

Variable	**Health Insured n = 350 (%)**	**Non-Health Insured n = 350 (%)**	**Total N = 700 (%)**	**Bivariate Analysis (Chi-Square/Fishers Exact)**
Sex				
Male	82 (23.4)	70 (20.0)	152 (21.7)	$\chi2$= 1.210; df = 1; p = 0.271
Female	268 (76.6)	280 (80.0)	548 (78.3)	
Age group (years)				
20 – 29	29 (8.3)	35 (10.0)	64 (9.1)	
30 – 39	114 (32.6)	128 (36.6)	242 (34.6)	
40 – 49	147 (42.0)	132 (37.7)	279 (39.9)	$\chi2$= 2.463; df= 4; p= 0.653
50 – 59	54 (15.4)	49 (14.0)	103 (14.7)	
≥ 60	6 (1.7)	6 (1.7)	12 (1.7)	

Mean age	40.89 ± 8.677	40.06 ± 8.827	40.48 ± 8.756	
Marital status				
Single	66 (18.9)	79 (22.6)	145 (20.7)	
Married	265 (75.7)	267 (76.3)	532 (76.0)	
Divorced/Separated	10 (2.9)	3 (0.9)	13 (1.9)	p= 0.08*
Widow/Widower	9 (2.6)	1 (0.3)	10 (1.4)	
Education Level				
None/Primary	4 (1.1)	5 (1.4)	9 (1.3)	
Secondary	48 (13.7)	87 (24.9)	135 (19.3)	p<0.001*
Tertiary	298 (85.1)	258 (73.7)	556 (79.4)	
Occupation				
Professional	308 (88.0)	228 (65.1)	536 (76.6)	
Skilled worker	25 (7.1)	32 (9.1)	57 (8.1)	
Semi-skilled worker	6 (1.7)	29 (8.3)	35 (5.0)	χ^2= 62.842; df = 4; p < 0.001
Unskilled worker	5 (1.4)	34 (9.7)	39 (5.6)	
Unemployed	6 (1.7)	27 (7.7)	33 (4.7)	
Religion				
Christian	340 (97.1)	348 (99.4)	688 (98.3)	
Muslim	8 (2.3)	1 (0.3)	9 (1.3)	p=0.025*
Traditionalist	2 (0.6)	1 (0.3)	3 (0.4)	
Number of Persons in Household				
1 – 2	63 (18.0)	67 (19.1)	130 (18.6)	
3 – 4	160 (45.7)	147 (42.0)	307 (43.9)	

>4	127 (36.3)	136 (38.9)	263 (37.6)	$\chi 2$= 0.982; df= 2; p= 0.612
Mean number of persons in household	4.04 ± 1.80	4.08 ± 1.74	4.06 ± 1.77	

*=Fishers' Exact

Table 1 shows that the socio-demographic characteristics of the respondents consisted of sex, age, marital status, educational level, occupation, religion and number of persons in household.

The socio-demographic characteristics of the respondents showed that the sex distribution among the health insured was eighty-two [82(23.4%)] as males while two hundred and sixty-eight [268(76.6%)] were females. That of the non-health insured was seventy [70(20.0%)] as males and two hundred and eighty [280(80.0%] as females. The sex distribution of the respondents was not statistically significant (p-value = 0.271).

The age distribution revealed that 29(8.3%) of health insured and 35(10.0%) of non-health insured were between 20-29 years, 114(32.6%) of health insured and 128(36.6%) of non-health insured between 30-39 years, 147(42.0%) of health insured and 132(37.7%) of non-health insured between 40-49 years, 54(15.4%) of health insured and 49(14.0%) of non-health insured 50-59 years, and 6(1.7%) of both health insured and non-health insured were ≥ 60 years. Majority of the respondents were between 30 and 49 years. The mean ages of the respondents were 40.89 ± 8.68 for health insured and 40.06 ± 8.83 for non-health insured. The age distribution of the respondents was not statistically significant (p-value = 0.653).

TABLE 2: Distribution of socio-economic characteristics of respondents

Variable	**Health Insured n = 350 (%)**	**Non-Health Insured n = 350 (%)**	**Total N = 700 (%)**	**Bivariate Analysis**

				(Chi-Square/Fishers Exact)
Employment Status				
Employed	343 (98.0)	309 (88.3)	652 (93.1)	$\chi2$= 25.856; df = 1; p <0.001
Unemployed	7 (2.0)	41 (11.7)	48 (6.9)	
Income Status (Naira)				
10000 – 99999	100 (28.6)	103 (29.4)	203 (29.0)	$\chi2$= 3.617; df = 3; p = 0.306
100000 – 199999	176 (50.3)	160 (45.7)	336 (48.0)	
200000 – 299999	46 (13.1)	45 (12.9)	91 (13.0)	
≥ 300000	28 (8.0)	42 (12.0)	70 (10.0)	
Average income status: median (IQR)	140000 (88500)	135000 (111500)	140000 (1240000)	
Class of Income (Naira)				
High income (≥ 145000)	177 (50.6)	175 (50.0)	352 (50.3)	$\chi2$= 0.023; df= 1; p= 0.880
Low income (<145000)	173 (49.4)	175 (50.0)	348 (49.7)	
Amount Spent on Health Monthly				
≤ 1000 – 10999	253 (72.3)	219 (62.6)	472 (67.4)	
11000 – 20000	50 (14.3)	52 (14.9)	102 (14.6)	$\chi2$= 10.615; df= 2; p= 0.005
>20000	47 (13.4)	79 (22.6)	126 (18.0)	

Average amount spent on health monthly: median(IQR)	9000 (5750)	10000 (14625)	10000 (149400)	
Amount Spent on Food monthly				
≤10000 – 39999	54 (15.4)	88 (25.1)	142 (20.3)	
40000 – 69999	138 (39.4)	125 (35.7)	263 (37.6)	$\chi 2$= 12.670; df= 3; p= 0.005
70000 – 99999	80 (22.9)	57 (16.3)	137 (19.6)	
≥ 100000	78 (22.3)	80 (22.9)	158 (22.0)	
Average amount spent on food monthly: median(IQR)	60000 (40000)	55000 (54250)	60000 (294000)	
Amount Spent on Non-food items				
0 – 40999	122 (34.9)	128 (36.6)	250 (35.7)	
41000 – 80999	69 (19.7)	78 (22.3)	147 (21.0)	
81000 – 120000	84 (24.0)	55 (15.7)	139 (19.9)	$\chi 2$= 7.941; df= 3; p= 0.047
>120000	75 (21.4)	89 (25.4)	164 (23.4)	
Average amount spent on non-food items monthly: median(IQR)	70000 (100000)	700000 (113500)	70000 (1402000)	

IQR: Interquartile Range

Table 2 displayed the socio-economic characteristics which consisted of employment status, income status, class of income, amount spent on health monthly, amount spent on food monthly, and amount spent on non-food items monthly.

TABLE 3: Catastrophic Expenditure at 10% and 40% thresholds among the respondents

Variable	Health Insured n (%)	Non-Health Insured n (%)	Chi-square (p-value)
10% Threshold			
Yes	113 (32.3)	143 (40.9)	5.543 (0.019)
No	237 (67.7)	207 (59.1)	
40% Threshold			
Yes	212 (60.6)	216 (61.7)	0.096 (0.756)
No	138 (39.4)	134 (38.3)	

Table 3 displayed the respondents results of catastrophic health expenditure which was assessed at 10% and 40% thresholds. At the 10% threshold, catastrophic health expenditure was 32.3% amongst the health insured and 40.9% amongst the non-health insured respondents. This was found to be statistically significant at p-value of 0.019 at 10% threshold.

While at 40% threshold, catastrophic health expenditure was 60.6% amongst the health insured and 61.7% amongst the non-health insured respondents. However, there was no statistical significance (p-value = 0.756) found at the 40% threshold.

From the foregoing, it showed that there was much out-of-pocket payment leading to some forms of catastrophic health expenditure in both groups of health insured and non-health insured in this study. It was much worrisome that this volume of catastrophic health expenditure was found amongst those who were health insured. Although, it was slightly higher with those who were non-health insured.

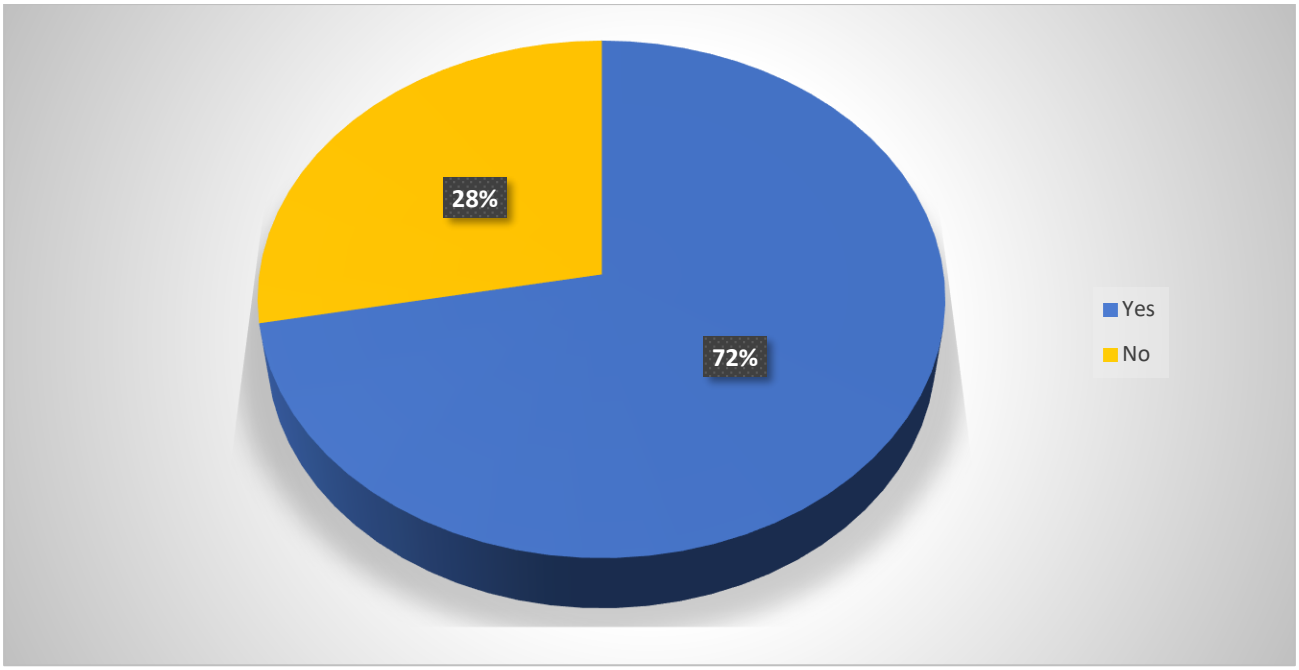


FIG 1: Health Insured but Still Pays Out-of-Pocket

In figure 1, majority of the health insured respondents were found to pay for health care services through out-of-pocket (OOP) payment. Seventy-two percent (72%) of those with health insurance affirmed they do out-of-pocket payment, while twenty-eight percent (28%) claimed they do not pay out-of-pocket for health care services. Payment for health care services through out-of-pocket mode will defeat the aim of health insurance and might led to catastrophic health expenditure.

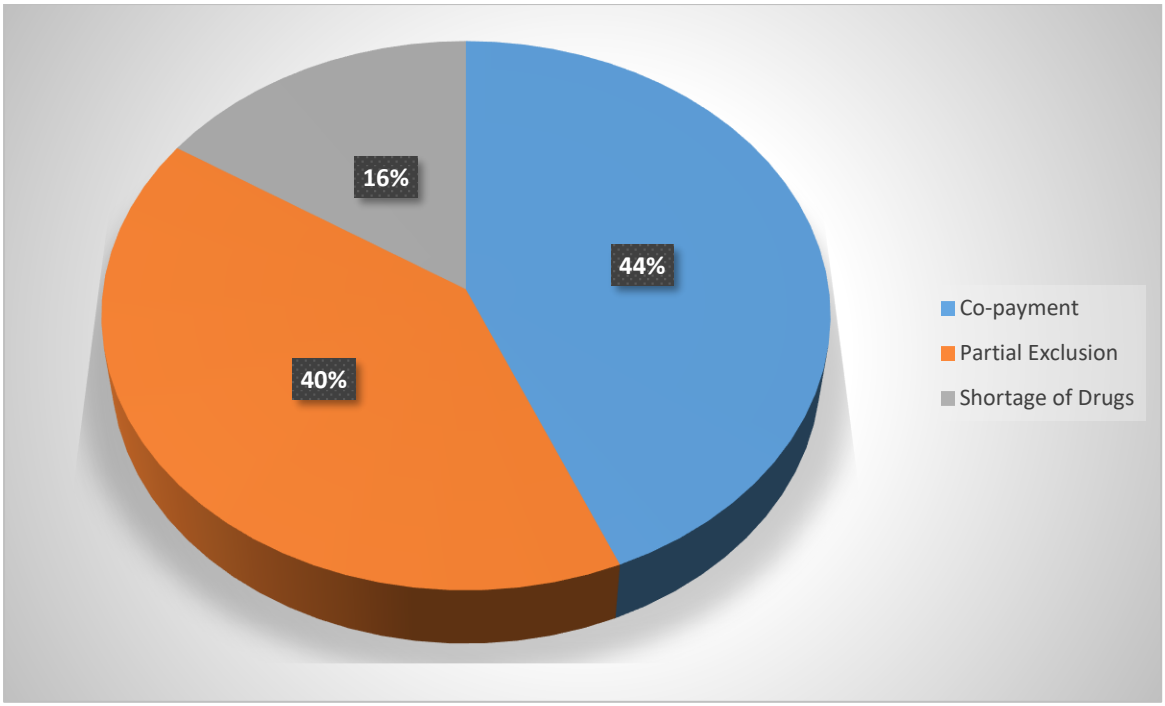


FIG 2: Reasons for Paying Out-of-Pocket Among Health Insured Respondents

Figure 2 displayed the main reasons why health insured respondents were paying for health care services through out-of-pocket mode in health care financing in this study.

Forty-four percent (44%) was due to co-payment, forty percent (40%) was as a result of partial exclusion, and sixteen percent (16%) was because of shortage of drugs (out-of-stock syndrome).

DISCUSSION

This was a comparative cross-sectional analytical study carried out among 350 health insured and 350 non-health insured respondents who accessed health care at the National Health Insurance clinic and the Family Medicine clinic of the University of Port Harcourt Teaching Hospital, Port Harcourt. It assessed comparatively the catastrophic health spending among these 700 respondents who were selected using the systematic sampling technique.

In this research, catastrophic health expenditure was assessed at both 10% and 40% thresholds among the respondents. It was observed that at 10% threshold, the catastrophic health

expenditure among the health insured was 32.3% and non-health insured was found to be 40.9%. This was statistically significant at p-value 0.019 (Table 3). While at the 40% threshold, catastrophic health expenditure was 60.6% for health insured and 61.7% for non-health insured (Table 3). However, this was not statistically significant at p-value 0.756 (Table 3). These findings showed that catastrophic health expenditure was found at both 10% and 40% thresholds among the respondents. Although, it was higher with non-health insured in both thresholds, but it was a closed call; and these were capable of pushing the population into financial hardship and consequently below the poverty line at the time of healthcare needs.

Particularly worrisome was the high level of catastrophic health spending recorded among the health insured respondents who were supposed to be protected against financial risks at times of health care need by health insurance scheme.

It was possible that the health insured had catastrophic health expenditure in this study as a result

of co-payments, partial exclusions and procurement of drugs that were out-of-stock; and were therefore massively involved in out-of-pocket payment despite been health insured. This was the assertion by Onyedibe et al (2012) and Eteng & Utibe (2015) in their various studies.

It had been reported in several studies that catastrophic health expenditure was worse with out-of-pocket mode of health care payment [Ejughemre (2015), Atake & Amendah (2018) and Oyibo (2011)]; and this is in corroboration with what was found in this study which had 32.3% and 60.6% as catastrophic health expenditure among health insured respondents; and 40.9% and 61.7% as catastrophic health expenditure among non-health insured respondents at 10% and 40% thresholds respectively and was higher among the non-health insured who had all their total healthcare expenditure made by out-of-pocket payment. Those studies also found and reported that out-of-pocket mode of healthcare payment was linked with impoverishment, lower standard of living, financial hardship and pushed the populace below the poverty line.

In this study, non-health insured respondents had higher catastrophic health expenditure when compared to their health insured counterparts (Table 3). But these finding are much higher than what Aregbesola & Khan (2018) reported; and this could be due to the fact that these researchers used secondary national data and found 16.4% and 13.7% as catastrophic health expenditure at 10% and 40% thresholds respectively in Nigeria.

The 32.3% and 60.6% of catastrophic health expenditure among health insured respondents at 10% and 40% thresholds reported in this study was within what was found by Atake & Amendah (2018) in Togo where they found a wide margin of between 3.94% and 75.60%. They pointed out that this sizable proportion of insured households facing catastrophic health expenditure was an indicator that there are gaps in the Togo insurance scheme and subsequently recommended free or heavily subsidized hospital services and without limitations/restrictions for all health insured clients in that country. Mchenga et al (2017) put catastrophic health expenditure in Malawi as between 10% to 40%; while for Kenya, catastrophic health expenditure was 31.1% for rural populace and 28.1% for urban dwellers. Burkina Faso had a national range of 6% to 15% catastrophic health expenditure for her citizen following a national survey. These findings from Malawi, Kenya and Burkina Faso are secondary data from their respective national health survey. Hailemichael et al (2019) reported catastrophic health expenditure in Ethiopia to be 24.0% at 10% threshold.

But these are much lower than figures from India where it was reported to be 25.3% (rural) and 17.5% (urban) by Puteh & Almualm (2017). While in South Korea, according to Seung et al (2018) in the Korea Health Panel Survey secondary data collected from 2011 to 2013, catastrophic health expenditure was found to be 4.5%, and they concluded in their report that those with catastrophic health expenditure had a lower health-related quality of life when compared to those without catastrophic health expenditure. The Korea report had buttressed

the fact that catastrophic health expenditure could lower one's standard of living and push recipients below the poverty line following out-of-pocket health payment.

It was found in this research that health insured respondents were still paying out-of-pocket despite been health insurance enrollees with Health Maintenance Organization (HMO). Seventy-two percent (72%) of health insured respondents pay out-of-pocket while twenty-eight percent (28%) of health insured respondents claimed they had not done out-of-pocket payment in this hospital when they came for medical services (Fig. 1). This finding is in conformity with studies in which the researchers reported that health insured clients still pay out-of-pocket despite their health insurance status [Oyibo (2011), Ejughemre (2014), Anyika (2014), Adefolaju (2014), Onyedibe et al (2012), Eteng & Utibe (2015)].

The reasons why the health insured respondents pay out-of-pocket as reported in this study (Fig. 2) were co-payment (44%), partial exclusion (40%) and shortage of drugs (16%). This finding is in agreement with reports from other studies in which out-of-pocket payments were made by health insured patients during medical encounter in hospitals because of co-payment for drugs [Adefolaju (2014)], partial exclusion [Onyedibe et al (2012), Eteng & Utibe (2015)] and shortage of drugs [Anyika (2014)].

In this study, the research hypothesis that there was a relationship between mode of payment and catastrophic health expenditure was proven. It was found that catastrophic health expenditure was present at 10% and 40% thresholds in both groups but it was lower with health insured than non-health insured respondents (Table 3). This was statistically significant at 10% threshold, but not statistically significant at the 40% threshold. That catastrophic health expenditure was present among the health insured was due to the fact that they still do out-of-pocket payment despite being health insured (Fig 1); and the major reasons why they were paying out-of-pocket was co-payment, partial exclusion and shortage of drugs (Fig 2).

CONCLUSION

In this study at the University of Port Harcourt teaching hospital, there was significant out-of-pocket payment with both health insured and non-health insured respondents. For the health insured who were not supposed to pay out-of-pocket, they were noted to be doing so due to co-payments, partial exclusions and shortage of drugs. Catastrophic health expenditure was found to be present in both health insured and non-health insured, and was recorded at 10% and 40% thresholds. The catastrophic health expenditure was higher among non-health insured group than health insured respondents. It was worse at the 40% threshold in this University of Port Harcourt Teaching Hospital study. This finding was worrisome and it is worth of note that there was high catastrophic health expenditure among health insured respondents who were supposed to be protected against health care financial risk by the health insurance scheme.

RECOMMENDATION

There is need for government policy that would increase citizens health insurance enrolment/participation under a functional and patient friendly national health insurance programme with zero or insignificant out-of-pocket payment to be instituted in Nigeria health care delivery system.

REFERENCES

Adefolaju T (2014). Repositioning health insurance in Nigeria: prospects and challenges. *Int J Health.* 2 (2): 151-162.

Adinma ED & Adinma BJ (2010). Community-based healthcare financing: an untapped option to a more effective healthcare funding in Nigeria. Nigerian Medical Journal. 51: 95-100.

Agba AM, Ushie EM & Osuchukwu NC (2010). National health insurance scheme (NHIS) and employees' access to healthcare services in Cross River state, Nigeria. *Global J Hum and Soc Sci.* 10: 9-16.

Anyika EN (2014). Challenges of implementing sustainable health care delivery in Nigeria under environmental uncertainty. Journal of Hospital Administration. 3(6): 113-126.

Araoye MO. (2003). Research methodology with statistics for health and social science. *Ilorin: Natadex.*

Aregbeshola BS. & Khan SM. (2018). Out-of-pocket payments, catastrophic health expenditure and poverty among households in Nigeria 2010. *International Journal of Health Policy and Management. 7(9): 798-806.*

Atake E & Amendah DD (2018). Porous safety net: catastrophic health expenditure and its determinants among insured households in Togo. BioMed Central Health Services Research. 18:175. https://doi.org/10.1186/s12913-018-2974-4

Atun RA & Fitzpatrick S (2005). Advancing economic growth: investing in health. Discussion paper at Chatham House Conference. https://www.chathamhouse.investhealth.org. Accessed on 20th March, 2022.

Carrin G, Waelkens MP & Criel B (2005). Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. *Trop Med Int Health.* 10: 799-811.

Eboh A, Akpata GO & Akintoye AE. (2016). Health care financing in Nigeria: an assessment of the national health insurance scheme (NHIS). *European Journal of Business and Management.* 8(27): 24-34.

Ejughemre UJ (2014). Accelerated reforms in healthcare financing: the need to scale up private sector participation in Nigeria. Int J Health Policy Manag. 1(2): 13-19.

Ejughemre UJ. (2015). Out of pocket spending for healthcare services: a study assessing the relationship between payment methods and perceived satisfaction with the quality of care in a tertiary health facility in Delta state, Nigeria. *Journal of Community Medicine and Primary Health Care.* 27(1): 27-36.

Ekman B (2004). Community-based health insurance in low-income countries: a systematic review of the evidence. *Health Policy Plan*. 19: 249-270.

Eteng IE & Utibe EE (2015). The National Health Insurance Scheme and its implication for elderly care in Nigeria. *International Journal of Science and Research.* 4(2): 128-132.

Federal Ministry of Health (1994). The Bamako initiative programme in Nigeria. Abuja. https://www.apps.who.int>handle. Accessed on 19th March, 2022.

Goudge J, Russell S, Gilson L, Gumede T, Tollman S & Mills A (2009). Illness-related impoverishment in rural South Africa: why does social protection work for some households but not other? *Journal of International Dev.* 21: 231-251.

Griffin C (1992). Welfare gains from user charges for government health services. *Health Policy Plan.* 7: 177-180.

Hailemichael Y, Hanlon C, Tirfessa K, Docrat S, Alem A, Medhin G, Lund C, Chisholm D, Fekadu A & Hailemariam D (2019). Catastrophic health expenditure and

impoverishment in households of persons with depression: a cross-sectional comparative study in rural Ethiopia. *BMC Public Health*. 19: 930.

Ibiwoye A. & Adeleke IA. (2008). Does national health insurance promote access to quality health care? Evidence from Nigeria. *The Geneva Papers.* 33: 219-233.

Jakab M & Krishnan C (2001). Community involvement in health care financing: a survey of the literature on the impacts, strength, and weakness. HNP discussion paper for the commission on microeconomics and health. *Wastington, DC: The World Bank.*

James CD, Hanson K, McPake B, Balabanova D, Gwatkin D, Hopwood I, et al (2006). To retain or remove user fees?: reflections on the current debate in low- and middle-income countries. *Appl Health Econ Health Policy.* 5: 137-153.

Largarde M & Palmer N (2006). Evidence from systematic reviews to inform decision-making regarding financing mechanisms that improve access to health services for poor people: a policy brief prepared for the international dialogue on evidence-informed action to achieve health goals in developing countries in Khon Kaen, Thailand. *Geneva: Alliance for Health Policy and Systems Research.* https://www.sematicscholar.org/paper. Accessed on 19th March, 2022.

Marcinowicz L, Rybaczuk M, Grebowski R & Chlabicz S (2010). A short questionnaire for measuring the quality of patient visits to family practices. *International Journal for Quality in Health Care* 22(4): 294-301.

Mchenga M, Chirwa GC & Chiwaula LS (2017). Impoverishing effects of catastrophic health expenditure in Malawi. *International Journal for Equity in Health.* 16: 25.

Mohammed S, Sambo MN & Dong H (2011). Understanding client satisfaction with a health insurance scheme in Nigeria: factors and enrollees experiences. *Health Res Policy System.* 9: 20.

National Bureau of Statistics (2006). Populations census. https://www.nigerianstat.gov.ng/connections/pop2006.pdf Accessed on 3/12/19

Obansa SAJ. & Akinnagbe O. (2013). Health care financing in Nigeria: prospects and challenges. *The Mediterranean Journal of Social Sciences.* 4(1): 221-236.

O'Donnell O, van Doorslaer E, Rannan-Eliya RP, Somanathan A, Adhikar SR, Akkazieva B, et al (2008). Who pays for health care in Asia? *Journal of Health Econs.* 27: 460-475.

Olakunde BO. (2012). Public health care financing in Nigeria: which way forward? *Annals of Nigerian Medicine.* 6(1): 4-10.

Onwujekwe O, Chukwogo O, Ezeoke U & Uzochukwu BSC (2010). Asking people directly about preferred health-seeking behaviour yields invalid response: an experiment in the South-east, Nigeria. *Journal of public health*, 33(1):93-100.

Onwujekwe O, Okereke E, Onoka C, Uzochukwu B, Karigia J & Petu A (2010). Willingness to pay for community-based health insurance in Nigeria: do economic status and place of residence matter? *Health Policy Plan.* 25: 155-161.

Onwujekwe OE, Uzochukwu BSC, Obkeze EN, Okorokwo I, Ochonma OG, Onoka CA, Madubuko G. & Okoli C (2010). Investigating determinants of out-of-pocket spending and strategies for coping with payments for healthcare in southeast Nigeria. *BMC Health Services Research.* 10: 67.

Onyedibe KI, Goyit MG & Nnadi NE (2012). An evaluation of the National Health Insurance Scheme (NHIS) in Jos, a North-Central Nigerian city. *Global Advanced Research Journal of Microbiology.* 1(1): 005-012.

Oyibo PG. (2011). Out-of-pocket payment for health services: constraints and implications for government employees in Abakaliki, Ebony state, south east Nigeria. *African Health Sciences.* 11(3): 481-485.

Puteh SEW. & Almualm Y. (2017). Catastrophic health expenditure among developing countries. *Health Systems and Policy Research.* 4(1): 50.

Sanusi RA & Awe AT (2009). Perception of national health insurance scheme by healthcare consumers in Oyo state, Nigeria. *Pakistan Journal of Social Science.* 6: 48-53.

Seung HK; Yeong JJ; Hyo JY; Sang AL; Woorim K. & Eun-Cheol P. (2018). The relationship between catastrophic health expenditure and health-related quality of life. *International Journal for Equity in Health.* 17:166.

Uzochukwu B, Onwujekwe O, Soludo E, Nkoli E & Uguru N (2022). The district health system in Enugu state, Nigeria: an analysis of policy development and implementation. *Consortium for Research on Equitable Health System.* https://www.researchgate.net/publication/228444248. Accessed on 20th November, 2022.

Uzochukwu BSC., Ughasoro MD., Etiaba E., Okwuosa C., Envuladu E. & Onwujekwe OE. (2015). Health care financing in Nigeria: implications for achieving universal health coverage. *Nigerian Journal of Clinical Practice.* 18(4): 437-444.

Webster TR, Mantopoulos J, Jackson E, Cole-Lewis H, Kidane L, Kebede S, Abebe Y, Lawson R & Bradley EH (2011). Abrief questionnaire for assessing patient healthcare experiences in low-income settings. *International Journal for Quality Care.* 23(3): 258-268.

World Bank (1987). Financing health care in developing countries: an agenda for reform. *Washington, DC*. https://www.elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-0900-1. Accessed on 20th March, 2022.

World Health Organization (2004). Tax-based financing for health system: options and experiences. *World Health Organization: Geneva.*

World Health Organization (2010). World Health Report 2010: Health systems financing - the path to universal coverage. *WHO: Geneva.*

World Health Organization (2012). spending on health: A global overview. Fact sheet No 319. April 2012. Weblog. https://www.who.int/mediacentre/factsheets/fs319/en. Accessed on 18th March, 2022.

World Health Organization (2012). Nigeria – National expenditure on health. *World Health Organization: Geneva.*

World Health Organization (2018). Out-of-pocket payments for health, particularly for medicines, are unaffordable for many in Europe. *WHO: Geneva.*

PERCEPTION AND UPTAKE OF COVID-19 VACCINE AMONG PRIMARY HEALTH CARE WORKERS IN RIVERS STATE

Obijuru-Chibuike Charity Kasarachi
University of Port Harcourt
kasarachicharity@gmail.com

ABSTRACT

The study is aimed at ascertaining the perception and uptake of the covid-19 vaccine among primary Health Care workers in Rivers State. The Cross-sectional survey design was used for the study. A total of 424 primary health care workers were selected from a population of 1200 health care workers in Rivers State. A self-structured questionnaire was used to collect data for the study. Descriptive statistics was used to analyse the data. Hence, measure of central tendency statistics (mean), simple percentage and charts was used to answer the research questions. The findings of the study revealed that 30.5% of the respondents were between 18 – 30years old, 53.4% were between 31 – 40years old, 10% were between 41 – 50years while 6.1% were between 50years and above., shows that 9.4% of the respondents had a school certificate, 76.4% had a diploma, 14.2% had a B.Sc. It further revealed that 74.3% of the sample size had the perception that COVID-19 vaccine is safe, 74.3% were willing to take COVID-19vaccine, 71.4% said they had taken the first dose of COVID-19 while 71.0% accepted that they had taken the second dose. The study, therefore, concluded that health care workers were willing to be vaccinated with the COVID-19 vaccine. Hence, the study recommends that the vaccine be made available so that those who are willing can get vaccinated, and that religious organizations should ensure they encourage their members to take the vaccine.

Keywords: Covid-19, Perception, Uptake, Health Care.

INTRODUCTION

Coronavirus disease is a pandemic that is highly infectious and has led to increased morbidity and mortality (Dong, Du & Gardner, 2020). It is a respiratory tract infection that is caused by a novel coronavirus, SARS-CoV-2 (Guo *et al*., 2020). The virus has now affected virtually every country across the world and the number of deaths continues to rapidly increase (Paterson *et al*., 2016). Following the negative impact on health, measures have been put in place to curb the spread of this pandemic with 398,572,703 confirmed cases and about 2,001,773 mortalities as of January 16, 2022 (,WHO, 2022). In Nigeria, 108,943 cases have been confirmed with 1,420 deaths reported across 35 states of Nigeria as of march, 2021 (NCDC, 2021).

Coronavirus disease breakout in Wuhan, China, in December 2019, has gradually spread to over 215 countries (WHO, 2020). It was declared a pandemic by the World Health Organization in March 2020 (WHO, 2020). Since the onset of the COVID-19 pandemic, more than 79 million cases and over 1.7 million deaths have been recorded globally as of December 29, 2020 (ECDC, 2021). The COVID-19pandemic has had a devastating effect on many countries' economies, health systems, education systems, and infrastructure (Li & Lalani, 2020). The disease presently has no cure, and disease management is mainly supportive. Regular hand washing, use of facemasks, social distancing, and cough etiquette are vigorously recommended to limit community transmission of the virus.

Researchers across the world have worked assiduously to develop vaccines against the highly infectious virus. However, there are widespread skepticism and divergent views regarding the legitimacy of various COVID-19 vaccines among people across the globe (Shereen et al., 2020). The effectiveness of vaccination programs and the global objective of eradicating the pandemic require optimal acceptance of the vaccine across all countries. The success of any vaccination program is largely dependent on how well the vaccines are accepted among the population and the willingness of people to be vaccinated (Detoc et al., 2020).

Vaccine hesitancy— a continuum that encompasses delay, reluctance, or refusal to receive a vaccine despite its availability (Ogundele & Omotosho, 2020) —has been found to be a major obstacle to vaccination among the general population and among health workers, and widely held perceptions of the safety of vaccines may contribute significantly to this phenomenon. COVID-19 vaccination programs, which is already ongoing in some countries including Nigeria is faced with these challenges, especially due to the novelty of the disease, perceived controversies related to its origin, and the fast-tracked development of vaccines (Nzaji et al., 2020). In tropical countries like Nigeria, some people still outrightly deny the existence of the

disease due to the misconception that the virus does not thrive in hot climates. Beliefs such as this -have posed additional barriers to vaccine acceptance (Shekhar et al., 2020). Health workers perceptions and willingness to receive vaccination have been documented as essential for improving vaccination rates among patients and the general population. This is because Health workers play a key role in changing patients' behaviors, are among the first - to understand the magnitude of the problem and are in the right position to recommend vaccination (Bartsch et al., 2020). The study used the risk-feeling theory to understudy health workers perceptions and willingness to receive vaccination.

Aim of the Study

The aim of this study is to ascertain the perception and uptake of -COVID-19 vaccine among primary Health Care workers in Rivers State.

METHODOLOGY

Materials and Methods

The instrument for data collection was be a self-structured questionnaire developed by the researcher. The questionnaire will be divided into two (2) parts. The first part was consist of personal data while the second part was consist of items designed to measure perception and uptake of covid-19 vaccine among primary Health Care workers in Rivers State. In order to get a concrete result, the researcher was administered the instrument by herself with the help a research assistant to the midwives and nurses and collect it two weeks after it has been filled.

Ethical statement

Ethical approval will be sought from the University of Port Harcourt Ethics and Research and University of Port Harcourt Teaching Hospital Ethics. Prior to the commencement of data collection, the purpose of the study was explained to all the midwives at the instance of their coordinator and they will be assured that the study is strictly for academic purpose. More so,

written and verbal consents was obtained from each participant and necessary assurance given to them about the privacy and confidentiality of information obtained. The midwives was also be informed of their choice to choose not to participate in the study and there will be no penalty to that effect. Thus, the field work of this study was only be carried out upon due ethical clearance from the relevant authorities and the study respondents as stated. The instrument was stored in a cupboard and locked. It was later burnt two weeks after the analysis was performed.

Study Area

The study will be carried out in primary health care centres in Rivers State. Rivers State also known simply as Rivers, is a state in the Niger Delta region of southern Nigeria (Old Eastern Region). Formed in 1967, when it was split from the former Eastern Region, Rivers State borders Imo and Abia States to the north, Akwa Ibom State to the east, and Bayelsa and Delta states to the west. The state capital, Port Harcourt, is a metropolis that is considered the commercial center of the Nigerian oil industry.

Calculation of sample size

The sample size of 394 was selected from the total population of 1200, using Fischer's sample size determination below.

$$n = \frac{Z^2PQ}{d^2}$$

Where:

n = Sample size (when population is ≥ 1000)

Z = National Deviation at the desired confidence level. In this case, it was taken at 95%.

Z value at 95% = 1.96

P = the prevalence or population of the attribute of interest that is present in the population. In this case the uptake of Covid-19 vaccine among health care workers in a previous study.

Q = Proportion of the population without the desired characteristics; Q = 1-P

I^2 = Degree of Precision, was taken to be 5% (0.05)

This implies that; $n = \frac{Z^2PQ}{d^2}$ (Mohammedjud, Shuma & Mohammedamin, 2021)

$$n = \frac{1.96^2 \text{ x } 0.5(1 - 0.5)}{0.05^2}$$

$$n = \frac{3.8416 \text{ x } 0.25}{0.0025}$$

$$En = \frac{0.9604}{0.0025}$$

$$= 384.16 \quad \sim 385$$

Provide 10% for non-response rate

i.e $n = \frac{10}{100}\ x\ 385$ = 39

therefore, n = 385 + 39 = 424

Eligibility criteria

Primary health care workers that are currently working in the facility emotionally stable were eligible for the study.

Sampling Method

A multi stage sampling procedure was adopted for the study which was done in three stages.

Stage one: Simple random sampling technique was adapted to select six (6) Local Government Areas out of the twenty-three (23) Local Government Areas in Rivers State using simple random sampling method of balloting.

Stage two: simple random sampling technique by balloting was used to select three (3) wards from each of the (6) Local Government Areas.

Stage three: at the time of this study a pilot study revealed that there is one primary health centre in each of the selected wards. The staff strength

Stage four: Stratified random sampling by was used to sample five (5) representatives from each of the stratum via balloting.

Data Analysis

Descriptive statistics was used as data analysis method. Hence, measure of central tendency statistics (mean), simple percentage and charts will be used to answer the research questions. The hypothesis was tested using t-test statistics.

RESULTS

Table 1 revealed that 312 representing 74.3% of the respondents - believe -COVID-19 vaccine is safe while 108(25.7%) did not believe it is safe -, 298(71.0%) - think -COVID-19 vaccine can protect against -COVID-19 while 122(29.0%) -are in denial. 108 (25.7%) said they cannot be infected with SARS-Cov-2 and do not think the vaccine is necessary, 108 (25.7%) said they think that some SARS-CoV-2 vaccines can come from a former communist republic (like Russia), which may result in influences on communist thinking, 120(28.6%) they think SARS-CoV-2 vaccines are part of the plan of a large company that created COVID-19. These show-that the majority of the respondents -have the perception that -COVID-19 vaccine is safe and can protect against -COVID-19.

Table 1 percentage and frequency of the perception of -COVID -19 vaccine among primary health workers in Rivers State.

	Items	Yes	No
1	Do you think -COVID-19 vaccine is safe?	324 (76.4%)	100 (23.6)
2	Do you think -COVID-19 vaccine can protect against covid-19	310 (74.2%)	108 (25.8%)
3	I have already been infected with SARS-Cov-2 and I do not think the vaccine is necessary.	108 (25.7%)	312 (74.3%)
4	I think that some SARS-CoV-2 vaccines can come from a former communist republic (like Russia), which may result in influences on communist thinking.	108 (25.8%)	310 (74.2%)
5	I think SARS-CoV-2 vaccines are part of the plan of a large company that created COVID-19.	120 (28.6%)	300 (71.4%)
6	I trust my health care system (including healthcare personnel).	324 **(**76.4**%)**	100 **(23.6)**
7	I think they are going to insert electronic chips/transistors to control my brain.	120 (28.6%)	300 (71.4%)

Fig. 1, show that 30.5% of the respondents were between 18 – 30years, 53.4% were between 31 – 40years, 10% were between 41 – 50years while 6.1% were between 50years and above.

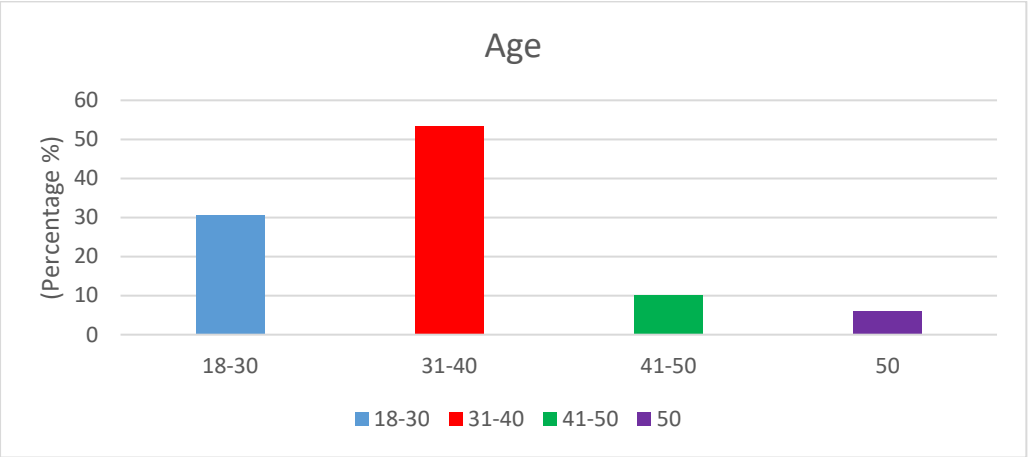


Fig. 1: Age of respondents

Fig. 2, shows that 9.4% of the respondents had school cert, 76.4% had diploma, 14.2% had B.Sc.

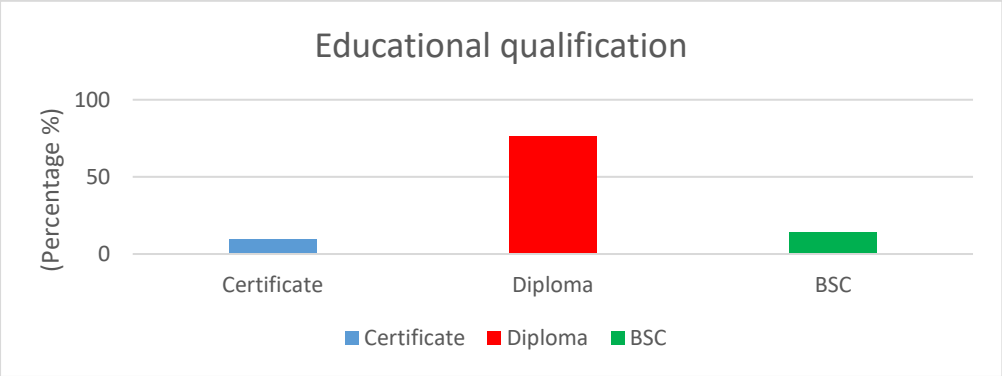


Fig. 2: Educational Qulification of respondents

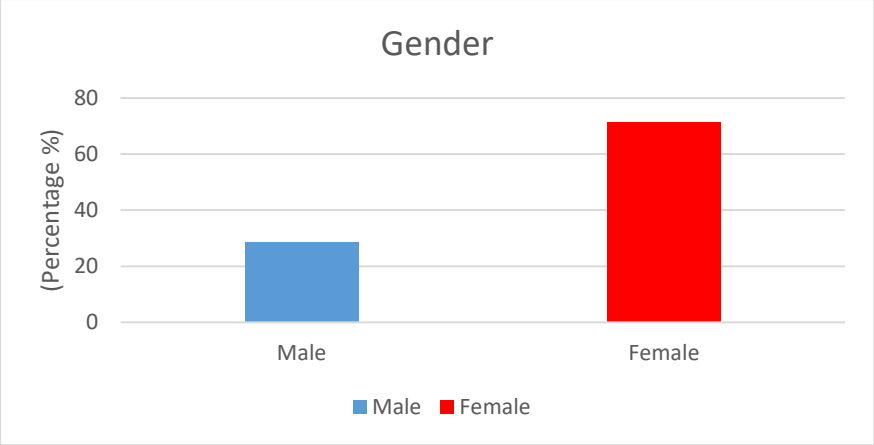


Fig. 4, revealed that 87.7% of the respondents were Christians, 0.4% were Muslims while 11.9% belonged to other religions.

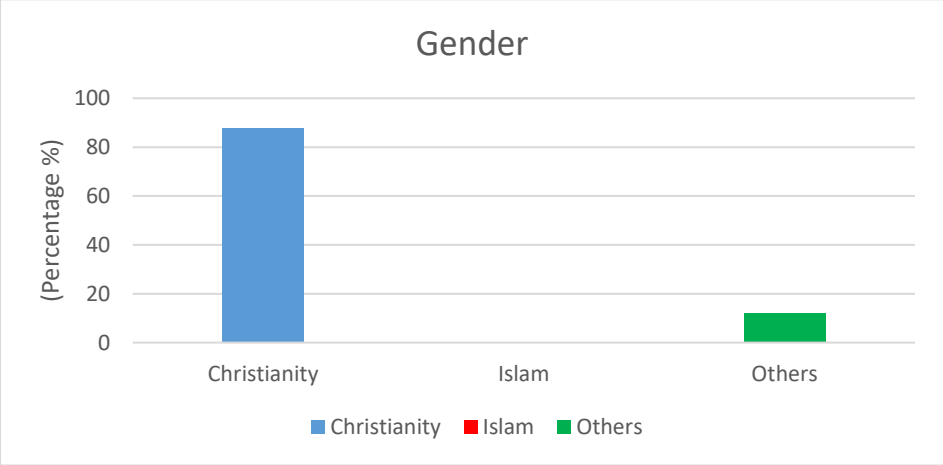


Fig. 4: Religion of respondents

Table 2 revealed that 315 of the respondents representing 75% of the respondents - have you taken -COVID-19 vaccine, 300 (71.4%) - -had not taken the vaccine - because they believe that their immune system is sufficient to protect me against the disease, 298 (71.0%) said that COVID-19 vaccination is not necessary in Nigeria, 310 (73.8%) said that their religion do not support vaccination. 312 (74.3%) - were willing to take the vaccine. 295(70.2%) -complained of lack of time to get the vaccine. 287(68.3%) -were afraid of injections. 280 (66.7%) s-had reaction to a vaccine in the past and 291 (69.3%) said that the reason why they were not willing to take the vaccine was because they prefer other people get the vaccine first.

Table 2 percentage and frequency of the uptake COVID-19 among primary Health Care workers in Rivers State.

Items	Yes	No
Have you taken COVID-19 vaccine?	**315 (75%)**	**105 (25%)**
If No to Q1, why have you not taken the vaccine		
My immune system is sufficient to protect me against the disease	300 (71.4%)	120 (28.6%)
COVID-19 vaccination is not necessary in Nigeria	298 (71.0%)	(122) (29.0%)
My religion do not support vaccination	310 (73.8%)	110 (26.2%)
If No to Q1, are you willing to take it?	**312 (74.3%)**	**108 (25.7%)**
If No to Q3, why are you not willing to take it?	295 (70.2%)	
I don't have time to get the Vaccine	287 (68.3%)	125 (29.8%)
Do not like needles/injections	280 (66.7%)	133 (31.7%)
Had a bad reaction to a vaccine in the past	291	140 (33.3%)

Prefer other people get the vaccine first	(69.3%)	
		129 (30.7%)

Table 3 revealed that 300 respondents representing 71.4% said that they have taken the 1st dose, 29% said they have taken the 2nd dose while 26.2% said they have taken the third dose. When they were asked the vaccine type, they have taken 295 (70.2%) said they have taken Modena, 287 (68.3%) said they have AstraZeneca, 0(0%) said they have taken Pfizer while 0 (0%) said they have Johnson and Johnson. When they were asked if they feel any undesirable effect after the vaccination 100% said No. when asked if they can recommend the vaccine to anyone who has not taken it, 300(71.4%) said yes.

