

ORIENT JOURNAL OF MEDICINE

Website: www.orientjomr.org.ng

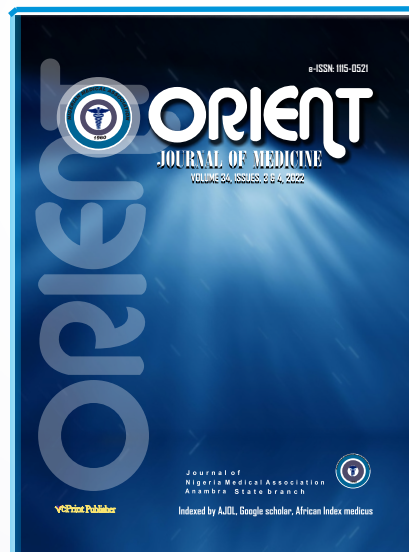
e-ISSN: 1115-0521

Prof Jude-Kennedy C Emejulu

Department of Surgery Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

Email: editorojm@gmail.com

Editor-in Chief



Journal of
Nigeria Medical Association
Anambra State Branch

Indexed by Google Scholar, African Index Medicus

VcPrint Publisher

orient



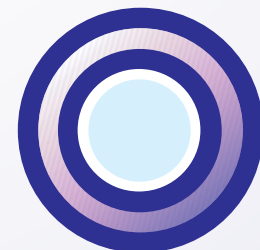
Title Page.....	i
Table of Contents.....	iii
Editorial Board.....	v
Editorial Notices.....	vii
Authors' Guide.....	ix

ORIGINAL ARTICLE

Clinicopathological Correlates of Patients with Prostate Cancer in a Tertiary Hospital in Northwestern Nigeria: EU Oyibo, MA Umar, K Abdullahi, SA Muhammad, PN Agwu.....	1-10
Prevalence and Pattern of Infectious (Septic) Arthritis in Immunocompromised Patients in a Tertiary Institution in Southern Nigeria: CN Chibuzom , CS Egele, Bafor Anirejuoritse.....	11-19
Quality of Life of Patients with Obstructive Sleep Apnea on CPAP Treatment in South West Nigeria: A Preliminary Report: OT Ojo, AO Ajibare, AO Dada, R Moronkola, A Odeyemi, T Fapohunda, O Ode.....	21-27
Basic Life Support Skills Training Among Healthcare Workers in Nigeria: A State-Wide Evaluation in the Niger-Delta Region: QN Kalu , TA Edentekhe, OE Omoronyia, BE Nakanda, RA Eshiemomoh, AA Archibong.....	29-36
Socio-Demographic Correlates of Antiretroviral Treatment Adherence among Paediatric HIV Patients Under Care at A Tertiary Health Institution in South-East Nigeria: CO Akahara, EC Nwolisa, I Egbuonu, CE Ezeudu, J Ezeogu, JC Elo-Ilo, BI Obi, CJ Okoro.....	37-43
Knowledge, Beliefs and Misconceptions about Epilepsy and its Treatment in a Rural Community in South-Eastern Nigeria: C Nnebue, E Nwazor, P Nwani, E Ewa, C Ifazulumba , F Iwere, N Onyebuchi.....	45-55

CASE REPORT

Laryngeal Papillomatosis in an Adult Patient Undergoing General Anaesthesia: IO Oranusi, G Obasikene, PC Okeke, ND Ukpai	57-60
---	--------------



orient



Editorial Board of the Orient Journal of Medicine**FOUNDING EDITOR 1989****FRANK AKPUAKA****Editor-in-Chief****Prof Jude-Kennedy C Emejulu**Department of Surgery Nnamdi Azikiwe University
Teaching Hospital, Nnewi, Nigeria**Email:** editorojm@gmail.com**Deputy Editor in Chief****Dr Okechukwu H Ekwunife**Department of Surgery Nnamdi Azikiwe University
Teaching Hospital, Nnewi, Nigeria.

+2349033825410

hyginusekwunife@yahoo.com

Assistant Editors**Jidefor O Ugwu**Department of Surgery Nnamdi Azikiwe University
Teaching Hospital, Nnewi, Nigeria.

+2348030960172.

Emeka B KesiemeDepartment of Surgery, Irrua Specialist Hospital Irrua,
Benin City.