Items	Yes	No
If yes to Q1, how many doses have you taken?		
1st	300 (71.4%)	120 (28.6%)
2nd	298 (71.0%)	122 (29.0 %)
3rd	110 (26.2%)	310 (73.8%)
Which vaccine type did you take?		
Modena	295 (70.2%)	125 (29.8%)
Astrazzeneca	287 (68.3%)	133 (31.7%)
Pfizer	0 (0%)	420 (100%)
Johnson and Johnson	0 (0%)	420 (100%)
If yes to Q1, did you feel any undesirable effect after the vaccination	0	420 (100%)

If yes to Q7, what were the effects		
	Nil	Nil
Would you recommend the vaccine to anyone who has not taken it?	300 (71.4%)	120 (28.6%)

Table 3 percentage and frequency of the willingness to take -COVID-19 among primary Health Care workers in Rivers State.

Table 4: reveals a correlation coefficient of 0.87. This coefficient shows that there is a positive relationship between the willingness and level of uptake of covid-19 vaccine among primary health care workers in Rivers State. The Spearman's rho table reveals p value of 0.000 and a sig. value of 0.05. Hence, since the sig value ($p = 0.000 < 0.05$) is lesser than 0.05 alpha therefore, the null hypothesis is rejected meaning there is a significant relationship between the willingness and level of uptake of covid-19 vaccine among primary health care workers in Rivers State.

-.

Table 4: Correlation analysis on relationship between the willingness and level of uptake of covid-19 vaccine among primary health care workers in Rivers State.

Correlations

			Willingness	Uptake
Spearman's rho	willingness	Correlation Coefficient	1.000	.87**
		Sig. (2-tailed)	.	.000
		N	424	424
	uptake	Correlation Coefficient	.87**	1.000
		Sig. (2-tailed)	.000	.
		N	100	100

** Correlation is significant at the 0.05 level (2-tailed).

Discussion of findings

-. In this study, we found that slightly more than half (74.3%) of the health workers had positive perceptions of the COVID-19 vaccine. This finding is quite revealing, as it is often assumed that the attitudes of health workers toward vaccination will be positive due to their knowledge

and training. It has been found that perceptions of vaccines among health workers and their perceived risk of infection influence vaccination decisions (Betsch, 2014).

Notably, more than 2/3 of the health workers had reservations about receiving the vaccine even though only 43% of the participants specifically expressed safety concerns about the vaccine itself. Widespread conspiracy theories associated with the pandemic and a psychological need to understand various events surrounding the pandemic are possible explanations for this finding (van Prooijen & Douglas, 2017). This finding is significant since psychosocial factors such as perceptions, emotions, trust in vaccines, and trust in vaccine providers have been found to contribute to vaccine hesitancy and refusal and may have played a role in vaccine acceptance among these health workers (Dube & MacDonald, 2016)

In this study, we also found that only 25.7% of the health workers were willing to receive the COVID-19 vaccine. This finding is surprising but explainable, as it has been found that public perceptions of the risks, religion and benefits of vaccination constitute major obstacles to vaccine acceptance (Harmsen *et al*., 2013). Health workers, as part of the general population, are also prone to subjective judgments that impact their behaviors and vaccination decisions, which may be the case in this study despite their medical knowledge. The acceptance rate in our study is similar to the 53.5% acceptance rate among United States residents Guidry *et al*., (2021), but lower than the 86% acceptance rate reported by (Williams et al., 2020). The higher acceptance rate reported by Williams *et al*., (2020) may be due to their study participants' high perceived susceptibility to COVID-19 infection since the participants in their study all had chronic respiratory illnesses. The proportion of those willing to receive the COVID-19 vaccine in our study fell short of the minimum rate of 75% required to reach herd immunity and stop the spread of the coronavirus epidemic (Bartsch *et al*., 2020). This is alarming since our study was conducted among health workers who were expected to have a higher likelihood of being willing to receive the vaccine than the general population because of their medical knowledge. Willingness to receive the COVID-19 vaccine among our respondents was significantly associated with their perceptions of the COVID-19 vaccine, their religion, and fear for injection, which is a similar finding to previous studies (Betsch & Wicker, 2012).

In this study, perceptions of the COVID-19 vaccine and one's perceived risk of contracting the results also indicate that efforts to change perception of COVID-19 severity may only partially increase vaccine up-take. Although a majority of Medicare beneficiaries were aware of the risk of COVID-19, a substantial portion may be still concerned about vaccine safety. Indeed, 80% of nurses and midwives reported not getting a COVID-19 vaccine due to concerns about side effects and distrust of government. The rapid development of COVID-19 vaccines may have

provided limited time to educate the public. More concerning, however, is the possibility that misinformation about COVID-19 vaccine could spread, especially through less reliable information sources like social media.

Several COVID-19 vaccines have been approved and distributed in various countries, which have initiated mass vaccination campaigns. Other preventive measures include physical or social distancing, quarantining, ventilation of indoor spaces, covering coughs and sneezes, hand washing, and keeping unwashed hands away from the face. The use of face masks or coverings has been recommended in public settings to minimize the risk of transmissions. While work is underway to develop drugs that inhibit the virus, the primary treatment is symptomatic. Management involves the treatment of symptoms, supportive care, isolation, and experimental measures.

Conclusion

In conclusion, our findings suggest that perception and willingness to receive COVID-19 vaccination was sub-optimal among this group of health workers and was associated with perceptions of the vaccine, religion, bad reaction to a vaccine in the past among others. Vaccination of health workers is essential for protecting them against infectious diseases, and considering their vital role in public health as major stakeholders in the fight against the COVID-19 pandemic and other major infectious diseases, improving vaccine acceptance among this group when it becomes available is critical. In addition, clear, well-articulated policies related to the COVID-19 vaccine are needed to combat the challenges that may arise from negative perceptions of the vaccine.

References

Bartsch SM, O'Shea KJ, & Ferguson MC, (2020). Vaccine efficacy needed for a COVID-19 coronavirus vaccine to prevent or stop an epidemic as the sole intervention. *American Journal of Prevention Medicine*, 5(9), 493–503. doi: 10.3390/bios12121129.

Betsch C. (2014). Overcoming healthcare workers vaccine refusal: competition between egoism and altruism. *European Surveillance*, 19, 20979.

Detoc, M.; Bruel, S.; Frappe, P.; Tardy, B.; Botelho-Nevers, E. & Gagneux-Brunon, A. (2020). Intention to participate in a COVID-19 vaccine clinical trial and to get vaccinated

against COVID-19 in France during the pandemic. *Vaccine*, 38, 7002–7006. doi: 10.3390/vaccines11010193.

Dong E, Du H, & Gardner L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Distance*. 20,533-4. doi: 10.3390/vaccines11010123.

Dube E, & MacDonald NE. (2016). Managing the risks of vaccine hesitancy and refusals. *Lancet Infect Dis*tance. 16,518–9. doi: 10.1038/s41467-023-35927-0.

Guo YR, Cao QD, Hong ZS, Tan YY, Chen SD, & Jin HJ, (2020). The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak - an update on the status. *Millennium Medical Research*, 7,11. doi: 10.1016/S1473-3099(21)00318-2.

Harmsen IA, Mollema L, & Ruiter RA, (2013). Why parents refuse childhood vaccination: a qualitative study using online focus groups. *BMC Public Health*; 13:1183. doi: 10.15585/mmwr.mm7003e2.

Islam M.A (2021). "Prevalence and characteristics of fever in adult and paediatric patients with coronavirus disease 2019 (COVID-19): A systematic review and meta-analysis of 17515 patients". *PLOS ONE. **16** (4): e0249788.* doi: 10.3390/ijerph20021574.

Jiang S, Xia S, Ying T, & Lu L (2020). "A novel coronavirus (2019-nCoV) causing pneumonia-associated respiratory syndrome". *Cellular & Molecular Immunology, 17(5), 554.* doi: 10.1093/ve/veac121NCDC 2021

Nzaji MK, Ngombe LK, Mwamba GN, Ndala DBB, Lungoyo CL, & Mwimba BL, (2020). Acceptability of vaccination against COVID-19 among healthcare workers in the Democratic Republic of the Congo. *Pragmatic Obstetrician Reservation*, 11, 103-9. Doi: 10.1186/s12889-018-5441-6.

Ogundele OA, & Omotosho AA. (2020). Vaccination of healthcare workers in Nigeria: a review of barriers, policies and level of implementation. *Annals of Internal Medicine*, 4(1), 9–15. doi: 10.1038/s41591-020-0851-2.

Page J, Hinshaw D & McKay B (2021). "In Hunt for Covid-19 Origin, Patient Zero Points to Second Wuhan Market – The man with the first confirmed infection of the new coronavirus told the WHO team that his parents had shopped there". *The Wall Street Journal*, 11:103-9. doi: 10.1038/s41591-020-1124-9.

Paterson T., Williams, L.; Gallant, A.J.; Rasmussen, S.; Nicholls, L.A.B.; Cogan, N.; Deakin, K.; Young, D. & Flowers, P. (*2016*). Towards intervention development to increase the uptake of COVID-19 vaccination among those at high risk: Outlining evidence-based and theoretically informed future intervention content. *Annals of Internal Medicine*. 25, 1039–1054. doi: 10.3390/children10010104.

Shereen MA, Khan S, Kazmi A, Bashir N & Siddique R. (2020). COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *Journal of Advance Research*. 24:91–8. DOI: 10.1016/j.ebiom.2016.08.042

Van Prooijen J.W & Douglas KM. (2017). Conspiracy theories as part of history: the role of societal crisis situations. *Annals of Internal Medicine*.10:323–33. doi: 10.1016/j.vaccine.2019.06.018.

Williams, L.; Gallant, A.J.; Rasmussen, S.; Nicholls, L.A.B.; Cogan, N.; Deakin, K.; Young, D. & Flowers, P. (2020). Towards intervention development to increase the uptake of COVID-19 vaccination among those at high risk: Outlining evidence-based and theoretically informed future intervention content. *Annals of Internal Medicine*. 25, 1039–1054. doi: 10.3390/children10010104.

World Health Organization (2020). WHO Director-General's opening remarks at the media briefing on COVID-19-11 March 2020 [Internet]. Geneva: WHO; 2020.

World Health Organization (2022). COVID-19: Current Situation and the way forward. World Health Organization Regional Committee for African AFR/RC56/17. Geneva, 2022.

KNOWLEDGE, CONFIDENCE AND EDUCATIONAL NEEDS OF MIDWIVES ON PERINEAL MANAGEMENT IN BAPTIST HOSPITALS DOUALA, CAMEROON.

BY

IAN KINKOH, LENJO NJOBARA.

ABSTRACT

Perineal tear either occurs spontaneously as a result of an unaided vaginal birth or a surgical cut made on the perineal body to widen the vaginal opening assisting vaginal birth. Globally about 85% and more women experience perineal tear during childbirth with up to 11% of all vaginal births resulting in a third and fourth degree perineal tear. The study aimed to assess the Knowledge, Confidence and educational needs of midwives on perineal management at Baptist Hospitals Douala Cameroon. A descriptive cross sectional survey research design was used in the study. A total population study among 150 midwives working in Baptist Hospitals Douala, Cameroon and the total number of respondents of the study was 110 midwives. The study used a researcher-developed instrument for the study. The instrument was subjected to a reliability testing using Cronbach's Alpha and reliability coefficient of 0.81 was obtained. The Research questions were analyzed using mean, standard deviation, percentage, and frequency counts, while the null hypothesis was tested using t-test statistics at 0.05 level of significance. The result of the study revealed that a great majority (80.9%) of the respondents were Females while 19.1% were Males, 10.9% of the respondents had master's degree, 53.6% were registered Bachelors of Nursing Sciences (BNS) / Bachelor Nursing Sciences-Midwife (BNS-Midwife), 18.1% had State Registered Nurse (SRN)/State Registered Midwife (SRM), and 10.9% had Advanced Practice Nurse Assistant-Obstetrics (APNA-OB), while 6.3% were Nurse Assistant (NA). It further revealed that the level of knowledge on the various perineal management techniques to prevent perineal tears during childbirth is high $\bar{x} = 3.32$, midwives at Baptist hospitals Douala, Cameroon have confidence in the identification and repair of the various degrees of perineal tears $\bar{x} = 3.42$ and that there is need for midwives to frequently undergo training on perineal management at Baptist hospitals Douala, Cameroon. The study therefore, recommends that there should be an improvement in perineal management educational programs that are designed to help midwives improve on their clinical skills and perineal protection techniques and also boost midwives' confidence in decision making.

Keywords: Midwives, Perineal Tear, Educational Needs.

INTRODUCTION

The perineum of a woman is the lower part of the pelvis close to the outlet which is diamond shape, located between the symphysis pubis and the coccyx (Goh & Ellepola, 2018). Perineal tear either occurs spontaneously as a result of an unaided vaginal birth or a surgical cut also known as episiotomy made on the perineal body to widen the vaginal opening assisting vaginal birth. Perineal tear is classified into four degrees, from the mildest form being first degree perineal tear which only affects the vaginal skin to the most severe one the fourth-degree perineal tear which extends to affect the anal sphincter muscle and anal epithelium, giving rise to a complication known as Obstetric Anal Sphincter Injuries (OASIS), (Bick et al., 2012).

Globally about 85% and more women experience perineal tear during childbirth with up to 11% of all vaginal births resulting in a third and fourth degree perineal tear hence this has profound short term and long term maternal physical and psychological morbidities (Carroll et al., 2020; Bick et al., 2012). Short term and long-term complications of perineal tears include bleeding, infection, urine and stool incontinence, persistent perineal pain and painful intercourse which is responsible for a reduced quality of life among women after childbearing and this will result to increased medical expenses. Conversely there is less likelihood of these problems in women with intact perineum. Majority of research on perineal tears have been carried out in developed countries with a report of 11.6% prevalence of third and fourth degree perineal tear in the USA, 15% in the UK and 9.7% in Sweden (Yang & Bai, 2021). A similar study conducted in low income area like Tanzania revealed a spike of perineal tears of about 96.5% after vaginal birth with an incidence of 6% and a prevalence of 36.5% reported in Uganda (Mantzius et al, 2020)

Smith et al. (2013) contended that this prevailing problem in maternal health as a result of perineal tear may be higher than previously known from research but however there was a known reduction in the rates when intervention programs on perineal management was implemented in Norway. Mantzius et al., (2020) demonstrated that intervention such as improving the knowledge of midwives on perineal management significantly reduces perineal tears. An obligatory yearly training on perineal management has proven to have significantly reduced the rate of obstetric anal sphincter injuries (Frost et al., 2016).

In the past decades perineal management has become an increasingly important aspect during childbirth as the risk of developing a perineal tear after birth globally has been on the rise within

hospital settings. According to studies carried out by Carroll et al., (2020) and Diaz et al. (2021) midwives perceived their knowledge on perineal `management to be low with confidence in perineal management higher among experienced midwives. There have been some recommended techniques effective in preventing perineal tears such as upright position during childbirth (Diorgu & Steen, 2016), and perineal support (Mantzius et al., 2020; Ali, et al., 2020) however these techniques are yet to have significant effect on the rate of perineal tears during childbirth. Midwives are the health care professionals are at the forefront in the prevention, diagnosis and repair of perineal tear during childbirth (Carroll et al., 2020). Confidence is a personal belief that a member of a profession has which is dynamic and maturing in nature (Holland et al., 2012). Confidence measures the ability to competently fulfill the expectations of a profession which involves knowing the roles of the profession, and believing in the role, scope of practice and significance of the profession through a process assertive experience. (Holland et al., 2012; Chapman, 2018), conversely many midwives do not have the requisite confidence needed to adequately diagnose and repair perineal tears. This is as a result of the lack of a standardized training on perineal management (Diaz et al, 2021).

It is estimated that ensuring the education of midwives can reduce maternal morbidities and mortality by up to 80% in low and middle-income countries (Nove et al., 2020). Literature review reveals that only about 10 to 21.6% of midwives are confident in accurately assessing and repairing perineal tears and had little knowledge on perineal anatomy resulting in their inability to adequately assess and identify perineal tears which amounts to about 33% of third and fourth degree tears poorly classified at the time of repair (Carroll et al., 2020; Diaz et al., 2021). Therefore, midwives need to have the necessary confidence and education to provide the best possible care grounded on the most updated evidence base of practice (Carroll et al., 2020), justified by the premise that professional confidence is as important as professional competence Holland et al., 2012. The study aimed to assess the knowledge, confidence and educational needs of midwives on perineal management at Baptist hospitals Douala Cameroon

MATERIALS AND METHODS

Ethical Statement

Ethical approval was obtained from the ethical review board of University of Port Harcourt Nigeria and ethical approval was obtained from the Cameroon Baptist Convention Institutional Review Board (C.B.C.I.R.B.). Administrative permit was obtained from the administrator and assistant administrator of Baptist hospitals Mboppi and Bonaberi respectively. Informed consent was obtained from respondents. All data obtained from respondents was treated with strict secrecy, and all data was securely stored on computers with password protection and any paper data was stored in locked filling cabinet within a locked office. The research data obtained from respondents was only seen by the researcher and research project supervisor.

Study Area

The study was conducted in Douala, Littoral region of Cameroon, at the Baptist hospitals of Mboppi and Bonaberi respectively. Douala is the regional capital of Littoral region, cosmopolitan in nature and doubles as the most populated city and the economic capital of the country with total population of 2.768 million according to the 2015 population survey. The Baptist hospitals of Cameroon also known as "MBINGO" is reputed for quality and compassionate health care within the country and it is the destination of choice for a majority of Cameroonians seeking health care. The Mboppi Baptist hospital is located at the heart of Douala town within the health district of New bell and the Bonaberi Baptist hospital is located at the periphery within the Bonassama health district, both hospitals are managed by an administrator.

Calculation of Sample Size

A total population study among midwives was carried out due to the smallness of the population under study.

Eligibility Criteria

Respondents included in this study met the following criteria

- ✓ Midwifes and nurses working in the maternity section of the Baptist hospitals of Douala
- ✓ Provided a signed consent prior to the study process
- ✓ Completed the structured questionnaire

Respondents excluded from enrollment into the study includes the following;

- Student nurses and midwives on internship are not included.
- Staff nurses and midwives on annual or maternity leave

Sampling Method

A purposive sampling technique used to choose all the nurses and midwives for the study at Baptist hospitals of Mboppi and Bonaberi given that he or she voluntarily participate in the study.

Data Analysis

The study design was a descriptive cross sectional survey. The study population constituted all the nurses and midwives the sampling method was a purposive sampling technique used to choose all the nurses and midwives for the study at Baptist Hospitals of Mboppi and Bonaberi given that he or she voluntarily participate in the study. Midwives assisting childbirth at the Baptist Hospital of Mboppi and Bonaberi within the study period. The total population of Nurses and midwives who assist childbirth is 150 with a census of 60 nurses and midwives in Bonaberi and 90 nurses and midwives in Mboppi Baptist hospital as per the respective hospital internal survey and this is equally seen on the maternity staff working schedule prepared by the supervisors of nursing services (SNS) of Baptist hospital of Mboppi and Bonaberi respectively. A total population study among midwives was carried out due to the smallness of the population under study. The sampling method was a purposive sampling technique used to choose all the nurses and midwives for the study at Baptist hospitals of Mboppi and Bonaberi given that he or she voluntarily participated in the study. The instrument for data collection was a structured questionnaire. Data obtained from the questionnaire was entered into the statistical package for social sciences version 25 (SPSS 25) and this was used for data analysis. Results were presented on graphs, frequency tables and charts to ease understanding and interpretation. Mean and standard deviation was used to answer the research questions while percentage was used to explain the demographic variables and finally One-Sample Test was used to test the hypothesis.

RESULTS

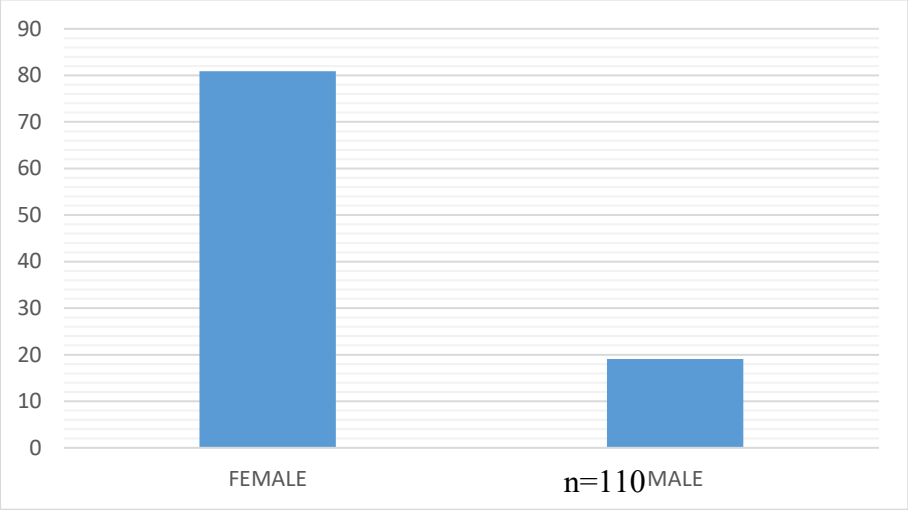


Figure 1: gender of respondents on knowledge, confidence and educational needs of midwives on perineal management in Cameroun

Figure 1. Shows that a great majority (80.9%) of the respondents were Females while 19.1% were Males.

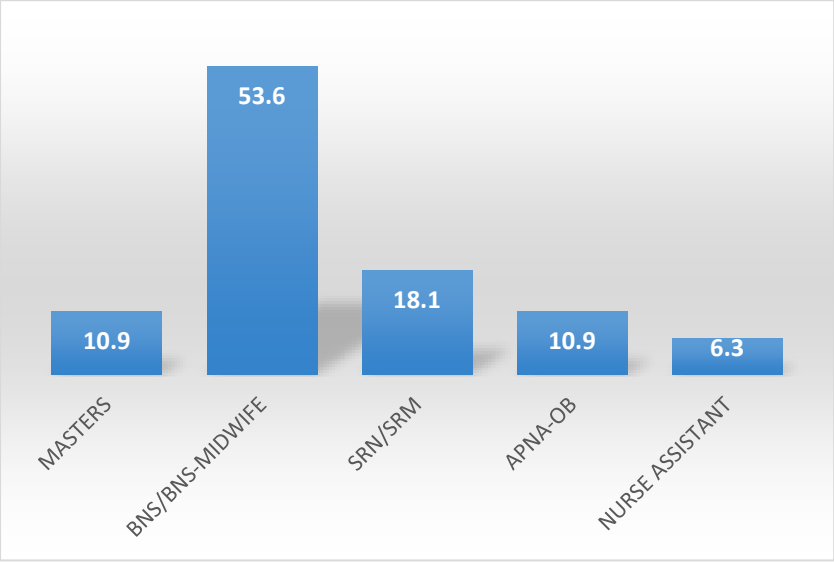


Figure 2: Cadre of respondents on knowledge, confidence and educational needs of midwives on perineal management in Cameroun

Fig 2. Show that 10.9% of the respondents had master's degree, 53.6% were registered Bachelors of Nursing Sciences (BNS) / Bachelors Nursing Sciences-Midwife (BNS-Midwife), 18.1% had State Registered Nurse (SRN)/State Registered Midwife (SRM), and

10.9% had Advanced Practice Nurse Assistant-Obstetrics (APNA-OB), while 6.3% were Nurse Assistant (NA).

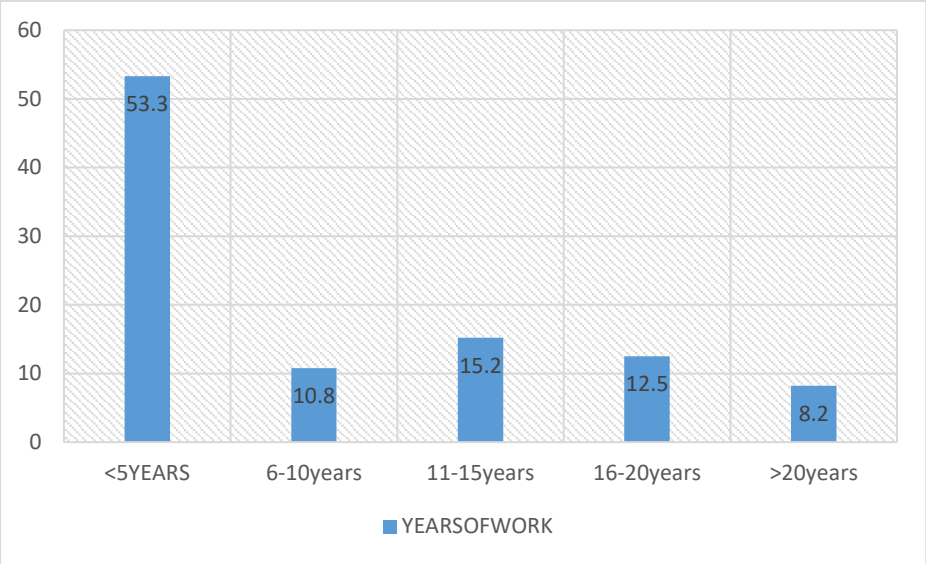


Figure 3: Years of work of respondents on knowledge, confidence and educational needs of midwives on perineal management in Cameroun

Figure 3. Shows that a significant majority of 53.3% of the respondents had less than 5 years of work experience, followed by a 15.2% of respondents whose have 11 – 15years of work experience. An identified 10.8% of respondents had 6-10years of work experience, with a proportion respondents (12.5%) who had 16 – 20 years of work experience while 8.2% had more than 20 years of work experience.

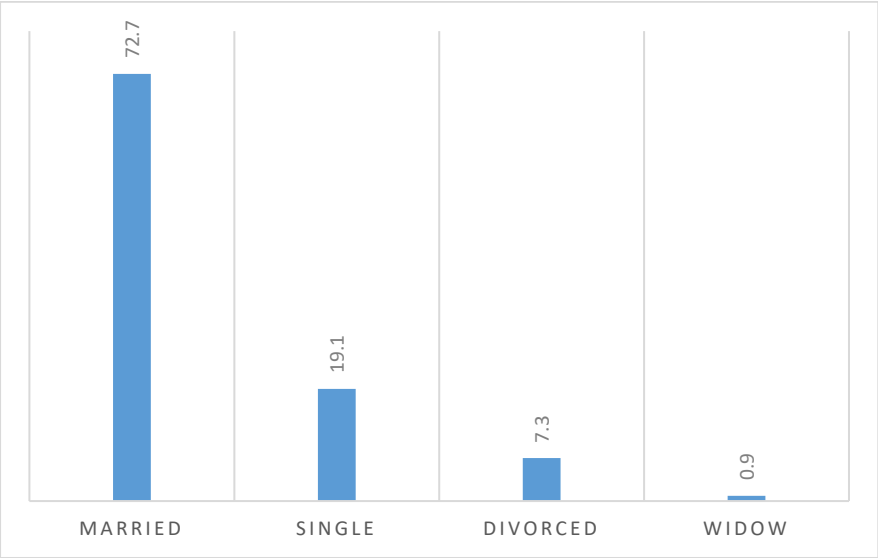


Figure 4: marital status of respondents on knowledge, confidence and educational needs of midwives on perineal management in Cameroun

Fig. 4. A majority (72.7%) of the respondents were married, with a proportion of 19.1% who were single, 7.3% were divorcees while a minimal proportion of 0.9% of respondents were widowed.

Table 1: Midwives' level of knowledge on the various perineal management of midwives on perineal management in Cameroun

ITEMS	N	Min.	Max.	Mean ± SD
Perineal management techniques are evidenced based methods of ensuring very little or no injury of the perineum during childbirth.	110	2	5	3.13±0.76
Perineal management ensures the slowing down of the delivery of the fetal head to prevent perineal tears.	110	2	5	3.02±0.77
Perineal support as a technique, is also aimed at slowing down the delivery of the fetal head during child birth.	110	1	5	3.23±1.67
Episiotomy as a technique is necessary in the primigravida to prevent severe perineal tears.	110	1	5	3.98±1.22
Perineal massage is also as important in preventing perineal tears as perineal support.	110	1	5	3.13±2.49
Selective episiotomy has more benefits than routine episiotomy on women during child birth.	110	1	5	3.96±1.17
Position such as the lithotomy position is not beneficial in general labor progress.	110	1	5	4.34±1.2
Birthin0g positions such as squatting, standing, leaning forward reduces length of labor and prevents perineal tears.	110	1	5	4.64±1.24
Antenatal perineal massage from 35weeks significantly reduces a woman's chance of developing a perineal tear.	110	1	5	3.6±1.19
First degree tear affects the vaginal mucosa and perineal body only.	110	1	5	4.53±1.83
First degree perineal tear does not require suturing.	110	1	5	4.94±2.88
Second degree perineal tear extends to the perineal muscle.	110	1	5	3.1±0.14

Average mean and Standard deviation	**3.8±1.98**

Table 1 show the mean ratings and standard deviations of the midwives' level of knowledge on the various perineal management techniques to prevent perineal tears during childbirth at the Baptist hospitals, Douala Cameroon. The mean value ranges from 3.02 to 4.94 with a grand mean value of 3.8 which is above the criterion mean of 3 thereby showing that the level of knowledge on the various perineal management techniques to prevent perineal tears during childbirth at the Baptist hospitals, Douala Cameroon is high.

Table 2 Midwives' confidence in the identification and repair of the various degrees of perineal tears in Cameroon

Items	**N**	**Min**	**Max.**	**Mean±SD**
I wash my hands and prepare the working environment before starting perineal care.	110	1.00	4.00	3.5±0.85
I wear gloves before starting perineal care.	110	2.00	4.00	3.90±0.35
I provide privacy before starting perineal care.	110	1.00	4.00	3.51±0.92
I explain every procedure to the patient during perineal care.	110	1.00	4.00	3.72±0.66
I can identify the patient with the need for perineal care.	110	1.00	4.00	3.75±0.75
I can identify and repair a first degree perineal tear.	110	1.00	4.00	3.74±0.64
I can identify and repair a second degree perineal tear.	110	1.00	4.00	3.28±1.00
I can guide and protect the perineum during delivery.	110	3.00	4.00	3.74±0.41
I can educate and perform antenatal perineal massage.	110	1.00	4.00	2.57±1.13
I can manage a perineal bleeding.	110	1.00	4.00	3.40±0.90
I can identify and repair a third degree perineal tear.	110	1.00	33.00	2.94±1.89
I can differentiate between a third degree tear and a fourth degree tear.	110	1.00	4.00	3.21±1.04

I can do perineal assessment and grade them accordingly.	110	1.00	4.00	3.31±0.8
I can manage the perineum and slow down the delivery of baby's head during delivery.	110	2.00	4.00	3.74±0.53
I repair third degree perineal tears without a doctor assistance or guidance	110	1.00	4.00	2.60±1.24
Fourth degree perineal tear extends through the anal epithelium resulting in communication between the vagina epithelium and the anal epithelium.	110	1.00	4.00	3.68±0.80
Third and fourth degree perineal tears are severe perineal tears and women can easily develop urine and fecal incontinence.	110	1.00	4.00	3.51±0.88
I can independently determine when an episiotomy is required and make the necessary cut on the perineum.	110	1.00	4.00	3.45±0.94
I can perform mediolateral technique for episiotomy.	110	1.00	4.00	3.32±0.90
I can classify perineal tears.	110	1.00	4.00	3.70±0.71
I can assess the healing a perineal tear post-partum making use of perineal assessment tool like the REEDA scale.	110	1.00	4.00	2.72±1.10
Average mean and standard deviation				**3.37±0.12**

Table 2 show the mean ratings and standard deviations of whether midwives' at Baptist hospitals Douala, Cameroon are confident in the identification and repair of the various degrees of perineal tears. The mean value ranges from 2.5 to 3.9 with a grand mean value of 3.37 which is above the criterion mean of 2.5 thereby showing that the midwives' at Baptist hospitals Douala, Cameroon have confident in the identification and repair of the various degrees of perineal tears.

Table 3 Midwives' educational needs on perineal management of midwives on perineal management in Cameroun

Items	**N**	**Min.**	**Max**	**Mean±SD**
I have received special training within the past year (2021) on techniques to prevent perineal tears.	110	1.00	5.00	2.92±1.42
Annual training workshop on perineal management is very necessary for midwives.	110	1.00	5.00	3.87±1.38

I have received any training within the past year on perineal tear repair.	110	1.00	5.00	3.10±1.33
There is need for yearly workshop and training on surgical techniques in perineal repair.	110	1.00	5.00	5.1±2.14
There is a need to have a routine workshop on training of midwives in perineal protection techniques.	110	1.00	5.00	4.2±1.12
There is need for education of midwives on various birthing positions to prevent perineal tear.	110	1.00	5.00	4.1±1.21
There is need for workshops on giving episiotomy and timing (when to perform) for episiotomy during childbirth.	110	1.00	5.00	4.1±1.18
There is need for training of midwives on how to infiltrate the perineum with local anesthetic for perineal tear repair.	110	1.00	5.00	4.7±3.25
There is a need for education of midwives on perineal massage technique.	110	1.00	5.00	3.8±1.12
There exist regular trainings and workshops on perineal management for midwives.	110	1.00	5.00	3.70±1.34
There is need for training on the performance of Perineal support technique during childbirth.	110	1.00	5.00	3.91±0.83
There is a protocol for perineal management existing in labor ward.	110	1.00	5.00	2.94±2.14
The government invested in the training and retraining of midwives.	110	1.00	5.00	2.9±0.96
There are training programs available for further studies for midwives within the country at the graduate and post graduate levels.	110	1.00	5.00	3.41±0.89
Sub specialties in midwifery are being created to train specialist midwives.	110	1.00	5.00	3.31±2.10
There exist opportunities for educational advancement for all midwives within the country.	110	1.00	5.00	3.00±0.15
Average mean and standard deviation				**3.68±2.01**

Table 3 show the mean ratings and standard deviations of the midwives' educational needs on perineal management at Baptist hospitals Douala, Cameroon. The mean value ranges from 2.9 to 5.1 with a grand mean value of 3.68 which is above the criterion mean of 3 thereby showing that there is need for midwives' to frequently undergo training on perineal management at Baptist hospitals Douala, Cameroon.

DISCUSSION

Level of Knowledge on the Various Perineal Management Techniques to Prevent Perineal Tears during Childbirth

The result of the study showed that the level of knowledge on the various perineal management techniques to prevent perineal tears during childbirth at the Baptist hospitals, Douala Cameroon is high due to the high level of education. These findings are consistent with that of Andrews et al., (2016) who in his research opined that midwives in Asia has high level of knowledge on the various perineal management techniques. He further stated that the reason for the high knowledge was due to frequent cases of such cases in the facility.

Midwives' Confidence in the Identification and Repair of the Various Degrees of Perineal Tears

The findings of this study revealed that the midwives at Baptist hospitals Douala, Cameroon have confidence in the identification and repair of the various degrees of perineal tears with a grand mean value of 3.37. These finding match the 90% of UK midwives who reported a similar level of confidence in perineal assessment (Bick et al., 2012). Like Bick et al. (2012), this study also identified that there was a lack of confidence amongst newly qualified midwives to either make a decision to perform an episiotomy, infiltrate the perineum or perform an episiotomy. Grigoriadias et al. (2009) argue that knowledge of the anatomy of the perineum is crucial to the assessment and repair of the perineum and suggest that this knowledge has been found to be lacking even though episiotomy is one of the most frequent surgical procedures performed by midwives and obstetricians. Finding from our study confirm reports by Bick et al., (2012), East et al., (2015) and Selo-Ojeme et al., (2015), that some midwives do not feel very confident in identifying third- and fourth-degree tears. Increasing rates of operative birth, increasing complexities in pregnancy, labor and birth, may also be contributing to a reduction in opportunities for midwives to perform perineal repairs, therefore decreasing their experience and confidence with assessment of the perineum and perineal repair.

Midwives' educational needs on perineal management

The result of the study shows the mean ratings and standard deviations of whether midwives at Baptist hospitals Douala, Cameroon are confident in the identification and repair of the various degrees of perineal tears. The mean value ranges from 2.5 to 3.9 with a grand mean value of 3.37 which is above the criterion mean of 2.5 thereby showing that there is a need for

midwives to frequently undergo training on perineal management at Baptist hospitals Douala, Cameroon. The findings of the study are consistent with a previous Irish study by Cowman and Dunlea, (2014) as cited in Carroll et al (2020) who also found that perineal management workshops were not meeting midwives needs. Only half of the respondents (55.6%) agree d that workshops provided were meeting their needs from a theoretical perspective and 51% from a skills perspective. Practices such as the use of warm compresses and alternate birthing positions during labour and birth have been shown to reduce perineal tears (Aasheim et al., 2017; Lodge & Haith-Cooper, 2016). Our study findings thus further highlight the continued need for improvements on perineal management education in Cameroon. Studies have also shown that educational programs increase midwives' confidence in assessing and undertaking perineal repair and maintaining compliance with evidence-based techniques (Selo-Ojeme et al., 2009; Wilson et al., 2012).

Conclusion

Effective perineal management is an important role of the midwife during labour and birth as perineal tear has the potential to cause significant short- and long-term morbidity for women. The findings from this study demonstrates high level of knowledge of midwives concerning perineal management and the desire of midwives for additional education in the area of perineal management, particularly prevention strategies. There were requests for modern and best practice guidelines from the current evidence base for midwifery care during the second stage of labour. This will enhance the midwives' enthusiasm for continuously evaluating their practice and commitment to further study on perineal care. It is anticipated that an educational program that is tailor made to midwives' needs will not only improve clinical skills and perineal protection techniques but also confidence in decision making. Therefore, training and re-training is recommended for the midwives in Cameroun.

REFERENCES

Aasheim, V., Nilsen, A., Reinar, L. M., & Lukasse, M. (2017). Perineal techniques during the second stage of labour for reducing perineal tear. The Cochrane database of systematic reviews, *6*(6), CD006672.

Ali, M., Migisha, R., Ngonzi, J., Muhumuza, J., Mayanja, R., Lapat, J.J. & Kayondo, M. (2020). Risk Factors for Obstetric Anal Sphincter Injuries among Women Delivering at a Tertiary Hospital in Southwestern Uganda, *Obstetrics and Gynecology International*, 202 Article ID 6035974, 7. https://pubmed.ncbi.nlm.nih.gov/18984077.

Bick, D.E., Ismail, K.M., Macdonald, S. Imail, M., Tohill, S., Thomas, P., & Kettle, C. (2012). How good are we at implementing evidence to support the management of birth related perineal tear? A UK wide survey of midwifery practice. *BMC Pregnancy Childbirth* **12,** 57 https://doi.org/10.1186/1471-2393-12-57.

Carroll, L., Sheehy, L., Doherty, J., O'Brien, d., Brosnan, M., Cronin, M & Kirwan, C. (2020).Perineal management: Midwives' confidence and educational needs, *Midwifery*, 90(2), 102817, ISSN 02666138, https://doi.org/10.1016/j.midw.2020.102817.

Cowman, T., Dunlea, M., (2014). Perineal repair by midwives in Ireland: a national survey of skills, knowledge and experience. In: Nursing & Midwifery Innovation and Information Event. School of Nursing & Midwifery, Trinity College Dublin, Dublin: Coombe Women and Children's Hospital, pp. 1–31

Diaz, M. P., Simpson, N., Brown, A., Diorgu, F. C., Steen, M. (2021). Effectiveness of structured education and training in perineal wound assessment and repair for midwives and midwifery students: A review of the literature. *European Journal of Midwifery*, 5(5), 1-12. https://doi.org/10.18332/ejm/134511.

Diorgu, F. & Steen, M. (2016). Birth practices in Port Harcourt, Nigeria: A retrospective case study review. *International journal of women's health and wellness*. 2(4), ISSN 24741353. https://doi.org/10.23937/2474-1353/1510037

Frost, J., Gundry, R., Young, H., & Naguib, A. (2016). Multidisciplinary training in perineal care during labor and delivery for the reduction of anal sphincter injuries. International journal of gynaec ology and obstetrics: *the official organ of the International Federation of Gynaecology and Obstetrics*, *134*(2), 177–180. doi: 10.1002/14651858.CD002866.

Goh, R., Goh, D., & Ellepola, H. (2018). Perineal tears - A review. *Australian journal of Jeneral practice*, 47(1-2), 35–38.

Holland, K., Middleton, L., & Uys, L. (2012). Professional confidence: a concept analysis. *Scandinavian journal of occupational therapy*, 19((2), 214-224. https://doi.org/10.3109/11038128.2011.583939

Lodge F & Haith-Cooper M. (2016). The Effect of Maternal Position at Birth on Perineal Trauma; A systematic review. British Journal of Midwifery, 24 (3): 172-180. http://dx.doi.org/10.12968/bjom.2016.24.3.172

Mantzius, J., Rudnicki, M., Skovbjerg, E., Maro, E., Mrema, D., Rasch, V., & SÃ¸rensen, B.L. (2020). Perineal tear following vaginal delivery in a low-income area: A criterion based audit. *International Journal of Nursing and Midwifery*, 12(4), 113-119. Https://doi.org/10.5897/IJNM2020.0449

Smith, L.A., Price, N., Simonite, V. & Burn, E. (2013). Incidence of and risk factors for perineal tear: a prospective observational study. *Pregnancy Childbirth.* 13**,** 59. DOI: 10.1097/aog.0000000000000833

Yang, J., & Bai, H. (2021). Knowledge, attitude and experience of episiotomy practice among obstetricians and midwives: a cross-sectional study from China. *British Medical Journal*. 11(4), e043596. https://doi.org/10.1136/bmjopen-2020-043596.

Effectiveness of Intermittent Preventive Treatment of Malaria in Pregnant Women Using Directly Observed Treatment in Selected Public Hospitals in Yenagoa.

*** TULAGHA, Charity Tonbara**
Post Graduate Student: African Centre of Excellence for Public Health and Toxicological Research, University of Port Harcourt, Rivers State, Nigeria

BASSEY, Robinson
Department of Nursing
University of Port Harcourt, Rivers State, Nigeria.

OGAJI, Daprim
Department of Public Health, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria

*Corresponding Author: charitytula@gmail.com Tel: +234-803-783-6055

ABSTRACT

Malaria in pregnancy is a major concern in Africa. as a result, it is expected that directly observed therapy be used in Intermittent Preventive Treatment of Malaria. This study aims to ascertain the uptake of intermittent preventive treatment of malaria by pregnant women using directly observed treatment in selected public hospitals in Yenagoa. The study was a descriptive survey design. Simple random sampling method was used to select a sample size of 396 respondents. Proportionate sample size was used for the calculated sample size, thus, the number of respondents for the women were 375, while nurse-midwife respondents were 21. A validated questionnaire was used to get response from respondents. The data was analyzed using descriptive and inferential statistics at a 95% confidence interval. The findings show that, sulfadoxine/pyrimethamine tablets are not always available in the hospitals 12(57%), pregnant women purchase sulfadoxine/pyrimethamine (SP) for themselves hence the nurse-midwives have no control over where and when they take the drug 16(76.1%). Also, pregnant women are allowed to go home with the tablets because there is no water 13(68.4%). The majority of the women (71.2%) admitted to have taken the intermittent preventive treatment of malaria, but majority stated that they have just taken it once, despite having attended antenatal clinic more than three times. It was recommended that water should be made available to women; drug should be given during routine vital signs check to ensure the nurse-midwife observe the woman take it; there should be a card indicating when last sulfadoxine/pyrimethamine was administered.

Keywords: Effectiveness, Intermittent, Preventive.

INTRODUCTION

According to Bakken and Iversen (2021), in Africa, Malaria has been a major health concern, which affects mostly the under-five years of age and pregnant women. This menace has unfavourable child and maternal outcome. This is because most anti-malaria drugs can cause teratogenic effect on the unborn foetus, therefore, there is a need to ensure the safe management of women with malaria in pregnancy. Malaria in pregnancy (MIP) can have serious health consequences for the woman, unborn child and newborn (Ameh, et al. 2016). These consequences according to Akpa, et al. (2019) are largely preventable. Malaria infection during pregnancy may lead to low birth weight and pre-term deliveries, and it may also increase mortality rates for mother and child. (Heath, 2018). Currently, it is estimated that each year more than 25 million women become pregnant in malaria-endemic areas – mostly in sub-Saharan Africa – and 75,000 to 200,000 infant deaths are attributable to malaria infection in pregnancy (Briand, et al. 2007) However, World Health Organisation (WHO) equally acknowledged that regions such as, South-East Asia, Eastern Mediterranean, Western Pacific, and the Americas are also at risk. Some population groups are largely at higher risk of contracting malaria, and developing severe disease, than others. These include infants, children under 5 years of age, pregnant women and patients with HIV/AIDS, as well as non-immune migrants, mobile populations and travellers. (WHO 2021). In the opinion of Ameh, et al. (2016), the direct effect of MIP on the mother is severe anaemia, resulting in an increased risk of maternal mortality. The indirect consequences of MIP are twofold: (i) intrauterine death/growth retardation of the foetus and (ii) low birth weight in the newborn with consequent higher risks of infant mortality and impaired child development.

Cerebral malaria, hypoglycemia, pulmonary edema, and severe hemolytic anemia are all extremely dangerous for women. According to Peter (2013), the renewed interest in protecting and promoting both maternal and child health has led to the development of a three-pronged approach to combating malaria in pregnancy, which includes: intermittent preventive treatment of malaria with an effective antimalarial drug to address the heavy burden of asymptomatic infections among pregnant women living in areas with moderate to high Plasmodium falciparum transmission; universal use of insecticide-treated nets by all pregnant women and effective case manager of malaria illness and anaemia. Intermittent Preventive Treatment of pregnancy (IPTp) involves the administration of therapeutic doses of an antimalarial drug to a population at risk whether or not they are known to be infected, at specific point intervals usually with the aim of reducing morbidity and mortality. Each dose treats existing malaria infection in the mother and may protect against new infections for several weeks after receipt.

According to WHO (2021), In the southwest and southeast, research has been conducted on issues concerning intermittent preventative treatment of malaria in pregnancy and the use of directly observed therapy, but no known studies have been conducted in the south-south in this regard.

LITERATURE

Malaria is a major public health concern that has been linked to negative pregnancy outcomes. It is a life-threatening disease caused by *Plasmodium* parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. It is an acute febrile illness, with the symptoms appearing within 10–15 days after the infective mosquito bite. According to Akinleye et al. (2009), more than 30 million African women in malaria-endemic areas become pregnant each year, putting them at risk of Plasmodium falciparum infection. Malaria is thought to be responsible for roughly 11% of overall maternal mortality in Nigeria, according to Ameh et al. (2016). According to the World Malaria Report of 2018, malaria caused an estimated 219 million infections and 435,000 deaths worldwide in 2018, with around 80% of these deaths occurring in the WHO African Region and India. Nearly 110 million cases of malaria are clinically diagnosed each year in Nigeria. A strategy and recommendation for managing malaria in pregnant women were developed by WHO due to the disease's widespread endemicity, particularly in Africa Nigeria adopted the IPT approach in 2005 to combat this threat. During antenatal care visits, the medication is given under supervision (i.e DOT), (Akinleye, et al. 2009). According to the Minnesota Department of Health (2020), DOT is a strategy used in patient care, in which a healthcare worker observes patient as they swallow every dose of their medicine. DOT includes: delivering the prescribed medication, checking for side effects, watching the patient swallow the medication, documenting the visit and answering questions. It can be used in the management of tuberculosis and other regimens that needs intermittent administration of drugs. Intermittent preventive treatment of malaria is a type of malaria treatment given during pregnancy which is a preventive regimen of the antimalarial drug sulfadoxine-pyrimethamine (SP) to be given monthly to all at-risk pregnant women in their second and third trimesters. (Heath, 2018). A minimum of three doses of SP, given one month apart, should be given after quickening (about 18 weeks gestation) and should be routinely delivered at prenatal clinics.

According to the national IPTp guidelines, healthcare providers are expected to administer SP at no cost to pregnant women attending antenatal clinic (ANC) in public and faith-based health facilities by directly observed treatment (Ameh, et al. 2016). In a study by Peter, (2013), it was

opined that chemoprophylaxis is no longer recommended for a no of reasons including the difficulty in the delivery of this strategy, poor adherence with weekly drug dosing and rising rate of resistance to most of the chemoprophylaxis regimens including chloroquine. So, IPT has been shown to be better than malarial chemoprophylaxis and has replaced it (Peter, 2013). Despite the advantages of IPTp, there are still some perceived barriers to SP-IPTp use which include drug stock-outs in the health facilities, lack of provider knowledge of the IPTp protocol, women's belief that SP is harmful to the foetus, and low levels of awareness of the use of IPTp as a malaria preventive measure (Ameh, et al. 2016).

Various factors have been identified as predictors of SP-IPTp use in PHC facilities in different regions of Nigeria, all of which vary in seasonality, intensity, and duration of malaria transmission. Knowledge of prophylaxis for malaria prevention is associated with SP-IPTp use in south-west Nigeria while advanced maternal age, higher education, higher parity, lower gestational age at registration for ANC, and use of ITNs are associated with the use of SP-IPTp in northern Nigeria (Ameh, et al. 2016). Remarkable progress has been made in the global fight against malaria. However, 3.4 billion people, including pregnant women, are still at risk of malaria. The brunt of the global malaria burden is borne by sub-Saharan Africa (SSA)

In a study by Azizi et al. (2018), failing to take SP dosages under the direct supervision of health care personnel resulted in low use of intermittent preventive treatment for malaria (OR=0.13, 95 percent CI: 0.04 - 0.43, p=0.001). Equally, there is scare literature showing the different levels at which IPTp is taken, and if the use of Directly Observed Treatment (DOT) strategy help in increased uptake of IPTp among pregnant women especially in Yenagoa, Bayelsa State. On this basis, the researcher chose to look into the uptake of intermittent preventive treatment of malaria among pregnant women using Directly Observed Treatment in selected public hospitals in Yenagoa.

METHODOLOGY

The study was carried out in three selected public hospitals in Yenagoa, the capital of Bayelsa state. The three public hospitals were Federal Medical Centre, Yenagoa, Diete-koki Memorial Hospital Opolo, Yenagoa, and Niger Delta University Teaching Hospital, Okolobiri. These three hospitals have a population of 517, 78, and 121 nurse-midwives respectively. They attend to all medical and surgical cases including obstetric and gynaecological cases. They are moderately staffed with all cadres of health workers. Yenagoa is a local government area and equally the capital of Bayelsa state. According to 2006 census, the population of the state is 1,704,515 of which Yenagoa constitutes 352,285 persons in this population. The petroleum

sector dominates the state's economy. The study was a descriptive survey study. This study accessed two group populations. One comprised of registered nurse-midwives who were working in selected public hospitals in Yenagoa. It equally included pregnant women who attended antenatal care in the selected public hospitals in Yenagoa. The participants for the study were recruited from a sample frame of 2179 pregnant mothers and 129 nurse midwives working in the obstetrics and gynaecology department of the selected facilities under study. This made the total study population to be 2308. Those included in the study were; women who had given birth before the present pregnancy and nurse-midwives who have worked in obstetrics and gynaecology department for more than six months. Those excluded in this study were, women with known allergy to SP and nurse-midwives who meet the inclusion criteria but were unwilling to take part in the study. Proportionate method and Taro Yamane formula were used to calculate the sample size. $n = N/1 + N(e)^{2,}$ where n = sample size; N = population size; e = error level. Then this was adjusted for attrition rate of 10%. Simple random sampling method was used to select three public hospitals from among all the public hospitals in Yenagoa. The names of these hospitals were written in a piece of paper and folded. It was shuffled thoroughly and the researcher dipped hand to pick three pieces of paper without looking. This was to ensure that any public hospital written had an equal chance of being selected. The names of the hospital written in those papers picked were the hospitals that were used. For stage two, the days of the week when antenatal care is done were written on a piece of paper, and two days out of the written days were randomly selected. Stage three: Simple random sampling method was equally used here. The researcher went to those facilities on the selected days when the women will be attending antenatal care. Cardboard sheets of different colours (pink and blue) were cut and put in a basket lined with black, non-transparent polyethylene. This was to ensure that, they do not see the particular colour they will pick. Pink will represent a selected respondent while blue means that the person is not selected. The pink colour was cut up to the number of the sample size which is 354. The cardboard sheet was shuffled, and women were allowed to pick from inside the basket. This was continued on the selected days until the sample size for each hospital was reached.

Collected data were entered directly into the Statistical Package for Social Sciences (SPSS) version 25.0, coded and cleaned. Categorical data were summarized using descriptive statistics of frequencies, percentages (%), and mean with results presented on tables and pie chart. Research questions were answered using mean and standard deviation. Letter of identification was obtained from the ACE-PUTOR school authorities. Ethical clearance was gotten from the ethical review board of the University of Port Harcourt and Niger Delta University Teaching

Hospital, before going to the area where the data was collected. The public hospitals where the study was carried out were informed in order to obtain permission from them. The consent of the participants was also obtained. Confidentiality was assured by informing them that, any information given by them will not be divulged to the public without their consent. They were told that their participation in the research work is voluntary; and that if at any time during the study, they wish to discontinue, they are free to do so. This withdrawal will not attract any sort of ill feeling or discrimination in their care. They equally do not need to give consent before withdrawal if they wish to withdraw. Their names were not written anywhere in the questionnaire to ensure that they were not exposed to the public. No risk in relation to the study was anticipated; but if any it will be taken care of immediately.

RESULTS

The questionnaire distributed to mothers had a 97% retrieval rate while that of nurse-midwives had a 100% retrieval rate.

Table 1: Respondents' Socio-demographic data **n = 342**

Variables	Frequency (n)	Percentage (%)
Age		
15 – 22	29	8.5
23 – 30	152	44.4
31 – 38	132	38.6
39 – 46	13	3.8
Non response	16	4.7
Parity		
Nullipara	95	27.8
Primipara	100	29.2
Multipara	132	38.6
Non response	15	4.4
Religion		
Christianity	315	92.1
Muslim	13	3.8
Others	5	1.5
Non response	9	2.6
Marital status		

Single	32	9.4
Married	286	83.6
Widowed	2	0.6
Separated	3	0.9
Co-habiting	11	3.2
Others	8	2.4
Employment status		
Employed	178	52.0
Unemployed	145	42.4
Non response	19	5.6
Ethnicity		
Ijaw	180	52.6
Igbo	69	20.2
Hausa	4	1.2
Yoruba	18	5.3
Others	64	18.7
Non-response	7	2.0
Educational level		
Illiterate	1	0.3
Primary	10	2.9
Secondary	128	37.4
Tertiary	196	57.3
Non-response	7	2.0

Table 1 shows the socio-demographic characteristics of the women. The result shows that majority 152 (46.6%) of the respondents were between the ages of 23 – 30 years, 132 (40.6%) of the respondents were multiparous women, followed by the primipara with a percentage of 100 (30.6%). Also, 315 (94.6%) were Christians, most of the respondents (84.9%) are married. The result showed that most of the respondents, (pregnant mothers) are employed (55.1%), while majority of the respondents 196 (58.5%) had education up to tertiary level while just 1 (0.3%) was illiterate.

The socio-demographic characteristics of the nurse-midwives show that majority of the nurses are within the age limit of 30 – 39 years 9(47.4%). Almost all the respondents were female 20(95.2%) with only one male. Most of the nurses are in antenatal clinic 7(33.3%), mostly

married 17(81.0%), predominantly Christians 17(81.0%) and principal nursing officers (PNO) 7(33.3). The result equally noted that most respondents 13(61.9) are B.NSc holders.

Table 2: Use of DOT by nurse-midwives in administration of IPTp n = 21

Item	SA F(%)	U F(%)	D F(%)	Mean	Std Dev
SP is always available in the health facility	12(57.1)	5(23.8)	4(19.0)	1.61	0.80
Pregnant women are allowed to go home with SP (i.e Fansidar tablet) because of no water	3(15.8)	3(15.8)	13(68.4)	2.12	0.71
Nurses observe mothers take SP during antenatal care	9(42.9)	7(33.3)	5(23.8)	1.80	0.81
Mothers are given prescription to purchase SP in a pharmaceutical shop	7(33.3)	5(23.8)	9(42.9)	2.09	0.88
Mothers are given SP during antenatal care by nurses, but are not observed as they take it	8(38.1)	5(23.8)	8(38.1)	2.00	0.89

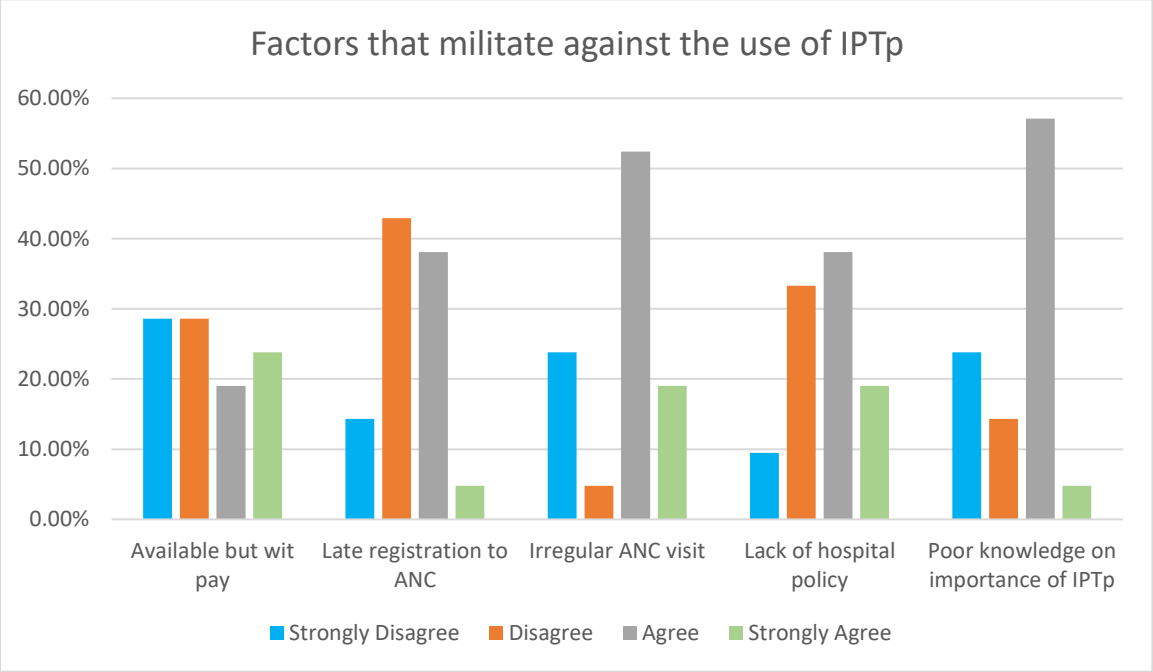
Table 2 illustrates the use of directly observed therapy (DOT) by nurse-midwives in the administration of intermittent preventive treatment. The result showed that, 12(57.1%) of the nurses said that sulfadoxine/pyrimethamine was usually available in the hospital. 13(68.4%) of the nurses disagreed that the women were allowed to go home with sulfadoxine/pyrimethamine because of no water. The result equally depicts that, equal number of nurses, admitted that, mothers are given sulfadoxine/pyrimethamine but are not observed while others said they are observed as they take it 8(38.1%). The result of this study showed that, though sulfadoxine/pyrimethamine are usually available in the hospital, women are not observed as they take it, sometimes, as a result of unavailability of water.

Table 3: Factors that militate against the usage of IPTp

Item	SD	D	A	SA	Mean	Std Dev
Unavailability of SP in the health facility	6 (28.6)	6 (28.6)	4 (19.0)	5 (23.8)	2.38	1.16

Late registration of women to antenatal clinic	3 (14.3)	9 (42.9)	8 (38.1)	1 (4.8)	4.00	4.24
Irregular antenatal visits	5 (23.8)	1 (4.8)	11 (52.4)	4 (19.0)	2.66	1.06
Lack of policy by the health facilities on measures to help in adequate uptake of IPTp	2 (9.5)	7 (33.3)	8 (38.1)	4 (19.0)	2.66	0.91
Poor knowledge on the importance of IPTp	5 (23.8)	3 (14.3)	12 (57.1)	1 (4.8)	2.42	0.92
Grand Mean					**2.82**	**1.66**

Criterion mean = 2.50; Decision < 2.50 = low; > 2.50 = high



Bar chart showing the factors that militate against the use of IPTp

Table 3, bar chart 1 depicts the factors that militate against the usage of intermittent preventive treatment of malaria. The overall result showed that, the factors that militate against the use of intermittent preventive treatment of malaria are high as the grand mean of 2.82 ± 1.66 was higher than the criterion mean of 2.50, indicating high factors. These factors that militate against the use of intermittent preventive treatment of malaria were expressed in the; unavailability of SP in the health facility; late registration of women to antenatal clinic;

irregular antenatal visits; lack of policy by the health facilities on measures to help in adequate uptake of IPTp.

DISCUSSION

The findings on the extent of usage of intermittent preventive treatment of malaria among pregnant women showed that the majority of the women (71.2%) admitted to have taken the intermittent preventive treatment of malaria, but majority stated that they have just taken it once, despite having attended antenatal clinic for more than three times. This means that though many have taken the anti-malaria, its uptake is not adequate as compared to the stage of their pregnancy. The result is in acceptance with the study of Mushi, et al. (2021) which opined that the uptake of optimal IPTp-SP doses is still low in Tanzania. The optimal uptake of IPTp-SP was associated with attending ANC in the first trimester, attending more than four ANC visits. According to Anto, et al. (2019), taking the first dose of SP during the second trimester allowed for taking ≥3 doses of SP compared to taking the first dose during the third trimester. This finding by Anto, et al. (2019) is at variance with the present study that at 30 weeks gestation, many have just taken it once. This study equally disagreed with Akpa, et al. (2019) who stated that, up to half of those attending ANC in mission-owned health facilities (51%) received at least three doses of IPTp during pregnancy.

On the factors influencing the use of intermittent preventive treatment of malaria, it showed that, the factors that militate against the use of intermittent preventive treatment of malaria is high as the grand mean of 2.82 ± 1.66 was higher than the criterion mean of 2.50. However, the respondents agreed that irregular antenatal visits and poor knowledge of the importance of IPTp affected its usage. This study is at par with Aberese-Ako, et al. (2021) who opined that refusing to take SP, skipping ANC appointments and initiating ANC attendance late affected uptake.

IMPLICATION TO RESEARCH AND PRACTICE

The study will serve as a guide to help map out policies that will ensure women take their drugs as at when due during each antenatal visit.

CONCLUSION

Though sulfadoxine/pyrimethamine are available most times in the health facilities, women do not complete the dose in each pregnancy due to lack of water to ingest it in the hospital,

forgetfulness to take it at home and the inability of the nurse-midwives to observe them while they are taking it. These have hindered the effectiveness of the use of IPTp.

FUTURE RESEARCH

Studies should be carried out to find out why nurse-midwives are inconsistent in the use of directly observed therapy (DOT) for the administration of sulfadoxine-pyrimethamine during pregnancy

There should be studies on why mothers are not regular to antenatal visits or why they register late. This will help curb the problem of inadequate uptake of sulfadoxine-pyrimethamine during pregnancy

REFERENCES

Aberese-Ako, M., Magnussen, P., Ampofo, G. D., Gyapong, M., Ansah, E., &Tagbor, H. (2021). An ethnographic study on how health system, socio-cultyral and individual factors influence uptake of intermittent preventive treatment of malaria in pregnancy with Sulfadoxine-Pyrimethamine in a Ghanaian context. *National Library of Medicine*, https://pubmed.ncbi.nlm.nih.gov/34618812/

Akinleye, S., Falade, C. O., &Ajayi, I. O. (2009). Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria. *BMC Pregnancy and Childbirth* https://www.researchgate.net/publication/26658288_

Akpa, C. O., Akinyemi, J. O., Umeokonkwo, C. D., Bamgboye, E. A., Dahiru, T. Adebowale, A. S., &Ajayi, I. (2019). Uptake of intermittent preventive treatment for malaria in pregnancy among women in selected communities of Ebonyi State, Nigeria. *BMC Pregnancy and Childbirth,* https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-019-2629-4

Ameh, S., Owoaje, E., Oyo-Ita, A., Kabiru, C. W., A. O. E. O., Etokidem, A., Enembe, O., &Ekpenyong, N. (2016). Barrriers to and Determinants of the use of intermittent preventive treatment of malaria in pregnancy in Cross River State, Nigeria. *BMC*

Pregnancy and Childbirth https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-016-0883-2

Anto, F., Agongo, I. H., Asoala, V., Awini, E., &Oduro A. R (2019). Intermittent Preventive Treatment of Malaria in Pregnancy: Assessment of the Sulfadoxine-Pyrimethamine Three-Dose Policy on Birth Outcomes in Rural Northern Ghana. *Journal of Tropical Medicine,* https://www.hindawi.com/journals/jtm/2019/6712685/

Azizi, S. C., Chongwe, G., Chipukuma, H., Jacobs, C. Zgambo, J., &Michelo, C. (2018). Uptake of intermittent preventive treatment for malaria during pregnancy with Sulphadoxine-Pyrimethamine (IPTp-SP) among postpartum women in Zomba District, Malawi. *BMC Pregnancy and Childbirth* https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-018-1744-y

Bakken, L. S., & Iversen, P. O. (2021). The impact of malaria during pregnancy on low birth weight in East-Africa: a topical review. Malaria Journal, 20(1). https://doi.org/10.1186/s12936-021-03883-z

Briand, V., Cottrell, G., Massougbodji, A. & Cot, M. (2007). Intermittent preventive treatment for the prevention of malaria during pregnancy in high transmission areas. *Malaria Journal* https://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-6-160

Heath, D., (2018). Intermittent preventive treatment of malaria during pregnancy. *GiveWell*https://www.givewell.org/international/technical/programs/intermittent-preventive-treatment-malaria-pregnancy

Minneostta Department of Health (2020), Directly Observed Therapy (DOT) for the Treatment of Tuberculosis https://www.health.state.mn.us/diseases/tb/lph/dot.html

Mushi, V., Mbotwa, C. H., Zacharia, A., Ambrose, T., & Moshi, F. V. (2021). Predictors for the uptake of optimal doses of Sulfadoxine-Pyrimethamine for intermittent preventive treatment of malaria during pregnancy in Tanzania. *National Library of Medicine,* https://pubmed.ncbi.nlm.nih.gov/33549094/

Peter, A. O. (2013). Effects of Intermittent Preventive Treatment of Malaria on the outcome of Pregnancy Among Women Attending Antenatal Clinic of a new Nigerian Teaching Hospital, Ado-Ekiti. Nigerian *Medical Journal* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3719243/ doi: 10.4103/0300-1652.114582

WHO (2020). Malaria: The malaria vaccine implementation programme (MVIP) https://www.who.int/news-room/q-a-detail/malaria-vaccine-implementation-programme

ASSESSMENT OF RISK AND PROTECTIVE FACTORS INFLUENCING RISKY SEXUAL BEHAVIOURS AMONG ADOLESCENTS IN RIVERS STATE

Running title: Factors influencing risky sexual behaviour among adolescents in Rivers State.

Vivian Ifeoma Ogbonna[1], Foluke Adeniji, [2, 3] Zubairu Iliyasu[4]

1 Department of Population and Reproductive Health, School of Public Health, University of Port Harcourt, Port Harcourt, Nigeria, 2 Department of Community Medicine, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria, 3College of Health Sciences, University of Port Harcourt, Nigeria, 4. Department of Community Medicine, Bayero University Kano, Nigeria

Corresponding author: Vivian Ifeoma Ogbonna, Department of Population and Reproductive Health, School of Public Health, University of Port Harcourt, Port Harcourt, Nigeria.

Tel. +2348032423334 email Vivian.ogbonna@uphsph.edu.ng

ABSTRACT

Introduction: The reproductive health practices and behaviours of adolescents can have lifelong consequences. In sub-Saharan Africa, they make up 23% of the region's population. Despite their large population, their health issues are under-researched and addressed. Some adolescents are sexually active, having mostly unprotected sexual contact. We considered it necessary to assess the risk and protective factors influencing risky sexual behaviours among adolescents in Rivers State.

Methods: A cross-sectional study design that surveyed 671 adolescents, using a multistage sampling technique to select participants for the study. Data were analysed with SPSS version 25. Pearson's Chi-square test was used to determine the association between outcome and independent variables at $p \leq 0.05$ statistical significance level. Bivariate and multivariate logistics regression models were also used to analyse data.

Results: Out of the 671 adolescents who responded, 53.1% were females. Overall, 46.6 % of the respondents had sexual debut of which 76.9 % of them had initiation of sexual debut by age 15 years and below. The study shows higher odds of Initiating sexual debut among adolescents aged 15-19 (cOR=3.14, 95% CI; 1.33-7.39, p=0.004) compared to those younger (10-14). In addition, it showed higher odds of initiating sexual debut among female adolescents than male adolescents (cOR=1.62, 95% CI: 1.19-2.20, p=0.001). Similarly, it shows a higher odd of adolescents who agree that religion is not important as against those who agree it is important (cOR=1.96, 95% CI: 1.19-3.20, p=0.011) and currently working for pay (cOR=4.19, 95% CI: 2.98-5.91, p=0.001). In contrast, it shows lower odds of initiating sexual debut among those currently in school (cOR=0.49, 95% CI: 0.36-0.68, p=0.001) and residing with any family member (P=0.001).

Conclusion: The study provides further evidence to promote improvement in efforts to promote protective sexual behaviours among adolescents in Rivers State.

Keywords: Risk and Protective Factors, Risky Sexual Behaviour, Adolescents.

Introduction

The period of adolescence is characterized by physiological and psychosocial changes and experimentations that could lay the foundation for lifelong sexual and reproductive health problems (Lehtimaki and Schwalbe, 2019). Adolescents are people 10-19 years of age, in sub-Saharan Africa, they make up 23% of the region's population (Lehtimaki and Schwalbe, 2019). Adolescents tend to have early onset of sexual intercourse, low use of contraception, and high adolescent pregnancy rates. Initiation of sexual intercourse at an early age has been associated with several health risks, such as the higher number of lifetime sexual partners, acquisition of STIs including HIV, pregnancy complications, abortions and possibly death (Ugoji, 2014). Early sexual initiation has a cascade of negative health outcomes. Early sexual debut is having sexual intercourse at or before the age of 18 years (Abajobir & Seme, 2014).

Globally, one in five girls has given birth by the age of 18. In the poorest regions of the world, this figure rises to over one in three girls (WHO, 2014). Every year, over 16 million adolescent girls give birth, the majority of whom live in low- and middle-income nations. (WHO, 2014). In several societies, girls may be under some form of pressure to marry and bear children early, and as such, they may have limited educational and employment prospects (WHO, 2014). Furthermore, married adolescents are likely to become pregnant and give birth following social norms (WHO, 2014). Also, each year an estimated 333 million new cases of curable sexually transmitted infections (STIs) occur globally with the second highest rates among adolescents aged 15-19 years. Data from different nations, including Nigeria, show that sexual behaviours among adolescents have changed in recent years, as indicated by the status of age at sexual debut, with many young people experiencing early physical maturation and engaging in early sexual debuts.

According to previous surveys on adolescent sexual behaviour in Nigeria, nearly half of the females (46.2%) and roughly a quarter of the boys (22.1%) of adolescents (15-19) in Nigeria had engaged in sexual intercourse. (Adebowale et al., 2016)·(Bukenya et al., 2019) These figures differ from one state to the next. (Bukenya et al., 2019).

In Nigeria, about 22.3% of the estimated population is made up of adolescents(National Population Commission Federal Republic of Nigeria, ICF International Rockville, Maryland, 2013; National Population Commission [Nigeria] and ICF International Rockville, Maryland, 2019; Odo et al., 2018). (Lehtimaki and Schwalbe, This population is expected to continually increase more so in sub-Saharan Africa and Nigeria in particular where the total fertility rate (TFR) is still 5.3 (Adebowale et al., 2016).

Adolescents comprise 20% of the world's population, about 1.2 billion (Lehtimaki and Schwalbe, 2019b; Williams et al., 2018a). In sub-Saharan Africa, they make up 23% of the region's population.(Lehtimaki and Schwalbe, 2019a) Despite their large population, their health issues are under-researched and addressed. (WHO Regional Office for Africa, 2019) Considering the cascade of negative physical mental and social consequences of early sexual debut among adolescents, we deemed it necessary to assess the risk and protective factors influencing early sexual debut among adolescents to provide evidence to stimulate improvement in efforts to promote protective sexual behaviours among adolescents in Rivers State.

Methods

Study Area: The study was carried out in Nigeria's Rivers State. The State, one of the most well-known Niger Delta states in the nation, is located in the oil-rich South-South Geopolitical Zone of the country.

The State is divided into 23 Local Government Areas (LGA), each of which is made up of wards and communities. As of 2016, the population of Rivers State was expected to be 7,303,924 million. (National Bureau of Statistics, 2018) We can say that about 23% of the population is made up of adolescents Lehtimaki and Schwalbe, 2019).

Study Design: A cross-sectional study conducted among male and female adolescents aged 10 – 19 years who have resided in Rivers State for at least one year.

Sample size estimation: The estimated sample size was 661, derived based on Cochran's formula for sample size calculation for descriptive study (Israel, 2013), using an estimate of risky sexual behaviour (condom use among adolescents in secondary school) of 31.3% from a similar study by Agunwa et al in South-South, Nigeria (Agunwa et al., 2014) and providing for a further 10% allowance for non-response rate.

Sampling technique: A multistage sampling technique was used to select participants for the quantitative aspect of the study.

Stage 1: Selection of LGAs - four LGAs were selected from the list of 23 by balloting.

Stage 2: Selection of wards-One ward was selected from a list of the wards in each of the selected LGAs.

Stage 3: Selection of a community - One community would be selected from a list of all the communities in each of the wards by balloting. The starting house was randomly selected by spinning a bottle in the middle of the community. Respondents in sequential residential houses and households who meet the eligibility criteria were sampled until 184 participants per ward were achieved.

Study tool: An interviewer-administered questionnaire was inputted into a Kobo toolbox and collected using Android phones. It had 3 sections, adapted from the Youth Risk Behaviour

Survey Questionnaire (YRBSS) developed by the Centre for Disease Control and Prevention (CDC) in the United States (CDC, 2017) and the WHO illustrative questionnaire for interview surveys with young people was used to elicit information (Cleland, 2001).

Reliability and validity: Before the study, it was pre-tested in a different community and face and content validity was ensured by content experts.

Data Analysis Plan: Data was taken from the Kobo toolbox in Microsoft Excel version 2016, cleaned, sorted, and then loaded into the IBM SPSS statistical analysis program version 25 and analysed. The proportion of sexually experienced respondents was determined and odd ratios of predictors were derived from multivariate logistic regression models.

Ethical approval was sought and obtained from the Research and Ethics Committee of the University of Port Harcourt with the approval number UPH/CEREMAD/REC/MM78/040. Participants 18 years of age and older offered consent; respondents under 18 gave agreement, and respondents' parents also provided approval.

Results

Table 1: Socio-demographic characteristics of adolescent respondents, Rivers State, Nigeria, 2021.

Characteristics	Frequency (%) n=671
Residence	
Rural	338 (50.4)
Urban	333 (49.6)
Sex	
Male	315 (46.9)
Female	356 (53.1)
Age group	
10-14	31 (4.6)
15-17	24 (3.6)
18-19	616 (91.8)
Religion	
Catholic	218 (32.5)
Protestant	387 (57.7)
Muslim	40 (6.0)
None	26 (3.9)
Importance of religion	
Very important	168 (25.0)
Important	428 (63.8)
Not important	75 (11.2)
Marital status	
Single	642 (95.7)
Ever married	29 (4.3)
Education	
No Formal	56 (8.4)
Primary	161 (24.0)
Junior Secondary	213 (31.7)
Senior Secondary	215 (32.0)
Post-secondary	26 (3.9)
Current school attendance	
Yes	267 (39.8)
No	404 (60.2)
Currently working for pay	
Yes	228 (34.0)
No	443 (66.0)
Living arrangement	
With both parents	245 (36.5)
With a single-parent	166 (24.7)
With relatives	168 (25.0)
With others	32 (4.8)
Alone/Self	60 (8.9)

Out of the 671 adolescents surveyed, the mean age of the participants was 17.7 years ± 1.3 years while 53.1% were females, 50.4% lived in places described as rural, 4.3% were married, and 95.7% were single.

Table 2: Sexual activity and risky sexual behaviour of adolescents in Rivers State, Nigeria (N=671 except stated otherwise).

Characteristics	Male N=315	Female N=356	Total N=671	Chi-square (P-value)
Ever had sex				9.08 (**0.003**) *
Yes	127 (40.6)	186 (59.4)	313 (100.0)	
No	188 (52.5)	170 (47.5)	358 (100.0)	
Age at sexual debut (n=313)				2.64 (0.268)
10-14	58 (37.4)	97 (62.6)	155 (100.0)	
15-17	65 (42.8)	87 (57.2)	152 (100.0)	
18-19	4 (66.7)	2 (33.3)	6 (100.0)	

*Statistically significant ($p \leq 0.05$)

Nearly half 313 (46.6 %) of the respondents were sexually experienced. The mean age at sexual debut is 14.5± 1.4 years, and the median age at sexual debut is 15 years. For those who had ever had sex, females were more likely 186 (59.4%) than males 127 (40.6%).

Table 3: Sociodemographic factors influencing risky sexual behaviours (initiation of sexual debut) among adolescents in Rivers State

Variables	Initiation of sexual debut (Freq %)		Total n=671	Chi-square (P-value)
	Yes n=313	No n=358		
Age				6.58 (**0.01**)*
15-19	306 (47.81)	334 (52.19)	640 (100.0)	
10-14	7 (22.58)	24 (77.42)	31 (100.0)	
Sex				9.08 (**0.003**)*
Female	186 (52.25)	170 (47.75)	356 (100.0)	
Male	127 (40.32)	188 (59.68)	315 (100.0)	
Importance of religion				6.67 (**0.01**)*
Not important	46 (61.33)	29 (38.67)	75 (100.0)	
Very Important/Important	267 (44.80)	329 (55.20)	596 (100.0)	
Educational level				85.71 (**0.001**)*
No education/primary	46 (21.20)	171 (78.80)	217 (100.0)	
Secondary	248 (57.94)	180 (42.06)	428 (100.0)	
Tertiary	19 (73.08)	7 (26.92)	26 (100.0)	
Currently attending school				18.28 (**0.001**)*
Yes	97 (36.33)	170 (63.67)	267 (100.0)	
No	216 (53.47)	188 (46.53)	404 (100.0)	
Currently working for pay				69.83 (**0.001**)*
Yes	158 (69.30)	70 (30.70)	228 (100.0)	
No	155 (34.99)	288 (65.01)	443 (100.0)	
Whom do you reside with				72.59 (**0.001**)*
Both Parents	70 (28.57)	175 (71.43)	245 (100.0)	
Single Parents	87 (52.41)	79 (47.59)	166 (100.0)	
Relatives/Others	105 (52.50)	95 (47.50)	200 (100.0)	
Self	51 (85.00)	9 (15.0)	60 (100.0)	

*Statistically significant ($p<0.05$)

As shown in Table 3, the Initiation of sexual debut varied across socio-demographic variables of the adolescents in Rivers State. Being older and a female, with a tertiary level of education was statistically significantly associated with initiation of sexual debut. Adolescents who agree that religion is not important as against those who agree it is important, currently working for pay and residing with a single parent or a relative as against those staying with both parents were statistically significantly associated with initiation of sexual debut. Finally, adolescents currently attending school engaged in a lower initiation of sexual debut compared to those not currently in school ($\chi^2 = 69.83$; $p < 0.001$)

Table 4: Bivariate and Multivariate results for sociodemographic factors influencing risky sexual behaviours among adolescents in Rivers State

Variables	Initiation of sexual debut (Freq %)		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes=313	No=358				
Age						
10-14[R]	7 (22.58)	24 (77.42)	-	-	-	-
15-19	306 (47.81)	334 (52.19)	3.14 [1.3-7.4]	**0.004***	2.07 [0.78-5.5]	0.142
Sex						
Male[R]	127 (40.32)	188 (59.68)	-	-	-	-
Female	186 (52.25)	170 (47.75)	1.62 [1.2-2.2]	**0.001***	1.79 [1.25-2.6]	**0.002***
Importance of religion						
Very Important/ Important	267 (44.80)	329 (55.20)	-		-	-
Not important	46 (61.33)	29 (38.67)	1.96 [1.2-3.2]	**0.011***	1.94 [1.09-3.5]	**0.025***
Educational level						
No education/ primary	46 (21.20)	171 (78.80)	0.09 [0.04-0.3]	**0.001***	7.84 [2.7-22.7]	**0.001***
Secondary	248 (57.94)	180 (42.06)	0.51 [0.2-1.2]	0.134	1.84 [0.67-5.09]	0.238
Tertiary [R]	19 (73.08)	7 (26.92)	-	-	-	-
Currently attending school						
No [R]	216 (53.47)	188 (46.53)	-	-	-	-
Yes	97 (36.33)	170 (63.67)	0.49 [0.4-0.7]	**0.001***	0.74 [0.49-1.09]	0.125
Currently working for pay						
No [R]	155 (34.99)	288 (65.01)	-	-	-	-
Yes	158 (69.30)	70 (30.70)	4.19 [2.98-5.9]	**0.001***	3.0 [2.02-4.45]	**0.001***
Whom do you reside with						
Both Parents [R]	70 (28.57)	175 (71.43)	-	-	-	-
Single Parents	87 (52.41)	79 (47.59)	0.1 [0.03-0.2]	**0.001***	5.48 [2.35-12.8]	**0.001***
Relatives/ Others	105 (52.50)	95 (47.50)	0.19 [0.1-0.4]	**0.001***	2.88 [1.24-6.7]	**0.014***
Self	51 (85.00)	9 (15.0)	0.19 [0.1-0.4]	**0.001***	3.32 [1.4-7.7]	**0.005***

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio

After adjusting for confounding variables, the multivariate logistic regression model showed statistically significant increased odds for initiation of sexual debut among females (aOR=1.79, 95% CI; 1.25-2.56, p=0.002) compared to males. 7.84 increased odds for initiation of sexual debut were observed among those with primary or no formal education compared to those with tertiary education (aOR=7.84, 95% CI; 2.71-22.69, p=0.001). It showed lower odds of initiation of sexual debut among those who are currently in school (aOR=0.74, 95% CI: 0.49-1.09, p=0.125). Additionally, a higher odds were observed among those currently working for pay (aOR=3.0, 95% CI: 2.02-4.45, p=0.001), and also a 5.48, 2.88, and 3.32 increased odds for initiation of sexual debut among those living with single parents (aOR=5.48, 95% CI; 2.35-12.75, p=0.001, relatives (aOR=2.88, 95% CI; 1.24-6.69, p=0.014) and self (aOR=3.32, 95% CI; 1.4-7.67, p=0.005), compared to those living with both parents, which observed a lower odds in the crude odds ratio.

Age and currently in school that was statistically significant in the crude were not after adjusting for confounders.

Table 6: Bivariate and Multivariate results for the individual domain factors (risk and protective) influencing initiation of sexual debut

Variables	Initiation of sexual debut (Freq %)		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes n=313	No n=358				
Believe that it is alright to 'date'						
Yes	216 (59.8)	145 (40.2)	1.66 [1.15-2.4]	**0.008***	0.97 [0.51-1.88]	0.938
No	21 (14.1)	128 (85.9)	0.18 [0.11-0.3]	**0.001***	2.61 [1.21-5.61]	**0.016***
Not sure[R]	76 (47.2)	85 (52.8)	-	-	-	-
Believe that it is alright to hug/touch						
Yes	225 (63.6)	129 (36.4)	3.3 [1.99-5.5]	**0.001***	0.82 [0.34-1.95]	0.650
No	60 (25.4)	176 (74.6)	0.65 [0.38-1.1]	0.114	1.07 [0.49-2.39]	0.870
Not sure[R]	28 (34.6)	53 (65.4)	-	-	-	-
Believe that sexual intercourse is alright if a couple loves each other						
Yes	229 (64.7)	125 (35.3)	3.05 [1.85-5.1]	**0.001***	0.82 [0.36-1.89]	0.639
No	54 (22.8)	183 (77.2)	0.49 [0.29-0.8]	**0.011***	1.36 [0.60-3.08]	0.457
Not sure[R]	30 (37.5)	50 (62.5)	-	-	-	-
Believe in female/male pre-marital virginity						
Yes	169 (66.8)	84 (33.3)	3.11 [2.03-4.8]	**0.001***	1.41 [0.62-3.20]	0.410
No	87 (31.9)	186 (68.1)	0.72 [0.48-1.1]	0.128	1.59 [0.76-3.29]	0.204
Not sure[R]	57 (39.31)	88 (60.7)	-	-	-	-
Believe in abstinence						
Yes	84 (51.2)	80 (48.8)	1.77 [1.15-2.7]	**0.011***	0.75 [0.35-1.59]	0.452
No	165 (49.3)	170 (50.8)	1.64 [1.12-2.4]	**0.001***	0.76 [0.40-1.42]	0.389
Not sure[R]	64 (37.2)	108 (62.8)	-	-	-	-
Believe that sex is alright if a						

contraceptive is used						
Yes	186 (68.9)	84 (31.1)	2.42 [1.54-3.8]	**0.001***	0.96 [0.44-2.10]	0.926
No	72 (25.2)	214 (74.8)	0.37 [0.23-0.6]	**0.001***	2.28 [1.16-4.64]	**0.024***
Not sure[R]	55 (47.8)	60 (52.2)	-	-	-	-
Believe that boys have to force sex						
Yes	93 (69.9)	40 (30.1)	2.78 [1.67-4.7]	**0.001***	0.69 [0.30-1.58]	0.380
No	164 (39.5)	251 (60.5)	0.78 [0.52-1.2]	0.234	1.99 [1.01-3.90]	**0.046***
Not sure[R]	56 (45.5)	67 (54.5)	-	-	-	-
Justifiable for a boy to hit his girlfriend						
Agree	126 (69.6)	55 (30.4)	3.12 [2.12-4.6]	**0.001***	0.66 [0.38-1.17]	0.161
Disagree	52 (30.4)	119 (69.6)	0.59 [0.40-0.9]	**0.001***	1.28 [0.69-2.37]	0.424
Not sure[R]	135 (42.3)	184 (57.7)	-	-	-	-
Believe that physical violence can be justifiable						
Yes	96 (63.6)	55 (36.4)	2.45 [1.54-3.9]	**0.001***	0.69 [0.35-1.33]	0.267
No	155 (41.8)	216 (58.2)	1.01 [0.68-1.5]	0.972	0.93 [0.50-1.70]	0.813
Not sure[R]	62 (41.6)	87 (58.4)	-	-	-	-

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio

As shown in 5**,** statistically significant explanatory variables in the Chi-Square test of association were included for the bivariate logistic regression. “Believe that it is alright to 'date', Believe that it is alright to hug/touch, Believe that sexual intercourse is alright if a couple loves each other, Believe in female/male pre-marital virginity, Believe in abstinence, Believe that sex is alright if a contraceptive is used, Believe that boys have to force sex, Justifiable for a boy to hit his girlfriend, and Believe that physical violence can be justifiable” were associated with the initiation of sexual debut.

The study shows higher odds of initiating sexual debut among adolescents who believe that it is all right to 'date' (cOR=1.66, 95% CI; 1.15-2.42, p = 0.008), do not believe (cOR= 0.18, 95% CI; 0.11-0.32, p=0.008), compared to those not sure.

After adjusting for confounding variables, the multivariate logistic regression model showed statistically significant increased odds for initiation of sexual debut among those who do not believe that it is all right to 'date', (aOR =2.61, 95% CI: 1.21-5.61, p=0.016), compared to those who do or are not sure.

Those who do not believe that sex is all right if a contraceptive is used had increased odds for initiation of sexual debut (aOR=2.28, 95% CI: 0.44-2.10, p=0.024), compared to those who do or are not sure. In addition, those who do not believe that boys have to force sex had increased odds for initiation of sexual debut (aOR=1.99, 95% CI: 1.01-3.90, p=0.046), compared to those who do or are not sure. The other factors that were significant in the crude were not after adjusting for confounders.

Table 6: Bivariate and multivariate results for the peer domain factors (risk and protective) influencing Initiation of sexual debut

Variables	Initiation of sexual debut (Freq %)		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes n=313	No n=358				
Friends think that one-night stands are OK						
Agree	138 (70.4)	58 (29.6)	3.63 [2.47-5.8]	**0.001***	0.55 [0.31-0.98]	**0.041***
Disagree	61 (32.6)	126 (67.4)	0.73 [0.50-1.1]	**0.001***	1.37 [0.63-2.98]	0.824
Not sure[R]	114 (39.6)	174 (60.4)	-	-	-	-
Friends think that sexual intercourse is alright if a couple loves each other						
Yes	193 (66.6)	97 (33.5)	2.44 [1.5-3.95]	**0.001***	1.37 [0.63-2.98]	0.425
No	80 (27.4)	212 (72.6)	0.46 [0.28-0.8]	**0.002***	2.26 [1.04-4.91]	**0.039***
Not sure[R]	40 (44.9)	49 (55.1)	-	-	-	-

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio.

Table 6 shows the bivariate and multivariate results for factors (risk and protective) influencing reproductive health behaviour (initiation of sexual debut) in the peer domain. As shown, after adjusting for confounding variables, the multivariate logistic regression model showed a statistically significant increased odds for initiation of sexual debut among those who agreed that their friends think a one-night stand is appropriate, had increased odds of initiation of sexual debut (aOR=0.55, 95% CI: 0.31-0.98, p=0.041), compared to those who disagreed or are not sure.

Table 7: Bivariate and Multivariate results for factors (risk and protective) influencing Initiation of sexual debut in the family domain.

Variables	Initiation of sexual debut (Freq %)		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes n=313	No n=358				
Father alive						
No	65 (50.0)	65 (50.0)	1.18 [0.81-1.7]	0.394	0.88 [0.49-1.57]	0.671
Yes [R]	248 (45.8)	293 (54.2)	-	-	-	-
Father live in the same household as you						
No	189 (55.6)	151 (44.4)	2.09 [1.53-2.9]	**0.001***	1.02 [0.61-1.69]	0.933
Yes [R]	124 (37.5)	207 (65.5)	-	-	-	-
Discuss sex-related matters with the father						
No	267 (44.87)	328 (55.1)	0.53 [0.32-0.9]	**0.011***	0.56 [0.28-1.14]	0.110
Yes [R]	46 (60.5)	30 (39.5)	-	-	-	-
Mother alive						
No	99 (59.3)	68 (40.7)	1.97 [1.38-2.8]	**0.001***	1.48 [0.85-2.59]	0.166
Yes [R]	214 (42.5)	290 (57.5)	-	-	-	-
Mother lives in the same household as you						
No	156 (58.9)	109 (41.1)	2.27 [1.66-1.8]	**0.001***	1.64 [0.99-2.70]	**0.050***
Yes [R]	157 (38.7)	249 (61.33)	-	-	-	-
Discuss sex-related matters with the mother						
No	266 (49.2)	275 (50.8)	1.71 [1.15-2.5]	**0.008***	1.46 [0.80-2.66]	0.218
Yes [R]	47 (36.2)	83 (63.9)	-	-	-	-
Have older siblings						
No	163 (49.7)	165 (50.3)	1.27 [0.94-1.7]	0.122	1.27 [0.73-2.20]	0.387
Yes [R]	150 (43.7)	193 (56.3)	-	-	-	-
She/he lives in the same household						
No	196 (52.3)	179 (47.7)	1.68 [1.23-2.3]	**0.001***	2.25 [1.37-3.70]	**0.001***

Yes [R]	117 (39.5)	179 (60.5)	-	-	-	-

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio

Table 7 shows the bivariate and multivariate results for factors (risk and protective) influencing reproductive health behaviour (Initiation of sexual debut) in the family domain. As shown, after adjusting for confounding variables, the multivariate logistic regression model showed a statistically significant increased odds for initiation of sexual debut among those mothers who did not live in the same household as them, (aOR=1.64, 95% CI: 0.99-2.70, p=0.050), compared to those whose mothers did. Those who do not have an older sibling who lives in the same household as they showed statistically significant increased odds for initiation of sexual debut (aOR=2.25, 95% CI:1.37-3.70, p=0.001), compared to those who have an older sibling living in the same household.

The other factors that were significant in the crude were not after adjusting for confounders.