+2348102460194..

Chinedu C Okoli*(Statistician)***Associate Editors**Basil C Ezeanolue
Prince U Ele
Thomas O Ulasi
Richard O Nnabuko
Edy I Aneke
Betrand Obi NwosuEkuma P Oji-Uzor
Dan CD Anyiam
OUJ Umeora
LU Ogbonna
Emeka Ogah
Igwebuikwe V Onyiaorah

Consulting Editors

Prof Udechukwu F Ezepue
University of Nigeria Teaching Hospital,
Enugu, Nigeria.

Prof Frank C Akpuaka
Anambra State University Teaching Hospital,
Awka, Nigeria.

Prof Alexander ME Nwofor
Nnamdi Azikiwe University Teaching
Hospital, Nnewi, Nigeria.

Professor Samuel CO Memphys .
Neurosurgery Centre, Enugu, Nigeria.

Professor Ed B Attah
University of Nigeria Teaching Hospital,
Enugu, Nigeria.

Prof Ed B Attah

Prof Samuel C Ohaegbulam

Prof JC Azubuike

International Editors

Ben C Nwomeh *Ohio USA*
MAC Onuigbo *Minnesota USA*

Orient Journal of Medicine

Orient Journal of Medicine is an Official Publication of the Anambra State Branch of the Nigerian Medical Association (NMA)

INDEXED BY AFRICAN JOURNAL ONLINE AND AFRICAN INDEX MEDICUS

Website: <https://www.orientjom.com>

Email: orientjournal@yahoo.com

Editorial Notices

Vol 35[1-2] Jan-Jun, 2023 ISSN 1115-0521

The Journal is published quarterly, Issues 1-4, and four Issues form one Volume

The Journal is published in English (*British*) Language

The subscriptions for parts of the world are as follow:

Nigeria - N1000.00 per copy

U.K. - £25.00 post free

The rest of the world is \$50.00 post free

Cheques or bank transfers should be made payable to:

Orient Journal of Medicine
First Bank of Nigeria
Account number: 2031173971

Cash could be paid at the Journal Office and a written receipt/acknowledgement obtained or into the Journal's account in Nigeria.

Business Correspondence, including Advert Enquiries, should be sent to:

Prof Jude-Kennedy C. Emejulu or Dr Okechukwu H. Ekwunife

Department of Surgery

Nnamdi Azikiwe University Teaching Hospital

PMB 5025 Nnewi, Anambra State, Nigeria

Tel: +234 803 328 3976, +234 803 372 5410

E-mail: editorojm@gmail.com **cc:** judekenny2003@yahoo.com, hyginusekwunife@yahoo.com

ADVERTISEMENT RATES IN THE ORIENT JOURNAL OF MEDICINE

Location of Advert	Full Page	Half Page	Quarter Page
Front Cover			N150,000.00
Back Cover	N100,000.00	N50,000.00	N35,000.00
Back of Front Cover	N100,000.00	N50,000.00	N35,000.00
Front of Back Cover	N100,000.00	N50,000.00	N35,000.00
First Page	N100,000.00	N50,000.00	N35,000.00
Last Page	N100,000.00	N40,000.00	N30,000.00
Either side of Centre Spread	N100,000.00	N50,000.00	N35,000.00
Front of Centre Spread	N100,000.00	N40,000.00	N30,000.00

Authors' Guidelines

Instructions for Journal Authors on Manuscript Preparation, Submission, and Peer Review

Peer Review

A paper is peer-reviewed for publication on the understanding that it is not being reviewed for publication simultaneously by another Journal, has not been accepted for publication elsewhere, and has not already been published. The Journal will publish original articles, review articles, case reports, and letters to the Editor. Contributions must be in English (British) Language and should be very concise.

Types of Article

Original articles may be in the clinical or laboratory medical sciences, not more than 3000 words with a maximum of six illustrations (figures and tables). Review articles are usually commissioned but, unsolicited reviews are welcome. A review article should be between 3000 and 3500 words, including references, and may contain illustrations (figures and tables). Case reports should not exceed 1500 words with four illustrations, and letters to the Editor should be at most 600 words long and may contain a maximum of two illustrations. Letters may be originated by the authors or be a reaction to previously published works in the Journal or on issues of relevance to Medicine and Medical Sciences.