Table 8: Bivariate and Multivariate results for factors (risk and protective) influencing Initiation of sexual debut in the community and national domain

Variables	Initiation of sexual debut (Freq %)		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes=313	No=358				
Go to clubs or parties where young people dance						
Often	29 (67.4)	14 (32.6)	5.57 [2.8-11.2]	**0.001***	6.55 [0.26-1.67]	0.578
Occasionally	223 (55.3)	180 (44.7)	3.33 [2.3-4.7]	**0.001***	0.56 [0.33-0.94]	**0.028***
Never^{R}	61 (27.1)	164 (72.9)	-	-	-	-
Go to the movies						
Often	19 (52.8)	17 (47.2)	2.1 [1.1-4.2]	**0.037***	1.24 [0.45-3.39]	0.620
Occasionally	195 (55.7)	155 (44.3)	2.36 [1.7-3.3]	**0.001***	1.05 [0.62-1.77]	0.867
Never^{R}	99 (34.7)	186 (65.3)	-	-	-	-
Drink alcohol						
Often	32 (82.1)	7 (18.0)	14.4 [6.1-34.1]	**0.001***	0.59 [0.62-1.77]	0.351
Occasionally	210 (62.3)	127 (37.7)	5.22 [3.7-7.4]	**0.001***	0.31 [0.188-0.50]	**0.001***
Never^{R}	71 (24.1)	224 (75.93)	-	-	-	-
Smoke cigarettes						
Often	19 (90.5)	2 (9.5)	16.76 [3.9-72.8]	**0.001***	0.11 [0.018-0.72]	**0.02***
Occasionally	120 (71.0)	49 (29.0)	4.32 [2.95-6.3]	**0.001***	0.37 [0.22-0.63]	**0.001***
Never^{R}	174 (36.2)	307 (63.8)	-	-	-	-
Exposure to mass media						
Often	100 (62.1)	61 (37.9)	2.91 [1.84-4.6]	**0.001***	0.44 [0.20-0.95]	**0.036***
Occasionally	159 (44.2)	201 (55.8)	1.41 [0.95-2.1]	0.089	0.73 [0.41-1.31]	0.292
Never^{R}	54 (36.0)	96 (64.0)	-	-	-	-
Engaged in healthy after-school programs						
Often^{R}	22 (62.9)	13 (37.1)	-	-	-	-
Occasionally	211 (50.12)	210 (49.9)	2.86 [1.4-5.98]	**0.005***	0.50 [0.19-1.33]	0.166
Never	80 (37.2)	135 (62.8)	1.69 [1.2-2.37]	**0.002***	0.50 [0.30-0.84]	**0.008***

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio

Table 8 shows the bivariate and multivariate results for factors (risk and protective) influencing reproductive health behaviour (Initiation of sexual debut) in the community and national domain.

As shown, after adjusting for confounding variables, the multivariate logistic regression model showed a statistically significant increased odds for initiation of sexual debut among those who occasionally go to the club (aOR=0.56, 95% CI: 0.33-0.94, p=0.028), compared to those who never, among those who occasionally drink alcohol (aOR=0.31, 95% CI:0.188 - 0.50, p=0.001), than those who never, among those who occasionally smoke cigarettes (aOR=0.37, 95% CI: 0.22 - 0.63, p=0.001), than those who never smoke cigarettes. Those who are exposed to mass media often showed statistically significant increased odds for initiation of sexual debut (aOR=0.44, 95% CI: 0.20 - 0.95, p=0.036), compared to those who are never exposed.

Those who were never engaged in healthy after-school programs, showed statistically significant increased odds for initiation of sexual debut (aOR=0.50, 95% CI: 0.30 - 0.84, p=0.008), compared to those who were often engaged in healthy after-school programs. The other factors that were significant in the crude were not after adjusting for confounders.

Discussion

This study determined the factors (risk and protective) influencing the initiation of sexual debut among adolescents in Rivers State. It showed that nearly half 313 (46.6 %) of the respondents were sexually experienced, the mean age at sexual debut was 14.5 ±1.4 years and the median age was 15 years. This study's findings are in tandem with a similar study in Nigeria which showed that the mean age at sexual debut is 15 years.(Alawode et al., 2021) This study's findings are also in tandem with a similar study in South-South Nigeria (Cross Rivers) which shows that the prevalence of sexually experienced adolescents was 41.5%,(Eyam et al., 2021) and in a Tanzania study reported that 48.7% of adolescents were sexually active with a mean age at the sexual debut of 14.6.(Mmbaga et al., 2012) Whereas, in a study carried out among United States adolescents, the prevalence of sexual experience was above 63% (Santelli et al., 1998).

Several background characteristics influenced the initiation of sexual debut among adolescents. They include age, sex, religion, marital status, education, employment, living arrangement, individual perceptions, peer behaviour, family, and community norms.

Specifically, female respondents were more likely than males to have initiated sexual debut. The findings from this study are in tandem with a similar study in Nigeria which reported that 18% of males; and 22% of females were sexually experienced.(Fatusi and Blum, 2008) it also corroborates with a study done in Ghana which showed that sexual experience was more in females than males (forty-one per cent of female and 36% of male youth reported being sexually experienced).(Mehryar et al., 2003)

The findings from this study are in contrast with a study among US youth which showed that males were more likely to have initiated sexual debut,(Cavazos-Rehg et al., 2012) and another study which stated that “in general, adolescent boys are more likely to have experienced sexual

intercourse, and at earlier ages, than girls".(WHO, 2005) This gender disparity may reflect cultural norms, the higher tolerance for female premarital sexual activity and early age at marriage for females in the context of this study.

Those with no or primary education are 7 times more likely to initiate sexual debut than those with tertiary education. Similarly, those currently working have higher odds of initiating sexual debut than those not working for pay. In addition, those currently in school have lower odds of initiation of sexual debut. Respondents who lived alone or with other unrelated persons had a two- and over three-fold increased risk of initiating sexual debut. Therefore, higher educational levels, being in school and residing with both parents are likely protective factors.

Our finding regarding respondents with no religious affiliation who were about two times more likely to have initiation of sexual debut is consistent with another Nigerian study.(Fatusi and Blum, 2008)

The findings from this study regarding adolescents who lived alone or with other unrelated persons having two- and over three-fold increased risk of initiating sexual debut is consistent with a study done in Tanzania which revealed that being raised by both parents and currently living with both parents was associated with lower incidence of early sexual debut.(Mmbaga et al., 2012) This corroborates with the findings that the protective factors associated with early initiation of sexual debut were having a mother alive, being raised by both parents and currently living with both parents.

Our finding regarding those with no or primary education are 7 times more likely to initiate sexual debut than those with tertiary education is consistent with an Indian study (Potdar and Mmari, 2011).

Individual domain factors that influenced the initiation of sexual debut among adolescents were the “belief that it is alright to date”, “belief that sex is alright if a contraceptive is used” and “belief that boys have to force sex”. Specifically, those who believe that it is alright to 'date’ were about 2 times more likely to initiate sexual debut, likewise those who believe that sex is alright if a contraceptive is used and those who do not believe that boys have to force sex.

Peer domain factors that influenced the initiation of sexual debut among adolescents were “friends think that one-night stands are all right” and “friends think that sexual intercourse is alright if a couple loves each other”. Specifically, those whose friends think that sexual intercourse is alright if a couple loves each other were more than 2 times more likely to initiate sexual debut.

Family domain factors that influenced the initiation of sexual debut after adjusting for covariates were “mother lives in the same household as you” and “those whose older sibling, she/he lives in the same household”. Specifically, those whose mothers do not live in the same household, are 1.6 times more likely to initiate sexual debut. Likewise, those whose older siblings do not live in the same household are more than 2 times more likely to initiate sexual debut. Attendance to parties, movies, alcohol, and cigarette use are risk factors for the initiation of a sexual debut.

Conclusion

In conclusion, addressing risky sexual behaviours among adolescents in Rivers State requires a multi-faceted approach that considers the interplay of risk and protective factors. By implementing evidence-based policies and interventions and fostering supportive environments, we can empower adolescents to make informed and responsible choices about their sexual health. We hope that this assessment will serve as a foundation for future efforts to promote the well-being of adolescents in Rivers State.

To address these issues effectively, policymakers' educators and healthcare providers should prioritize comprehensive sex education programmes to provide accessible healthcare services and promote open communication between parents and adolescents. By addressing the risk and protective factors we can work towards reducing risky sexual behaviours among adolescents in Rivers State and promoting their overall well-being continued research and community efforts are essential in this ongoing endeavour.

References

Abajobir, A. A., & Seme, A. (2014). Reproductive health knowledge and services utilization among rural adolescents in east Gojjam zone, Ethiopia: A community-based cross-sectional study. *BMC Health Services Research*, *14*(1), 1–11. https://doi.org/10.1186/1472-6963-14-138

Adebowale, A. S., Fagbamigbe, A. F., & Adebayo, A. M. (2016). Regional differences in Adolescent childbearing in Nigeria. *Journal of Population and Social Studies*, *24*(2), 101–116. https://doi.org/10.14456/jpss.2016.8

Agunwa, C. C., Aniebue, U. U., & Aniebue, P. N. (2014). Sexual Behaviour and Contraceptive Use Among Female Students in A Rural Community. *Journal of Experimental Research*, *2*(2), 65–72.

Alawode, O. A., Ogunwemimo, H., Bolorunduro, M.-E., & Awoleye, A. F. (2021). Age at Sexual Debut and Multiple Sexual Partnerships among Adolescents in Nigeria: An Assessment of the Mediating Role of the Knowledge of Sexually Transmitted Infections. *Adolescents*, *1*(4), 421–432. https://doi.org/10.3390/adolescents1040032

Bukenya, J. N., Nakafeero, M., Ssekamatte, T., Isabirye, N., & Guwatudde, D. (2019). Sexual behaviours among adolescents in a rural setting in eastern Uganda: a cross-sectional study. *Tropical Medicine and International Health*, *00*(00), 1–8. https://doi.org/10.1111/tmi.13329

Cavazos-Rehg, P. A., Krauss, M. J., Spitznagel, E. L., Schootman, M., Bucholz, K. K., Peipert, J. F., Sanders-Thompson, V., Cottler, L. B., & Bierut, L. J. (2012). Age of sexual debut among US adolescents. *NIH Public Access*, *23*(1), 1–7. https://doi.org/10.1016/j.contraception.2009.02.014.Age

CDC. (2017). Centres for Disease Control and Prevention. Youth Risk Behavior Survey (YRBS) 2017 Standard Questionnaire Item Rationale. *Cdc*, *75*(6), 1–45. https://doi.org/10.1001/jama.2010.1635.Centers

Cleland, J. (2001). illustrative questionnaire for interview surveys with young people. Asking Young People About Sexual and Reproductive Behaviors. Illustrative Core Instruments, Geneva: World Health Organization. *Geneva: World Health Organization*, 3–55.

Eyam, L., Eyam, S., Ekpeyong, B., Ndep, A., Akpan, M., & Ekanem, E. (2021). Determinants of risky sexual behaviour among secondary school adolescents in Cross River State, Nigeria. *Nigerian Journal of Medicine*, *30*(6), 658. https://doi.org/10.4103/njm.njm_126_21

Fatusi, A. O., & Blum, R. W. (2008). Predictors of early sexual initiation among a nationally representative sample of Nigerian adolescents. *BMC Public Health*, *8*(136), 1–14. https://doi.org/10.1186/1471-2458-8-136

Israel, G. D. (2013). Determining Sample Size 1. In *Institute of Food and Agricultural Sciences (IFAS), University of Florida, Gainesville, FL 32611.* (Issue June, pp. 1–5).

Lehtimaki, S., & Schwalbe, N. (2019a). *Adolescent Health. The missing population in Universal Health Coverage*.

Lehtimaki, S., & Schwalbe, N. (2019b). *Adolescent Health. The missing population in Universal Health Coverage*.

Mehryar, A., Karim, R. J., Magnani, G. T., Bond, M., & Bond, K. C. (2003). Reproductive Health Risk and Protective Factors Among Unmarried Youth in Ghana. *International Family Planning Perspectives*, *29*(1), 14–24.

Mmbaga, E. J., Leonard, F., & Leyna, G. H. (2012). Incidence and Predictors of Adolescents' Early Sexual Debut after Three Decades of HIV Interventions in Tanzania : A Time to Debut Analysis. *PLoS ONE*, *7*(July), 1–8. https://doi.org/10.1371/journal.pone.0041700

National Bureau of Statistics. (2018). *Demographic statistics bulletin* (Issue May, pp. 1–25).

National Population Commission Federal Republic of Nigeria, ICF International Rockville, Maryland, U. (2013). *Nigeria Demographic and Health Survey*.

National Population Commission [Nigeria] and ICF International Rockville, Maryland, U. (2019). Nigeria Demographic and Health Survey Key Indicators Report. In *Nigeria Demographic and Health Survey 2018 Key Indicators Report.* (Issue May).

Odo, A. N., Samuel, E. S., Nwagu, E. N., Nnamani, P. O., & Atama, C. S. (2018). Sexual and reproductive health services (SRHS) for adolescents in Enugu state, Nigeria : a mixed methods approach. *BMC Health Services Research*, *18*(92), 1–12. https://doi.org/10.1186/s12913-017-2779-x

Potdar, R., & Mmari, K. (2011). Factors influencing sexual initiation, multiple partners and condom use among male slum youth in Pune, India. *Global Public Health*, *6*(8), 843–858. https://doi.org/10.1080/17441692.2010.516759

Santelli, J. S., Brener, N. D., Lowry, R., Bhatt, A., & Zabin, L. S. (1998). Multiple sexual partners among U.S. Adolescents and young adults. *Family Planning Perspectives*, *30*(6), 271–275. https://doi.org/10.2307/2991502

Ugoji, F. N. (2014). Determinants of risky sexual behaviours among secondary school students in Delta State Nigeria. *International Journal of Adolescence and Youth*, *19*(3), 408–418. https://doi.org/10.1080/02673843.2012.751040

WHO. (2005). Risk and Protective Factors Affecting Adolescent Reproductive Health in Developing Countries. In *World Health Organization*.

WHO. (2014). Adolescent pregnancy fact sheet. *Adolescent Pregnancy Fact Sheet*, 1.

WHO Regional Office for Africa. (2019). *Assessment of barriers to accessing health services for disadvantaged adolescents in Nigeria*.

Williams, K., Sassier, S., Addo, F., & Frech, A. (2018). First-birth timing, marital history, and women's health at midlife. *J Health Soc Beha*, *56*(4), 514–533. https://doi.org/10.1177/0022146515609903.First-birth

Sensitivity and Specificity of malaria Rapid Diagnostic Tests in Nigeria: a review

Ngozi Noel-Ogamba[1], Prof Best Ordinioha[2], Dr. Hillary Adie[3],

[2]School of Public Health, University of Port Harcourt, Nigeria: M& E Manager, Solina Group / Solina Centre for International Development and Research, Nigeria
[3]Professor of Community Medicine and Public Health, Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria

Abstract

As one of its recommendations for eradicating malaria parasites worldwide, the World Health Organization (WHO) is making malaria rapid diagnostic tests compulsory. There is a pressing requirement for an accessible, acceptable, and precise method of diagnosing malaria in the African region due to the high prevalence of the disease. The sensitivity and specificity of mRDT in Nigeria was assess and compared with other African countries. A globally recognized online data base (PubMed) was searched for relevant articles, not less than 10 years ago. The sensitivity, specificity, positive predictive values, and negative predictive values were compared with the WHO standard. Some geopolitical zones had a fairly high mRDT accuracy compared to other zones. In, South-East, this study found sensitivity values between 50.8% and 86.9%, with an average value of 69.9%. The average specificity value for the South-East is 84.4%. The average positive predictive value (PPV) and average negative predictive value recorded in the South-East are 80.5% and 78.8%, respectively. North-Central had a sensitivity value of 75%, while a specificity of 98.8% was recorded during this study. The average specificity of 93.2% was recorded in the South-South, while the highest specificity of 97.3% was observed during this study. The highest PPV and NPV were 100% each, with an average of 87.5% and 76.5%, respectively. The minimum PPV for the south-west was 55.4% with an average value of 79.1%, while the average NPV was 84.5% with the highest value of 98.7%. Generally, test results need improvement across contexts; especially in many areas where lower specificities and false positives were observed. To minimize variation in the performance of RDT kits; storage and correct manufacturer instruction execution are essential. Considerations for temperature and humidity levels should be taken into account when determining storage circumstances for the mRDTs. We recommend mRDTs that is suitable for the environmental conditions in the Nigerian market in order to meet the global standard.

Keywords: Malaria, Rapid Diagnostic Tests (RDTs), Performance.

Introduction

According to a World Health Organization (WHO) report, the number of malaria cases worldwide is now expected to be 247 million, representing an increase of 6 million cases. This global record is spread across 84 endemic countries, and Nigeria has the largest population of people with the highest burden of the disease (WHO, 2022) . Malaria must be correctly diagnosed in all contexts (WHO, 2015): in areas where the disease is endemic, a highly sensitive diagnosis is necessary, particularly in children, for whom *falciparum* malaria can quickly become fatal; in all contexts, a highly specific diagnosis will reduce the need for unnecessary antimalarial therapy and aid in the identification of other causes of fever. In 2012, the World Health

Organization suggested a "test, treat, and track" strategy to raise the standard of care and surveillance (WHO, 2015).

In 2010, prior to beginning treatment, the WHO recommended that all patients with malaria suspicions undergo prompt parasitological testing (using microscopy or the malaria rapid diagnostic test (mRDT)) to confirm the diagnosis. Only when a parasitological diagnosis is unavailable should a treatment plan based on a presumptive diagnostic be taken into account. On the other hand, when the results of the parasitological diagnostic test are delayed by up to two hours or more, patients who are suspected of having severe malaria, including infants and high-risk groups, should start treatment right away (WHO, 2015). A pervasive overuse of ACTs for the treatment of malaria as a result of erroneous presumptive diagnosis, however, is likely to exacerbate the issue. The WHO's recommendation for universal testing is supported by some fundamental shifts in global malaria trends, including the decline in malaria cases in high-burden nations, the emergence of parasite resistance to anti-malarial medications, particularly artemisinin-based combination therapies (ACTs), and the expansion of diagnostic testing options like MRDT (WHO, 2011).

Malaria is a severe disease that the entire population of Nigeria is susceptible to. It is widespread and endemic throughout the country, with varying risks and degrees of endemicity. (Cameron et al., 2021; NMCP, 2015b; Weiss et al., 2019). Nigeria also accounts for about 29% of the malaria load in Africa (WHO, 2022), as well as more than 25% of all malaria cases and malaria-related deaths worldwide in 2021 (WHO, 2022). The national malaria strategic plan era in Nigeria (2009–2013) saw the introduction of the malaria rapid diagnostic test (mRDT), with the intention of expanding its use to all public and private health facilities, including those at the community level (Badger-Emeka, 2020; Saleh et al., 2018). In accordance with the WHO's Global Technical Strategy (GTS) for Malaria 2016–2030, Nigeria's national malaria strategic plan, 2014–2020, establishes a target for the country to reach pre-elimination status and achieve zero malaria mortality by 2020 (NMCP, 2015a). One of the goals of the 2014-2020 national malaria strategic plan is to perform mRDT or microscopy for all patients with suspected malaria who seek medical care by 2020. The strategic actions include making sure mRDT (and or microscopy) is accessible and available at public and private health facilities, developing the skills of healthcare workers, and increasing demand for

parasitological diagnostic testing through actions targeted at both the health workers and the general public (NMCP, 2015a). It is obvious that the strategy set up by NMCP did not meet the required target.

Nations around the world, including Nigeria, have long embraced the WHO's recommendation for routine parasitological testing. The Nigerian government has increased the accessibility of mRDT in recent years (with the assistance of international partners), but there are still big obstacles to overcome. In many communities, the incidence of malaria/mRDT is still too low. More so, in those areas where mRDT is in use, the precision is questioned in some cases. The standard for an acceptable mRDT as itemized by WHO is been negated in most cases. The sensitivity, specificity, positive predictive, and negative predictive values are not in consonance with the norm thereby leading to wrong use of malaria drugs. Most times, when drugs are misused, the possibility of developing resistance to such drug, as witness with ACTs nowadays is inevitable (Naß & Efferth, 2019; van der Pluijm et al., 2021).

Many countries have started to highlight parasitological diagnostic testing as the cornerstone of malaria therapy by expanding the accessibility and use of mRDT, especially in the public sector. It is important to remember that adoption and application of mRDT can only address overtreatment with ACTs when healthcare professionals (and patients) properly react to test results that are negative (Laktabai et al., 2020). Therefore, the aim of this review is to assess the sensitivity and specificity of mRDT in Nigeria.

Materials and Methodology

Original articles from previously published research were compiled for the study; reviewed articles were not included. The globally recognized online data base ("PubMed") was searched for relevant articles. Relevant keywords includes malaria diagnosis, malaria rapid diagnostic tests, diagnostic performance and accuracy of mRDTs, and Nigeria. After the initial search, we reviewed the retrieved articles, removing duplicates, reviewed articles, and articles that did not meet the inclusion criteria. The selected research articles were analyzed for information on the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of mRDTs. The articles were categorized based on the geopolitical zones of Nigeria, and the data on mRDT performance in each zone were extracted. The results were presented using figures

and tables to illustrate the average sensitivity and specificity of mRDTs in different regions of Nigeria. We compared the sensitivity and specificity values obtained in Nigeria with the standards and recommendations set by the World Health Organization (WHO) for RDT procurement and quality assurance. The discussion involved variations in sensitivity and specificity values among different regions of Nigeria, potential factors influencing these variations, and the implications for malaria diagnosis and treatment.

Inclusion Criteria

Studies primarily concentrating on malaria parasites, studies assessing the reliability of RDT findings, and original RDT-focused studies carried out in formal healthcare settings, educational institutions, or research facilities were needed for inclusion.

Exclusion Criteria

All systemic reviews, studies conducted outside of Nigeria, and studies conducted without the use of RDTs were not taken into account in this research.

Results and Discussion

We discovered during our search of the online database that a number of studies only addressed the use of RDTs as a diagnostic instrument, making it difficult to evaluate the test's efficacy in those studies. They were consequently excluded from the subsequent sections of the study. However, studies that were considered for this research used both RDT and microscopy to make diagnosis. The retrieved research articles (46) were based on “malaria rapid diagnosis and Nigeria”. The search was conducted on 27th February, 2023 which were used for the current review. Duplicate (3). Reviewed articles (7), and irrelevant (14) articles (i.e., articles addressing cost of mRDTs, sale of mRDTs, non-availability of relevant data, conference report, monitoring, and study protocols alone) were removed from the list.

The RDT kits' sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV), as well as their diagnostic accuracy, were evaluated using the research papers that were retrieved. These articles were divided according to the geopolitical zones of the country. Also included in our analysis were

research articles that focused on pregnant women, children, and pre-school children, while the remaining studies covered mixed age groups of participants. At the end, forty-six research articles were retrieved from PubMed, and the RDTs from the following eleven various brands were employed: SD-Bioline, Carestart, FirstResponse, Paracheck-Pf, and Antec. With test kits that either detected HRP-2 and/or Pf-pLDH and/or pan-pLDH, these brands differed both in manufacturers and antigen detected.

For the South-East, this study found sensitivity values between 50.8% and 86.9%, with an average value of 69.9%. The average specificity value for the South-East is 84.4%, the highest value of specificity is 95.5%, while the least value is 75% (Figures 1 and 2). The average positive predictive value (PPV) and average negative predictive value recorded in the South-East are 80.5% and 78.8%, respectively.

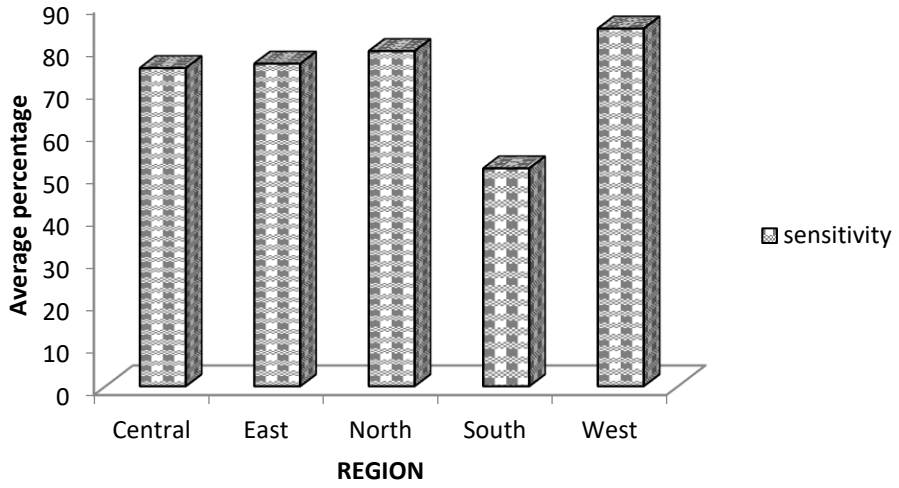


Fig. 1: Average mRDT sensitivity in Nigeria

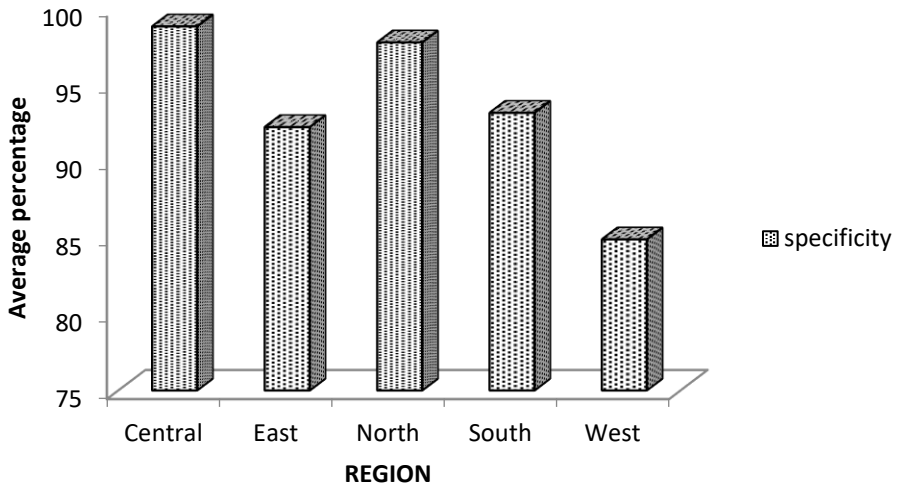


Fig. 2: Average mRDT specificity in Nigeria

On the other hand, the North had an average sensitivity of 79%, while the average specificity was 97.8%, with the highest values of 100% and 98.8% recorded for sensitivity and specificity, respectively. The highest NPV was 100%, with an average of 93.6%, while the highest positive predictive value recorded in the North was 88.7% (Figures 3). In the South-South, the lowest sensitivity value (29%) was recorded during the study, while the highest sensitivity value is 73.7%.

The average specificity of 93.2% was recorded in the South-South, while the highest specificity of 97.3% was observed during this study. The highest PPV and NPV were 100% each, with an average of 87.5% and 76.5%, respectively (Figures 3). For South-West, the lowest sensitivity value was 25.4% with an average of 84.3%, and the highest specificity value was 100% with an average of 84.9%. The minimum PPV for the south-west was 55.4% with an average value of 79.1%, while the average NPV was 84.5% with the highest value of 98.7%. North-Central had a sensitivity value of 75%, while a specificity of 98.8% was recorded during this study. The PPV and NPV values are 92.3% and 95.4%, respectively (Figures 3).

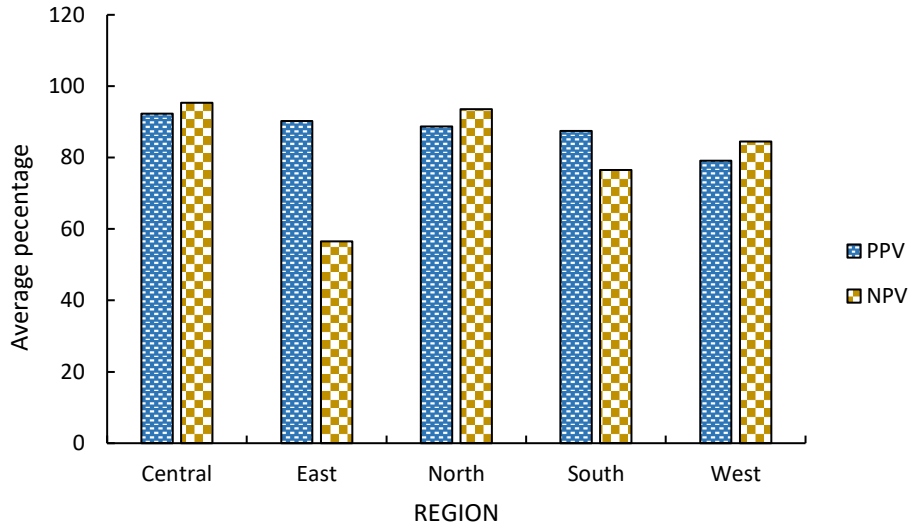


Fig. 3: Average mRDT positive predictive and negative predictive values in Nigeria

The strength of many RDTs is their performance qualities. Both an annual programme for RDT product testing for quality assurance (Iwuafor et al., 2018) and general recommendations for RDT procurement (WHO, 2018) are provided by WHO. The three factors listed below make up WHO's selection parameters for RDT procurement: for *P. falciparum* and *P. vivax*, the panel identification score must be at least 75% at 200 parasites/L, the percentage of false positives must be below 10%, and the invalid percentage ought to be under 5% (WHO, 2018). Sensitivity and specificity estimates from the WHO put the typical values for *Pf*HRP2-detecting RDTs at 95.0% and 95.2%, respectively (WHO, 2015). *Pf*pLDH-detecting RDTs have higher specificities of 98.5% but a reduced average sensitivities of 93.2% (WHO, 2015). A higher sensitivity was recorded in Guinea-Bissau compared to this present study; however, the specificity of our study was comparably higher than that of Guinea-Bissau. Although our study's sensitivity and specificity made reference to malaria microscopy, the study done in Guinea-Bissau used PCR (McGregor et al., 2021), yet the specificity and sensitivity were still high. Many studies have shown that when making reference to PCR, the specificity and sensitivity are expected be low. This implies that the method of storage and compliance with the manufacturer's instructions were much more adhered to compared to many studies found in Nigeria. Meanwhile, comparing the mRDT in rural areas and urban centres; the mRDT sensitivity in the rural areas was greater in the rural areas compared to the urban settings, while the specificity was lower in the rural settings. The reason for the differences was traced to the high immunity to malaria, which allows for the

mRDT to be more sensitive. It has also been confirmed that mRDT is affected by low parasitic densities and that below 100 parasites/microL, the RDT performance decreases. The decrease in the specificity of mRDTs in rural areas could be due to the fact that patients maintain a high level of antibodies against malaria for more days or do not receive adequate treatment during malaria episodes (Berzosa et al., 2018).

Comparing Pv-pLDH RDTs to reference microscopy in endemic settings, they also have a comparable aggregated sensitivity of 95% and specificity of 99% (Abba et al., 2014). However, sensitivities and specificities decreased to 59-77% and 97-100%, respectively, when a fraction of Pv-pLDH-detecting RDT experiments used PCR as the reference (Abba et al., 2014). This is most likely a result of the inherent bias that exists in microscopy, whereas PCR is intended to be more objective. As a result of PCR's superior sensitivity, which has a parasite density threshold of detection of 5 parasites/uL (0.0001% parasitemia) compared to light microscopic examination (50–100 parasites/uL; 0.001-0.002% parasitemia) and RDT (100 parasites/uL; 0.002% parasitemia), using PCR as the reference standard may lead to inconsistent results (Mukkala et al., 2018). RDT sensitivities for higher virulent malaria parasite have been found to range from 88.0 to 100% (for all antigens) due to variations in usage, storage, and end-user standardization (Mukkala et al., 2018). At parasitemia higher than 500 parasites/L (0.01% parasitemia), RDT sensitivities for *P. vivax* range from 77.4 to 97.2% (WHO, 2015). Although the lowest sensitivity observed in Nigeria was 51.4%, it's however higher than the sensitivity (47.4%) recorded in a secondary health facility in Ghana. The low level of sensitivity was also ascribed to the low level of parasitemia among the study population (Agyapong et al., 2019). A study by Oyeyemi et al. (2015), which used a single mRDT brand across various populations and discovered a lower sensitivity value in children than adults, was the opposite of this. Parasite abundance is an additional variable that might have an impact on sensitivity data. Lower parasite density is typically correlated with lower sensitivities, even though this is not supported by the majority of research conducted in Nigeria. Therefore, there is a need for standardization in research design to allow a national comparison, which would assist in informing policies. Based on parasite density, there may be a sizable variation in sensitivity.

In this research, the specificity values were generally greater than the sensitivity values. The North and North-Central regions of Nigeria had the highest mRDT specificity (Ajumobi et al., 2015; Ita et al., 2018; Mbah et al., 2018), followed by the South and South-western regions (Falade et al., 2013; Ogunfowokan et al., 2020; Wogu & Nduka, 2018). Generally, the specificity of mRDT is higher than the sensitivity in many studies. The potential for HRP2-based RDTs to generate false positive findings in patients who have recently received treatment for malaria had raised concerns in earlier reviews, which limited specificity. This possibility has been connected to HRP2's capacity to stay in the bloodstream for up to 28 days even after the parasite has been eliminated.

Therefore, it has previously been noted that HRP2-based RDTs typically have a lower specificity but a higher sensitivity than pLDH-based RDTs (Reichert et al., 2020). HRP2-based tests identified two more malaria cases than pLDH tests did for several cases of the disease, but they also produced four false positive results (Coldiron et al., 2019). Similar reports of lower specificity than sensitivity values were made by numerous other investigations (Adu-Gyasi et al., 2018; Kong et al., 2021; Leonard et al., 2022; Prosser et al., 2021).

False positives are a concern, especially in regions with moderate-to-high malaria transmission rates, where there is a correlation between the most recent episode of the disease and poor specificity. By doing so, the cost-effectiveness and user impression of RDTs are compromised, (Lover et al., 2019) and drug abuse and subsequent drug resistance may result. A study in Cameroon showed a low value of specificity in a study involving malaria diagnosis in coastal settings. The study shows an indication that there could be an indication where there are high chances of treating people who are not sick with malaria in the population (Moyeh et al., 2019).

However, there are some exceptions to this rule, and some studies have linked these cases to hypoendemic areas with little malaria transmission. In one of these studies, higher specificity values were also noted in

older patients, patients who were afebrile, and near the end of the transmission season (Acquah et al., 2021). Studies conducted in Mozambique found similar results with higher specificity values (Galatas et al., 2020). Therefore, it would be crucial to determine whether the generalised association of HRP2 with fewer specificities is still valid or if it needs to be updated considering more recent information.

In order to standardize RDT interpretation in endemic regions, the WHO advises lab training (WHO, 2015). To minimize variation in the performance of RDT kits; storage and correct manufacturer instruction execution are essential (WHO, 2018). Considerations for temperature and humidity levels should be taken into account when determining storage circumstances (WHO, 2015). Low parasitemia, or less than 200 parasites/L, causes RDT performance constraints (Mukkala et al., 2018). Besides, because children and pregnant patients are more likely to experience symptoms at low parasite loads, mRDT interpretation should be done with extreme caution in these patient groups (WHO, 2018). The development of mRDT is particularly interested in the capability to diagnose malaria in infants, under the age of five, and other categories of malaria infection in adults.

Strength of the review

The review provides a thorough analysis of the sensitivity and specificity of mRDTs in different regions of Nigeria, breaking down the data by geographical zones. This comprehensive approach allows for a detailed understanding of the performance variations. This review addresses a highly relevant topic and contributes to the understanding of the effectiveness of diagnostic tools in the context of malaria in Nigeria. Furthermore, the review compares its findings with existing literature, providing context and insights into how its results align or differ from previous research. This adds credibility to the analysis. Lastly, the review discusses various factors that can influence mRDT performance, such as parasite density and storage conditions. This comprehensive discussion adds depth to the analysis.

Limitations of the review

The review does not mention whether the studies included have consistent sample sizes, which can affect the reliability of the findings. Studies with smaller sample sizes may have less statistical power. Also, the review includes studies using various mRDT brands and antigens, which could introduce heterogeneity in the data. Different brands and antigens may have varying performance characteristics.

Implications of the findings from this review

Policy makers can use the findings to inform and update national malaria diagnosis and treatment guidelines. The data on mRDT sensitivity and specificity in different regions can help guide decisions on diagnostic strategies and treatment protocols. The variations in mRDT performance across different regions of Nigeria may prompt policy makers to allocate resources strategically. Areas with lower sensitivity or specificity may require additional support and monitoring to improve diagnostic accuracy. Policies can be developed to ensure the proper storage and handling of mRDT kits to maintain their performance. This may include training healthcare workers on correct procedures and monitoring compliance.

Healthcare practitioners can use the findings to make more informed decisions about the use of mRDTs in clinical practice. They can consider regional variations in sensitivity and specificity when diagnosing and treating patients. Health practitioners can use the information to avoid over-diagnosis and overtreatment of malaria, especially in regions where mRDTs have lower specificity. This can help reduce unnecessary use of antimalarial drugs and the risk of drug resistance.

The review highlights the need for further research to understand the factors contributing to variations in mRDT performance across different regions. Researchers can investigate the impact of factors such as parasite density, healthcare worker training, and environmental conditions on diagnostic accuracy. Research can focus on developing and evaluating interventions to improve the sensitivity and specificity of mRDTs in regions where they perform poorly. This might include the development of more accurate test kits or innovative storage solutions. Besides, longitudinal studies can monitor changes in mRDT performance over time, allowing researchers to assess the impact of interventions and policy changes on diagnostic accuracy.

Conclusion

Malaria RDT has come to stay, and its development has contributed immensely towards the control and elimination of malaria as a public health problem in Nigeria and the world at large. Although the sensitivity and specificity of most brands of RDT are relatively high in many parts of the country, there is still more to be done regarding the areas where the test performance is below the standard. We recommend improvements to many of the mRDTs in the Nigerian market due to low performance. Many researchers across the country and elsewhere in the world are encouraged to improve on the issues of false-positives and false-negatives through thorough innovative research.

References

Abba, K., Kirkham, A. J., Olliaro, P. L., Deeks, J. J., Donegan, S., Garner, P., & Takwoingi, Y. (2014). Rapid diagnostic tests for diagnosing uncomplicated nonfalciparum or Plasmodium vivax malaria in endemic countries. In *Cochrane Database of Systematic Reviews* (Vol. 2014, Issue 12).

Acquah, F. K., Donu, D., Obboh, E. K., Bredu, D., Mawuli, B., Amponsah, J. A., Quartey, J., & Amoah, L. E. (2021). Diagnostic performance of an ultrasensitive HRP2-based malaria rapid diagnostic test kit used in surveys of afebrile people living in Southern Ghana. *Malaria Journal*, *20*(1).

Adu-Gyasi, D., Asante, K. P., Amoako, S., Amoako, N., Ankrah, L., Dosoo, D., Tchum, S. K., Adjei, G., Agyei, O., Amenga-Etego, S., & Owusu-Agyei, S. (2018). Assessing the performance of only HRP2 and HRP2 with pLDH based rapid diagnostic tests for the diagnosis of malaria in middle Ghana, Africa. *PLoS ONE*, *13*(9).

Agyapong, F. O., Ansong, D., Owusu-Ofori, A., & Martin-Peprah, R. (2019). Diagnostic Performance of Blood Film Microscopy and PfHRP2-based RDT in a Routine Clinical Setting of a Secondary Health Facility in Ghana. *Journal of Advances in Medicine and Medical Research*, 1–9.

Ajumobi, O., Sabitu, K., Nguku, P., Kwaga, J., Ntadom, G., Gitta, S., Elizeus, R., Oyibo, W., Nsubuga, P., Maire, M., & Poggensee, G. (2015). Performance of an HRP-2 rapid diagnostic test in nigerian children less than 5 years of age. *American Journal of Tropical Medicine and Hygiene*, *92*(4), 828–833.

Badger-Emeka, L. (2020). The malaria burden: A look at 3 years outpatient malaria clinic visits in a university community town in Southeast of Nigeria. *Nigerian Journal of Clinical Practice*, *23*(5), 711–719.

Berzosa, P., De Lucio, A., Romay-Barja, M., Herrador, Z., González, V., García, L., Fernández-Martínez, A., Santana-Morales, M., Ncogo, P., Valladares, B., Riloha, M., & Benito, A. (2018). Comparison of three diagnostic methods (microscopy, RDT, and PCR) for the detection of malaria parasites in representative samples from Equatorial Guinea 11 Medical and Health Sciences 1108 Medical Microbiology. *Malaria Journal*, *17*(1).

Cameron, E., Young, A. J., Twohig, K. A., Pothin, E., Bhavnani, D., Dismer, A., Merilien, J. B., Hamre, K., Meyer, P., Le Menach, A., Cohen, J. M., Marseille, S., Lemoine, J. F., Telfort, M. A., Chang, M. A., Won, K., Knipes, A., Rogier, E., Amratia, P., … Battle, K. E. (2021). Mapping the endemicity and seasonality of clinical malaria for intervention targeting in Haiti using routine case data. *eLife*, *10*.

Coldiron, M. E., Assao, B., Langendorf, C., Sayinzoga-Makombe, N., Ciglenecki, I., De La Tour, R., Piriou, E., Yarima Bako, M., Mumina, A., Guindo, O., Page, A. L., & Grais, R. F. (2019). Clinical diagnostic evaluation of HRP2 and pLDH-based rapid diagnostic tests for malaria in an area receiving seasonal malaria chemoprevention in Niger. *Malaria Journal*, *18*(1).

Falade, C. O., Adesina-Adewole, B., Dada-Adegbola, H. O., Ajayi, I. O., Akinyemi, J. O., Ademowo, O. G., & Adewole, I. F. (2013). Evaluation of Paracheck-PfTM rapid malaria diagnostic test for the diagnosis of malaria among HIV-positive patients in Ibadan, South-Western Nigeria. In *Pathogens and Global Health* (Vol. 107, Issue 2, pp. 69–77). http://docserver.ingentaconnect.com/deliver/connect/maney/20477724/v107n2/s7.pdf\nhttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed15&NEWS=N&AN=368600966

Galatas, B., Mayor, A., Gupta, H., Balanza, N., Jang, I. K., Nhamussua, L., Simone, W., Cisteró, P., Chidimatembue, A., Munguambe, H., Saúte, F., Aide, P., & Bassat, Q. (2020). Field performance of ultrasensitive and conventional malaria rapid diagnostic tests in southern Mozambique. *Malaria Journal*, *19*(1).

Ita, O. I., Otu, A. A., Onyedibe, K., Iwuafor, A. A., Banwat, E., & Egah, D. Z. (2018). A diagnostic performance evaluation of rapid diagnostic tests and microscopy for malaria diagnosis using nested polymerase chain reaction as reference standard in a tertiary hospital in Jos, Nigeria. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *112*(10), 436–442.

Iwuafor, A., Ita, O., Ogban, G., Udoh, U., & Amajor, C. (2018). Evaluation of diagnostic accuracy of rapid diagnostic test for malaria diagnosis among febrile children in Calabar, Nigeria. *Nigerian Medical Journal*, *59*(6), 64.

Kong, A., Wilson, S. A., Ah, Y., Nace, D., Rogier, E., & Aidoo, M. (2021). HRP2 and HRP3 cross-reactivity and implications for HRP2-based RDT use in regions with Plasmodium falciparum hrp2 gene deletions. *Malaria Journal*, *20*(1).

Laktabai, J., Saran, I., Zhou, Y., Simmons, R. A., Turner, E. L., Visser, T., & O'Meara, W. (2020). Subsidise the test, the treatment or both? Results of an individually randomised controlled trial of the management of suspected malaria fevers in the retail sector in western Kenya. *BMJ Global Health*, *5*(11).

Leonard, C. M., Assefa, A., McCaffery, J. N., Herman, C., Plucinski, M., Sime, H., Mohammed, H., Kebede, A., Solomon, H., Haile, M., Murphy, M., Hwang, J., & Rogier, E. (2022). Investigation of Plasmodium falciparum pfhrp2 and pfhrp3 gene deletions and performance of a rapid diagnostic test for identifying asymptomatic malaria infection in northern Ethiopia, 2015. *Malaria Journal*, *21*(1).

Lover, A. A., Dantzer, E., Hocini, S., Estera, R., Rerolle, F., Smith, J. L., Hwang, J., Gosling, R., Yukich, J., Greenhouse, B., Jacobson, J., Phetsouvanh, R., Hongvanthong, B., & Bennett, A. (2019). Study protocol for a cluster-randomized split-plot design trial to assess the effectiveness of targeted active malaria case detection among high-risk populations in Southern Lao PDR (the AcME-Lao study). *Gates Open Research*, *3*, 1730.

Mbah, H. A., Jegede, F. E., Abdulrahman, S. A., & Oyeyi, T. I. (2018). Evaluation of standard diagnostic rapid test kits for malaria diagnosis among HIV patients in Kano, Nigeria. *African Journal of Laboratory Medicine*, *7*(1).

McGregor, D., da Silva, E. T., Grignard, L., Goncalves, A., Vasileva, H., Mabey, D., & Last, A. (2021). The epidemiology of plasmodium falciparum malaria in the bijagos islands of guinea-bissau. *American Journal of Tropical Medicine and Hygiene*, *104*(6), 2117–2122.

Moyeh, M. N., Ali, I. M., Njimoh, D. L., Nji, A. M., Netongo, P. M., Evehe, M. S., Atogho-Tiedeu, B., Ghogomu, S. M., & Mbacham, W. F. (2019). Comparison of the Accuracy of Four Malaria Diagnostic Methods in a High Transmission Setting in Coastal Cameroon. *Journal of Parasitology Research*, *2019*.

Mukkala, A. N., Kwan, J., Lau, R., Harris, D., Kain, D., & Boggild, A. K. (2018). An Update on Malaria Rapid Diagnostic Tests. In *Current Infectious Disease Reports* (Vol. 20, Issue 12).

Naß, J., & Efferth, T. (2019). Development of artemisinin resistance in malaria therapy. In *Pharmacological Research* (Vol. 146).

National Malaria Control Programme. (2015a). *National Malaria Strategic Plan 2014-2020. Abuja: FMoH*.

National Malaria Control Programme. (2015b). *National Malaria Strategic Plan 2014-2020. Abuja: FMoH; 2015.*

Ogunfowokan, O., Nwajei, A. I., & Ogunfowokan, B. A. (2020). Sensitivity and specificity of malaria rapid diagnostic test (mRDT CareStatTM) compared with microscopy amongst under five children attending a primary care clinic in southern Nigeria. *Journal of Primary Health Care and Family Medicine*, *12*(1), 1–8.

Oyetunde, T. O., Oluwarotimi, J. S., Olalekan, D. A., & Mensah-Agyei, G. O. (2015). Reliability of rapid diagnostic tests indiagnosing pregnancy andinfant-associated malaria in Nigeria. *Journal of Infection and Public Health*, 1–7.

Prosser, C., Gresty, K., Ellis, J., Meyer, W., Anderson, K., Lee, R., & Cheng, Q. (2021). Plasmodium falciparum histidine-rich protein 2 and 3 gene deletions in strains from Nigeria, Sudan, and South Sudan. *Emerging Infectious Diseases*, *27*(2), 471–479.

Reichert, E. N., Hume, J. C. C., Sagara, I., Healy, S. A., Assadou, M. H., Guindo, M. A., Barney, R., Rashid, A., Yang, I. K., Golden, A., Domingo, G. J., Duffy, P. E., & Slater, H. C. (2020). Ultra-sensitive RDT performance and antigen dynamics in a high-transmission Plasmodium falciparum setting in Mali. *Malaria Journal*, *19*(1).

Saleh, J.-E. A., Uchenna, A. A., Saddiq, D. A., Wondimagegnehu, A., Mpazanje, R., & Audu, D. B. M. (2018). Lots Quality Assurance Survey (LQAS) as a Strategy to Achieving Quality LLIN Campaigns: The Nigerian Experience. *OALib*, *05*(04), 1–13.

Van der Pluijm, R. W., Amaratunga, C., Dhorda, M., & Dondorp, A. M. (2021). Triple Artemisinin-Based Combination Therapies for Malaria – A New Paradigm? In *Trends in Parasitology* (Vol. 37, Issue 1, pp. 15–24).

Weiss, D. J., Lucas, T. C. D., Nguyen, M., Nandi, A. K., Bisanzio, D., Battle, K. E., Cameron, E., Twohig, K. A., Pfeffer, D. A., Rozier, J. A., Gibson, H. S., Rao, P. C., Casey, D., Bertozzi-Villa, A., Collins, E. L., Dalrymple, U., Gray, N., Harris, J. R., Howes, R. E., … Gething, P. W. (2019). Mapping the global prevalence, incidence, and mortality of Plasmodium falciparum, 2000–17: a spatial and temporal modelling study. *The Lancet*, *394*(10195), 322–331.

Wogu, M. N., & Nduka, F. O. (2018). Evaluating Malaria Prevalence Using Clinical Diagnosis Compared with Microscopy and Rapid Diagnostic Tests in a Tertiary Healthcare Facility in Rivers State, Nigeria. *Journal of Tropical Medicine*, *2018*.

World Health Organization. (2011). *WHO. Universal access to malaria diagnostic testing: an operational manual. Malta: WHO; 2011.*

World Health Organization. (2015a). *Guidelines for the treatment of malaria third ed. Geneva: World Health Organization*. Available from: http://apps.who.int/iris/

World Health Organization. (2018). Recommended selection criteria for procurement of malaria rapid diagnostic tests. *Geneva: World Health Organization;* Available from: http://apps.who.int/iris/bitstream/10665/

World Health Organization. (2022). *World malaria report 2022. World Health Organization*.

Male perpetrated economic abuse in the context of intimate partner violence: A global review of the literature

Chinelo Nduka[1], Vivian Omuemu[2], Adedayo Tella[3], and Darlington Obi[4]

[1] School of Public Health, University of Port-Harcourt, Rivers State.

[2] Department of Public Health & Community Medicine, UBTH, Benin

[3] Department of Community Medicine, UPTH, Port Harcourt

[4]Department of Community Medicine, NAUTH, Nnewi

Corresponding author: Chinelo Nduka, nwokeabiachinelo@yahoo.com, 08037808500
c/o Department of Community Medicine,
Nnamdi Azikiwe University Teaching Hospital, Nnewi
Anambra State

Abstract

Background: Economic abuse (EA) is described as patterns of behavior in which one partner controls the ability of the other to acquire, use and maintain economic resources. It is significant because economic concerns are a major reason survivors remain in abusive relationships, as they lack the means to cater for themselves and their children if they leave.
Aim: This paper reviews the global literature on the measurement, prevalence, and response to EA.
Methods: A comprehensive desk-based review was conducted. Google, Google Scholar, Pubmed, ResearchGate, Web of Science and Science Direct were searched using relevant keywords such as EA, intimate partner violence, domestic violence, financial abuse. Full-text publications written in English were included.
Findings: Various measurement scales for EA have been created, revised and adapted over the years with some being more inclusive. Available measurement scales for EA and prevalence rates reviewed observed that variations in prevalence of EA were influenced by the method of inquiry and measurement scale used as well as by actual differences in the extent of EA experienced. Economic abuse was found to be the form of IPV with the least legislative response and often absent from plans of action on violence against women.
Conclusion: This review buttresses the need for development of context-specific scales for measurement of EA to enable proper assessment of its prevalence for that context. There is also need to heighten awareness of EA to promote recognition and appropriate response.

Keywords: Economic Abuse, Intimate Partner Violence, Measurement Scale.

Introduction

Background

Violence against women (VAW) is arguably one of the most endemic but yet overlooked human rights violation globally (Fawole et al., 2013; Tanimu et al., 2016). Upon development of the Sustainable Development Goals (SDGs) in 2015, elimination of all forms of violence against all women and girls in the public and private spheres, including trafficking, sexual and other types of exploitation was adopted as a target (target 5.2) for achieving SDG 5 which is to achieve gender equality and empower all women and girls (Jewkes et al., 2017; Klugman, 2017; World Health Organization, 2020).

Intimate partner violence (IPV) is one of the most common forms of VAW (Antai, Oke, et al., 2014; Dunkle et al., 2020; Sharp-Jeffs, 2015a) and it has been described as an ongoing pattern of behaviour where one partner uses physical, sexual, psychological and/or economic abuse against the other in order to exert power and control over the other (Baloushah et al., 2019; Sharp-Jeffs, 2015b). While research has shown that IPV is not experienced exclusively by women, it has also revealed that it is disproportionately perpetrated by men against women (Jury et al., 2017; Kutin et al., 2017; Pollet, 2011; Postmus et al., 2018) and the consequences are worse for women (Adhia et al., 2019; Zamorski & Wiens-Kinkaid, 2013) thus making it

a gendered issue. The phenomenon is a pervasive social and public health issue globally cutting across all populations, irrespective of social, economic, religious or cultural groups (Dalal, 2011; Fawole et al., 2013; Hetling et al., 2015), with about 1 in every 3 women having experienced it in their lifetime (Dhungel et al., 2017; Klugman, 2017; Ranganathan et al., 2019). According to a regional analysis by the World Health Organization (WHO), the findings revealed that IPV has a prevalence of 21%, 28%, 29%, 30%, 33%, 40%, 40% and 43% in North America; Australia and New Zealand; Europe and Central Asia; East Asia and the Pacific; Latin America and the Caribbean; Middle East and North Africa; Sub Saharan Africa; and South Asia, respectively (Klugman, 2017). Furthermore, a systematic review on the subject in low and lower-middle income countries reported that the pooled lifetime prevalence of IPV was 55% in these countries (Semahegn et al., 2019). Evidence suggests that 50-75% of Nigerian women have experienced IPV, and that this is higher in some ethnic groups than others (Nwabunike & Tenkorang, 2015). This is corroborated by the findings of studies conducted in various regions of the country whereby overall prevalence with at least one form of violence was found to be 42.5% (Tanimu et al., 2016), 90% (Tella et al., 2017), 66% (Adejimi et al., 2014) and 44.6% (Onoh et al., 2013) in studies conducted in the Northern, South-South, South-West and South-Eastern regions of Nigeria, respectively albeit some differences in composition of study populations and duration reported. Despite these alarming numbers, researchers still believe that they are underestimated because victims tend to under-report IPV due to the persistent belief that issues concerning families and intimate relationships are 'private' and should not be discussed (Alsaker et al., 2016; Onyemelukwe, 2018; Tanimu et al., 2016).

Economic abuse

To perpetrate IPV, various tactics are utilized by abusive men over time to exert power and control over their partners (Hoge et al., 2017; Postmus, Huang, et al., 2012). One of such commonly employed tactic by perpetrators of IPV is economic abuse (EA) (Alsaker et al., 2016; Postmus, Plummer, et al., 2012) which has been described as patterns of behavior in which one partner controls the ability of the other to acquire, use and/or maintain economic resources (Christy-McMullin et al., 2020; Stylianou et al., 2019). The primary aim of EA is to undermine the victims autonomy and economic independence (Alsaker et al., 2016) with the

direct consequence being that they become economically dependent on the abuser (Pollet, 2011; Voth Schrag, 2019). Economic dependence in this context means that the woman relies on her partner, who is in full control of the couple's economic resources, for economic support regardless of if he is the main provider or merely controlling resources provided by the woman (Peled & Krigel, 2016).

Three major domains of tactics employed by EA perpetrators have been outlined in the literature namely economic control, economic exploitation and work sabotage (Postmus, Huang, et al., 2012; Voth Schrag & Ravi, 2020). Economic control occurs when abusers prevent their victims from having knowledge of or access to economic resources (Barzilay, 2017; Postmus, Plummer, et al., 2012); economic exploitation on the other hand occurs when abusers intentionally aim to destroy the economic resources of their victims (Sharp-Jeffs, 2015b; Stylianou, 2018b); while economic sabotage occurs when abusers prevent their victim from acquiring regular or increased income (Postmus, Plummer, et al., 2012; Valandra, 2017).

Economic abuse has been labeled an 'invisible' or 'unseen' form of abuse because of the covert means employed to perpetrate it, which may often be perceived as innocuous and can easily blend as normal financial behaviour occurring between individuals in a relationship (Eriksson & Ulmestig, 2017; Postmus et al., 2018). The subtle difference is control because while it is common for one partner to be responsible for most of a couple's finances, abuse occurs when one partner is not permitted to have a say in financial decisions (Barzilay, 2017; Huang et al., 2013).

Two critical dynamics differentiate EA and its effects from the other forms of abuse. First, it can occur even without any contact between the victim and the abuser. Hence, IPV survivors can continue experiencing EA long after the relationship has ended and other forms of abuse has been terminated (Krigel & Benjamin, 2020; Stylianou et al., 2013; Toews & Bermea, 2015). Secondly, EA perpetrators have a unique aim distinct from other forms of abuse which is to create and reinforce economic dependency of the victim on the abuser thus limiting their options in ways that pose barriers to resisting other abusive acts (Huang et al., 2013; Sanders, 2015), leaving the abusive relationship and rebuilding their lives (Sharp-Jeffs, 2015a; Stylianou et al., 2013). Therefore, strategies to curb IPV are significantly incomplete without putting EA into consideration.

Although it has been over five decades since IPV moved from the private to the public sphere, it continues to be a social and public health problem affecting millions of individuals and families, as well as the entire society (Christy-McMullin et al., 2020; Vasiliauskaitė & Geffner, 2020) and in most of the world, no place is less safe for a woman than her own home (Klugman, 2017). The literature is rife with studies mostly focused on physical and sexual forms of violence which has been attributed to their ease of identification and operationalization (Gibbs et al., 2018; Stern et al., 2019). When the non-physical forms are being considered, attention is usually paid to psychological abuse with EA either subsumed under it or simply ignored (Adams et al., 2015; Stylianou, 2018b; Yau et al., 2019).

Methods

This narrative review utilized a comprehensive desk-based literature review to identify available measurement scales and establish current global knowledge on the prevalence and response to economic abuse as a form of intimate partner violence.

The search terms used were keywords like ("gender-based violence" OR "intimate partner violence" OR "intimate partner abuse" OR "domestic violence" OR "domestic abuse") AND ("economic abuse" OR "economic violence" OR "financial abuse" OR "economic control" OR "employment sabotage" OR "economic exploitation" OR "financial exploitation"). Similar search strategy was used for all the databases searched which included Google, Google Scholar, Pubmed, ResearchGate, Web of Science and Science Direct. Sources used included full-text publications written in English of both quantitative and qualitative research.

Findings

Measurement scales for assessing economic abuse

Like has been noted, majority of the existing research on IPV focuses on the physical, sexual, and even psychological forms of abuse (Gibbs et al., 2018; Stern et al., 2019) mostly because EA had historically been included within the definition of psychological abuse (Adams et al., 2015; Stylianou, 2018b). It was only about a decade ago that scholars began to identify EA as its own unique form of IPV and as such, have

identified economic exploitation, economic control, and employment sabotage as specific domains (Davila et al., 2017; Stylianou et al., 2013). Since then, attention has been given to measuring how perpetrators economically abuse their partner and various scales measuring EA have been created, tested, and revised.

Formerly, most of what was known about EA came from one or two questions in measures that included a few items on EA such as the Psychological Maltreatment of Women Inventory (PMWI) (Tolman, 1989), the Index of Psychological Abuse (IPA) (Sullivan et al., 1999), and the abuse questions used by the Safer and Stronger Program (SSP) (Curry et al., 2009). Similarly, the Abusive Behaviour Inventory (ABI) included 10 questions on physical abuse; and 20 questions on psychological abuse with only two questions that focus on EA imbedded in the psychological abuse subscale (Shepard & Campbell, 1992).

The Domestic Violence-Related Financial Issues Scale (DV-FI) is another scale that incorporates an EA subscale, containing five items that measure EA experiences (Weaver et al., 2009). It was developed to be a comprehensive assessment of the unique financial issues victims of IPV face. Although the DV-FI expanded on the definition of EA when compared to the previous one or two item measures, it is still limited. It primarily focuses on credit card debt and credit rating which are important items in assessing for economic exploitation but they are narrow in scope and only focus on victims of IPV who are engaged in the formal credit system and so might be insignificant in some contexts. Another instrument, the Checklist of Controlling Behaviors (CCB) was developed as a domestic violence assessment instrument to address multiple levels of violence and coercive control in IPV relationships (Lehmann et al., 2012). It includes an EA subscale with seven items that focuses primarily on capturing experiences of economic control within IPV relationships. Similar to the DV-FI, the CCB is also limited as it cannot fully measure the array of experiences a victim of EA may experience.

Having a measure that fully assesses all three domains of EA applicable to victims of IPV using either formal economic services and/or cash-only finances would permit an expansive and inclusive measure of EA experiences. The Scale of Economic Abuse (SEA) was the first full measurement scale for assessing EA (Adams et al., 2008). It is a 28-item scale, although with only two subscales including Economic Exploitation (11 items) and Economic Control (17 items). The second full scale, the Scale of Economic

Abuse—Revised (SEA-R) is a revised shortened version of the SEA (Postmus et al., 2016). It reduced the SEA to 12 items with subscales encompassing the whole three domains of EA: economic control (five items); employment sabotage (four items); and economic exploitation (three items).

It is worthy of note that these two full scales specifically designed for measuring EA as a form of IPV were developed among population of women in the US with attendant implications for their use in other contexts. This is because not all of the items will be relevant globally and so it is important to either adapt these scales for use in other contexts or develop context specific ones. To this end, the Economic Coercion Scale (ECS) has been developed during research in rural Bangladesh and included 40 items capturing barriers to acquiring, using or maintaining economic resources (Yount et al., 2021). Similarly, the SEA-R has been validated and adapted for use in China (Yau et al., 2019). It recognizes the full range of economically abusive behaviours relevant for that context.

Although there appears to be no consensus yet on the best practices for measuring EA as it can manifest in various ways (Rivas et al., 2019), scales for measuring it are important because they permit the assessment of a range of economically abusive behaviours. They can also be used to establish prevalence of EA and the subsequent need for response.

Prevalence of economic abuse

Economic abuse has historically not been included as a form of IPV in most surveys and so available prevalence rates depends on the study contexts, groups and the definition used (Antai, Antai, et al., 2014). Many available data on the prevalence of EA is as a result of few questions on the subject included in larger studies that focused on physical, sexual or psychological/emotional forms of IPV (Kutin et al., 2017; Postmus, Plummer, et al., 2012). For instance, the study conducted in Australia (Kutin et al., 2017) to determine the lifetime prevalence of EA in the country which was found to be 15.7% analysed secondary data from the country-wide Personal Safety Survey in which data specific for EA was not reported. Instead, they utilised five questions related to EA which were included in items under emotional abuse to determine prevalence of EA (Kutin et al., 2017) and this could have led to an underestimation of the phenomenon.

Also, given the sensitive nature of the subject, issues of underreporting and incomplete reporting must be considered (Krigel & Benjamin, 2019).

Amidst this dearth of studies on EA, some core EA research have been conducted among the general population of women in developed countries (where most of the work on EA have been done) and they had comparable findings. A cross-sectional survey of a nationally representative sample of 10,171 women residing in Spain found the lifetime prevalence of EA to be 10.8% but although questions about specific behaviours synonymous with EA were asked, a comprehensive measurement scale for EA was not employed for data collection (Domenech & Sirvent, 2016). Another nationally representative survey conducted in the UK to determine the national prevalence of EA among women and men found the prevalence to be 21% and 15%, respectively (Sharp-Jeffs, 2015b).

Other studies conducted in some developing countries showed higher findings compared to the western world such as the randomised controlled trial done in Cote d'Ivoire about the effects of interventions to reduce IPV where the general population (control group) of married women reported a 32.6% prevalence rate of EA (Falb et al., 2018) and in Kenya where a 92.8% prevalence rate was reported (Sang & Sang, 2014). Moreover, a review of demographic health surveys in different regions of the world showed that sub-Saharan Africa, compared with the other regions of the world, had the highest percentage of husbands making decisions alone on daily household expenditure (Nwabunike & Tenkorang, 2015). However, a cross-sectional study conducted among men in Nigeria estimated the rate of perpetration of EA against women to be 23.2% (Fawole et al., 2010) but this result could be fraught with social desirability bias and its associated underreporting as women were not interviewed either to corroborate or refute their assertions (Fawole et al., 2010).

Although the prevalence of EA may vary across regions, women are deprived of equal access to economic resources, opportunities, and power in every region of the world. Even in the same region and within the same country, the prevalence of EA has been found to vary which gives rise to the question as to what factors could be responsible for such differences. For instance, a multi-country cross-sectional study conducted in Asia and the Pacific to contrast women's reported experience of IPV with men's reported perpetration of

the same phenomenon found that women and men reported the prevalence of experiencing and perpetrating EA, respectively to be as low as 4.1% in some countries and as high as 27.7% in some other countries although they did not compare men and women's report from the same relationship which might have ensured greater validity of their findings (Jewkes et al., 2017). Similarly, a cross-sectional study among young women in an urban area of South Africa reported the prevalence of EA to be 43.7% (Gibbs et al., 2018) while in a rural area of that same country, the lifetime prevalence of EA reported by women was 14.3% - 16.1% (Ranganathan et al., 2019).

In multiple qualitative studies conducted among IPV survivors in shelters or assessing various IPV reduction interventions in the USA, the prevalence of EA was found to be as high as 95% (Sauber & O'Brien, 2017), 94.2% (Postmus, Plummer, et al., 2012), 94% (Postmus et al., 2016), with the lowest being 93% (Stylianou, 2018a) which suggest the predominance of EA in IPV situations. However, given the fact that these were solely qualitative studies, their findings can proffer marked insight into the phenomenon but can hardly be generalised to other populations and contexts. Secondly, previous scholarships suggest that participants in IPV reduction interventions may over-report IPV due to an increased awareness (Gupta et al., 2013) and this might very well have been the case in these studies as awareness especially about EA is still very low in the general population. This position was brought to light in a study conducted in the UK where an estimated 98% of women seeking IPV services reported instances of EA but in that same study in the general population, only 20% of women reported experiencing some form of EA (Sharp-Jeffs, 2015b).

Some scholars have posited that EA is even more prevalent than the physical forms of IPV (Christy-McMullin et al., 2020; Gibbs et al., 2020; Mahoney, 2011; Stylianou, 2018b) and this is corroborated by the results of some studies. For instance, based on the results of a National Survey on Violence Against Women conducted in Palestine, women reported more prevalence of EA (45%) than sexual abuse (37.6%) even though there were only two questions on EA. This buttresses how rampant this important but neglected form of IPV is because if the construct of EA had been explored with a comprehensive measurement scale, the reported prevalence would most likely have been higher. In that same region, a three-country (China, Sri-Lanka and Papua New Guinea) population-based study also concluded from their findings that EA is more

common, or as common as physical and sexual abuse in those count (Gibbs et al., 2020). Even in sub-Saharan Africa, descriptive evidence from the Ghana Statistical Service shows that EA is the most common type of IPV against Ghanaian women (Tenkorang & Owusu, 2018). This is also comparable to a study done in the USA that analysed data from a longitudinal study involving 4,898 women and found a higher prevalence of EA (33%) than physical (11%) and sexual abuse (7%).

Findings from sub-Saharan Africa suggests that this higher prevalence of EA over other forms of IPV is a rising trend as a study conducted in Tanzania gave the prevalence rate of EA as 34% which was found to be the second highest form of IPV, based on the women's experiences in the past year (Kapiga et al., 2017). But for lifetime experience, physical abuse had higher rates (Kapiga et al., 2017) and thus could be an indicator to the growing awareness of EA as a form of IPV. This suggestion is buttressed by findings from other regions of the world such as South-East Asia whereby the EA prevalence rate in Palestine as at 1994 was 45% but by 2011, it had risen to 55% (Usta et al., 2013). Thus, as prevalence of EA grows, there is need to develop appropriate responses to it.

Global, Regional, National, and sub-National Response to economic abuse

Since the awareness of IPV, the literature has been rife with studies mostly focused on physical and sexual forms of violence which has been attributed to their ease of identification and operationalization (Gibbs et al., 2018; Stern et al., 2019). This has also translated to response to IPV being tilted towards these more studied forms of violence (Krigel & Benjamin, 2020). To respond to EA, recognition is important in addition to prioritization at the policy level. There are differing levels of recognition of EA globally as it is often noted to be absent from plans of action on domestic abuse or violence against women. A global report found that 160 out of the190 countries examined had legislation on domestic abuse, but only 113 of them had laws in place to protect women from EA (Royal & Wilson-Garwood, 2022) which was found to be the form of abuse with the least legislative response. However, there is evidence that EA has started receiving significant attention internationally and in many nations' laws over the past few years with civil societies playing key roles at global and local levels (Klugman, 2017; Valenetine & Breckenridge, 2016). It had been reported in

2013 that 60.3% of countries had no specific legislations against EA but a 2017 report found that this figure had reduced to 50.1% (Royal & Wilson-Garwood, 2022).

At some international levels, such as in the Istanbul Convention in Europe and within the African continent, the Protocol to the African Charter of Human and Peoples' Rights on the Rights of Women in Africa (known as the Maputo Protocol), EA was recognized as they include a comprehensive definition of violence against women, in which economic harm is referred to (Royal & Wilson-Garwood, 2022). The Maputo Protocol obligates African states to introduce legislative reforms against domestic abuse and there is evidence that some countries like Gabon, Ghana, Kenya, Liberia, Namibia, Nigeria, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe included EA. In Nigeria, the Violence against Persons (Prohibition) Act 2015 was recognized as a landmark achievement because previously, legislative responses to gender-based violence were dependent on individual states. The Act prohibits all gender-based violence, defining violence as including economic harm, which includes 'forced financial dependence or EA and damage to property' (Royal & Wilson-Garwood, 2022).While celebrating the inclusion, this definition appears to be limited in scope as it did not expand upon what might be meant by EA hence leaving it open to misinterpretation.

Even with international and national recognition and institution of policies, response to EA remains incomplete if the underlying norms and behaviors associated with it are not addressed (Klugman, 2017; Valandra, 2017). This is because while developing laws are an important commitment as they create enabling environments for change, prevailing social norms present several obstacles to its effectiveness such as lack of awareness by the population so that would be perpetrators may be unaware of the law and its penalties which might have served as a deterrent (Onyemelukwe, 2018; Raj et al., 2018). For instance, a study in India reported that women and men who were unaware of the law, or regarded the law as inappropriate, were 1.5 times more likely to experience and perpetrate IPV, respectively (Raj et al., 2018). Also, in some countries like Nigeria where the law co-exists and is even preceded by customary and religious laws, such national legislation on IPV may be ineffective if they are inconsistent with prevailing customs and religions (Onyemelukwe, 2018). Finally, if socio-cultural tolerance of IPV persists, victims will remain unlikely to report it for fear of the social consequences of doing so (Chimah et al., 2015; Dalal, 2011;

Nwabunike & Tenkorang, 2015), then the law cannot be enforced and perpetrators would remain unsanctioned and unpunished (Klugman, 2017). This is particularly pertinent for EA as evidence suggests that the main predictor for reporting abuse is its severity and for a lot of women, they do not consider money as being important enough to disrupt their home and so continue to suffer in silence (Sedziafa et al., 2017; Vasiliauskaitė & Geffner, 2020).

This recognition that laws alone cannot eliminate IPV as law does not automatically change people's perception (Klugman, 2017; Sedziafa et al., 2017) highlights the need to address the informal sociocultural norms that cause, sanction and tolerate IPV which individuals have internalized as they are more difficult and slower to change than formal policy and are also greater determinants of perpetrating or experiencing abuse than formal policy. To illustrate this point, a study in India found that men and women with rigid gender views were about 1.35 times more likely to perpetrate and experience IPV, respectively over men and women with more equitable views (Raj et al., 2018).

Moreover, unlike some other forms of IPV, response to survivors of EA entails more than short-term, crisis-oriented services to involve longer term career and educational opportunities (Barzilay, 2017; Postmus, Plummer, et al., 2012; Stylianou et al., 2019) which are currently not available in many developing countries like Nigeria probably on account of non-recognition of EA and its' requirements for appropriate individualized response (Rivas et al., 2019). In addition, the poor conceptualization of EA presents the dilemma of not being believed to the survivors (Vasiliauskaitė & Geffner, 2020) because unlike the physical forms of abuse, the EA survivor might be unable to provide any documentary evidence of abuse (Sedziafa et al., 2017) and some abusive men may go to great lengths to present the 'right image' in public (Sharp-Jeffs, 2015b). Furthermore, available evidence suggests that the police and courts require further resources and a more developed understanding of EA for protections introduced by legislation to be fully enacted. Hence, there is need to explore how the criminal justice system can best respond to EA and provide survivors with economic justice. It must be noted that there are almost no empirically supported interventions for perpetrators of IPV globally (Schwab-Reese et al., 2016; Valenetine & Breckenridge, 2016).

A common response to different forms of IPV has been poverty alleviation whereby poor women are targeted by various agencies in different programs (Hetling et al., 2015; Hoge et al., 2017). The assumption is that engaging women in various enterprises with resultant earnings will reduce poverty (a well-known determinant of abuse) and enhance women empowerment (Jewkes et al., 2017; Peled & Krigel, 2016; Ranganathan et al., 2019) which is an important human rights and development goal (Rettig et al., 2020). However, experts have suggested that caution be exercised in applying such economic strengthening strategies especially to survivors of EA (Ranganathan et al., 2019) as dramatic structural changes in the face of sustained gender inequities in the home may create tensions that erupt in IPV especially EA (Raj et al., 2018; Yount & Krause, 2016). Hence the suggestion is that such economic empowerment of these women be complemented by social empowerment programs if they are to be truly transformative (Raj et al., 2018; Ranganathan et al., 2019). This is because economic and gender empowerment alone without addressing social norms could increase the frequency of transgressing gender norms by these women with increased risk of abuse for them (Falb et al., 2014; Jewkes et al., 2017). For instance, a cluster randomized trial in South Africa reported that economic empowerment combined with participatory gender training achieved a 55% reduction in levels of past year IPV. However, economic empowerment only programs were not found to reduce risk for IPV (Ranganathan et al., 2019).

One of the promising ways that current evidence suggests for reduction of the risk of IPV especially EA is community activism to shift patriarchal norms, attitudes and beliefs that underlie it (Falb et al., 2014; Klugman, 2017; Vaillant et al., 2020). This is in recognition of the fact that many of these victims especially in developing countries like Nigeria may lack access to or even avoid contact with formal IPV services and prefer to seek support from community and religious leaders (Vasiliauskaitė & Geffner, 2020). Historically, religious organizations have played a paradoxical role in addressing IPV as some women report experiences of empowerment through religious communities while others report that religious teachings have been used as a justification for abuse (Shorey et al., 2014). Nevertheless, this community activism has been tried in sub-Saharan African countries like Uganda and Rwanda with demonstrable success (Chatterji et al., 2020; Dunkle et al., 2020) which suggests high chances of success in Nigeria. Finally, an appropriate response to

IPV will not only reduce the risk of women experiencing it currently but also reduce the risk for the next generation as childhood exposure to abuse is a recognized risk factor for experiencing and perpetrating IPV in adulthood (Jewkes et al., 2017), the so-called 'intergenerational violence'.

Conclusion

This review consolidates the fact that EA is a global problem and a form of IPV with vicious effects that can linger long after the abusive relationship has ended. While it establishes that there have been remarkable developments in measuring, understanding and responding to EA in recent years, it also demonstrates how some regions of the world do not have context-specific scales of measurement. It also buttresses how any meaningful response aimed at tackling the phenomenon would require commitment from all sectors of the society and the political will to ensure enforcement.

Recommendations

1. Researchers need to develop context-specific scales for measuring EA that can be used to determine the true nature and extent of the problem in their context which would provide evidence base for appropriate context-specific response.
2. Policy makers should make research-informed policies which recognize EA at all levels and are supportive of responses being made to curtail it.
3. Government agencies that enact or enforce legislation such as the police and courts should undergo special trainings to enable them to recognize and respond appropriately to survivors of EA, making sure they are supported, and abusers are held accountable.

References:

Adams, A. E., Beeble, M. L., & Gregory, K. A. (2015). Evidence of the construct validity of the scale of economic abuse. *Violence and Victims*, *30*(3), 363–376.

Adams, A. E., Sullivan, C. M., Bybee, D., Greeson, M. R., Adams, A. E., Sullivan, C. M., & Greeson, M. R. (2008). Development of the scale of economic abuse. *Violence Against Women*, *14*(5), 563–588. https://doi.org/10.1177/1077801208315529

Addo-Lartey, A. A., Alangea, O. D., Sikweyiya, Y., Chirwa, E. D., Coker-Appiah, D., Jewkes, R., & Adanu, R. M. K. (2019). Rural response system to prevent violence against women: Methodology for a community randomised controlled trial in the central region of Ghana. *Global Health Action*, *12*(1), 1–14. https://doi.org/10.1080/16549716.2019.1612604

Adejimi, A., Fawole, O. I., Sekoni, O. O., & Kyriacou, D. N. (2014). Prevalence and correlates of intimate partner violence among male civil servants in Ibadan, Nigeria. *African Journal of Medicine and Medical Sciences*, *43*(Suppl 1), 51–60.

Adhia, A., Gelaye, B., Friedman, L. E., Marlow, L. Y., Mercy, J. A., & Williams, M. A. (2019). Workplace interventions for intimate partner violence: A systematic review. *Journal of Workplace Behavioral Health*, *34*(3), 149–166. https://doi.org/10.1080/15555240.2019.1609361

Alsaker, K., Moen, B. E., Baste, V., & Morken, T. (2016). How has living with intimate partner violence affected the work situation? A qualitative study among abused women in Norway. *Journal of Family Violence*, *31*, 479–487. https://doi.org/10.1007/s10896-016-9806-2

Antai, D., Antai, J., & Anthony, D. S. (2014). The relationship between socio-economic inequalities, intimate partner violence and economic abuse: A national study of women in the Philippines. *Global Public Health*, *9*(7), 808–826. https://doi.org/10.1080/17441692.2014.917195

Antai, D., Oke, A., Braithwaite, P., & Lopez, G. B. (2014). The effect of economic, physical, and psychological abuse on mental health: A population-based study of women in the Philippines.

International Journal of Family Medicine, 1–11.

Baloushah, S., Mohammadi, N., Taghizadeh, Z., Taha, A. A., & Farnam, F. (2019). A whole life of threats: A qualitative exploration of lived experiences of Palestinian women suffering from intimate partner violence. *International Journal of Women's Health*, *11*, 547–554. https://doi.org/10.2147/IJWH.S216952

Barzilay, A. R. (2017). Power in the age of in/equality: Economic abuse, masculinities, and the long road to marriage equality. *Akron Law Review*, *51*(2), 324–366.

Chatterji, S., Stern, E., Dunkle, K., & Heise, L. (2020). Community activism as a strategy to reduce intimate partner violence (IPV) in rural Rwanda: Results of a community randomised trial. *Journal of Global Health*, *10*(1), 1–17. https://doi.org/10.7189/jogh.10.010406

Chimah, U. C., Adogu, P. O. U., Ubajaka, C. F., Ilika, A. L., & Egenti, N. B. (2015). Attitude and perception of intimate partner violence among women in military and civilian communities in Abuja Nigeria. *Advances in Applied Sociology*, *5*, 195–205. https://doi.org/10.4236/aasoci.2015.56019

Christy-McMullin, K., Welter, T., Dundon, K., & Bruce, A. (2020). Economic abuse: A subtle but common form of power and control. *Journal of Interpersonal Violence*, *00*(0), 1–27. https://doi.org/10.1177/0886260520916264

Curry, M., Renker, P., Hughes, R., Robinson-Whelen, S., Oschwald, M., Swank, P., & Powers, L. (2009). Development of measures of abuse among women with disabilities and the characteristics of their perpetrators. *Violence Against Women*, *15*(9), 1001–1025.

Dalal, K. (2011). Does economic empowerment protect women from intimate partner violence? *Journal of Injury and Violence Research*, *3*(1), 35–44. https://doi.org/10.5249/jivr.

Davila, A. L., Johnson, L., & Postmus, J. L. (2017). Examining the relationship between economic abuse and mental health among Latina intimate partner violence survivors in the United States. *Journal of Interpersonal Violence*, *00*(0), 1–24. https://doi.org/10.1177/0886260517731311

Dhungel, S., Dhungel, P., Dhital, S. R., & Stock, C. (2017). Is economic dependence on the husband a risk factor for intimate partner violence against female factory workers in Nepal? *BMC Women's Health*, *17*(82), 1–9. https://doi.org/10.1186/s12905-017-0441-8

Domenech, I., & Sirvent, E. (2016). The consequences of intimate partner violence on health: A further disaggregation of psychological violence — Evidence from Spain. *Violence Against Women*, 1–19. https://doi.org/10.1177/1077801216671220

Dunkle, K., Stern, E., Chatterji, S., & Heise, L. (2020). Effective prevention of intimate partner violence through couples training: A randomised controlled trial of Indashyikirwa in Rwanda. *BMJ Global Health*, *5*(12), 1–22. https://doi.org/10.1136/bmjgh-2020-002439

Eriksson, M., & Ulmestig, R. (2017). "It's not all about money": Toward a more comprehensive understanding of financial abuse in the context of VAW. *Journal of Interpersonal Violence*, *00*(0), 1–27. https://doi.org/10.1177/0886260517743547

Falb, K. L., Annan, J., King, E., Hopkins, J., Kpebo, D., & Gupta, J. (2014). Gender norms, poverty and armed conflict in Côte D'Ivoire: Engaging men in women's social and economic empowerment programming. *Health Education Research*, *29*(6), 1015–1027. https://doi.org/10.1093/her/cyu058

Falb, K. L., Annan, J., Kpebo, D., Cole, H., Willie, T., Xuan, Z., Raj, A., & Gupta, J. (2018). Differential impacts of an intimate partner violence prevention program based on child marriage status in rural Côte d'Ivoire. *Journal of Adolescent Health*, *57*(5), 553–558. https://doi.org/10.1016/j.jadohealth.2015.08.001.Differential

Fawole, O. I. (2008). Economic violence to women and girls, is it receiving the necessary attention? *Trauma, Violence And Abuse*, *9*(3), 167–177. https://doi.org/10.1177/1524838008319255

Fawole, O. I., Salawu, T. A., & Olarinmoye, E. O. A. (2010). Intimate partner violence: Prevalence and perceptions of married men in Ibadan, Nigeria. *International Quarterly of Community Health*, *30*(4), 349–364. https://doi.org/10.2190/IQ.30.4.f

Fawole, O. I., van Wyk, J., & Adejimi, A. (2013). Training on prevention of violence against women in the medical curriculum at the University of Ibadan , Nigeria. *African Journal of Health Professions Education*, *5*(2), 75–79. https://doi.org/10.7196/AJHPE.222

Gibbs, A., Dunkle, K., & Jewkes, R. (2018). Emotional and economic intimate partner violence as key drivers of depression and suicidal ideation: A cross-sectional study among young women in informal settlements in South Africa. *PLoS ONE*, *13*(4), 1–18. https://doi.org/10.1371/journal.pone.0194885

Gibbs, A., Dunkle, K., & Jewkes, R. (2020). The prevalence, patterning and associations with depressive symptoms and self-rated health of emotional and economic intimate partner violence: A three-country population based study. *Journal of Global Health*, *10*(1), 1–13. https://doi.org/10.7189/jogh.10.010415

Gottlieb, A., & Mahabir, M. (2019). The effect of multiple types of intimate partner violence on maternal criminal justice involvement. *Journal of Interpersonal Violence*, *00*(0), 1–24. https://doi.org/10.1177/0886260518820705

Gupta, J., Falb, K. L., Lehmann, H., Kpebo, D., Xuan, Z., Hossain, M., Zimmerman, C., Watts, C., & Annan, J. (2013). Gender norms and economic empowerment intervention to reduce intimate partner violence against women in rural Côte d'Ivoire: A randomized controlled pilot study. *BMC International Health and Human Rights*, *13*(46), 1–12.

Hahn, S. A., & Postmus, J. L. (2015). Economic empowerment of impoverished IPV survivors: A review of best practice literature and implications for policy. *Trauma, Violence and Abuse*, *15*(2), 79–93. https://doi.org/10.1177/1524838013511541

Hetling, A., Stylianou, A. M., & Postmus, J. L. (2015). Measuring financial strain in the lives of survivors of intimate partner violence. *Journal of Interpersonal Violence*, *30*(6), 1045–1064. https://doi.org/10.1177/0886260514539758

Hoge, G. L., Stylianou, A. M., Hetling, A., & Postmus, J. L. (2017). Developing and validating the scale

of economic self-efficacy. *Journal of Interpersonal Violence*, *0*(0), 1–23. https://doi.org/10.1177/0886260517706761

Huang, C.-C., Postmus, J. L., Vikse, J. H., & Wang, L. (2013). Economic abuse, physical violence, and union formation. *Children and Youth Services Review*, *35*(5), 780–786. https://doi.org/10.1016/j.childyouth.2013.01.020

Jewkes, R., Fulu, E., Naved, R. T., Chirwa, E., Garcia-Moreno, C., Dunkle, K., & Haardorfer, R. (2017). Women's and men's reports of past-year prevalence of intimate partner violence and rape and women's risk factors for intimate partner violence: A multicountry cross-sectional study in Asia and the Pacific. *PLoS MEDICINE*, *14*(9), 1–20.

Jiwatram-Negrón, T., Hunt, T., Nikitin, D., Rychkova, O., Ermolaeva, I., Sharonova, N., Mukambetov, A., & Gilbert, L. (2018). An exploratory study of economic abuse among substance-involved women in Kyrgyzstan, Central Asia. *Journal of Substance Use*, *23*(4), 358–365. https://doi.org/10.1080/14659891.2017.1421272

Jury, A., Thorburn, N., & Weatherall, R. (2017). "What's his is his and what's mine is his": Financial power and the economic abuse of women in Aotearoa. *Aotearoa New Zealand and Social Work*, *29*(2), 69–82.

Kapiga, S., Harvey, S., Muhammad, A. K., Stöckl, H., Mshana, G., Hashim, R., Hansen, C., Lees, S., & Watts, C. (2017). Prevalence of intimate partner violence and abuse and associated factors among women enrolled into a cluster randomised trial in northwestern Tanzania. *BMC Public Health*, *17*(190), 1–11. https://doi.org/10.1186/s12889-017-4119-9

Klugman, J. (2017). *Gender based violence and the law*. https://pubdocs.worldbank.org/en/232551485539744935/WDR17-BP-Gender-based-violence-and-the-law.pdf

Krause, K. H., Gordon-Roberts, R., VanderEnde, K., Schuler, S. R., & Yount, K. M. (2016). Why do

women justify violence against wives more often than do men in Vietnam? *Journal of Interpersonal Violence*, *31*(19), 3150–3173. https://doi.org/10.1177/0886260515584343.Why

Krigel, K., & Benjamin, O. (2019). Between patriarchal constraints and neoliberal values: Dimensions of job quality for intimate partner violence survivors. *Current Sociology*, *00*(0), 1–18. https://doi.org/10.1177/0011392119879478

Krigel, K., & Benjamin, O. (2020). From physical violence to intensified economic abuse: Transitions between the types of IPV over survivors' life courses. *Violence Against Women*, *00*(0), 1–21. https://doi.org/10.1177/1077801220940397

Kutin, J., Russell, R., & Reid, M. (2017). Economic abuse between intimate partners in Australia: Prevalence, health status, disability and financial stress. *Australian and New Zealand Journal of Public Health*, *41*(3), 269–274. https://doi.org/10.1111/1753-6405.12651

Lehmann, P., Simmons, C. A., & Pillai, V. K. (2012). The validation of the checklist of controlling behaviors (CCB): Assessing coercive control in abusive relationships. *Violence Against Women*, *18*(8), 913–933. https://doi.org/10.1177/1077801212456522

Mahoney, J. (2011). Types of abuse. *Nurs Clin N Am*, *46*(4), 385–390. https://doi.org/10.1016/j.cnur.2011.08.005

Matjasko, J. L., Niolon, P. H., & Valle, L. A. (2013). The role of economic factors and economic support in preventing and escaping from intimate partner violence. *Journal of Policy Analysis and Management*, *32*(1), 122–128. https://doi.org/10.1002/pam.21666.THE

Natalier, K. (2018). State facilitated economic abuse: A structural analysis of men deliberately withholding child support. *Feminist Legal Studies*, 1–20. https://doi.org/10.1007/s10691-018-9376-1

Nwabunike, C., & Tenkorang, E. Y. (2015). Domestic and marital violence among three ethnic groups in Nigeria. *Journal of Interpersonal Violence*, 1–26. https://doi.org/10.1177/0886260515596147

Onoh, R., Umeora, O., Ezeonu, P., Onyebuchi, A., Lawani, O., & Agwu, U. (2013). Prevalence, pattern

and consequences of intimate partner violence during pregnancy at Abakaliki Southeast Nigeria. *Annals of Medical and Health Sciences Research*, *3*(4), 484–491. https://doi.org/10.4103/2141-9248.122048

Onyemelukwe, C. (2018). How well does the law protect women at home? An analysis of Nigeria's domestic violence legislation. *International Journal of Law and Management*, *60*(2), 186–209. https://doi.org/10.1108/IJLMA-05-2017-0111

Peled, E., & Krigel, K. (2016). The path to economic independence among survivors of intimate partner violence: A critical review of the literature and courses for action. *Aggression and Violent Behavior*, 1–9. https://doi.org/10.1016/j.avb.2016.08.005

Pollet, S. L. (2011). Economic abuse: The unseen side of domestic violence. *New York State Bar Association Journal*, *83*, 40–44.

Postmus, J. L., Hoge, G. L., Breckenridge, J., Sharp-Jeffs, N., & Chung, D. (2018). Economic abuse as an invisible form of domestic violence: A multicountry review. *Trauma Violence and Abuse*, *20*(10), 1–23. https://doi.org/10.1177/1524838018764160

Postmus, J. L., Huang, C., & Mathisen-Stylianou, A. (2012). The impact of physical and economic abuse on maternal mental health and parenting. *Children and Youth Services Review*, *34*(9), 1922–1928. https://doi.org/10.1016/j.childyouth.2012.06.005

Postmus, J. L., Plummer, S., Mcmahon, S., & Murshid, N. S. (2012). Understanding economic abuse in the lives of survivors. *Journal of Interpersonal Violence*, *27*(10), 411–430. https://doi.org/10.1177/0886260511421669

Postmus, J. L., Plummer, S., & Stylianou, A. M. (2016). Measuring economic abuse in the lives of survivors: Revising the scale of economic abuse. *Violence Against Women*, *22*(6), 692–703. https://doi.org/10.1177/1077801215610012

Raj, A., Silverman, J., Klugman, J., Saggurti, N., Balaiah, D., & Shakya, H. (2018). Longitudinal analysis

of the impact of economic empowerment on risk for intimate partner violence among married women in rural Maharashtra, India. *Social Science & Medicine*, *196*, 197–203. https://doi.org/10.1016/j.socscimed.2017.11.042.Longitudinal

Ranganathan, M., Knight, L., Abramsky, T., Muvhango, L., Ngwato, T. P., Mbobelatsi, M., Ferrari, G., Watts, C., & Stöckl, H. (2019). Associations between women's economic and social empowerment and intimate partner violence: Findings from a Microfinance Plus program in rural North West Province, South Africa. *Journal of Interpersonal Violence*, *00*(0), 1–29. https://doi.org/10.1177/0886260519836952

Rettig, E. M., Fick, S. E., & Hijmans, R. J. (2020). The Female Empowerment Index (FEMI): Spatial and temporal variation in women's empowerment in Nigeria. *Heliyon*, *6*, 1–9. https://doi.org/10.1016/j.heliyon.2020.e03829

Rivas, C., Vigurs, C., Cameron, J., & Yeo, L. (2019). A realist review of which advocacy interventions work for which abused women under what circumstances. *Cochrane Database of Systematic Reviews*, *6*(CD013135), 1–283. https://doi.org/10.1002/14651858.CD013135.pub2.www.cochranelibrary.com

Royal, K., & Wilson-Garwood, R. (2022). *Economic abuse: A global perspective*.

Sanders, C. K. (2015). Economic abuse in the lives of women abused by an intimate partner: A qualitative study. *Violence Against Women*, *21*(1), 3–29. https://doi.org/10.1177/1077801214564167

Sang, P., & Sang, L. (2014). Economic abuse prevalence in Kabisaga sub-location, Nandi County, Kenya. *International Researchers*, *3*(3), 141–151.

Sauber, E. W., & O'Brien, K. M. (2017). Multiple losses: The psychological and economic well-being of survivors of intimate partner violence. *Journal of Interpersonal Violence*, *0*(0), 1–25. https://doi.org/10.1177/0886260517706760

Schwab-Reese, L. M., Peek-Asa, C., & Parker, E. (2016). Associations of financial stressors and physical intimate partner violence perpetration. *Injury Epidemiology*, *3*(1). https://doi.org/10.1186/s40621-

016-0069-4

Sedziafa, A. P., Tenkorang, E. Y., Owusu, A. Y., & Sano, Y. (2017). Women's experiences of intimate partner economic abuse in the Eastern Region of Ghana. *Journal of Family Issues*, *38*(18), 2620–2641. https://doi.org/10.1177/0192513X16686137

Semahegn, A., Torpey, K., Manu, A., Assefa, N., Tesfaye, G., & Ankomah, A. (2019). Are interventions focused on gender-norms effective in preventing domestic violence against women in low and lower-middle income countries? A systematic review and meta-analysis. *BMC Reproductive Health*, *16*(93), 1–31. https://doi.org/10.1186/s12978-019-0726-5

Sharp-Jeffs, N. (2015a). *A review of research and policy on financial abuse within intimate partner relationships*. http://repository.londonmet.ac.uk/1482/1/Review-of-Research-and-Policy-on-Financial-Abuse.pdf

Sharp-Jeffs, N. (2015b). *Money matters. Research into the extent and nature of financial abuse within intimate relationships in the UK*. http://www.refuge.org.uk/files/Money-Matters.pdf

Shepard, M. F., & Campbell, J. A. (1992). The Abusive Behavior Inventory: A measure of psychological and physical abuse. *Journal of Interpersonal Violence*, *7*(3), 291–305.

Shorey, R. C., Tirone, V., & Stuart, G. L. (2014). Coordinated community response components for victims of intimate partner violence: A review of the literature. *Aggression and Violent Behavior*, *19*(4), 363–371. https://doi.org/10.1016/j.avb.2014.06.001.Coordinated

Stern, E., Gibbs, A., Willan, S., Dunkle, K., & Jewkes, R. (2019). 'When you talk to someone in a bad way or always put her under pressure, it is actually worse than beating her': Conceptions and experiences of emotional intimate partner violence in Rwanda and South Africa. *PLoS ONE*, *14*(11), 1–19. https://doi.org/10.1371/journal.pone.0225121

Stylianou, A. M. (2018a). Economic abuse experiences and depressive symptoms among victims of intimate partner violence. *Journal of Family Violence*, *33*, 381–392.