Mailing

Authors are requested to submit their articles online at the journal website: Submit Article; or in an electronic format as an e-mail attachment to editorojm@gmail.com (Cc:judekenny2003@yahoo.com, hyginusekwunife@yahoo.com) or, as an electronic copy on a compact disc (CD) or, in a flash drive to the Editor, Orient Journal of Medicine, Department of Surgery, Nnamdi Azikiwe University Teaching Hospital, PMB 5025 Nnewi, Anambra State, Nigeria, in Microsoft Word format of all documents, tables, and figures. Pictures should be of good resolution in JPEG format, and all manuscripts are subject to peer and editorial reviews.

Charges

Authors are required, to pay a submission fee of N15, 000 (Fifteen Thousand Naira only) at

submission and a publication charge of N25,000.00 (Twenty-five thousand naira) only after acceptance, paid into the **Orient Journal of Medicine Bank Account**:

Name: *Orient Journal of Medicine,*

Bank: *First Bank of Nigeria,*

Account number: *2031173971*

Please, mail a scanned copy of the evidence of payment as an e-mail attachment to the Journal's e-mail address. Upon acceptance of the article, a publication fee of N20,000 (Twenty Thousand Naira only) should be paid before the author's proof copy is mailed to the author and the paper transferred to the publisher. There are no extra charges for reproducing colour or black-and-white photographs.

Preparation of Manuscripts

Manuscripts should be arranged in the following sections: Title page, Abstract, Body of Text, any Acknowledgement(s), References, Tables, and Figures (with or without Legends for figures). All details about the Journal could be accessed at www.orientjom.org.

Title Page should give the following information: (1) title of the article (2) first name in full, the second name abbreviated and surname in full of the author(s), no titles or qualifications may be attached (3) the department(s) and institution(s) to which the work should be attributed for each author (4) name and address of the author for correspondences (5) sources of support in the form of grants (6) a running title and (7) four to seven keywords are required; none of which should have appeared in the article title.

The abstract should be structured and not more than 250 words. It should embody the Background, Objectives, Methodology, Results, and main Conclusions of the study, under appropriate sub-headings. Abstracts for case reports need not be structured.

Tables and Illustrations (Figures or Pictures) should have the relevant title, typed in brief, just above each one. Illustrations should be submitted in the JPEG format (or MS Word of reasonable size and high resolution to reduce the electronic byte load). Tables and figures should be numbered consecutively in Arabic numerals and must be made reference to in the Results and/or Discussion sections in parenthesis

References

References should follow the Vancouver style, numbered consecutively in the order in which they are first mentioned in the text, situated at the end of the sentence in superscript after the full stop, within the manuscript. At the end of the article, the full list of references should give the surnames and initials of all authors if three or less. For more than three authors, the names of the first three authors should be followed by “et al” in italics. The authors’ names are followed by the title of the article, then the title of the journal abbreviated according to the style of the Index Medicus or written in full, the year of publication, the volume number, and the first and last page numbers. Titles of books should be followed by the names of any editors, publisher, edition, place of publication, year of publication, and relevant pages.

Clinicopathological Correlates of Patients with Prostate Cancer in a Tertiary Hospital in Northwestern Nigeria

Emmanuel U OYIBO, Mohammed A UMAR, Khalid ABDULLAHI, Sadiq A MUHAMMAD, Peter N AGWU

ABSTRACT

Background: Worldwide, prostate cancer is a common cause of significant morbidity and mortality in ageing men. Digital rectal examination (DRE) and serum total prostate specific antigen (tPSA) are widely used tools for prostate cancer (CaP) screening and diagnosis before transrectal ultrasound (TRUS)-guided prostate biopsy. **Objectives:** This study aimed at finding the clinical, biochemical, radiological and pathological correlates in patients with an enlarged prostate and elevated serum tPSA. **Methodology:** This is a 12-month cross-sectional study of 80 male patients aged 50 years and above with lower urinary tract symptoms (LUTS), abnormal digital rectal examination and/or elevated PSA greater than 4ng/mL. Aged-matched males were also included as a negative biopsy group with serum levels of tPSA determined using ELISA methods among both groups. Clinical, procedural (TRUS guided biopsy) assessment, transrectal ultrasound-guided biopsies of the prostate for histological characterisation of all patients and Gleason score categorization for prostate in cancer group were done. The relationship between serum tPSA and Gleason score of prostate cancer patients was determined using Spearman's correlation. **Results:** The mean serum total PSA in patients with prostate cancer and the negative biopsy group was 82.93 ± 35.02 and 28.85 ± 30.92 ng/ml respectively. The majority of the patients in the prostate cancer group (90.0%) had suspicious findings on DRE compared to the negative biopsy group (46.2%). There is a positive correlation between serum tPSA and Gleason score in patients with prostate cancer. Serum tPSA levels were significantly lower in the negative biopsy group. The Gleason score pattern of distribution among patients with Prostate cancer showed that the majority had a score greater than 8 and ISUP Grade V. **Conclusion:** Findings of elevated total serum PSA and abnormal digital rectal examinations in patients with an enlarged prostate in our practice are predictive of high Gleason score prostate cancer on TRUS-guided biopsy of the prostate.

Keywords: Clinicopathological, Digital rectal examination, Gleason score, Prostate cancer, Serum total prostate specific antigen (tPSA), Transrectal ultrasound guided biopsy.

OPEN ACCESS

Affiliation

Urology Unit,
Department of Surgery, Usmanu
Danfodiyo University Teaching Hospital,
Sokoto, Sokoto State, Nigeria.

*Correspondence

Emmanuel Ugbede Oyibo
Tel: +2348069669973
Email: ugbedeoyibo@gmail.com

Article Metrics

Date Submitted: 9 July 2022
Date Accepted: 19 Sept 2022
Date Published: Jan-June 2023

Journal Metrics

E- ISSN: 1115-0521
Website: www.orientjom.org.ng
E-mail: editorojm@gmail.com

Publisher:

cPrint, Nig. Ltd
E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7126985

How to cite this article

Oyibo EU, Umar MA, Abdullahi K, Muhammad SA and Agwu PN. Clinicopathological Correlates of Patients with Prostate Cancer in a Tertiary Hospital in Northwestern Nigeria. *Orient J Med*, 2023;35(1-2):1-10. DOI:10.5281/zenodo.7126985

INTRODUCTION

Prostate cancer ranks the second most common malignancy in men and the fourth most common cancer in males and females with an estimate of about 1.1 million men diagnosed with this cancer in 2012, and 70% of the diagnoses occurred in developing nations.¹ The incidence of prostate cancer varies worldwide, with the highest rates in Australia, New Zealand, Northern America, and Western and Northern Europe due to the widespread practice of screening for cancer using prostate specific antigen test and then a subsequent prostate biopsy.²

In men, prostate cancer is the fifth leading cause of death, and the greatest mortality has been found among men of African descent¹. However, the 2012 age-standardised incidence rate for prostate cancer estimated for Nigeria was 30.7 per 100,000.³ Contrary to the World Health Organization reports, several other studies indicate a higher incidence of prostate cancer in Nigerian men. Studies from Northwestern Nigeria suggest that 6.0% of male cancers are due to prostate cancer corroborated by other hospital-based studies from across other geopolitical zones of Nigeria with a rising incidence of 6.2% in certain regions to 16.5% in others.⁴⁻⁹

Patients with an enlarged prostate may present with complaints of lower urinary symptoms, necessitating physical examination and digital rectal examination(DRE), serum prostate specific antigen assay which may be elevated often culminating in prostate biopsy to reach a diagnosis and the subsequent need to provide suitable treatment.^{7,10-13}

Early detection and improved treatment in patients with cancer of the prostate are associated with declining mortality in most Western and European countries.¹⁴ However, this is contrary to what obtains in developing countries like Nigeria where no institutionalized screening protocol coupled with poor awareness, knowledge and attitude toward the disease.¹⁵⁻¹⁷ Prostate biopsy and histology have remained the gold standard for prostate cancer

diagnosis after the detection of an anomaly on the digital rectal examination(DRE) though not the only indication for such procedure. Tumour biomarkers elaborated in the body have played a vital role in the early diagnosis, treatment and follow-up of patients with prostate cancer. These biomarkers may be present in the blood or urine samples of patients and these samples may be obtained with minimal or no complications as the sample collection is minimally invasive.¹⁸