Stylianou, A. M. (2018b). Economic abuse within intimate partner violence: A review of the literature. *Violence and Victims*, *33*(1), 3–22.

Stylianou, A. M., Counselman-Carpenter, E., & Redcay, A. (2019). Developing a financial literacy program with survivors of intimate partner violence: The voices of survivors. *Social Work*, 1–10. https://doi.org/10.1093/sw/swz033

Stylianou, A. M., Postmus, J. L., & Mcmahon, S. (2013). Measuring abusive behaviors: Is economic abuse a unique form of abuse? *Journal of Interpersonal Violence*, *28*(16), 3186–3204. https://doi.org/10.1177/0886260513496904

Sullivan, C., Parisian, J., & Davidson, W. (1999). Index of psychological abuse: development of a measure. *Journal of Consulting and Clinical Psychology*, *67*(1), 43–53.

Tanimu, T. S., Yohanna, S., & Omeiza, S. Y. (2016). The pattern and correlates of intimate partner violence among women in Kano, Nigeria. *African Journal of Primary Health Care & Family Medicine*, *8*(1), 1–6.

Tella, A. O., Tobin-West, C. I., & Babatunde, S. (2017). Pattern, consequences and medical cost of domestic violence among pregnant women in rural and urban areas of Rivers State, Nigeria. *The Nigerian Journal of Public Health*, *2*(2), 151–161.

Tenkorang, E. Y., & Owusu, A. Y. (2018). Does economic abuse affect the health outcomes of women in Ghana? *Health Education and Behavior*, *00*(0), 1–9. https://doi.org/10.1177/1090198118806970

Toews, M. L., & Bermea, A. M. (2015). "I was naive in thinking, 'I divorced this man, he is out of my life'": A qualitative exploration of post-separation power and control tactics experienced by women. *Journal of Interpersonal Violence*, 1–24. https://doi.org/10.1177/0886260515591278

Tolman, R. . (1989). The development of a measure of psychological maltreatment of women by their male partners. *Violence and Victims*, *4*(3), 157–177.

Usta, J., Makarem, N. N., & Habib, R. R. (2013). Economic abuse in Lebanon: Experiences and

perceptions. *Violence Against Women*, *19*(3), 356–375. https://doi.org/10.1177/1077801213486313

Vaillant, J., Koussoubé, E., Roth, D., Pierotti, R., Hossain, M., & Falb, K. L. (2020). Engaging men to transform inequitable gender attitudes and prevent intimate partner violence: A cluster randomised controlled trial in North and South Kivu, Democratic Republic of Congo. *BMJ Global Health*, *5*(5), 1–14. https://doi.org/10.1136/bmjgh-2019-002223

Valandra, K. C. (2017). A multi-systems life course perspective of economic abuse. *Advances in Social Work*, *18*(1), 80–102. https://doi.org/10.18060/21288

Valenetine, K., & Breckenridge, J. (2016). Responses to family and domestic violence: supporting women? *Griffith Law Review*, *25*(1), 30–44. https://doi.org/10.1080/10383441.2016.1204684

Vasiliauskaitė, Z., & Geffner, R. (2020). Reasons that keep women from disclosing intimate partner violence. *Social Work*, *18*(2), 65–80. https://doi.org/10.13165/SD-20-18-2-05

Voth Schrag, R. J. (2019). Experiences of economic abuse in the community: Listening to survivor voices. *Journal of Women and Social Work*, *34*(3), 313–324. https://doi.org/10.1177/0886109919851142

Voth Schrag, R. J., & Ravi, K. (2020). Measurement of economic abuse among women not seeking social or support services and dwelling in the community. *Violence and Victims*, *35*(1), 1–28.

Voth Schrag, R. J., Ravi, K., & Robinson, S. R. (2020). The role of social support in the link between economic abuse and economic hardship. *Journal of Family Violence*, *35*(1), 85–93. https://doi.org/10.1007/s10896-018-0019-8

Voth Schrag, R. J., Robinson, S. R., & Ravi, K. (2019). Understanding pathways within intimate partner violence: Economic abuse, economic hardship, and mental health. *Journal of Aggression, Maltreatment & Trauma*, *28*(2), 222–242. https://doi.org/10.1080/10926771.2018.1546247

Warren, A., Marchant, T., Schulze, D., & Chung, D. (2019). From economic abuse to economic empowerment: Piloting a financial literacy curriculum with women who have experienced domestic and family violence. *Journal of Women and Social Work*, 1–20.

https://doi.org/10.1177/0886109919868828

Weaver, T., Sanders, C., Campbell, C., & Schnabel, M. (2009). Development and preliminary psychometric evaluation of the domestic violence--related financial issues scale (DV-FI). *Journal of Interpersonal Violence*, *24*(4), 569–585.

World Health Organization. (2020). *Sustainable Development Goals (SDGs)*. Fact Sheets. https://www.who.int/health-topics/sustainable-development-goals

Yau, J. H., Wong, J. Y., Choi, E. P.-H., & Fong, D. Y. (2019). Transcultural validation of the scale of economic abuse (SEA) in Chinese population. *Violence and Victims*, *34*(5), 804–817. https://doi.org/10.1891/0886-6708.VV-D-17-00164

Yount, K. M., Cheong, Y. F., Miedema, S., & Naved, R. T. (2021). Development and Validation of the Economic Coercion Scale 36 (ECS-36) in Rural. *Journal of Interpersonal Violence*, *36*, 1–32. https://doi.org/10.1177/0886260520987812

Yount, K. M., & Krause, K. H. (2016). Economic coercion and partner violence against wives in Vietnam: A unified framework? *Journal of Interpersonal Violence*, *31*(20), 3307–3331. https://doi.org/10.1177/0886260515584350

Zamorski, M. A., & Wiens-Kinkaid, M. E. (2013). Cross-sectional prevalence survey of intimate partner violence perpetration and victimization in Canadian military personnel. *BMC Public Health*, *13*(1019), 1–18.

Sex Determination by Discriminant Function Analysis of Femur of Nigerians

Clinton David Orupabo[1,2], Loveday Ese Oghenemavwe[1], Blessing Didia[1]

[1] Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt.

[2] Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University.

ABSTRACT

Thorough analysis of skeletal bones has progressed with time from superficial observations to histomorphometry enabling more accurate and precise information to help in the identification of victims. This study is aimed at developing a model for sex estimation from histomorphometric parameters using discriminant function analysis (DFA). The mid shaft of the right femur of 105 individuals (78 males and 27 females), within the age range of 21 and 60 years was utilized for this study. Skeletal remains were obtained from cadaveric specimens from the Anatomy Department of University of Port Harcourt. Ground sections of the bone specimen were done using modified Frost's manual method of bone preparation. Our results show secondary osteons (Os-S) to be higher in the males while Fragmented osteons (Os-F) were higher in the females. The femur bone shows fitness for DFA at a canonical correlation of 0.631. **Across** validation showed that 78% of the cases **were** correctly classified as males and 85.3% as females. A sex estimation model was therefore developed **with a discriminant score equal** or close to – 0.520 indicating males and scores equals or close to 1.253 indicating female. We could therefore determine **the sex** of Nigerians using the model established by this study, which **could assist in cases requiring forensic diagnosis**.

Keywords: Sex determination, Femur, Discriminant function analysis

INTRODUCTION

An important and thorough analysis of skeletal bones has progressed with time from superficial observations to histomorphometry with the goal of producing more precise and highly satisfying answers for both the field investigators and those who are waiting for the outcome of the forensic expert. There is however **not much** studies done to find a more accurate and reliable approach in forensic case investigation when it pertains to **the determination of sex and age in humans.** These inquiries cover numerous headings including macroscopic analysis (Brooks, 1955, Redfield, 1970, Lovejoy et al., 1985, Krogman et al.,1987, Stout el al., 1994, Smith, 1991, John, 1998, Loth et al., 2000, Scheuer et al., 2000, Oettle et al., 2000, Scheuer, 2002, Buckberry et al., 2002, Yuriko et al., 2005), **and microscopic (Sobol et al., 2014, Ubelaker et al., 2019, Kerley, 1965, Kerley, 1968, Uytterschaut, 1985, Ericksen, 1991, Jane, 1997, Maat et al.,**

2003, Crowder, 2013, Nor et al., 2013, Meltem et al., 2014, Abdullah et al., 2018, Orupabo et al., 2020, Oghenemavwe et al., 2022).

Several researchers have promoted a combined approach combining the histology, macroscopy, and radiography as well, based on years of actual field experience and using a multifactorial technique to produce reliable results and a short list of differentials (Thomas et al., 2000, de Boer et al., 2003, Steyn et al., 2004, Godde et al., 2012). The procedure to be adopted, therefore depends entirely on the tools that are accessible and the available bony remains at the crime scene. So, where the remains have been altered by natural and human forces, histology may be the necessary method. Of course, this is the standard approach where the accused tries to mutilate the victims' anatomical structures in order to conceal the evidence. Nonetheless, it has been reported that the histological nature of bones may endure the test of time even when subjected to human and physical alteration; whether temperature-related or following exposure to burning (Bradtmiller et al., 1984). This is a breakthrough indeed for forensic studies with the push back on previously existing limitations with macroscopy and unwarranted bone distortions. The aim of this study **was** therefore to determine sex from histomorphometric features of the femur using discriminant function analysis. Some researchers have **reported** the microscopic findings for various populations (Ericksen, 1991; Ingraham 2004; Crowder, 2013; Abdullah et al., 2018) and including South African populations (Steyn et al., 2004 & Keough, 2007).

In his earlier studies, Kerley (1965) did not report any significant outcome between sex and histomorphometric traits. Likewise, John (1998) agreed in his book on forensics that structure appears more accurate with estimation of sex, adding that sex identification would have been challenging with a missing pelvis or skull. Ericksen, 1991 developed sex specific equations for age. He wrote that **variations** among the sexes was only significant in two parts of the bone microanatomy, which is the count of secondary osteons and osteonal fragments. Abdullah et al., (2018a) showed that intact osteonal count was higher in males (9.74 ± 0.39) than females (6.73 ± 0.31) while fragmented osteons were higher in females (4.68 ± 0.27) than males (2.59 ± 0.14). Also, Oghenemavwe et al., 2022 documented in their findings that the mean value of matured secondary osteons was greatly different in males and females. Moreover stepwise

discriminant function analysis showed that the secondary osteons could be used to estimate sex with 71.4% of the samples correctly predicted for sex.

STATEMENT OF THE PROBLEM

It is an important fact that most African countries and including Nigeria are grossly lagging behind as it pertains investigating and solving criminal cases for cases of questionable deaths and identification of missing victims from remains (Adiele, 2013). This is however due to lack of forensic data base which has stalled the investigation of cases and left the judiciary with the nearest available means, hence resulting in poor case diagnosis.

MATERIALS AND METHODS

The cadaveric samples included bones from the right femur of 105 individuals (78 males and 27 females), within the age range of 21 and 60 years. Bone specimen of 2-3 slides were harvested out of the mid shaft of the right femur with the use of a hacksaw-blade and the cadaver placed in supine position. The mid-shaft is anatomically defined as the point on the long shaft of the bone, mid-way between the proximal and distal ends. Cut transverse sections were made to sizes at about 0.5mm to 1.0cm thick. These were cut within 5 to 15 degrees positioned at right angles with the longitudinal axis of the long bone. Ground sections of the bone specimen were done using modified Frost's manual method of bone preparation (Frost 1958, Maat, 2001, George et al., 2001, Keough 2007 & Orupabo et al., 2020). Viewing and analysis was carried out under a photomicroscope with the help of Leica ICC 50E photomachine to view and demonstrate the histological features. A study of photo-images of four fields at 12 º clock, 3 º clock, 6 º clock and 9 º clock were taken as adjudged by two researchers. The features of interest include the primary osteons, secondary osteons, osteon fragments, non Haversian canals, total osteon population, Haversian canal area and diameter. An Image J software was utilized to analyze the features. Data obtained here were further analyzed using SPSS version 25 and Microsoft Excel.

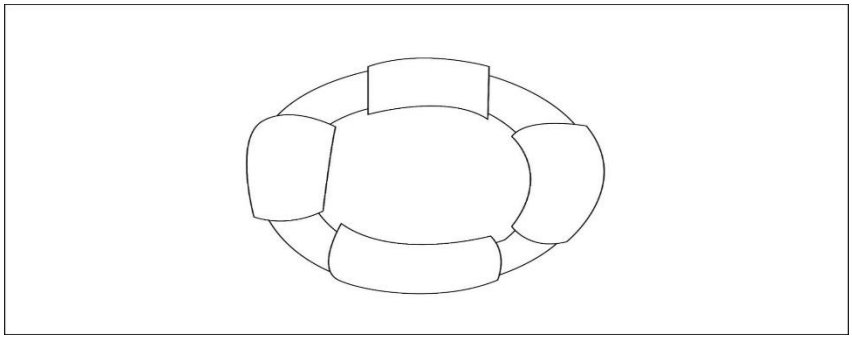


Fig.1. Diagram showing osteons view in a cross section of a long bone

Figure 1 shows the various views under the microscope where the osteons were examined and counted. A=Anterior or 12 ^{0} clock, P=Posterior or 6 ^{0} clock, Lateral=Lateral or 9 ^{0} clock, M=Medial or 3 ^{0} clock.

Ethical Approval

The research clearance and approval was sought from the University of Port Harcourt Research Ethics committee and was granted with the ethical number UPH/CEREMAD/REC/MM83/012.

RESULTS

Table 1. Descriptive Statistics for Histomorphometric Parameters of the Femur

Parameters		Mean	SEM	SD	Var	MaxV	MinV
Age	M	32.04	1.48	10.81	116.81	21.00	60.00
	F	33.60	3.59	11.35	128.71	25.00	50.00
Os-P	M	6.40	0.74	6.51	42.37	0.00	36.00
	F	7.22	0.89	4.61	21.26	0.00	22.00
Os-S	M	19.74	0.91	8.01	64.22	0.00	46.00
	F	11.52	1.36	7.05	49.72	2.00	26.00

Os-F	M	9.83	0.70	6.18	38.24	0.00	25.00
	F	16.78	1.38	7.18	51.56	6.00	36.00
Nhc	M	0.72	0.24	2.09	4.39	0.00	14.00
	F	1.74	0.54	2.82	7.97	0.00	11.00
HCD	M	19.67	0.61	5.38	28.98	0.00	38.74
	F	19.11	0.78	4.08	16.62	11.67	28.13
HCA	M	236.65	9.56	84.42	7126.45	0.00	503.20
	F	227.68	14.73	76.56	5861.27	103.91	416.11

Note: All units are given in micrometer

Os-P- primary osteons, Os-S- secondary osteons, Os-F- osteonal fragments, Nhc- non haversian canal, HCD-haversian canal diameter, HCA-haversian canal area, SD-standard deviation, SEM-standard error of mean, Var.-variance, M-male, F-female

Table 2. Eigenvalues Test for Fitness of Data for Discriminant Function Analysis for Femur Bone

Test of Function(s)	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0. 663[a]	100.0	100.0	0.631

Inference: Canonical correlation is fit for sex discriminant function. The value 0.631 is a strong correlation.

Table 3. Wilks' Lamda Test for Fitness of Data for Discriminant Function Analysis for Femur Bone

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1	0.601	56.767	6	0.000

Inference: Measured histomorphometric parameters are good for discriminant Function test

Table 4. Group Classification

		SEX	**Predicted Group Membership**		**Total**
			Male	Female	
Original	Count	,Male	64	18	82
		Female	5	29	34
	%	Male	78.0	22.0	100.0
		Female	14.7	85.3	100.0

a.80.2% original categorized cases accurately classified

Table 5. Group Centroid

SEX	**Function**
	1
Male	-0.520

Female	1.253

Unstandardized canonical discriminant functions evaluated at group means

Inference: Discriminant score of or close to - 0.520 indicate males while scores of or close to 1.253 indicate females.

Table 6. Unstandardized Classification Function Coefficient for Formulation of Sex Estimation Model

Parameter	Function
	1
Os-P	0.069
Os-S	-0.076
Os-F	0.131
Nhc	0.126
HCD	0.026
HCA	0.000
(Constant)	-1.364

PREDICTIVE MODEL FOR SEX ESTIMATION FROM HISTOMORPHOMETRY OF FEMUR BONE

Discriminant Function Score (DF) Model = -1.364 + 0.069(Os-P) _ 0.076(Os-S) + 0.131(Os-F) + 0.126(Nhc) + 0.026(HCD) + 0.000(HCA)

DISCUSSION

Our study investigated the histomorphometric features of both male and female femur bones. These parameters were utilized to the formulation of a sex estimation model using discriminant function analysis. Table 1 shows the data on the cadaveric femurs for both males and females at a mean age of 32.04 and 33.60 respectively. Secondary osteons (Os-S) are higher in the males while Fragmented osteons (Os-F) are higher

in the females. Earlier studies by Oghenemavwe et al., 2021 had consented to the present findings. Also Orupabo et al., (2020) and Keough, (2007) reported that osteonal fragments are higher in the female with a strong positive correlation at r= 0.82 and 0.55 respectively. Crowder, (2013) stated that matters pertaining to age are best expressed in osteonal fragments, most especially in females. Abdullah et al., (2018) documented that osteonal fragments were greater in females (4.68 ± 0.27) than the males (2.59 ± 0.14). Ericksen, (1991) also affirmed that osteonal fragments increased in the fifth decade of female life compared to other osteons. In fact, Ericksen did not exclude disease conditions in his selection of persons for his work because he reasoned that forensic analysis of individuals is for unknown persons, whose health status may be unknown pre-mortem. Mulhem, (1997) study on medieval Nubian population investigated the femurs and wrote that osteon fragments were higher in the females (4.68/mm2) than the males (2.59/mm2).

The HCD and HCA are higher in the males compared to the females. The male femurs have an HCD and HCA of 19.67 & 236.65 respectively while the females have 19.11 & 227.68 respectively (Tables 1). Abdullah et al., (2018) who worked on a Malaysian population reported slightly higher HCA values in males than the females just like the present study. Some other authors who had worked on European and American populations differed from ours and stated that the HCD and HCA were higher in the female population compared to the males (Thompson, 1980 & 1981).

A further analysis to check whether our data from the femur can be used for Discriminant function analysis (DFA) for sex determination, employed Eigenvalue and Wilk's lambda equation (Table 2 & 3). The femur bone shows fitness for DFA at a canonical correlation of 0.631. Wilk's lambda test was statistically significant, hence measured values are good for DFA (Table 3). An attempt at group classification, shows that 80.2% of original cases of subjects utilized for the study are correctly classified for sex using the histomorphometric parameters of the femur (4). Also a cross validation shows that 78% of the cases are correctly classified as males and 85.3% as females. A sex estimation model was therefore developed with any discriminant score equals or close to – 0.520 **indicating** males and scores equals or close to 1.253 indicating female (Tables 5 & 6). In Oghenemavwe et al., 2022 study the mean value of matured secondary

osteons was greatly different in males and females. Moreover stepwise discriminant function analysis showed that the secondary osteons could be used to estimate sex **as** 71.4% of the samples correctly predicted for sex. In a similar though contrasting study done on gross parameters of the bone, clavicle length and horizontal diameter were investigated by Khan et al., 2020, on skeletal remains of a South-East Asian group and 85% of the study participants could be correctly identified as male or female using the humeral head. There are few studies that have explored the use of discriminant function analysis to determine sex from histomorphometric parameters of long bones. Hence there is need for further studies in this regard.

CONCLUSION

Sex determination is a crucial aspect of forensic case diagnosis and several studies have tried to proffer much better and accurate techniques. Our study has developed a sex estimation model from discriminant function analysis from histomorphometric features of femur bones. Such findings have shown the relevance of microscopic features when gross features are severely distorted, and thus with our model equation, sex of unknown victims can be accurately determined.

REFERENCES

Abdullah, H, Jamil, M.M.A, Ambar, R, Nor, F.M. (2018b). Bone histology: A key for human sex determination after death. Journal of Physics conference series. 1019:012010.

Abdullah, H, Jamil, M.M.A, Nor, F.M. (2018a). Histomorphometric variance of Haversian canal in cortical bone of Malaysian ethnic group. Journal of Physics conference series. 1019 (1): 012009.

Adiele, F.D. (2013). Serious crime in Nigeria: An empirical analysis using Time Series Data (between 2000 - 2010). Global Journal of Mathematical Sciences. Vol.12: 25-29.

Bradtmiller, B, Buikstra, J. (1984). Effects of burning on human bone microstructure: A preliminary study. Journal of Forensic sciences. Vol. 29 (2): 535-540.

Brooks, S.T. (1955). Skeletal age at death: the reliability of cranial and pubic age indicators. Am J Phys Anthropol. 13:567–597.

Buckberry, J.L, Chamberlain, A.T. (2002). Age estimation from the auricular surface of the ilium: A revised method. American Journal of Physical Anthropology. 119:231-239.

Crowder, C. (2013). Estimation of Age at Death Using Cortical Bone Histomorphometry. Submitted to the U.S. Department of Justice Office of Justice Programs, National Institute of Justice, Award no.240692 2010-DN-BX- K035.

De Boer, H.H, Maat, G.J.R. (2003). The histology of human dry bone: A review. Barge's Anthropologica CPAG22, 49 – 65.

Ericksen, M.F. (1991). Histologic estimation of age at death using the anterior cortex of the femur. American Journal of Physical Anthropology, 84:171-179.

Frost, H.M. (1958). Preparation of thin undecalcified bone sections by rapid manual method. Stain Technology, 33: 271–276.

George, J.R.M, Robert, P.M.V & MJ (JOB), A. (2001). Manual preparation of ground sections for the microscopy of natural bone tissue: Update and Modification of Frost's'Rapid Manual Method'. International Journal of Osteoarchaeology. 11: 366–374.

Godde, K, Hens, S.M. (2012). Age-at-death estimation in an Italian historical sample: a test of the Suchey Brooks and transition analysis methods. Am J PhysAnthropol.149:259–265.

Ingraham, M.R. (2004). Histological age estimation of the midshaft clavicle using a new digital technique. M.Sc Thesis (Biology), University of North Texas.

Jane, L.R. (1997). An investigation of bone histology as a potential age indicator in Roe Deer. PhD Thesis, Institute of Archaelogy, University College London

John, K.L. (1998). Forensic anthropology: What bones can tell us. Laboratory Medicine, Vol.29. no.7. Journal of Physical Anthropology, 23:149-164.

Keough, N. (2007). Estimation of age at death from the microscopic structure of the femur. MSc Thesis submitted to the School of Medicine, Faculty of Health Sciences, University of Pretoria, South Africa.

Kerley, E. R. (1965). The microscopic determination of age in human bone. American Journal of Physical Anthropology. 23:149-164.

Kerley, E. R. (1968). Age determination of bone fragments. J Forensic Sci. 14(1):59-67

Khan, M.A, Gul, H, Nizami, S.M. (2020). Determination of Gender from Various Measurements of the Humerus. Cureus. 12(1): e6598. doi: 10.7759/cureus.6598.

Krogman, W.M, İsçan, M.Y. (1987). The Human Skeleton in Forensic Medicine. American Journal of Physical Anthropology. 74 (1):136 – 137.

Loth, S.R, İsçan, M.Y. (2000). Morphological age estimation. In: Siegal, J, Saukko, P, Knupfer, G (Eds). Encyclopedia of Forensic Science. Academic. 242-252.

Lovejoy, C.O, Meindl, R.S, Mensforth, R.P. (1985b). Multifactorial determination of skeletal age at death: A method and blind tests of its accuracy. Am J Phys Anthropol. 68:1–14.

Maat, G. J. R, Aarents, M. J, Nagelkerke, N. J. D. (2003). Age prediction from bone replacement: Remodeling of circumferential lamellar bone tissue in the anterior cortex of the femoral shaft of the present Dutch population. Barge's Anthropologica Leiden, Leiden University Medical Centre. 10:1-19.

Maat, G.J.R, Robert, P.M.V & Aarents, M.J. (2001). Manual Preparation of Ground Sections for the Microscopy of Natural Bone Tissue: Update and Modification of Frost's Rapid Manual Method. *International Journal of Osteoarchaeology*, *11*: 366 – 374.

Meltem, K, Dincer, A. (2014). Age determination and long bone histology in Stellagama stellio (Linnaeus, 1758) (Squamata: Sauria:Agamidae) populations in Turkey, Senckenberg Gesellschaft fur Naturforschung, 64 (1): 113- 126.

Mulhern, D.M, Van Gerven, D.P. (1997). Patterns of femoral bone remodeling dynamics in a Medieval Nubian population. American Journal of Physical Anthropology, Vol. 104, pp. 133-46.

Nor, F.M, Pastor, R.F, Schutkowski, H. (2013). Age at death estimation from bone histology in Malaysian males. Medicine, Science and the Law. 0(0): 1-6.

Oettle, A.C, Steyn, M. (2000). Age estimation from the sternal ends of ribs by phase analysis in South African blacks. Journal of Forensic Sciences. 45(5):1071-1079.

Oghenemavwe, L.E, Orupabo, C.D. (2022). Sex Estimation from Histomorphometric Analysis of Cortical Bone: A Hospital-based Study. Arab Journal of Forensic Sciences and Forensic Medicine. Vol.4 Issue (1): 1-12

Orupabo, C.D, Oghenemavwe, L.E, Diamond, T.E. (2020). Histomorphometric estimation of age from bone samples of Nigerians. International Journal of Medicine and Medical Research. 6(2): 67-76.

Redfield, A. (1970). A new aid to ageing immature skeletons, development of the occipital bone. American Journal of Physical Anthropology. 33:207-220.

Scheuer, L, Black, S. (2000). Developmental Juvenile Osteology London: Academic Press. Pp. 11-50.

Scheuer, L. (2002). Application of osteology to forensic medicine. Clinical Anatomy. 15:297-312.

Smith, K. J. (1991). Standards of human tooth formation and dental age assessment. In Kelley, M. A, Larson, C. S. (Eds), Advances in Dental Anthropology, New York: Wile Liss. pp. 143-168.

Sobol, J, Ptaszyńska-Sarosiek, I, Charuta, A, Oklota-Horba, M, Żaba1, Cz, Niemcunowicz-Janica, A. (2015). Estimation of age at death: examination of variation in cortical bone histology within the human clavicle Folia Morphol, Vol. 74, No. 3, pp. 378–388.

Steyn, M, Loots, M, L'Abbe, E. N. (2004). Adult age estimation. Forensic Anthropology, Department of Anatomy, University of Pretoria.

Stout, S.D, Dietze, W.H, İsçan, M.Y, Loth, S.R. (1994). Estimation of age at death using the cortical histomorphometry of the sternal end of the fourth rib. Journal of Forensic Sciences. 39(3):778-784.

Thomas, C.D.L, Steyn, M.S, Feik, S.A, Wark, J.D, Clement, J.G. (2000). Determination of age at death using combined morphology and histology of the femur. Journal of Anatomy. 196, Pp 463 – 471.

Thompson, D.D. (1980). Age changes in bone mineralization, cortical thickness, and Haversian canal area. Calcified Tissue International, 31: 5 – 11

Thompson, D. D, Gunness-Hey, M. (1981). Bone mineral-osteon analysis of Yupik-Inupiaq, Skeletons. American Journal of Physical Anthropology, vol. 55, pp. 1-7.

Ubelekar, D. H, Khosrowshahi, H. (2019). Estimation of age in forensic anthropology: historical perspective and recent methodological advances, Forensic Sciences Research, 4:1, 1-9, DOI: 10.1080/20961790.2018.1549711

Uytterschaut, H.T. (1985). Determination of skeletal age by histological methods. Zeitschrift für Morphologie und Anthropologie, Bd. 75, H. 3, pp. 331-340.

Yuriko, I, Kagumi, U, Tetsuaki, W, Eisaku, K. (2005). New method for estimation of adult skeletal age at death from the morphology of the auricular surface of the ilium. American Journal of Physical Anthropology. 128(2):324-339.

QUANTIFYING TOTAL BODY DECOMPOSITION OF PIG (SUS SCROFA) REMAINS IN A PORT HARCOURT (CHOBA) REGION

Adheke, O. M., Didia, B. C.

Department of Anatomy, Faculty of Basic Medical Sciences, University of Port Harcourt, Choba, Nigeria.

Corresponding Author: Adheke, O.M **E-mail**: michael_adheke@uniport.edu.ng

Abstract

The total body score (TBS) is a quantitative parameter that was established for the purpose of scaling the extent of progressive decay of cadavers. Post-mortem interval (PMI) is a critical aspect of forensic taphonomy that is important in the analysis of human remains. The present study was carried out to quantify the total body decomposition of pig remains in a clandestine Port Harcourt (Choba) region. In this study, the period of total body decomposition of pigs lasted for 40 days during the dry season and for 15 days during the wet season. Four healthy pigs (*Sus scrofa domesticus*) weighing between 40 – 60 kg were used as non-human proxies for the study. This study used the amended method of Megyesi et al (2005) for pig models, which was developed by Keough et al. (2017). This was used to score decomposition based on the morphological appearance of three (3) body regions; head and neck, trunk, and limbs. The results of data analyses were expressed in the form of tables and figures. Pearson correlations test was used to evaluate the relationship between post-mortem interval (PMI) and total body score (TBS). There was a strong, positive correlation between PMI and TBS during the dry season ($r = 0.856$, $p = 0.000$) while during the rainy season, there was also a strong, positive correlation between PMI and TBS ($r = 0.952$, $p = 0.000$). In conclusion, the application of the Keough body scoring system in a Port Harcourt (Choba) region using pig models showed that there were significant seasonal differences in the level of pig decomposition.

Keywords: Total Body Score, Post Mortem Interval, Sus Scrofa.

Introduction

Upon death, the first phase of postmortem changes that are usually observed in the body is the algor mortis – whereby the body begins to lose heat to the environment and internal temperatures begin to drop (Marks et al., 2015; Kumar & Gorea, 2023). The purple-red discoloration of the soft tissues due to postmortem gravity-dependent pooling of blood is livor mortis. Livor mortis may be observed either externally in the skin and mucous membranes or internally in the abdominal or thoracic viscera, most notably the lung, and typically develops within 30 minutes to 2 hours after death in humans (DiMaio and DiMaio, 2001). Concurrent with cooling, body stiffening or rigor mortis will later develop as the muscles become depleted of adenosine triphosphate (ATP) and the muscle fibres permanently crosslink (Matarneh et al., 2023). The gradual process that follows upon the completion of the early postmortem changes in the deceased body is called decomposition (Marks et al., 2015; Marais-Werner et al., 2017).

In previous times, the assessment of human decomposition by forensic investigators was done from a qualitative approach such as observations of the notable signs of rigor mortis, and witness information (De-Giorgio et al., 2020). Because qualitative assessments relied on the observations and interpretations of forensic experts, different experts may have varying levels of experience and expertise, leading to subjectivity in post mortem assessments. Also, due to the fluctuating environmental factors that affect decomposition, it becomes difficult to establish precise timelines for decomposition stages based solely on qualitative assessments (Behrensmeyer et al., 2000; Meygesi et al., 2005; Bachmann & Simmons, 2010; Villet & Amendt, 2011; Marais-Werner et al., 2018; Pittner et al., 2020). This led to the development of several quantitative methods of scoring decomposition sequence, thereby improving the field of forensic anthropology.

The total body score (TBS) is a quantitative parameter that was established for the purpose of scaling the extent of progressive decay of cadavers (Galloway et al., 1989; Meygesi et al., 2005). The Galloway et al. (1989) classification of total body decomposition using human cadavers became the foundation for the development of total body scoring systems based on the observable changes as seen in the carcasses at different stages of decomposition. These stages of decomposition were classified into five namely, fresh, bloat, active decay, advanced decay, and skeletonization (Galloway et al., 1989). By expanding on the Galloway et al. (1989) classification using human cadavers, the total body score (TBS) technique was developed by Meygesi et al. (2005), to quantitatively predict the time of death by scoring morphological changes as a result of decomposition from selected body regions – head and neck, trunk and limbs (Tables 1-3). Since its inception, the use of the Meygesi et al (2005) method has been reported in countless taphonomic studies using animal carcasses for prediction of PMI. However, the use of TBS system is hugely dependent on environmental temperature (Meygesi et al., 2005; Marais-Werner et al., 2018).

After the extensive studies that have been done using pig models to study taphonomic events in line with the scoring methods of Galloway and Meygesi, Keough et al (2017) developed an amended method of scoring total body decomposition. Keough et al (2017) stated that the methods that were formulated by Galloway and Megyesi were majorly applicable to the taphonomic study of human subjects only. Megyesi et al. (2005) assessed 68 human bodies from various regions and developed a scoring system based on the degree of decomposition (adapted from Galloway et al., 1989). The body decomposition of deceased human subjects, as previously highlighted, has best been studied using preferably pig models as both species share a lot of anatomy of body structures even though few contrasting studies have shown that there are biochemical differences that have been noticed between both organisms while in the process of decomposition such as biological changes in bone chemistry and adipocere composition (Vass et al., 2008; Notter et al., 2009). The Keough body scoring system maintained the scoring patterns of the earlier method developed by Megyesi et al. (2005) as shown in tables 1, 2, and 3.

Table 1. Scores of body decomposition and their morphological changes as observed in the head and neck regions (Keough *et al*., 2017)

Decomposition steps	Morphological changes	Points
Fresh	No signs of discoloration, with a slight pink or red form of lividity	1
Early decomposition	Insect activity; a sharp pink or red form of lividity	2
	Dark-red discoloration with some flesh still relatively fresh; odema of ears; maggot colonization (mouth); initial bloating of neck and skin slippage	3
	Discoloration and/or brownish shades particularly at edges, drying of nose, ears, and lips; prominent bloating of neck; maggot colonization (mouth and eyes); purging of decompositional fluids (mouth)	4
	Purging of decompositional fluids (mouth, eyes, nose); brown discoloration; hair loss and skin slippage; drying of lips, nose and ears	5
	Black discoloration of flesh; extensive maggot colonization and migration	6
Advanced decomposition	Caving in of the flesh and tissues of eyes and throat.	7
	Moist decomposition with bone exposure less than one half that of the area being scored	8
	Mummification with bone exposure less than one half that of the area being scored	9
Skeletonization	Bone exposure of more than half of the area being scored with greasy substances and decomposed tissue	10
	Bone exposure of more than half of the area being scored with desiccated or mummified tissue	11
	Bones largely dry, but retaining some grease	12
	Dry bone	13

Table 2. Scores of body decomposition and their morphological changes as observed in the trunk region (Keough *et al*., 2017)

Decomposition steps	Morphological changes	Points
Fresh	No signs of discoloration, with a slight pink lividity	1
Early decomposition	Skin appears shiny/glossy with early bloating and may show purple-black discoloration over abdominal area	2
	Gray-purple to green discoloration: some flesh still relatively fresh; marbling of abdomen with maximum bloat	3
	Purple-black discoloration and purging of decompositional fluids; skin slippage with maggot-filled blisters present; hair loss	4
	Postbloating following release of the abdominal gases, with extensive skin slippage and drying out of blisters	5

Advanced decomposition	Decomposition of tissue producing sagging of flesh; caving in of the abdominal cavity	6
	Moist decomposition with bone exposure less than one half that of the area being scored	7
	Mummification with bone exposure less than one half that of the area being scored	8
Skeletonization	Bones with decomposed tissue, sometimes with body fluids and grease still present	9
	Bone exposure of more than half of the area being scored with dessicated or mummified tissue	10
	Bones largely dry, but retaining some grease	11
	Dry bone	12

Table 3. Scores of body decomposition and their morphological changes as observed in the limb region (Keough *et al*., 2017)

Decomposition steps	Morphological changes	Points
Fresh	No signs of discoloration, with a slight pink lividity and rigor present	1
Early decomposition	Pink-white appearance with bloating of proximal parts of limbs	2
	Gray to green discoloration: marbling and shiny appearance of skin; some flesh still relatively fresh; skin slippage and hair loss	3
	Discoloration and/or brownish shades particularly at edges, drying of skin (starting distal to proximal).	4
	Brown to black discoloration, skin having a leathery appearance	5
Advanced decomposition	Moist decomposition with bone exposure less than one half that of the area being scored	6
	Mummification with bone exposure less than one half that of the area being scored	7
Skeletonization	Bones exposure over one half of the area being scored, some decomposed tissue and body fluids remaining	8
	Bones largely dry, but retaining some grease	9
	Dry bone	10

Port Harcourt metropolis consisting of Port Harcourt Local Government Area and parts of Obio-Akpor and Eleme Local Government Areas is located within the Niger Delta region of Nigeria. As stated by Nkejiaka (2010) and Oghenemavwe et al. (2022), this particular region has been known for crimes associated with illegal oil theft, leading to several social vices such as kidnapping, local militia unrest, and manmade disasters such as oil explosion. In some discovered cases, deaths associated with some of these vices and disasters are usually poorly investigated or neglected by security agencies. A major cause for the poor investigation is the lack of tools for the estimation of postmortem interval (PMI). Post-mortem interval (PMI) is a critical aspect of forensic taphonomy that is important in the analysis of human remains. PMI is the time from the point of death of an organism to the point of detection and retrieval of that deceased

organism (Cockle and Bell, 2015). In line with several forensic studies, there is a relationship between the process of decomposition and PMI (Galloway et al., 1989; Shalaby et al., 2000; Vass et al., 2002). Also, some local law enforcement agencies, as well as medical examiners, and forensic anthropologists have encountered setbacks in the estimation of PMI due to paucity of quantitative models for predicting PMI derived from environmental factors in Nigeria. In view of this, this study aims at quantifying the total body decomposition of pig remains in a Port Harcourt region, Choba.

Materials and Methods

This study was an observational and descriptive design study that took place from December 2022 to April 2023 during the dry and rainy seasons. Four healthy pigs (*Sus scrofa domesticus*) weighing between 40 – 60 kg were used as non-human proxies for the study. They were obtained from the Livestock Unit, Research and Teaching Farm of the Faculty of Agriculture, University of Port Harcourt, and were confirmed to be healthy by a veterinary doctor. The pigs were euthanized with 105 ml of sodium pentobarbiturate which was administered intramuscularly. After about 3 – 5 minutes of administration, there were signs of convulsion showed by uncontrolled muscle spasms, and after a while, the animal became still. Pig death was confirmed upon observations of cessation of heartbeat and pulse. The exact date and time of death was then recorded. The pigs were taken to the study site for surface burial. The study was carried out in the Anthropological/Burial Farm of the Department of Anatomy Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt. Upon arrival at the burial site, four pigs were allocated a number to ensure proper observation. Two of the pigs were used for a period of dry season (between the months of December 2022 to February 2023) and another two pigs were used for a period of rainy season (for the month of April 2023). The sample size was considered due to stringent animal protection laws on animal rights in Nigeria.

The Keough et al. (2017) TBS system was used to score decomposition based on the morphological appearance of three (3) body regions; head and neck, trunk, and limbs. The stages of decomposition are first assessed qualitatively and then converted into quantitative scores from these three regions in the body. The allotted point value of each region was then added to determine the TBS which represents the overall stage of decomposition of each pig from a minimum of 3 to a maximum of 35 points.

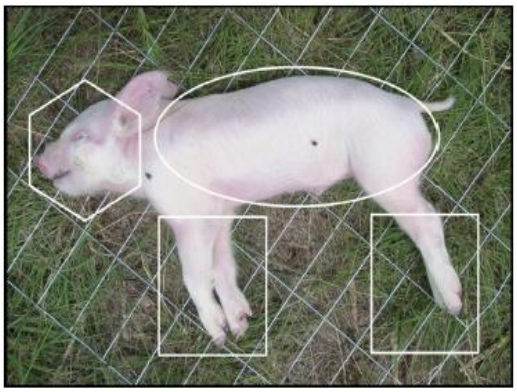


Figure 1: A pig carcass showing the body regions to be scored (represented in the form of shapes) to calculate TBS. (Adopted from Sutherland et al., 2013)

Figure 2: Stages of decomposition (A) Fresh stage (B) Bloat (early) stage (C) Active decay stage (D) Advanced decay stage

Data Analysis: Quantitative and qualitative data collected were analyzed using the Statistical Package for Social Sciences (SPSS) IBM version 25.0. The results of data analyses were expressed in the form of tables and figures. Both descriptive and inferential statistical tools were utilized for proper representation and understanding of results. Pearson correlations test was used to evaluate the relationship between post-mortem interval (PMI) and total body score (TBS). A statistical significance of less than 0.05 was accepted.

Result

As shown in table 4, the mean TBS at different postmortem intervals were obtained for the various stages of decomposition at both seasons. The period of total body decomposition of pigs lasted for 40 days during the dry season and for 15 days during the wet season.

During the dry season, the fresh decomposition stage which took place at day 1 postmortem had a mean TBS of 3. Meanwhile, the phase of fresh decomposition during the wet season also occurred at day 1 postmortem with a mean TBS of 3.

During the dry season, the early decomposition stage took place from day 2 to day 6 postmortem having a mean TBS of 15.5, while that of the wet season also occurred from day 2 to day 5 postmortem with a mean TBS of 16.

However, the advanced stage of decomposition of pigs during the dry season study period lasted longer for 8 days at a mean TBS of 24 in comparison to the advanced stage of decomposition of pigs during the rainy season which lasted for 2 days at a mean TBS of 24.

The dry season period remains of the pig continued from the 15th day into the 40th day of pig death (with a mean TBS of 29). However, the rainy season period of skeletonization of the pig remains continued from the 8th day into the 15th day of pig death having achieved a mean TBS of 35.

There was a strong, positive correlation between PMI and TBS during the dry season ($r = 0.856$, $p = 0.000$) while during the rainy season, there was also a strong, positive correlation between PMI and TBS ($r = 0.952$, $p = 0.000$).

Table 4. Postmortem interval (PMI) and mean total body score (TBS) at each stage of decomposition.

Stage of Decomposition	**Dry Season**		**Rainy Season**	
	PMI	Mean TBS	PMI	Mean TBS
Fresh	Day 1	3	Day 1	3
Early	Days 2 – 6	15.5	Days 2 – 5	16
Advanced	Days 7 – 14	24	Days 6 – 7	24
Dry Remains/ Skeletonization	Days 15 – 40	29	Days 8 – 15	35

PMI = Postmortem Interval, TBS = Total Body Score

Table 5: Pearson correlation between PMI and TBS (Dry season)

	PMI (Days)	**TBS**

Pearson Correlation	PMI (Days)	1.000	0.856
	TBS	0.856	1.000
Sig. (1-tailed)	PMI (Days)	.	0.000
	TBS	0.000	.
N	PMI (Days)	40	40
	TBS	40	40

PMI = Postmortem Interval, TBS = Total Body Score

Table 6: Pearson correlation between PMI and TBS (Rainy season)

		PMI (Days)	**TBS**
Pearson Correlation	PMI (Days)	1.000	0.952
	TBS	0.952	1.000
Sig. (1-tailed)	PMI (Days)	.	0.000
	TBS	0.000	.
N	PMI (Days)	15	15
	TBS	15	15

PMI = Postmortem Interval, TBS = Total Body Score

Discussion

The present study was carried out to quantify the total body decomposition of pig remains in a clandestine Port Harcourt (Choba) region. In this study, the period of total body decomposition of pigs lasted for 40 days during the dry season and for 15 days during the wet season. Rainy conditions tend to accelerate decomposition because moisture encourages microbial growth and enzymatic activity. However, dry conditions generally slow down decomposition because moisture is limited and microbial activity is reduced, which leads to a slower breakdown of tissues (Jordan & Tomberlin, 2017).

Additionally, the pig remains during the dry season in this study did not achieve skeletonization during the period of total body decomposition; instead, the remains were dry and well mummified. In contrast to the rainy season, the remains decomposed fully and attained skeletonization. In extremely dry environments, the lack of moisture can lead to mummification, where the body dries out rather than decomposing rapidly thereby making the skin and tissues to become desiccated and preserved (Wilson et al., 2020; Ceciliason et al., 2023). The presence of water can lead to faster bloating and putrefaction of the body due to the increased production of gases from microbial activity. Rain can attract insects, especially flies, which are commonly

associated with decomposition. Increased insect activity can lead to faster colonization of the body by scavenging insects and contribute to tissue breakdown (Anderson, 2019).

In line with this present study, Gelderman et al (2018) showed from their research that the highest correlation was found between total decomposition score (TDS) and PMI ($r = 0.812$, $p = 0.000$). Estimating the time of death (PMI) based solely on body decomposition can be challenging, as it is influenced by various factors such as temperature, humidity, environmental conditions, and the presence of scavengers (Pittner et al., 2020; Gelderman et al., 2021). However, forensic anthropologists and pathologists have established general stages of decomposition based on observable changes in the body's appearance and condition. These stages can help provide a rough estimate of the time since death.

Conclusion

In conclusion, the application of the Keough body scoring system in a Port Harcourt (Choba) region using pig models showed that there were significant seasonal differences in the level of pig decomposition. In addition, total body scores (TBS) had significant relationships with postmortem interval (PMI). At a TBS of 29, pig remains of the dry season had achieved mummification while remains of the rainy season attained skeletonization at a TBS of 35.

References

Anderson, G. S. (2019). Factors that influence insect succession on carrion. In *Forensic entomology* (pp. 103-139). CRC press.

Bachmann, J., & Simmons, T. (2010). The influence of preburial insect access on the decomposition rate. *J. Forensic Sci*, 55(4), 893-900.

Behrensmeyer, A. K., Kidwell, S. M., & Gastaldo, R. A. (2000). Taphonomy and paleobiology. *Paleobiology*, 26(S4), 103-147.

Ceciliason, A. S., Käll, B., & Sandler, H. (2023). Mummification in a forensic context: an observational study of taphonomic changes and the post-mortem interval in an indoor setting. *Int. J. Legal Med*, 137(4), 1077-1088.

Cockle DL, Bell LS. (2015). Human decomposition and the reliability of a 'Universal' model for post mortem interval estimations. *Forensic Sci Int*. 253: 136.e1-9

De-Giorgio, F., Ciasca, G., D'Amico, R., Trombatore, P., D'Angelo, A., Rinaldi, P., & Pascali, V. L. (2020). An evaluation of the objectivity and reproducibility of shear wave elastography in estimating the post-mortem interval: a tissue biomechanical perspective. *Int. J. Legal Med*, 134, 1939-1948.

DiMaio VJ, DiMaio D. Forensic Pathology. New York: CRC Press; 2001

Galloway, A., Birkby,W.H., Jones, A., Henry, T. and Parks, B. (1989). Decay rates of human remains in an arid environment. *J. Forensic Sci*, 34: 607–616.

Gelderman, T., Stigter, E., Krap, T., Amendt, J., & Duijst, W. (2021). The time of death in Dutch court; using the Daubert criteria to evaluate methods to estimate the PMI used in court. *Legal Med*, 53, 101970.

Jordan, H. R., & Tomberlin, J. K. (2017). Abiotic and biotic factors regulating inter-kingdom engagement between insects and microbe activity on vertebrate remains. *Insects*, 8(2), 54.

Keough, N., Myburgh, J and Steyn, M. (2017). Scoring of decomposition: Amendment to the method when using pig model for human studies. *J. Forensic Sci,* 62(4): 986 – 993.

Kumar, S., & Gorea, R. K. (2023). Correlation of Postmortem Changes with Time since Death. In *Textbook of Forensic Science* (pp. 197-243). Singapore: Springer Nature Singapore.

Marks, M. K., Love, J. C., & Dadour, I. R. (2015). Taphonomy and time: estimating the postmortem interval. In *Hard Evidence* (pp. 165-178). Routledge.

Matarneh, S. K., Scheffler, T. L., & Gerrard, D. E. (2023). The conversion of muscle to meat. In *Lawrie's meat science* (pp. 159-194). Woodhead Publishing.

Marais-Werner, A., Myburgh, J., Meyer, A., Nienaber, W. C., & Steyn, M. (2017). Decomposition patterns of buried remains at different intervals in the Central Highveld region of South Africa. *Med. Sci. Law*, 57(3), 115-123.

Marais-Werner, A., Myburgh, J., Becker, P. J., & Steyn, M. (2018). A comparison between decomposition rates of buried and surface remains in a temperate region of South Africa. *Int. J. Legal Med*, 132, 301-309.

Megyesi MS, Nawrocki SP, Haskell NH. (2005). Using accumulated degree days to estimate the postmortem interval from decomposed human remains. *J. Forensic Sci,* 50(3):618–26

Nkejiaka, C. (2010). Emergency of ethnic movements in the Niger Delta region: from voice to armed struggle in the new democratic era (1999-present). Central European University, Dissertation

Notter SJ, Stuart BH, Rowe R, Langlois N. (2009). The initial changes of fat deposits during the decomposition of human and pig remains. *J Forensic Sci*. 54(1):195–201

Oghenemavwe, L. E., Oyakhire, M. O., & Onwugbufor, U. E. (2022). Sex and Stature Estimation from Odontometric Parameters of Kalabari Ethnic Group in Rivers State, Nigeria. *Eur. J. Dent. Oral Health*, 3(2), 9-16.

Pittner, S., Bugelli, V., Benbow, M. E., Ehrenfellner, B., Zissler, A., Campobasso, C. P., & Amendt, J. (2020). The applicability of forensic time since death estimation methods for buried bodies in advanced decomposition stages. *PLoS One*, 15(12), e0243395.

Pittner, S., Bugelli, V., Weitgasser, K., Zissler, A., Sanit, S., Lutz, L., & Amendt, J. (2020). A field study to evaluate PMI estimation methods for advanced decomposition stages. *Int. J. Legal Med*, 134, 1361-1373.

Shalaby O., deCarvalho L., Goff M.L. (2000). Comparison of patterns of decomposition in a hanging carcass in contact with soil in a xerophytic habitat on the Island of Oahu, Hawaii. *J. Forensic. Sci.* 45: 1267–1273

Sutherland A, Myburgh J, Steyn M, Becker PJ. (2013). The effect of body size on the rate of decomposition in a temperate region of South Africa. *Forensic Sci. Int.* 231(1–3): 257–262

Vass AA, Smith RR, Thompson CV, Burnett MN, Dulgerian N, Eckenrode BA. (2008). Odor analysis of decomposing buried human remains. *J Forensic Sci*. 53(2): 384–91.

Vass, A.A., Barshick, S,-A., Sega, G., Caton, J., Skeen, J.T. *et al*. (2002). Decomposition chemistry of human remains: a new methodology for determining the postmortem interval. *J. Forensic. Sci*, 47: 542–553.

Villet, M. H., & Amendt, J. (2011). Advances in entomological methods for death time estimation. *Forensic Pathol. Rev*, 213-237.

Wilson, A., Neilsen, P., Berry, R., Seckiner, D., & Mallett, X. (2020). Quantifying human post-mortem movement resultant from decomposition processes. *Forensic Sci. Int*, 2, 248-261.

PATIENT SAFETY CULTURE AMONG CLINICAL STAFF IN HOSPITALS IN NIGERIA: A SYSTEMATIC REVIEW

Kenneth, Karadobii Queen[a]; Onuoha, Uchechi Stanislaus[a]; Dimkpa, Barinem Mary[a].

[a]Health Systems Management, School of Public Health, University of Port Harcourt, Nigeria

Abstract

Patient safety in health care is an expanding area of research in Western nations with an increasing evidence base. However, little research has been carried out in Nigeria. This study aimed to examine the safety culture and patient safety measures literature used to guide healthcare professionals' development of safety culture in Nigeria. A systematic review of the literature. From July 2011 - August 2021, searches were conducted using PubMed, PsycINFO, Cochrane Library, Embase, and Web of Science. Terms identifying patient safety and the research site were paired with terms describing safety culture. The database searches identified 523 papers that were screened for inclusion in the review. After the screening and verification, data were extracted from 8 papers that described safety culture in healthcare. The distribution of the articles is as follows: The Kaduna, Nigeria (1), South Eastern states (4), South-South (2), and South West (1). The most commonly used safety culture assessment tool is the Hospital survey on patient safety culture (HSOPSC) which has been used in developing countries. This systematic review demonstrated that the assessment of safety culture in health organization settings had received particular interest on the part of health researchers, managers and practitioners in Nigeria. However, a little review has been done on patient safety for healthcare workers in Port Harcourt.

Keywords: Patient Safety Culture, Clinical Staff, Hospitals.

Introduction

Patient safety is an essential aspect of healthcare quality. It is becoming increasingly apparent that maintaining a strong safety culture in healthcare organizations is critical to maintaining high-quality treatment. Strong safety culture is linked to positive outcomes, particularly in hospitals (Di-Cuccio *et al*., 2015; Fan *et al*., 2016). In the context of health care, safety culture is described as the result of individual and group beliefs, attitudes, perceptions, skills, and norms of behavior that influence the administration's dedication, style, and competency in managing patient safety (Nieva & Sorra, 2003).

In nations worldwide, hospital safety culture evaluation is being utilized as a management tool and is being pushed by health policymakers and managers. The cultural assessment may be used for a variety of purposes: (i) increasing staff awareness of patient safety; (ii) assessing the current state of patient safety culture (PSC) in the organization; (iii) identifying strong points of safety culture and areas for improvement; (iv) examining

safety culture trends over time; (v) assessing the impact of initiatives and interventions to improve patient safety on the safety culture; and (vi) drawing comparisons with other organizations (Sorra *et al*., 2016). Measuring hospital staff safety attitudes has been extensively investigated and published in the literature to offer a lens through which to examine and improve hospital patient safety culture (Blegen *et al*., 2005; Bondevik *et al*., 2014; Carvalho *et al*., 2015; Sexton *et al*., 2011; Steyrer *et al*., 2013; Yaprak & Intepeler, 2015).

In the recent decade, African countries have paid more attention to patient safety, but little is known about the obstacles and potential for quality improvement. The majority of efforts to enhance patient safety and quality have been done at the international level, especially by the World Health Organization (WHO). However, the sustainability of the momentum is crucial to the delivery of focused, culturally relevant changes in hospital care in the region. Patient safety is, therefore, a global problem that affects countries at all stages of development. Although figures are limited, especially in developing countries such as Nigeria, millions of people worldwide are likely to be handicapped, injured, or killed annually due to insecure health treatment (Ghobashi *et al*., 2014).

Patient safety has risen in the previous ten years, yet there is limited knowledge of African obstacles to patient safety. Most of the patient safety and quality improvement efforts have been made at the international level, particularly by the World Health Organization (WHO) (Safe Care, 2011).

Research has shown that patient safety and quality of Port Harcourt health information remain "infrequent and restricted in breadth" In terms of advancement (Carpenter *et al*., 2010). The first step in establishing the appropriate urgency for reform might thus be to assess the amount and breadth of preventable patient damage within the African health care system. Setting specific quality objectives and improving patient safety will need broad collaboration across and across frontiers, frontiers and national cultures (Aspden *et al*., 2004). The safety of the patient is intended for everyone, regardless of sect, sex, tribe, nation, etc. Patient safety is the cornerstone of great patient attention. Health care personnel must be responsible for ensuring that no harm may occur to the patient, public or environment, whatever where in the globe we operate (Storr, 2010). Other systematic review studies have looked into the link between patient safety attitudes and patient

outcomes to identify vulnerable patient outcomes in hospital settings (DiCuccio, 2014; Bigham et al., 2012). However, the state of the research literature on healthcare workers' safety attitudes in hospitals in Nigeria has not been thoroughly examined.

The specific objectives for this review were:

1. To assess patient safety culture among healthcare workers in hospitals in Nigeria.
2. To determine healthcare worker's attitudes toward patient safety culture.

Methods

A protocol designed by the researcher guided the systematic literature review conducted to meet the stated aims. The search methodology and related findings are described following the relevant sections of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher *et al*., 2009). Articles were selected by consulting the following databases: PubMed, PsycINFO, Cochrane Library, Embase, and Web of Science. The search strategy included combined terms using the Boolean operator 'OR' between keywords and phrases with different meanings combined with the Boolean operator 'AND' to refine the search. The search was complemented by consulting both the Research Reference List of articles that have used the HSOPSC, which is posted on the AHRQ website and the references cited in the themes identified by the search.

Table 1 Search strategy

Strategy	Keywords
#1	'Safety culture' (All fields) **OR** 'safety climate' (All fields) **OR** organisational culture
#2	Hospitals
#3	Patient safety (All fields)
#4	Nigeria **OR** Port Harcourt
#5	#1 **AND** #2 **AND** #3 **AND** #4

Inclusion Criteria and Study Selection

Two reviewers assessed the eligibility of potential studies for inclusion in the review of research. All identified records from the aforementioned database searches (a total of 523) were imported into EndNote citation software, where duplicates were first identified and then removed. The 102 remaining titles and abstracts were screened against the predetermined inclusion and exclusion criteria such that studies, where attitudes of hospital staff towards patient safety had been assessed and/ or measured, were included at this point of the review. Based on this set of criteria, an additional 381 studies were further excluded from the review, leaving a total of 40 eligible research articles. A final inclusion/exclusion criterion was then applied by removing articles where the study did not include a hospital. From this investigation, a total of 32 papers were excluded from the final review leaving eight full-text research papers for in-depth analysis and review. Full-text articles were retrieved from an electronic library and examined in detail for the study design, sample, measures, and findings. The study selection process is summarized in Figure 1 using the PRISMA flow diagram (Moher *et al*., 2009).

The eligibility criteria allowed us to narrow down the subject literature and identify publications relevant to the stated research questions. The articles selected for this study met specific inclusion criteria; namely, these papers (a) were written in English; (b) had been peer-reviewed; (c) identified or described PSC; (d) applied to hospital settings; (e) utilized a survey tool to measure dimensions of PSC among acute care hospital personnel; and (f) applied to general, secondary, tertiary, teaching, or university hospitals.

Exclusion criteria included (a) book chapters; (b) papers that, upon review, were found not to be related to the research questions; (c) opinions, viewpoints, anecdotes, letters, and editorials; (d) studies with small sample sizes; and (e) case studies that focused on only one specific hospital unit or sector. Paper titles and abstracts were analyzed based on the stated inclusion and exclusion criteria. Any discrepancies that arose during this phase were resolved through a process of discussion and consensus.

Data Extraction and Quality Appraisal

Data extracted included study sample and setting, type and number of participants, study design, variables and measurement tools and study findings. The quality of the reviewed articles was assessed through the

National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2017) which gives a score out of 14 to indicate the quality of research studies.

Critical Appraisal

As part of the systematic review process, each study must be assessed. Bettany-Saltikov (2012) argues that assessing the quality refers to the methodical quality and, therefore, internal and external validity. Studies should also be assessed for the adequacy of the ethical process followed. If an adequate process has been observed, then is an indicator of good quality assessment and research. The strengths and weaknesses of each study should be recorded, including any risk of bias. All eight studies included were critically appraised.

Electronic Search

The PubMed, PsycINFO, Cochrane Library, Embase, and Web of Science databases were searched for relevant articles between July 2011 and August 2021, using the keywords explained in Table 1. To minimize publication bias, the search wasn't restricted to published studies, the PubMed, PsycINFO, Cochrane Library, Embase, and Web of Science databases were searched for any relevant information. Boolean operators were used to supporting the search. 'AND' was used to link all 3 search terms together. 'OR' was used to broaden the search for the synonyms. To ensure a systematic approach to searching, every database was searched using the same combination of search terms; 1, 2, 3, and 4.

Results

The initial search from 5 databases generated 523 results. One hundred two (102) studies were excluded as duplicates. Four hundred twenty-one (421) studies were deemed potentially relevant from their title. Three hundred eighty-one (381) were then excluded as not relevant after reading the abstract. Subsequently, the full study was evaluated for the remaining 40. Finally, 32 were excluded. After the full paper was reviewed, eight studies were selected to be included. From the eight included studies in the systematic review, some were cross-sectional, including prospective, multi-institutional and descriptive, and some mixed methods.

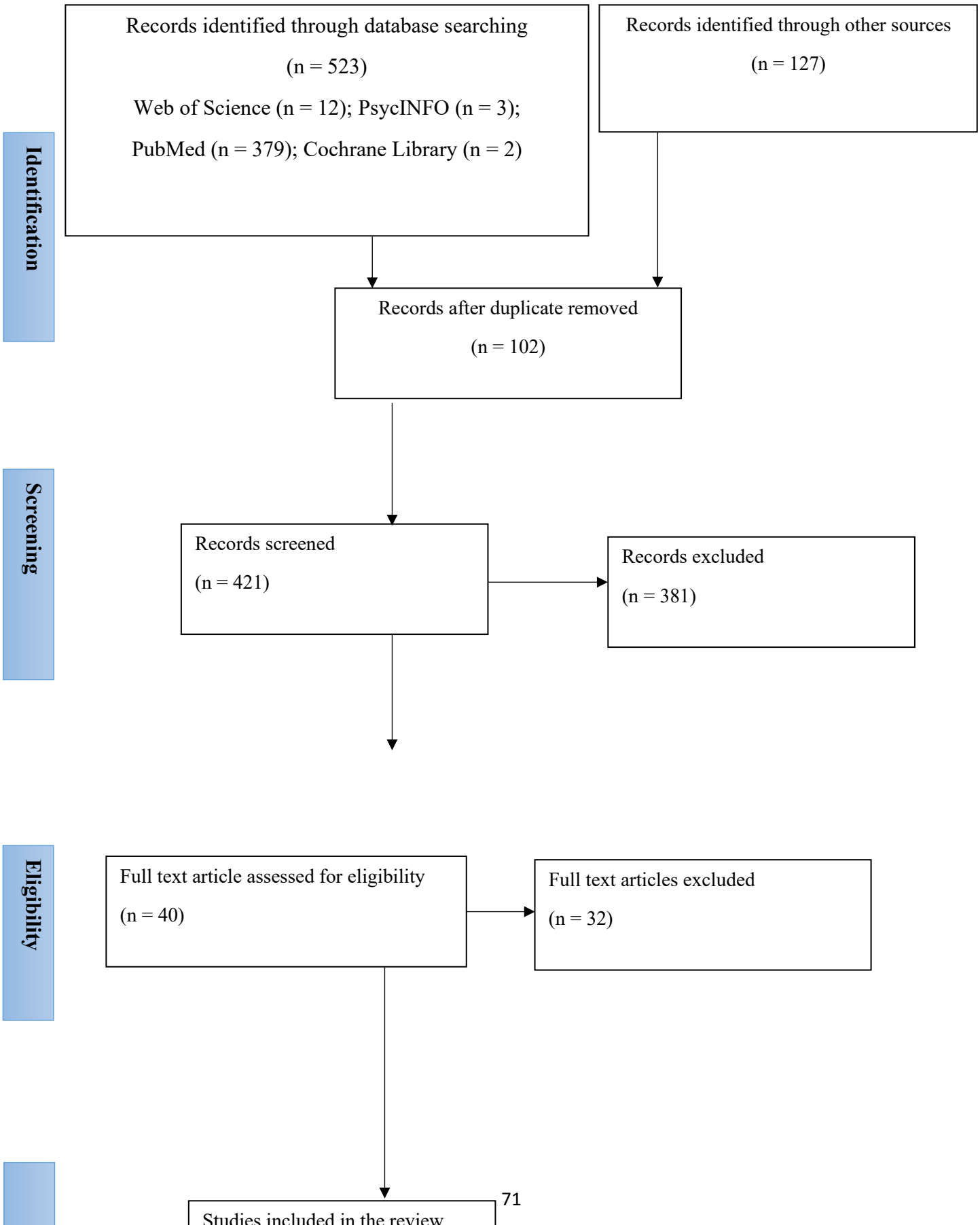

Identification
Records identified through database searching
(n = 523)
Web of Science (n = 12); PsycINFO (n = 3);
PubMed (n = 379); Cochrane Library (n = 2)
Records identified through other sources
(n = 127)
Records after duplicate removed
(n = 102)
Screening
Records screened
(n = 421)
Records excluded
(n = 381)
Eligibility
Full text article assessed for eligibility
(n = 40)
Full text articles excluded
(n = 32)
Studies included in the review

Figure 1: PRISMA flow diagram depicting the selection process of studies for systematic review.

Results of the Critical Appraisal

A full critical appraisal for the studies was beyond the remit of this review, as agreed with the supervisor, only the first section of the appraisal forms was used. This contains screening questions to determine whether to continue with the appraisal.

Additionally, section A looks at the sources and quality of clinical data used to create estimations on the measures of health outcomes. This can have a significant impact on the validity of the results.

The appraisal tool did not provide a scoring system. However, the assessment demonstrated that all 8 studies had a well-defined question. It was found that all studies used secondary data as their main source of data. Some evaluations used previously published and unpublished studies. When available, information related to the specific location of the study was used but if unavailable, then data from other locations were used, mainly from Nigeria.

Table 2. Summary of critical appraisal of studies

Author/date	Aim of study	Study Design	Sample size	Analysis	Key findings	Strengths and limitations
Lawal *et al*. (2020)	The study aimed to explore medication safety practices in healthcare facilities in Kaduna State, Nigeria.	The study adopted a mixed-method approach divided into three phases.	The healthcare facilities for this study were selected from the three Senatorial zones of the State.	Data analysis for pre-and post-intervention was conducted using SPSS software Version 23, where Student's t-tests were carried out.	The study findings offered a substantial opportunity for improvements. The study also opened up an area of patient safety culture, where not much research has been conducted in Nigeria.	**Strengths** This study has several strengths, amongst which is that it is the first study in Kaduna State to assess the presence of medication safety practices and safety culture. The use of a multi-phased mixed-methods the research approach will also add substantial strength. The educational intervention will provide an avenue to inform and educate health care workers about patient safety. **Limitations** The number of healthcare facilities sampled to participate in the study, although representing the various zones of the state may still be limited.
Okafor *et al*. (2018)	To assess the effect of patient safety culture on patient satisfaction in radiodiagnostic practice.	Two validated questionnaires via Hospital Survey on Patient Safety Culture by	80 radiology health workers and 376 patients of Radiology	Data were analyzed using SPSS version 17.	Overall patient satisfaction with radiological services was 72.6%. There is no correlation between patient safety culture	**Strengths** There was an excellent level of patient satisfaction in the study. **Limitations** Findings from the study do not relate to the practice of patient

		Agency of Health Research and Quality and patient satisfaction questionnaire.			and patient satisfaction.	safety culture in radiodiagnostic unit.
Ordinioha & Sawyer, (2011)	To examine the facilities at the permanent site of the University of Port Harcourt Teaching Hospital (UPTH) to ascertain their adequacy for the delivery of five-star hospital services, while guaranteeing the safety of patients, staff and the environment.	A descriptive cross-sectional study design was used, with the data collected through field observation, using 5 an assessment checklist adopted from WHO guidelines	The study was carried out in the University of Port Harcourt Teaching Hospital, one of the two tertiary health care institutions in Port Harcourt.	The data collected were manually checked for consistency and completeness, and then analyzed using a pocket calculator. Summary measures were calculated for each outcome of interest.	The permanent site of the hospital had all the facilities required for the safety and comfort of clients and staff, but maintenance has been an expensive and difficult tasks.	**Strengths** **Limitations** The study showed that maintenance has been an expensive and difficult task
Ogaji *et al*. (2018)	This study was designed to compare and determine the clinical and socio-demographic predictors of PSC among clinical staff involved with ambulatory primary and tertiary care in the	This study used a comparative cross-sectional study.	A minimum sample size of 32 per level of the facility was required.	All analyses were conducted using the SPSS version 22 statistical package with statistical significance set at a p-value	The overall level of PSC was low and there were significant variations between levels of practice. These findings call for appropriate interventions to improve PSC among	**Strengths** This situational analysis has several implications as it highlighted gaps in PSC along with domains of SAQ-AV and provide additional imperative to institutionalize periodic surveys on PSC.

	south-south zone of Nigeria.			<0.05.	health care providers in Nigeria.	**Limitations** PSC measured in this study was not linked to patient outcomes as such; study could not determine how PSC impacts patient outcome in this setting.
Iloh *et al*. (2020)	The study was aimed at describing the experience, drivers, barriers and preventive measures for patient safety incidents and accidents in a cross-section of medical ractitioners in Abia State, Southeast Nigeria.	The study used the cross-sectional study - self-administered questionnaire.	185 physicians in Southeast Nigeria were sampled.	The data generated were analysed using the Statistical Package for the Social Sciences (IBM SPSS) version 21.	Patient safety incidents occurred amongst the study participants, with the most committed safety incident being medication errors.	**Strengths** **Limitations**
Okafor *et al*. (2017)	To evaluate the level of patient safety culture in the radiodiagnosis units	A prospective, cross-sectional study hospital survey on patient safety culture (HSOPSC) questionnaire was used	The total population of the healthcare personnel in the radiodiagnosis units was estimated at 80 376 patients of radiology.	Data analysis was performed in SPSS version 17 using descriptive statistics for the demographic variables (n=8) of the respondents and a t-test to assess the mean differences in	According to the results, the patient safety culture in the studied tertiary institutions was barely above average.	**Strengths** patients may not be entirely safe in the selected healthcare units due to the high rate of positive responses in the dimension of 'teamwork within units'. **Limitations** The low rate of positive responses in the dimension of the 'frequency of events reported' indicated that the healthcare team members might

				the positives responses for comparison with the benchmark of the AHRQ. In all the statistical analyses, a P-value of 0.05 was considered significant.		cover adverse events, which is likely to cause patient harm.
Nwosu *et al*. (2019)	To evaluate patient safety awareness among healthcare professionals is known to impact this outcome; thus we set out to appraise the patient safety awareness among surgeons in Enugu, Nigeria.	A multi-institutional cross-sectional survey was used.	A total of 309 surgeons were surveyed.	Data obtained were analyzed using the statistical package for scientific solutions (SPSS) version 20 software	The patient safety awareness and practice among the surgeons in Enugu, Nigeria is low and this was found to be influenced by the professional status and years in service of the surgeon.	
Badejoko, (2019)	To perform a sociological analysis of the Oduyoye/LUTH case and another managed in OAUTHC Ile-Ife; as a means of providing insight into the current state of patient safety in maternity, in Nigeria.	Review		sociological analysis	Patient safety issues in maternity are prevalent in Nigeria. Responsible macro-sociological factors include lack of clarity regarding the political economy of healthcare in Nigeria	

Discussion

Finally, 8 studies (Lawal *et al*., 2020; Okafor *et al*., 2018; Ordinioha & Sawyer, 2011; Ogaji *et al*., 2018; Iloh *et al*., 2020; Okafor *et al*., 2017; Nwosu *et al*., 2019; Badejoko, 2019) were included, which had been published between 2011 and 2020, all in English. Table 2 shows the studies by the country where they were carried out and the year of publication. The eight studies (Lawal *et al*., 2020; Okafor *et al*., 2018; Ordinioha & Sawyer, 2011; Ogaji *et al*., 2018; Iloh *et al*., 2020; Okafor *et al*., 2017; Nwosu *et al*., 2019; Badejoko, 2019) originated from different regions in Nigeria at varying stages of development. The characteristics of the eight studies are shown in Tables 2 above. All the studies included observational epidemiological design in their methodology and presented findings on the status of safety culture in their study sample. However, the studies' focus varied: (i) 5 studies focused primarily on evaluating the status of safety culture among hospital staffs; (ii) 2 studies focused on psychometric validation of the HSOPSC 1 study evaluated the effects on PSC of investments in improving the quality and safety of healthcare at hospitals. Six of the studies collected their data using the instrument on paper, achieving response rates ranging from 23% to 100%.

This systematic review of the current literature identified eight studies, including seven quantitative studies and one qualitative study that met the inclusion criteria of studies where the safety attitudes of health care professionals from the hospital were ascertained. Given the number of studies to have investigated the safety attitudes of the frontline emergency staff of hospitals is comparatively few and patients within the hospital are especially vulnerable to medical errors (Shaw et al., 2009), there is justification for addressing the lack of research on the safety attitudes of hospital staff in future studies. Furthermore, additional research into the safety attitudes of hospital staff is justified because the current systematic review revealed the overall methodological

quality of the reviewed studies was comparatively low despite some of the reviewed studies having large participant numbers, which contribute to the validity of the findings, all the quantitative studies employed cross-sectional research designs which undermines the internal validity of the findings.

It would appear from the literature, and the review of research reported here that human resource issues like teamwork and management support are related to lower safety attitudes of hospital staff and that interventions to improve these factors in the hospitals are likely to impact positively on safety attitudes.

Nevertheless, the findings of this review suggest the safety issues associated with the human resource components of a hospital are a particular focus for health care workers.

Altogether, the findings contribute to the literature by being one of the first studies to systematically review the safety attitudes of health professionals in the hospital. Although the numbers of studies on this topic are limited, they do show that teamwork, communication, and management support are central to positive safety attitudes and that teamwork training can improve safety attitudes. Nevertheless, a strength of three of the reviewed studies was an investigation of the relationship between safety attitudes and adverse patient events, with one study showing the number of adverse events was related to poor safety and team climate, poor inter-departmental working relationships, and increased cognitive demands.

Study Limitations

The authors recognize that this study has several limitations. Firstly, as regards the databases consulted, it was decided to restrict the search to the four databases because they were considered suitable for collecting all the eligible articles according to the proposed subject and objectives and

because they were available to the authors in their academic setting. Another issue that should be highlighted is that this review searched for articles in English only. Another significant potential limitation of this review was the authors' choice not to conduct a meta-analysis. The rationale behind this is that the findings of the studies included are difficult to generalize and compare for the following reasons: the studies occurred in different periods, they used different sampling strategies and were conducted in hospital contexts in regions of Nigeria at different stages of development, which entail different capacities for investment in improving the quality and safety of care at the study hospitals.

Conclusion

This systematic review demonstrated that the assessment of safety culture in health organization settings had received particular interest on the part of health researchers, managers, and practitioners in Nigeria. However, a little review has been done on patient safety for healthcare workers. The set of studies included in this review reveals that hospital organizational cultures are predominantly underdeveloped or weak as regards patient safety and comprise dimensions that require strengthening. Strategies directed to prepare personnel to offer safe, quality healthcare should be encouraged.

Recommendations

1. Work processes surrounding shift changes and handovers to prevent loss of important information about patients and their treatment should be adhered to and also archived.
2. It is important to promote cooperation, integration and coordination of teamwork among the hospital units, to prevent fragmentation of care;

3. The culture of the blame should give way to a 'just culture' approach, which would counter the urge to blame, enhance professional and institutional accountability, prioritize the identification of systemic failures, and, consequently, proceed to mitigate them.

References

Aspden, P., Corrigan, J. M., Wolcott, J., & Erickson, S. M. (2004). Patient Safety: Achieving a New Standard for Care. National Academies Press.

Badejoko, B. O. (2019). Investigating the Safety Culture among Hospital Staff in Southwestern Nigeria. *Journal of Healthcare Quality Research, 41*(2), 132-140.

Bettany-Saltikov, J. (2012). How to do a Systematic Literature Review in Nursing: A Step-by-Step Guide. Maidenhead: Open University Press;

Bigham, B. L., Buick, J. E., Brooks, S. C., Morrison, M., Shojania, K. G., & Morrison, L. J. (2012). Patient Safety in Emergency Medical Services: A Systematic Review of the Literature. *Prehospital Emergency Care, 16*(1), 20-35.

Blegen, M. A., Gearhart, S., O'Brien, R., Sehgal, N. L., Alldredge, B. K., & Vazirani, S. (2005). Patient Safety Climate in Hospitals: A review of the literature. *Journal of Nursing Scholarship, 37*(4), 316-320.

Bondevik, G. T., Hofoss, D., Husebø, S. E., & Deilkas, E. C. T. (2014). Patient Safety Culture in Norwegian Primary Care: A Study in Out-of-hours Casualty Clinics and GP Practices. *Scandinavian Journal of Primary Health Care, 32*(3), 132-138.

Carpenter, J., Button, P., & Nitzkorski, Z. (2010). Health Information for Patient Safety and Quality of Care in Port Harcourt, Nigeria. *Journal of Health Informatics in Developing Countries, 4*(1).

Carvalho, R. E. F. L. de, Cassiani, S. H. de B., & Miasso, A. I. (2015). The safety attitude of health professionals: A study in the teaching hospital. *Journal of Nursing Education and Practice, 5*(4), 49-56.

DiCuccio, M. H. (2014). The Relationship between Patient Safety Culture and Patient Outcomes: A Systematic Review. *Journal of Patient Safety, 11*(3), 135-142.

Di-Cuccio, M. H., & Swanson, K. M. (2015). The influence of organizational culture on patient safety. *Journal of Patient Safety, 11*(1), 28-35.

Fan, C. J., Pawlik, T. M., Daniels, T., Vernon, N., Banks, K., Westby, P., & Makary, M. A. (2016). Association of safety culture with surgical site infection outcomes. *Journal of the American College of Surgeons, 223*(1), 88-95.

Ghobashi, M. M., El-Ragehy, H. A., Mosleh, H., & Ibrahim, H. M. (2014). Assessment of patient safety culture in primary health care settings in Kuwait. *Epidemiology, Biostatistics, and Public Health, 11*(3).

Iloh, G. U. P., Ofoedu, J. N., Njoku, P. U., Odu, F. U., Ifedigbo, C. V., & Iwuamanam, K. D. (2020). Safety Culture in Nigerian Hospitals: A Study of Hospital Staff Attitudes towards Patient safety. *Nigerian Journal of Clinical Practice, 23*(3), 315-322.

Lawal, A. K., Rotter, T., Kinsman, L., Machotta, A., Ronellenfitsch, U., Scott, S. D., & Goodridge, D. (2020). What is the Effect of Health Systems Interventions on Patient Safety? A systematic review. *BMC Health Services Research, 20*(1), 1-13.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-analyses: The PRISMA statement. *PLoS Medicine, 6*(7), e1000097.

National Institute of Health. (2017). Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies. NHLBI, NIH

Nieva, V. F., & Sorra, J. (2003). Safety Culture Assessment: A tool for Improving Patient Safety in Healthcare Organizations. *Quality and Safety in Health Care, 12*(suppl 2), ii17-ii23.

Nwosu, A. D. G., Eke, N. A., Nwankwo, U. U., & Onwukwe, J. E. (2019). Patient Safety Culture among Healthcare Workers in a Tertiary Hospital in Nigeria: A Cross-sectional Study. *African Journal of Medicine and Medical Sciences, 48*(2), 123-131.

Ogaji, D. S., Etukumana, E. A., & Inem, V. (2018). Safety Attitudes among Frontline Health Workers in Hospitals in Port Harcourt, Nigeria. *Nigerian Medical Journal, 59*(5), 274-280.

Okafor, I. P., Dolapo, D. C., & Okafor, C. E. (2017). Patient Safety Attitudes and Barriers to Incident Reporting among Nurses in a Nigerian Tertiary Hospital. *Ethiopian Journal of Health Sciences, 27*(6), 567-576.

Okafor, I. P., Ugwu, E. O., & Okafor, C. E. (2018). Safety Culture in Hospitals: A study of Nurses' Attitudes in Southwestern Nigeria. *International Journal of Medical Sciences, 15*(9), 961-969.

Ordinioha, B., & Sawyer, W. (2011). Safety Culture in a Teaching Hospital in Nigeria: An Assessment of the Perceptions of Health Care workers. *West African Journal of Medicine, 30*(6), 401-406.

Safe Care. (2011). The Role of WHO in Improving Global Patient Safety. *World Health Organization*. Retrieved from https://www.who.int/patientsafety/about/en/

Sexton, J. B., Helmreich, R. L., Neilands, T. B., Rowan, K., Vella, K., Boyden, J., & Thomas, E. J. (2011). The Safety Attitudes Questionnaire: Psychometric Properties, Benchmarking Data, and Emerging Research. *BMC Health Services Research, 6*(1), 44.

Shaw, G., Drever, F., Hughes, H., Osborn, S., & Williams, S. (2009). Adverse Events and Near Miss Reporting in the NHS. *Quality and Safety in Health Care, 18*(2), 86-94.

Sorra, J., Gray, L., Streagle, S., Famolaro, T., Yount, N., & Behm, J. (2016). *AHRQ Hospital Survey on Patient Safety Culture: User's Guide*. Agency for Healthcare Research and Quality.

Steyrer, J., Schiffinger, M., Lang, R., & Latzke, M. (2013). The Influence of Organizational Learning on Hospital Performance: The Moderation of Safety Climate. *Health Care Management Review, 38*(3), 220-230.

Storr, J. (2010). Patient safety: A Global Imperative. *World Health Organization*. Retrieved from https://www.who.int/patientsafety/en/

Yaprak, M., & Intepeler, S. S. (2015). Determining the Patient Safety Attitudes of the Operating Room Nurses. *Journal of PeriAnesthesia Nursing, 30*(4), 291-297.

Assessment of health care data processes and infrastructure at the University of Port-Harcourt teaching hospital

Onuoha, Uchechi Stanislaus*, Kenneth, Karadobii Queen and Dimkpa, Barinem Mary

Health Systems Management, School of Public Health, University of Port Harcourt, Rivers State.
***Corresponding author, email:** drslaux@yahoo.com,
Phone: +(234)806-382 9227

Abstract

Background and aim: The availability of adequate health data management processes ranging from effective data collection protocols to seamless transmission of data after performing its analysis are paramount to achieving health care delivery effectiveness and efficiency. It is thus necessary to ensure the availability of required infrastructure that allow for these processes. It was on this premise that this study assessed the data processes and health information management infrastructure of the University of Port Harcourt Teaching Hospital in Rivers state, Nigeria.

Materials and methods: This was a mixed methods study comprising both descriptive and phenomenological designs. The study was conducted among 83 medical/health information management staff of the University of Port Harcourt Teaching Hospital, who were selected using an enumerative sampling method. Data was collected using a questionnaire abstracted from the World Health Organization, 2021 Health facility checklist as well as a focused group discussion (FGD) guide. Data was analysed using the Statistical Package for Social Sciences, version 21.

Results: In this study, most (63.6%) of the participants reported a poor infrastructure base for data management. Regarding healthcare data processes at the facility, it was identified that only 64 (44.1%) of them were of the view that healthcare data collection was done while 57 (41.0%) reported that healthcare data documentation was done. Also, 60 (42.3%) of the respondents reported that healthcare data storage and retrieval was done. Overall, majority 77.6% of the participants reported the presence of poor current methods/processes of data collection at the centre. These results were corroborated with the reports obtained from the focused group discussions.

Conclusion and Recommendations: Infrastructure and processes of data information management at the University of Port Harcourt Teaching Hospital were identified to be inadequate and mostly paper-based. It was recommended that there was the need to formulate policies that encourage the adoption of the electronic-based information management systems in healthcare facilities located in Nigeria.

Key Words: Health Care, Data Processes, Infrastructure

Introduction

The availability of reliable and accurate public health information is essential for monitoring health and for evaluating and improving the delivery of health-care services and programmes (Elikwu et

al., 2020; Tull, 2018). As countries report their progress towards achieving the United Nations Sustainable Development Goals (SDGs), the need for high quality data has never been greater. This is made possible by successfully developed and implemented health care information systems which inadvertently results in improved health care efficiency and effectiveness (Omole, 2015). A Health Information Management System (HIMS) is a comprehensive system that facilitates the collection, management, storage, retrieval, and dissemination of health-related data and information within a healthcare organization or a broader healthcare ecosystem. HIMS plays a crucial role in improving healthcare delivery, decision-making, and overall healthcare management. Components of HIMS includes the collection of data, as well as the storage, integration, retrieval and analysis of this data. It also involves using the analysed data to provide support for making clinical decisions, provide effective patient management while providing surveillance mechanisms and ensuring privacy of patient data among others (Adedapo, 2017; Obimba et al., 2022).

A wide range of health-related data, including patient demographics, medical history, clinical observations, laboratory results, and administrative information are known to exist within the health care industry. This data can be gathered from various sources such as electronic health records (EHRs), paper records, medical devices, and patient surveys as well as from different healthcare departments and systems (Haule & Muhanga, 2021). It is however essential that the data is well organized to facilitate easy retrieval and analysis by healthcare providers, administrators, and policymakers, for making informed decisions (Adedapo, 2017). The application of Health Information Management Systems (HIMS) in health care, thus plays a crucial role in improving healthcare delivery through efficient Data Management, by streamlining the collection, storage, and retrieval of patient information, and reducing the reliance on paper records (Ifezue, 2020; Obimba et al., 2022). This efficiency ensures that healthcare providers have quick access to accurate patient data, resulting in faster and more informed decision-making (Esene et al., 2017; Ifezue, 2020). The application of these systems in health care also promotes patient safety through the reduction of errors and alerting healthcare providers to potential issues, such as allergies or contraindications, when prescribing medication or conducting medical procedures (Elikwu et al., 2020; Esene et al., 2017).

They also support population health initiatives by providing data on disease prevalence, risk factors, and healthcare utilization (Esene et al., 2017). This data can be used to identify and target at-risk populations for preventive interventions and public health campaigns, while providing efficient means for optimizing resource allocation in terms of manpower and equipment (Sani et al., 2017). Some HIMS systems also include patient portals and communication tools that empower patients to actively participate in their healthcare. Patients can access their health records, schedule appointments, and communicate with their healthcare providers more easily, leading to better engagement and adherence to treatment plans (Elikwu et al., 2020; Tull, 2018). Healthcare providers can also monitor patient conditions in real time, which is especially valuable for critical care units. This is an important factor considering that the early detection of changes in a patient's

condition can lead to timely interventions and better outcomes (Elikwu et al., 2020; Tull, 2018). In order to effectively implement Health Information Management Systems, factors such as commitment of health care leadership, proper implementation and maintenance of the systems and the adoption of information, communication, technology (ICT) systems are important enabling factors (Tull, 2018).

As earlier stated, HIMS work hand-in-hand with the application of ICT systems, thus, most problems limiting ICT application in health would also have similar effects on HIMS adoption in health care systems (Attah, 2017). These problems have been found to include the presence of a fragmented landscape of e-Health pilot projects and stakeholders as well as numerous data and health information systems (HIS) silos which have not been organized to provide an arrowhead for e-Health and thus HIMS development (Attah, 2017; Tull, 2018). Others include the lack of ICT infrastructure, inadequately trained manpower to operate this infrastructure, as well as the expensive nature of the processes involved in setting up this infrastructure. Furthermore, there are problems of the lack of coordination and commitment on ICT matters among ministries, departments, agencies (MDAs), and the lack of an architecture to guide the development of identified HIS bottlenecks (Oluwatuyi, 2020; Tull, 2018). The 2016 National health policy of Nigeria has pointed out that the health information system adopted in health care is an important part and major thrust of the Nigerian health system. It is also crucial to note that ensuring the effective implementation of the Nigerian health management information system is crucial to ensuring and enjoying a standardized health care system in Nigeria (Federal Ministry of Health, 2016; Oluwatuyi, 2020).

It is apparent that Health Information Management Systems in Nigeria could be faced with a myriad of problems limiting its effective development and use (Federal Ministry of Health, 2016; Oluwatuyi, 2020; Sani et al., 2017). These problems could also be affecting the utilization of these systems for managing health care information in Rivers state. Considering that to the best of our knowledge, there are no published literature to refute or confirm this, it has become necessary to conduct this study to determine health care data processes and infrastructure availability at the University of Port Harcourt Teaching Hospital.

Materials and methods

This was a mixed-method study conducted at the University of Port Harcourt Teaching Hospital which is located along the East-West road, at Choba, in Port Harcourt metropolis, Rivers state. The University of Port-Harcourt Teaching Hospital (UPTH) is a tertiary-care teaching and research facility in Rivers State which is affiliated with the University of Port-Harcourt (Abereton & Ordinioha, 2018; Federal Ministry of Health, 2014; Google, 2014). The mixed method used in this study involved a quantitative component which utilized a descriptive research design, while the qualitative component used the phenomenological design. This study was conducted among

medical/health information management staff of the health care facility. A total enumerative sampling of all the health information management personnel was used to select 83 respondents used for the study. Data was collected using a questionnaire abstracted from the World Health Organization, 2021 Health facility checklist which was used to assess the infrastructure base and processes involved in health data management at UPTH. A focused group discussion (FGD) guide was also used to guide the FGDs.

One research assistant was recruited and appropriately trained prior to commencement of data collection. Study objectives, procedures to engage during data collection, eligibility criteria and data sampling technique were explained to the research assistant during the course of the training. The instrument was then distributed to the study respondents at one of their monthly departmental meetings and was retrieved immediately after completion. The study participants were also assigned to focused groups of 10-12 participants. Using the focused group discussion guide, the study participants were asked open-ended questions pertaining to the infrastructure and processes of health information management systems at the study site. The data collected was entered and analysed using the IBM SPSS Statistics for Windows, version 25.

Data was presented on frequency distribution tables and expressed as percentages and frequencies. Concerning the infrastructure base of data management, a total of 10 questions was used to assess it. These responses were then summed and converted to 100%. A score of 0-49% was classified as being poor infrastructure base of data management, while 50-100% was classified as having good infrastructure base. Current methods/ processes of data collection in the centre were assessed with a total of 5 questions, and the responses were summed and converted to 100%. A score of 0-49% was classified as poor methods/ processes of data collection, while 50-100% was classified as good methods/ processes of data collection in the centre. For the qualitative data analysis, the results of the data set were explored to identify recurring patterns, common areas, differences, and relationships. The interpretative phenomenological analysis (IPA) procedure, which entails breaking down transcripts into the different units of meaning and then into subthemes and themes was done. After this was done, the transcripts were broken down into individual units of meaning and each unit of meaning was reduced to their essential meanings, which became the subthemes of the transcript.

In order to conduct this study under required ethical standards for biomedical research, ethics clearance to conduct this research was sought and obtained from the research ethics committee of the University of Port-Harcourt (UPH/CEREMAD/REC/MM79/034). Permission to conduct this study was also obtained from required authorities of the University of Port-Harcourt Teaching Hospital. The informed consent of the respondents to participate in this research was also sought and obtained. It was also ensured that no harm came to any of the respondents by maintaining the confidentiality of their responses (where necessary) and ensuring that data collection did not interfere with the carrying out of respondent’s official duties.

Results

In this study, a total of 83 respondents were involved. It was identified that most of them were aged between 28 and 37 years 45 (54.2%), were female 59 (71.1%), were single 49 (59.0), and had received tertiary education 68 (81.9%). Also, most of the respondents were senior level staff 42 (50.6%), who had worked for a period of 3 to 10 years 44 (53.0%) and have a background knowledge of health information management 67 (80.7%). These are shown in below.

Socio demographic characteristics of the respondents

Variables	Frequency (n=83)	Percentage (%)
Age (years)		
• 18-27	12	14.5
• 28-37	45	54.2
• 38-47	23	27.7
• 48 and above	3	3.6
Mean ± SD = 35.64±8.24years		
Sex		
• Male	24	28.9
• Female	59	71.1
Cadre in Occupation		
• Senior	42	50.6
• Midlevel	25	30.1
• Junior	16	19.3
Years on Current Employment		
• 6months-3years	8	9.6
• 3years-10years	44	53.0
• 10years and above	31	37.3
Marital status		
• Single	49	59.0
• Married	34	41.0
Level of Education		
• Secondary	15	18.1
• Tertiary	68	81.9
Background knowledge		
• Yes	67	80.7
• No	16	19.3

Regarding the infrastructure base of health care data management in the health facility, it was identified that most of them were of the opinion that they had a functional record management unit

67 (80.7%), which undertakes management of healthcare information 67 (80.7%), and the largest proportion of them operated both paper-based and electronic records management system 39 (47.0%). Also, most of the respondents were of the opinion that the facility needed infrastructure for health information system 61 (73.5%) and needed manpower to ensure proper health data management 49 (59.0%). It was also identified that most of the respondents were of the opinion that the facility utilized a standardized set of entry format to complete a medical chart or record for each patient 50 (60.2%). These are shown in the table showing the infrastructure base of healthcare data management.

Infrastructure base of health care data management

Variables	Frequency (n=83)	Percentage (%)
Functional record management unit		
• Yes	67	80.7
• No	16	19.3
Unit undertake management healthcare information		
• Yes	67	80.7
• No	16	19.3
Facility run paper based, electronic or both health records management system		
• Paper based	37	44.6
• Electronic	7	8.4
• Both	39	47.0
Facility need infrastructure for system chosen		
• Yes	61	73.5
• No	22	26.5
Facility needs manpower to ensure proper health data management		
• Yes	49	59.0
• No	34	41.0
Facility use individual patient chart or records for patients		
• Yes	48	57.8
• No	35	42.2
Format for in-patient record		
• Both paper and electronics	55	66.3
• Paper only	28	33.7

Facility utilizes a standardized set of entry format to complete a medical chart or record for each patient		
• Yes	50	60.2
• No	33	39.8
Stock out of the official inpatient medical record form in the past 6 months		
• Yes	47	56.6
• No	36	43.4

Altogether, it was identified that the available infrastructure for health care data management was poor 70 (80.3%) as shown in the table below.

Assessment of infrastructure base of data management

Variables	Frequency (n=83)	Percentage (%)
Overall assessment of Infrastructure base		
Poor	70	84.3
Good	13	15.7

Regarding the data management processes at the health care facility, it was identified that most of the respondents were of the opinion that the facility undertakes healthcare data collection 64 (77.1%), healthcare data documentation 57 (68.7%), as well as data storage and retrieval 60 (72.3%). Fifty-three (63.9%) of the respondents were also of the view that healthcare data analysis was also performed but only 40 (48.2%) were of the view that data transmission was carried out. This is shown in the following table.

Current processes of data management

Variables	Frequency (n=83)	Percentage (%)
Facility undertakes healthcare data collection		
• Yes	64	77.1
• No	19	22.9
Facility undertakes healthcare data documentation		
• Yes	57	68.7
• No	26	31.3
Healthcare data storage and retrieval		
• Yes	60	72.3
• No	23	27.7
Facility undertakes healthcare data analysis		
• Yes	53	63.9
• No	30	36.1
Healthcare data transmission		

• Yes	40	48.2
• No	43	51.8

Altogether, it was found that 45 (54.2%) of the respondents were of the opinion that the health care data management processes were poor. This is shown in the succeeding table.

Assessment of the current methods/ processes of data collection in the centre

Variables	Frequency (n=83)	Percentage (%)
Current methods/ processes of data collection in the centre		
Poor	45	54.2
Good	38	45.8

Results of qualitative aspect of the study

The qualitative aspect of this study which was aimed at assessing the effect of collaborative improvement of the Health Management Information System (HIMS) on health service delivery at the UPTH after being subjected thematic content analysis provided some useful themes. Altogether, 4 themes and 8 subthemes were generated which answered the four research questions outlined by the study protocol to be achieved in this study. In response to these questions, the 4 identified themes in order of the objectives are shown in the table below.

Thematic analysis results for qualitative assessment

Objectives	Themes identified
Objective 1: To review the infrastructure of healthcare data administration	1. *The use of paper records.* 2. *A case for training needs.* 3. *The need for infrastructure development for improved service delivery.*
Objective 2: Current processes of data collection	1. *The inadequacy of health records management.*

Objective 1: Infrastructure of healthcare data administration

The theme: *The use of paper records* was made up of 3 sub-themes: (a) *Paper records are mainly used,* (b) *Current paper-based recording is faced with risk of errors*, (c) *Paper records need to be integrated with electronic forms.*

The theme: *a case for training needs* was made up of a single sub-theme: (a) Need for training to curb errors.

The theme: *The need for infrastructure development for improved service delivery* was made up of 2 sub-themes: (a) *Insufficiency of electronic methods,* and (b) *Electronic records not well maintained*.

Objective 2: Current methods/ processes of data management

The theme: I*nadequacy of health records management* was made up of 2 sub-themes: (a) *Only data collection, documentation, storage and retrieval are done,* (b) *No expertise nor training on data analysis and transmission.*

Elaboration of themes and sub-themes

Objective 1: Infrastructure of healthcare data administration

Theme 1: The use of paper records

Subtheme 1: Paper records are mainly used

Considering enquiry of what health information management system was in place at the study site, study participants vividly expressed their opinions which was centred around the use of paper-based records system being mainly used. Supporting quotes for this includes: "*I don't even know which one works fine in our centre, but we usually do a lot of paper work", "We use mainly paper, and computer in few cases", "We use both but mainly paper method", "We rely mainly on Paper method, though we have few computers", "Most of our infrastructure base in our facility is majorly Paper but there are also some computers", and "See we may have the electronic methods, but we are only conversant about the use of paper".*

Subtheme 2: Current paper-based recording is faced with risk of errors

Participants in this study were also of the opinion that this major paper-based information system was faced with the risk of experiencing errors and inconsistencies that could affect the effectiveness of the record-keeping system. This is seen in the supporting quotes: *"Yes, especially, if the person filling the data is constrained by time", "I don't think so, except that every column may not be filled", "It depends on what you call error., but you can agree with me that most errors would come from poor quality of data recording and that is one of the areas your training on us addressed", "Like, I said in one earlier answer I said we sometimes get another folder for the patients when the old one is temporarily missing", "The time restraint we have to attend to the patients make us to sometimes rush and not complete every segment in their folders", "See when one get stressed with doing a tedious paper work about patients folders, errors are bound to happen now".*

Subtheme 3: Paper records need to be integrated with electronic systems

Considering the effectiveness, efficiency and ease of use of electronic records system, participants in this study opined that it was necessary that electronic-based systems be integrated with the paper-based systems for more effective service delivery. This is exemplified in the supporting quotes, including: *"Please we need to involve full electronic health records system", Yes, but that doesn't imply we will throw away everything we have now", "Well let me assure you that we are trying with the available things we have",* and, "*See, we need to integrate it to e-records".* Other supporting quotes include that: "*UPTH is a centre that pioneers health data administration, but you see generally we need infrastructure especially the electronic types", "Yes now, that is what we have been talking about, we need to upgrade", "Ahhhh, oga, we have been talking about upgrading our infrastructure and getting into electronic methods" and "Yes because, since we agree that the current system is not helping as much as it should, then something has to be done, don't you think so?"*

Theme 2: A case for training needs

Subtheme 1: Need for training to curb errors.

Under this theme, the occurrence of errors in the use of paper-based records was blamed on certain factors related with inadequate skills and knowledge to manage such records. Supporting quotes included: "*It depends on what you mean by errors, but you know error can come from anywhere, even from a staff who doesn't understand the work", "My brother, error can come from anybody, so we cannot just blame it on just our existing system".*

Theme 3: The need for infrastructure development for improved service delivery

Subtheme 1: Insufficiency of electronic methods

This study also identified that even though there were some elements of electronic records in the health facility, it was grossly inadequate to meet the needs of the high patient load who utilize health care services in the facility. This is seen in the supporting quotes: *"the infrastructures we have here are getting old, we use mainly paper to record the patients information", "I believe we have the both, but we mainly use the paper records, I just wish we will be using more of electronic".*

Subtheme 2: Electronic records not well maintained

In addition to the insufficiency of electronic-based records in the health facility, it was also identified the existing electronic records system was not being well maintained. This is exemplified in the supporting quote: *"Both paper and electronic records are used, but I'm not sure if the electronic method works fine".*

Objective 2: Current methods/ processes of data collection

Theme 1: The inadequacy of health records management

Subtheme 1: Only data collection, documentation, storage and retrieval are done

Assessment of the processes of the current health records paper-based system revealed that there was an inadequacy of the processes that were meant to be conducted for a wholesome adequacy of the paper-based system. It was reported that only data collection, documentation, storage and retrieval were done but data analysis and transmission were rarely performed. Supporting quotes for this includes: "*I understand we should be able to do all as listed, but the ones I know is mainly to collect data, document it and the third one, ... data storage, yes.", "We carry out mainly the ones that are very important to our facility, mainly the first 4. What concerns me with the last two?", "We do data collection, data documentation, storage and retrieval, I am interested in data analysis and would like to be part of data analysis in UPTH", "I believe we do the first 4 items, well I also believe some people may be handling the data analysis and transmission", "We do the first 4 options but attempt the data analysis sometimes it is not usually completed, my brother the time and hands to do these are not there", and "To tell you the truth, we do not do that data analysis and data transmission, but we carry out the others".*

Subtheme 2: No expertise nor training on data analysis and transmission

Participants in this study were also identified to be void of the expertise and training needed to perform data analysis and transmission. This is seen in the stated supporting quotes: *"I am sure about all except the last 2, I don't think we have the time to do the analysis, I have not done it before", "Ok, seeing all the suggested items, where do we do the transmission, because I have not heard about transmission to any database, that is if it exists, I am telling you. Ehmm, I think we do mainly the first 4 items", "How I wish, we do the whole 6, it will help some of us to know how to do proper data analysis", and "How I wish we can do all, but I believe we can do it better with more hands and training".*

Discussion

In this study conducted to determine the health care information management processes and infrastructure availability at the University of Port Harcourt Teaching Hospital, it was identified that the processes as well as infrastructure made available for health information management were inadequate. Regarding the infrastructure of healthcare data administration in the centre, it was identified by most participants in the study that the infrastructural base of the health information management system in the facility was inadequate for providing effective service delivery. This was also the finding from the qualitative aspect of this study which showed the use of mainly paper-based records for health information management within the study site. This finding is also corroborated by the findings of other studies that have identified similar use of mainly paper-based records for managing health information (Alobo et al., 2020; Elikwu et al., 2020; Obimba et al.,

2022). The implication of this finding is that the use of paper-based systems hinders the effective and efficient collection, storage, and retrieval of patient information (Ifezue, 2020; Obimba et al., 2022). There is the possibility of paper records resulting in having poorly legible and clear clinical documentation of patient information and records. This inadvertently increases the likelihood of misinterpretation that can occur with handwritten paper records. This can also result in poor patient care as well as poor legal and regulatory compliance with laid down rules (Haule & Muhanga, 2021). It is pertinent to push for the adoption of automation of various health information administrative tasks, such as appointment scheduling, billing, record keeping and claims processing. Electronic record systems help to streamline workflows, reduce paperwork, and minimize the administrative burden on staff through easier identification, location and retrieval of patient health care information in health facilities. They also facilitate data-driven decision-making by offering robust reporting and analytics tools that help health personnel to monitor performance, track trends, as well as identify areas for quality improvement, and ultimately leading to more effective and efficient healthcare delivery (Luxon, 2015; Obimba et al., 2022).

Regarding the methods and processes of data management currently being used in the health facility in this study, it was identified that data management processes including data collection, documentation, storage and retrieval were the processes that were being used in the facility. This is also in agreement with the qualitative data retrieved in this study which revealed that these processes were actually been carried out, while data transmission was left out. This study revealed that even though these processes were carried out, the management system was still inadequate. Also, it was claimed that there was no expertise nor training on data analysis and transmission among the health care workers. This findings are in line with the findings of other studies that have reported similar data management inadequacies in health facilities (Obimba et al., 2022; K. Osundina & Kolawole, 2016; Sani et al., 2016). The implication of this finding is that these inadequate data management processes are consequences of the continued use of paper-based records management systems (Ifezue, 2020). The absence of data transmission also has a crucial implication, in that it will severely inhibit interoperability of health information management systems which is a hallmark for the successful achievement of collaborative improvement of health information systems (Alobo et al., 2020; K. S. Osundina, 2016). Integration and interoperability are key components of collaborative improvement in Health Information Management Systems (HIMS), considering that they help in achieving seamless exchange of healthcare data among various health care systems and providers. The integration of health information systems also allows for the secure and efficient sharing of patient information, that helps in minimizing duplication of efforts and improve care coordination (Alobo et al., 2020; K. S. Osundina, 2016). Collaborative improvement in HIMS is crucial for helping health care providers to adapt to the ever-evolving healthcare landscape, and in the process, meet the needs of patients through technological innovations (Sani et al., 2017). Interdisciplinary collaboration also provides a platform for applying a holistic approach to improving HMIS, thus ensuring that both clinical and technical aspects of health care service are considered (Boutillier et al., 2007).

Conclusion

In this study conducted to identify the processes and infrastructure of health data management systems at the University of Port-Harcourt Teaching Hospital, it was identified that most participants perceived the infrastructural base of the health information management system in the facility to be inadequate for providing effective service delivery and that the data management process was inadequate and lacked data transmission components.

Recommendations

In accordance with the findings made in this study, the following recommendations have been made:

(i) Considering the inadequate deployment of electronic-based systems in the health information management systems at the study facility, the Federal Ministry of Health alongside the legislative arm of government should as a matter of urgency look into formulating policies that encourage the adoption of these electronic-based systems healthcare facilities located in Nigeria.

(ii) The Federal Ministry of Health, legislative arm of government alongside the management of the health care facilities should engage in laying down guidelines that will ensure the proper maintenance, sustenance and improvement of the electronic medical records systems.

References

Abereton, P., & Ordinioha, B. (2018). Proxy Indoor Air Quality Measures and the respiratory health of under-five patients seen as the Pediatrics department of the University of Port Harcourt Teaching Hospital, Nigeria. *Niger Delta Medical Journal*, *2*(3), 36–46. http://ndmjournal.org/journal/december-2018/proxy-indoor-air-quality-measures-respiratory-health-five-patients-seen-paediatrics-department-university-port-harcourt-teaching-hospital-nigeria/

Adedapo, A. (2017). *An Assessment of Data Quality in Routine Health Information Systems in Oyo State, Nigeria* (Issue January). University of the Western Cape.

Alobo, I. G., Soyannwo, T., Ukponwan, G., Akogu, S., Akpa, A. M., & Ayankola, K. (2020). Implementing electronic health system in Nigeria : perspective assessment in a specialist hospital. *Afri Health Sci.*, *20*(2), 948–954. https://doi.org/https://doi.org/10.4314/ahs.v20i2.50

Attah, A. O. (2017). *Implementing the Electronic Health Record in a Nigerian Secondary Healthcare Facility: Prospects and Challenges*. UiT-The Arctic University of Norway.

Boutillier, B. M., Connor, P. O., Zyzis, T., Roberts, J., & Banasiak, K. (2007). *Does*

Collaborative Service Delivery Improve Client and Organization Outcomes? A Review of the Evidence on NPO Collaboration in Health and Social Services.

Elikwu, I. M., Igbokwe, A. C., & Emokhare, G. (2020). Elikwu, Igbokwe & Emokhare. *UNIZIK JOURNAL OF BUSINESS*, *3*(1), 43–56. https://doi.org/10.36108/unizikjb/0202.30.0140

Esene, H., Obi, A., Okojie, P., Omuemu, V., & Okojie, O. (2017). Health Infrastructural Correlates and Data Quality in Primary Health Care-Health Care-Health Management Information System in Edo State, Nigeria. *Journal of Advances in Medicine and Medical Research*, *23*(6), 1–10. https://doi.org/10.9734/JAMMR/2017/34967

Federal Ministry of Health, F. (2014). *"List of all Federal Teaching Hospitals". Nigeria*. Federal Ministry of Health.

Federal Ministry of Health, F. (2016). *National Health Policy: Promoting the Health of Nigerians to Accelerate Socio-economic Development* (Issue September).

Google. (2014). . *"Location of University of Port Harcourt Teaching Hospital" (Map)*. Google Maps.

Haule, C. D., & Muhanga, M. (2021). Influence of Health Information Systems on Services Delivery in Public and Private Health Facilities: A Systematic Literature Review. *The Sub Saharan Journal of Social Sciences and Humanities*, *1*(1), 24–30.

Ifezue, O. (2020). *DIGITALIZATION OF PATIENT DATA MANAGEMENT SYSTEM IN A PRIVATE HEALTHCARE FACILITY. Lessons learned from Lagoon Hospital, Lagos, Nigeria* (Issue November). University of Eastern Finland.

Luxon, L. (2015). Infrastructure – the key to healthcare improvement. *Future Hospital Journal*, *2*(1), 4–7. https://doi.org/10.7861/futurehosp.15.002

Obimba, K. C., Arize, I., & Ezenduka, C. C. (2022). Examination of health records documentation and management practices among health records personnel in two tertiary healthcare facilities in Enugu, South-East Nigeria. *African Journal of Health Economics*, *11*(1), 1–17. https://doi.org/10.35202/AJHE.2022.1110117

Oluwatuyi, M. F. (2020). A Dive into Problems of National Health Management Information Systems (NHMIS) in Nigeria. *International Journal of Innovative Science and Research Technology*, *5*(6), 236-240\. https://doi.org/10.38124/IJISRT20JUN269

Omole, G. (2015). Health Management Information System for Decision-Making in Nigeria: Challenges and Resolutions. *International Journal of Science and Research*, *4*(5), 2968–2974.

Osundina, K., & Kolawole, J. (2016). *Assessment of Health Information Management Practice among Health Records Professionals in Osun state Nigeria*.

Osundina, K. S. (2016). Health Information Utilisation and Decision Making in Tertiary. *International Journal of Health and Pharmaceutical Research*, *2*(1), 1–30.

Sani, N., Ibrahim, H., Ango, I., Hussaini, S., & Saleh, B. . (2016). Assessment of Patient Healthcare Record Management Practices in Tertiary Health Institutions of Jigawa State, Nigeria. *Int Jour Adv Tech Engr & Sc.*, *4*(5).

Sani, N., Manohar, R., Okocha, D. O., & Bdamasi, S. (2017). Health Information Systems , Best Practices in Patient data Management for Effective Health Care Service Delivery in Hospitals . A case of Some Selected Health Information Systems , Best Practices in Patient data Management for Effective Health Care Servi. *AGU International Journal of Management Studies & Research*, *5*(July), 1–12. http://www.aguijmsr.com

Tull, K. (2018). *Designing and Implementing Health Management Information Systems*.

SERVICE AVAILABILITY, HEALTH SYSTEM READINESS AND QUALITY OF LIFE (QOL) OF TYPE II DIABETIC PATIENTS IN GHANA

Corresponding Author:
Christine Ahiale
Head Institutional Public Health
Ga North Municipal Hospital
Accra, Ghana
Email: christineladjagla@yahoo.com

[1] Head Institutional Public Health, Ga North Municipal Hospital, Accra, Ghana
[2] University of Port Harcourt – Department of Preventive and Social Medicine
[3]Head of Graduate Studies, University of Health and Allied Sciences Ho Ghana

Abstract

Diabetes Mellitus (DM) prevalence has increased across several countries with varied income levels. DM if not managed can result in several health complications including nerve damage, kidney damage, eye damage, foot damage and skin conditions. The presence of DM and its accompanied health complications affect the overall quality of life (QOL) of the patient. This study seeks to assess service availability, system readiness and QOL of type 2 diabetic patients in Ghana. This is a hospital based cross-sectional descriptive study conducted in the 3 main Regions of Ghana among 1194 patients with type 2 diabetes. A multistage sampling technique was used selection of health facilities in each region. The WHOQOL-BREF tool was used in assessing health related QOL and WHO SARA tools was adopted to assess service availability and readiness. Systematic random sampling method was used to recruit diabetic patients, multiple regression was done to determine independent predictors of QOL. There was 40% of the Fifteen health facilities assessed had the service available with 70% service readiness in all domains which was found mainly among regional and district hospitals. the overall readiness score for basic equipment domain among all the facilities was 87%, staff and diagnosis domain were 44%, 35% and 60% for essential

medicine and diagnostic facilities respectively. On QOL out of 1194 respondents, 90% reported a satisfactory quality of life. There was generally low QOL in all the four domains. The overall mean score of QOL was 6.25 (±1.28). Marital status, occupational status and self-reported health status predicted overall QoL Males have better quality of life than females, and those below 50 years also have better QoL than those above 50 years. Similarly, those employed had better QoL than the unemployed, however, married and unmarried, educated and non-educated had no significant differences in their QoL. Although there is high service readiness, this study demonstrated lack of readiness in all domains among lower-level facilities such as health centers and CHPS compounds. Initiatives such as mobile clinics, telehealth solution and community outreach to broaden reach of diabetes services in underserved areas may address disparities in service availability and readiness.

Keywords: Service availability, health system readiness, Quality of life.

INTRODUCTION

The global prevalence of type 2 DM is projected to increase to 7079 individuals per 100,000 by 2030, reflecting a continued rise across all regions of the world (Khan et al., 2020).The WHO ranked DM as the 9th leading cause of death globally (WHOb, 2020) In Ghana, a retrospective cross-sectional study conducted on predominant complications of type 2 DM revealed that the prevalence of microvascular and microvascular complications of type 2 DM was 31.8% and 35.3% respectively(Annani-Akollor et al., 2019). The study further revealed that the prevalence of neuropathy, nephropathy, retinopathy, sexual dysfunction, diabetic keto-acidosis and hypoglycaemia were 20.8%, 12.5%, 6.5%, 3.8%, 2.0% and 0.8% respectively (Annani-Akollor et al., 2019). All these complications of type 2 DM can be minimized if much effort is directed to improving service availability and system readiness in the management of type 2 DM, thereby improving the QoL of people with type 2 DM.

According to WHO, health system readiness refers to the physical presence of the delivery of services (WHO, 2015). Readiness is the availability of components require to provide services such as basic amenities, equipment, standard precautions for infection prevention, diagnostic capacity and essential medicine(WHO, 2015). Health service availability and system readiness is

a component of structural attribute of health care quality. Provision of infrastructure, medicine, guidelines, equipment and staffs is a starting point for high-quality health care, and although it does not guarantee better process of care and quality effects, it may contribute greatly to QOL of patients with the disease condition (WHO, 2015).

QOL is a level at which a person stays fit, healthy, and ability to enjoy life to the maximum (Phillips, 2006). The WHO defines QOL as an individual's perception of their position in life in the context of the cultural and value systems in which they live and in relation to their goals, expectations, standards and concerns (WHO, 2013). This comprises of four main domains; physical, psychological, social relationships and environment domains. The physical domain include daily living activities, mobility, pain and discomfort, sleep and rest, work capacity, dependency on medicinal substances and medical aids, and fatigue (WHO, 2013). The psychological domain also comprises of bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality, thinking, learning, memory and concentration. The social relationships domain is also made up of personal relationships, social support and sexual activity. And the environment domain includes financial resources, freedom, physical safety and security, health and social care, opportunities for acquiring new information and skills, participation in and opportunities for recreation, and transport (WHO, 2013).Health interventions mostly aim at QOL as an ultimate goal of outcome for patients (Killaspy et al., 2016).

Considering the increasing incidence, prevalence and fatality rates of DM, especially type 2, it is important that the healthcare systems are prepared adequately in terms of infrastructure, personnel and medical equipment's to handle diabetic cases(Khan et al., 2020). It is also empirical that DM service availability in the management of people with DM are also taken into critical consideration

since both service availability and health system readiness can influence the overall QOL of people with DM patients.

In spite of the devastating health impacts faced by people with type 2 DM, enough has not been done by researchers to assess the number of health facilities that are providing DM services, the quality of the services provided and the overall QOL of people with Type 2 DM. Also, anecdotal evidence from some diabetic patients in Ghana shows low health system readiness in the management of Type 2 diabetes

A survey conducted in Ethiopia on service availability and readiness for diabetes care at health facilities, found majority of health facilities (59%) offer service services for diabetes (Acharya & Paudel, 2019). However, there was low specific service availability domain on guidelines for diagnosis and management of diabetes (12%), training on diabetes (6%), low availability of basic medicine required for treatment of diabetes (15%). It was also found inadequate basic equipment for diagnosis and management of diabetes(Bekele et al., 2017)

In a study done in both Ghana and Nigeria on predictors of QoL in patients with diabetes mellitus in two tertiary health institutions, shows generally low (66.14+-9.99 and 68.78+-7.86) QoL in Ghana and Nigeria respectively (Ababio et al., 2017)

Base on a cross sectional study carried out on predictors of HRQoL among patients with diabetes on follow up in Western Ethiopia indicates that a unit increase in age is likely to decrease HRQoL of patient with diabetes by 0.25 (Feyisa et al., 2019). The male diabetes patients had about five times better HRQoL compared to females (Feyisa et al., 2019). Diabetes patients who are married had five times better HRQoL compare to those unmarried and those who are unable to read and

write had about nine times lower HRQoL 3.6 units compared with those who can read and write (Feyisa et al., 2019).

METHODOLOGY

A cross section study of type 2 diabetes patient across selected regional and district hospitals in the three regions in Ghana namely Greater Accra representing the southern zone, Ashanti region representing the middle zone and Northern Region representing the northern zone. Fifteen health facilities were assessed for service availability and readiness in the selected regions.

Study Population

Persons aged 18 years and above who are type 2 diabetic and have been medically diagnosed at least one year at the time of this study. Health facility heads and/or a more knowledgeable health worker who provide service to diabetic patients in all health facilities in the three regions

Inclusion Criteria

All participants were 18 years and above and mentally sound to provide consent People living with DM ware included when they were diagnosed with DM at least one year ago They receive health services from selected health facilities, they have been diagnosed with Type 2DM. Health care providers will be included if: they provide health services to diabetic patients They work in any of the selected health facilities

Exclusion Criteria

Diabetic patients who had any physical disability or illness unrelated to the disease will be excluded because physical illness or disability may affect their response to the study. Health care workers who were not at posts or busy attending to the client's ware excluded from the study.

Procedure and Study Instrument

The study used a multistage sampling method. Regional Hospitals, were selected through stratify sampling method, District Hospitals ware selected using simple random sampling method. Selection of study participants ware through systematic random sampling

A health facility inventory questionnaire was customized from the standard WHO, (2015) SARA tool (19.20) which was used to collect data on service availability and system readiness. The WHOQOL-BREF tool was adapted to assess the QOL of people with T2DM. The WHOQOL-BREF tool has four main domains namely; physical, psychological, social and environmental domains.

Statistical Analysis

Data entered in Kobo Collect toolbox was exported as an excel file to STATA version 14.1 for cleaning and analysis. To assess QOL, 4 domain scores that measures overall QOL were computed. The four domain scores denote an individual's perception of QOL in the following domains: physical, psychological, social and environmental. The domain scores ware scaled in a positive direction, that is, higher scores denote higher QOL. The mean score of items within each domain was used to calculate the domain score. Mean scores are then multiplied by 4, and subsequently transformed to a 10-100 scale using a transformation formula (WHO, 2015). Higher scores will mean a better QOL. Socio-demographic characteristics of diabetic patients was presented as percentages, frequencies and means. QOL scores was presented as mean±SD.

Descriptive analysis such as frequencies, mean, and percentages was used to describe service availability and system readiness. To analyse overall service availability and system readiness, the score for service availability and system readiness was calculated in three stages, and this was done

in Microsoft Excel Software: the first stage was the determination of percentage score of facilities that have the service available (number of facilities that have the indicator *100/total number of facilities); secondly, readiness index (RI) of facilities according to all 5 domains (staff and guidelines, equipment, diagnostics and medicines and commodities) ware calculated (the percentage of all indicators score in each domain). The third stage is the calculation of facility level's overall readiness score (the average of the readiness index of all 5 domains). A cut-off score of 70% was used to interpret the readiness score, where scores above 70% will be considered as "ready" to manage DM at that level.

RESULTS AND DISCUSSION

Health Service Availability System Readiness in the Management of Diabetes

Profile of health facilities

The 15 health facilities surveyed were all Ghana Health Service owned. The survey consists of 80% primary level health facilities which include CHPS compounds, health centers, and district health facilities and 25% were secondary level facilities. Furthermore 53% of the facilities that is Regional, district hospital and some policlinics and health centers were located in an urban area.

Figure 1: Profile of Health Facilities

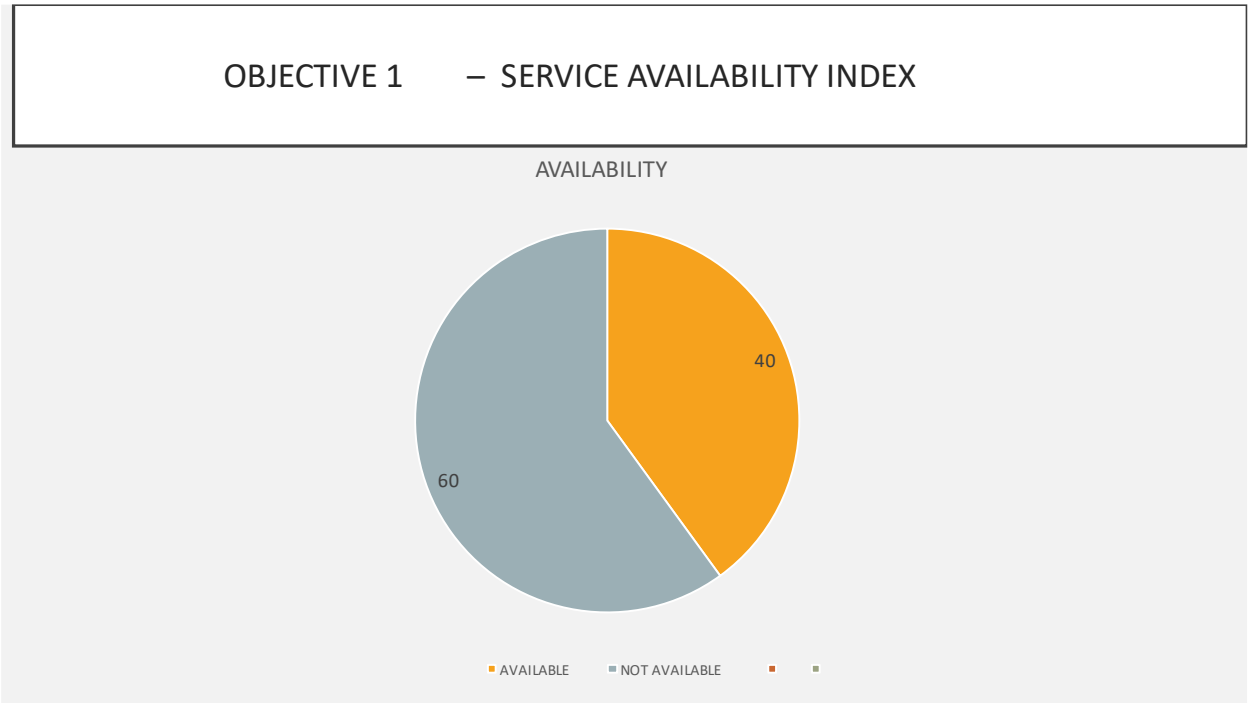
Variable	Frequency (N=15)	Percentage (%)
Type of facility		F
Regional Hospital	3	20
District Hospital	3	20
Poly Clinic	3	20
Health Centre	3	20
CHPS	3	20
Ownership of facility		

Ghana Health Service	15	100

Health Service availability

The study found that 40% of facilities surveyed had service available. This comprises of the Regional and District health facilities.

Figure 2 -Health Service Availability



Health Service Readiness.

The figure shows the proportion of health facilities with guidelines, equipment, diagnostic capacity and availability of essential medicine among facilities under study. The regional and district health facilities have the highest score of 89% for diabetes management guidelines availability while polyclinics and health centers had 68% and 44% respectively. 80% of health facilities had available

blood glucose test, 66% of the facilities had available urine dipstick for protein test and 42% were able to use urine dipstick for albumen. On the availability of trained staff on diabetes diagnosis and management in the last two years found that 40% had at least one staff trained in diagnosis and management of diabetes. 60% had guidelines and 33 % had specialist available for diabetes management. facilities score overall 87% in availability of blood pressure apparatus, weighing scale, and stadiometer. all health facilities had 100% in availability of blood pressure apparatus and adult weighing scale and 60% had available stadiometer., there is an overall 35% availability of essential medicines.

Figure 4 – Service Availability and Readiness

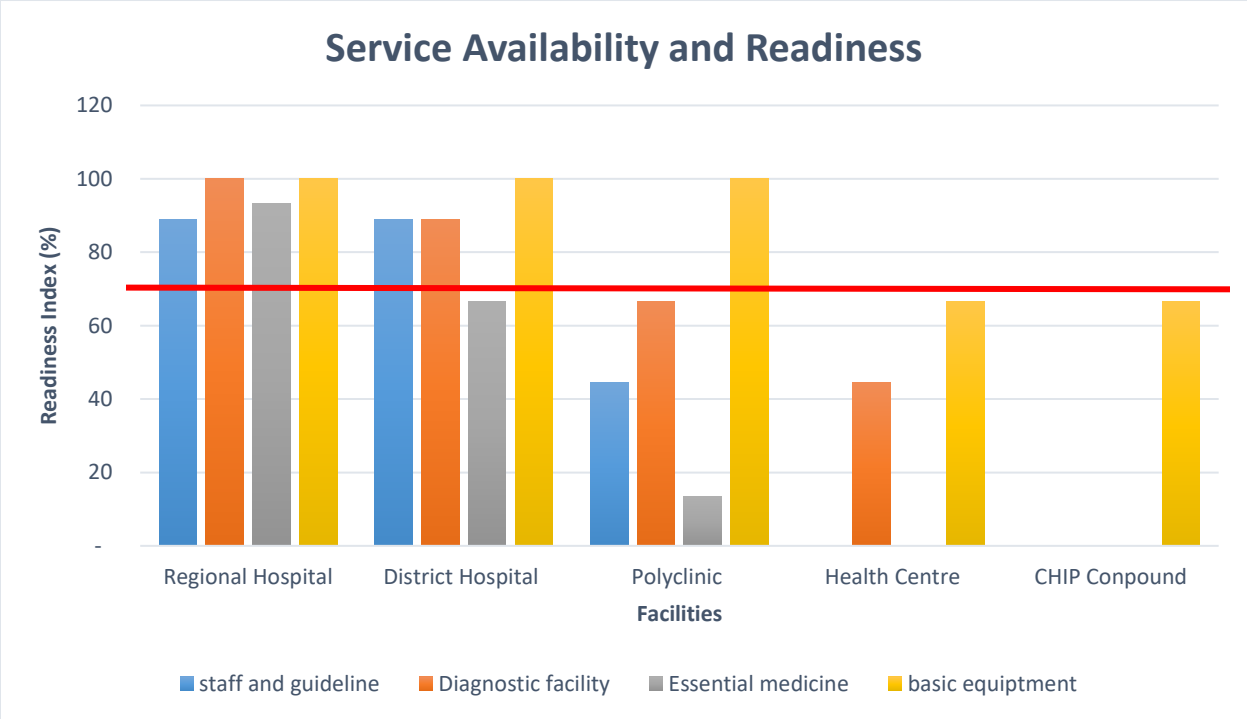
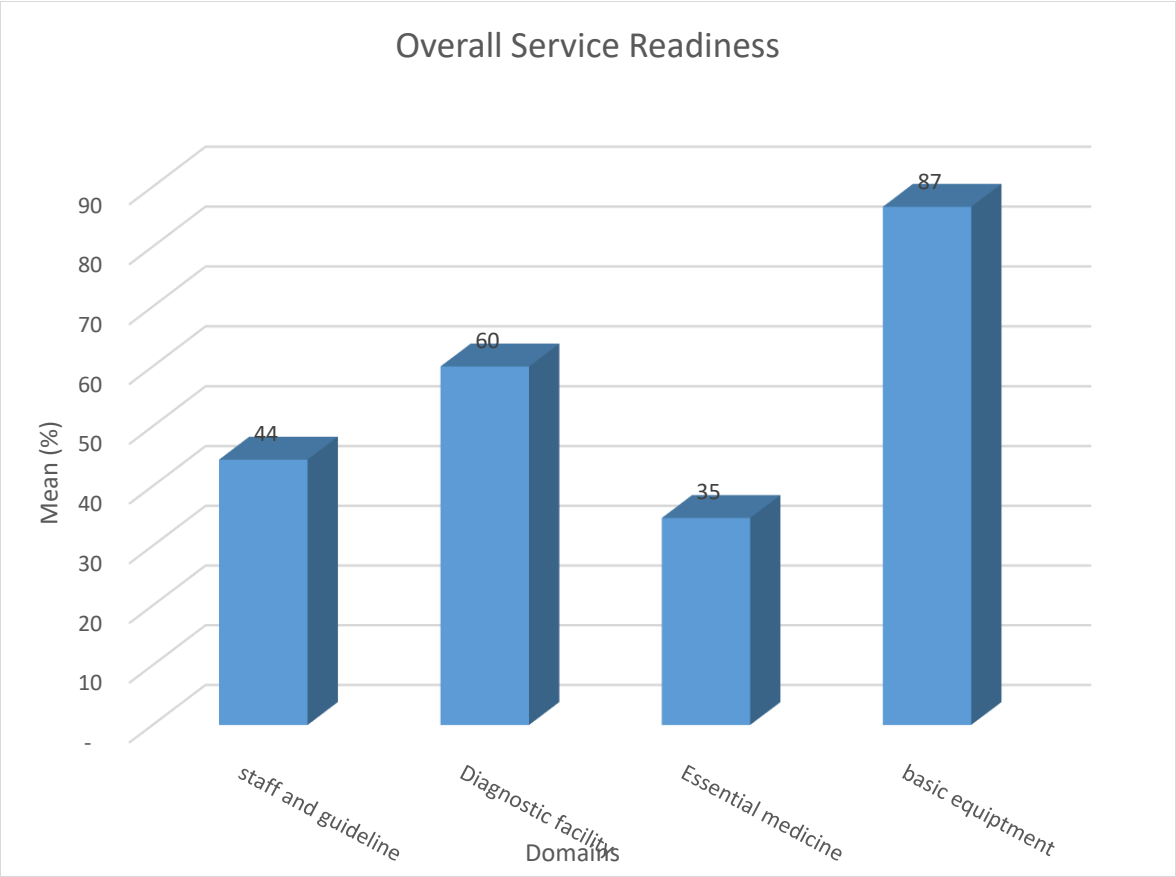


Figure 5: Service Readiness Index



Health-related quality of life among person with type 2 DM in Ghana

In all, 1194 participants were involved in this study. With mean age and standard deviation of 54.23 (±13.41), the study revealed that majority (60.3%) of participants were more than 50 years of age. About 5% were less than 30 years of age. With respect to sex, 56.5% of study participants were males. In terms of education, more than a quarter (25.5%) of participants had tertiary level of education. Also, more than one-sixth (61.9%) of participants were married as at time of conduct of the study. More than half (50.1%) of study participants were employed. Out of this, 62.5% were working in the private sector. Majority (41.6%) of the employed participants received less than 500.00 cedi monthly (Table 1.0).

Table 4.1: Socio-Demographic Characteristics

Variables	Frequency (N=1194)	Percentage (%)
Age Group		
< 30 years	71	5.9
30 - 50 years	403	33.8
> 50 years	720	60.3
Mean Age (±SD)	**54.23 (±13.41)**	
Sex		
Male	675	56.5
Female	519	43.5
Educational status		
None at all	222	18.6
Primary school	106	8.9
Junior High School	319	26.7
Senior High School	243	20.4
Tertiary	304	25.5
Marital Status		
Living as married	739	61.9
Divorced	49	4.1
Separated	104	8.7
Single (never married)	144	12.1
Widowed	158	13.2
Employment status		
Employed	598	50.1

Unemployed	596	49.9
Type of employment		
Government worker	114	19.1
Private sector worker	110	18.4
Private sector worker	374	62.5
Estimated monthly income		
<500	249	41.6
500 – 1000	197	32.9
1100 – 2000	87	14.6
> 2000	65	10.9
Median (IQR) income		**600 (400 – 1150)**
Health status		
Healthy	583	48.8
Unhealthy	611	51.2

IQR (Interquartile range), SD (Standard Deviation)

Comparison of the WHOQOL-BREF mean scores in four domains according to sex, age, education status, marital status, employment status, and health status

From table 4.2, there was increased mean score for all the four domains (physical, psychological, social and environmental) of health and the overall quality of health among participants less than 50 years compared to participants 50 years and beyond. Similarly, males had higher mean scores for all the four domains and the overall quality of life compared to females. For instances, males had a mean score of 22.52 and SD of 3.16 compared to mean score and SD of 21.29±2.98 for females. Also, educated participants had higher mean scores compared to participants who are not educated. Married participants had higher mean score in all domains compared to unmarried/divorced/widowed participants. In addition, employed participants had higher mean scores for all the four domains compared to unemployed participants.

Table 4.3 Comparison of the WHOQOL-BREF mean scores in four domains according to sex, age, education status, marital status, employment status, and health status

	Domains

	Physical health Mean ±SD	Psychological health Mean ±SD	Social relationships Mean ±SD	Environmental health Mean ±SD	Overall QoL Mean ±SD
Age Group					
<50 year	23.21±2.97	19.66±2.78	10.01±1.68	26.00±3.44	6.49±1.19
≥50 year	20.91±2.88	18.08±2.95	9.56±1.91	25.32± 3.43	6.08± 1.31
P-value	<0.001	<0.001	<0.001	0.0008	<0.001
Sex					
Female	21.29±2.98	18.26±2.94	9.59± 1.91	25.17± 3.49	6.11± 1.35
Male	22.52±3.16	19.29±2.95	9.93± 1.71	26.14±3.32	6.42± 1.15
P-value	0.001	0.0000	0.0012	<0.001	0.001
Educational level					
Not educated	21.62±3.23	18.96±3.18	9.63±1.79	25.25± 3.56	6.06± 5.89
Educated	21.87±3.09	18.65± 2.94	9.76±1.99	25.67±3.42	6.29± 6.21
P-value	0.2866	0.1828	0.3973	0.1066	0.0156
Marital Status					
Married	21.88±2.89	18.96±2.91	9.99±1.77	25.94±3.32	6.37± 1.25
Single/Divorced/Widowed	21.73±3.35	18.29±3.05	9.32±1.86	25.03±3.58	6.05± 1.29
p-value	0.4206	0.010	<0.001	<0.001	0.004
Employment status					
Employed	22.88±2.65	19.75±2.49	10.26±1.66	26.35±3.28	6.59± 1.23
Unemployed	20.76±3.19	17.66±3.07	9.21±1.85	24.83±3.45	5.83±2.06
P-value	<0.001	<0.001	<0.001	0.003	<0.001
Health status					
Ill health	22.38±3.33	19.23±2.86	9.73± 1.73	25.61±3.52	6.43± 1.15
Healthy	21.29±2.81	18.21±3.02	9.74±1.93	25.57±3.38	6.06± 1.36
P-value	<0.001	<0.001	0.9067	0.8431	<0.001

DISCUSSION

Service availability and readiness

The finding on service availability, 40% of health facilities comprising District and Regional hospital have the service available. Service readiness of the various domains majority (87%) of the health facilities had all equipment necessary for diabetes care and similar finding was found in Uganda (Kantadede et al,2015) however no single health facility had 100% in all domains, regional

and district health facilities were better ready for diabetes management compared to polyclinics, health centers and CHPS compounds. The current study recorded low availability of essential medicine which is supported by study done in Tanzanian recording 41% (Bintabara et al,2020). The study found low availability of guideline and trained staff as reported in Ethiopia by Bekele et al,2020.

Low service availability and readiness signify deficit in efficient prevention diagnosis and management of type 2 diabetes especially those in underserved communities. There is the need to increase diabetes service availability in the lower health facilities owing to the increase number of cases of type 2 diabetes couple with its multiple complications

Quality of Life of Type 2 Diabetes Patients

The quality of life of type 2 diabetes patient were evaluated according to the various domains such as physical, psychological, social relationship, environmental and the overall quality of life. The lowest quality of life was recorded in the social relationship domain which implies that there is relatively less satisfaction with the social support system in terms of family and other social network which can help in the management of the disease Married and unmarried had on significant differences in their quality of life same as educated and uneducated. There is high quality of life in the physical domain compared to other domains and lowest quality of life was among social relationship domain. Lack social life show significant negative influence in reducing depression and lower quality of life there is the need to improve social determinants of health such as socioeconomic status, educational, physical environment, employment and social support network to aid in improving quality of life

There was generally low quality of life among type 2 diabetes patients below average. This is same with study done in two countries Ghana and Nigeria in 2017 also reporting low quality of life of type 2 diabetes patients. (Ababio et al, 2017) but it was opposed by study done in Austria reporting higher quality of life (Al-Taie, 2019) Patients below 50 years had better quality of life than those above 50 years, this is supported by study done in Ghana in 2022 which showed that there is significantly lower quality of life among patient ages above 60 years (Agyei et al,2022) this is due increase risk of others disease such as arthritis as one advances with age this is similar to study done in 2020 in xx which indicate that age was associated with better quality of life in terms of composite and individual domain score The study also reported males had better quality of life compared to females this is supported by study done in Bahasa which indicate male participant had higher EQ-5D index score compare to females (Arifin et al 2019)and in study done in Indonesia indicated that all domains of quality of life were significantly lower in females less educated and age group above 50 year(Hamid et al 2022) conversely study done in Ghana in 2016 indicated there is no significant differences between male and female participants in the overall quality of life (,Osei-Yeboah et al, 2016) he study showed that Low socio-economic status in terms of unemployment is associated with low quality of life and low level of education predispose one to poor quality of life. This implies that good educational level that is to be able to read and understand lead good self-management of the disease possibly may lead to better quality of life which is supported by study done in UAE (Al kaabi,2021)

Limitation of this study is that it did not assess the comparison of quality of life of the normal postulation which other studies (Dudzińska et al,2015 and Jankowska et al,2021). indicated better quality of life in the normal population is better than that of type 2 diabetes patients. Another

limitation is that the study did not take into consideration other factors that may affect quality of life such as diabetes complication, duration of the disease and presence of other comorbidities

CONCLUSION AND RECOMMENDATIONS

In conclusion, this study highlights the disparities in service availability, service readiness, and quality of life among type 2 diabetes patients in Ghana. Lower primary level health care provider's areas face greater challenges in accessing diabetes care, leading to potential disparities in quality of life. Additionally, deficiencies in standardized care protocols and healthcare provider training require attention to improve the quality of diabetes care across the country

This study recommended the following

1. The government of Ghana in collaboration with Ministry of Health must formulate policies on mass education regarding the knowledge on the disease, prevention, and management of diabetes,
2. The Ghana Health Service should Create and execute plans to broaden the reach of diabetes services in rural and underserve regions, encompassing initiatives such as mobile clinics, telehealth solutions, and community outreach endeavors.
3. The Ghana Health Service should Invest in training and capacity-building for healthcare providers, particularly in rural healthcare facilities. Standardize diabetes care protocols to ensure consistent and evidence-based treatment.

4. The various health facilities must develop diabetes education programs to empower patients with the knowledge and skills to manage their condition effectively. Encourage self-care and self-monitoring.

5. The social support groups, NGO, Civil Society group and media houses should engage local communities in diabetes awareness and prevention campaigns to reduce the prevalence of type 2 diabetes and its associated complications that impact negatively on quality of life.

REFERENCES

De-Graft Aikins, A., Boynton, P., & Atanga, L. L. (2010). Developing effective chronic disease interventions in Africa: insights from Ghana and Cameroon. *Globalization and health*, *6*, 1-15.

Akazili, J. (2010). Equity in health care financing in Ghana.

Al-Busaidi, Z. Q. (2010). A qualitative study on the attitudes and beliefs towards help seeking for emotional distress in Omani women and Omani general practitioners: Implications for post-graduate training. *Oman medical journal*, *25*(3), 190.

Abdul Basith Khan, M., Hashim, M. J., King, J. K., Govender, R. D., Mustafa, H., & Al Kaabi, J. (2020). Epidemiology of type 2 diabetes global burden of disease and forecasted trends. *Journal of epidemiology and global health*, *10*(1), 107-111.

World Health Organisation. (2020). The top 10 causes of death. *World Health Organisation*.

Annani-Akollor, M. E., Addai-Mensah, O., Fondjo, L. A., Sallah, L., Owiredu, E. W., Acheampong, E., & Akamugri, S. (2019). Predominant complications of type 2 diabetes in kumasi: a 4-year retrospective cross-sectional study at a teaching hospital in Ghana. *Medicina*, *55*(5), 125.

Shayan, N. A., Eser, E., Neyazi, A., & Eser, S. (2020). Reliability and validity of the Dari version of the World Health Organization Quality of Life (WHOQOL-BREF) Questionnaire in Afghanistan. *Turkish Journal of Public Health*, *19*(3), 263-273.

Killaspy, H., Priebe, S., Bremner, S., McCrone, P., Dowling, S., Harrison, I., ... & King, M. (2016). Quality of life, autonomy, satisfaction, and costs associated with mental health supported accommodation services in England: a national survey. *The Lancet Psychiatry*, *3*(12), 1129-1137.

Bekele, A., Getachew, T., Amenu, K., Defar, A., Teklie, H., Gelibo, T., ... & Feleke, Y. (2017). Service availability and readiness for diabetes care at health facilities in Ethiopia. *Ethiopian Journal of Health Development*, *31*(2), 110-118.

Ababio, G. K., Bosomprah, S., Olumide, A., Aperkor, N., Aimakhu, C., Oteng-Yeboah, A., ... & Ogedegbe, G. (2017). Predictors of quality of life in patients with diabetes mellitus in two tertiary health institutions in Ghana and Nigeria. *Nigerian Postgraduate Medical Journal*, *24*(1), 48-55.

Feyisa, B. R., Yilma, M. T., & Tolessa, B. E. (2019). Predictors of health related quality of life among diabetic patients on follow up at Nekemte Specialized Hospital, Western Ethiopia: A cross sectional study. *medRxiv*, 19013516.