Since the late 80s, serum prostate specific antigen assay has revolutionized the screening and diagnosing of prostate cancer. Despite the controversies surrounding its application, the introduction of PSA as a screening tool has reduced the rate of diagnosis of advanced disease and mortality from prostate cancer due to earlier detection of apparently asymptomatic stage.^{19,20} On the other hand, the Gleason grade and score of the biopsy specimen is an objective assessment of the degree of differentiation of the malignant prostate tissue and has been applied as a surrogate indicator of the aggressiveness of the tumour.^{21,22}

METHODOLOGY

The study was a hospital-based prospective cross-sectional study conducted following the approval of the Health Ethics and Research Committee(HERC) of the Usmanu Danfodiyo University Teaching Hospital, Sokoto. It included consecutive patients presenting to the urology clinic of our hospital from March 2019 to February 2020 with clinical, radiological, and biochemical features suggestive of prostate cancer.

The inclusion criteria were patients aged 50 years and above with: elevated PSA and/or Lower urinary symptoms (LUTS), abnormal digital rectal examination (DRE) findings, and/or abnormal TRUS/transabdominal scan findings or those with histologically confirmed prostate cancer before the commencement of treatment.

Those patients who have had a digital rectal

examination in less than a week, a biopsy of the prostate in less than three weeks, urethral instrumentation(urethroscopy) or stones in the urethra or the bladder in less than three weeks, prostate cancer patients on 5 α -reductase inhibitor drugs, hormonal or radiation therapy and those who have had the previous prostatectomy for benign prostatic hyperplasia or radical prostatectomy for malignant prostatic conditions were excluded from the study.

The sample size calculation for the prospective cross-sectional study²³ is as follows:

$$n = \frac{[Z_{1-\alpha/2}\sqrt{P_0(1-P_0)} + Z_{\beta}\sqrt{P_1(1-P_1)}]^2}{(P_1 - P_0)^2}$$

- $Z_{1-\alpha/2}$ = percentage point of the normal distribution corresponding to the required (two-sided) significance level (α) of 0.05 = 1.96.
- Z_{β} = one sided percentage point of the normal distribution corresponding to 100% -the power, example if power = 80% (100% - power) = 20% (i.e. p- value of 0.2) = 0.84
- P_0 = Null hypothesis proportion (i.e. no increase expected, which means that the proportion will remain as previously obtained i.e.sensitivity of prostate specific antigen from the previous study, 89.8%.^{24,25}=0.898
- P_1 = Alternative hypothesis proportion = 89.8% baseline + 10% increase = 99.8% = 0.998
- $P_1 - P_0$ = The difference (i.e. expected increase in the proportion of microseminoprotein - beta, new biomarker in the diagnosis of CaP) = 0.998-0.898 = 0.1

$$n = \frac{[1.96 \times \sqrt{0.898(1-0.898)} + 0.84\sqrt{0.998(1-0.998)}]^2}{(0.998 - 0.898)^2}$$

$n = 32.67 = 33$ Patients or subjects.

The sample size includes attrition of 20% {that is 6.30 approximately 7}. The minimum sample size for this research was forty(40). Out of the eighty patients(80) recruited, forty(40) patients returned

with adenocarcinoma of the prostate on histology while the remaining forty(40) patients had a negative biopsy. All the patients had TRUS-guided biopsy of the prostate. A structured proforma was used to collect relevant data, including demographics, clinical history, physical examination, clinicopathological variables, results of the relevant investigation and prostate biopsy findings on TRUS examination. The data were entered into the Statistical Package for the Social Sciences (IBM SPSS) for Windows, Version 20.0. Armonk, NY: IBM Corp, 2011. The mean of serum total prostate-specific antigen (tPSA) in both groups was determined and compared using the Students' t-test. The relationship between serum levels of total prostate-specific antigen (tPSA) and Gleason scores of patients with prostate cancer was calculated using Spearman's correlation. The level of significance was set at $p < 0.05$. After informed consent, under aseptic conditions, 4mls of the venous blood sample was collected from the upper extremity and put into plain red top venipuncture tubes without additives and anticoagulants. The assay for total PSA(tPSA) was done using the enzyme-linked immunosorbent assay (ELISA) method based on the manufacturer's (Monobind Inc- AccuBind ELISA Microwells Product Code:2125-300) instruction.

Prostate Biopsy

Transrectal ultrasound(TRUS) guided prostate biopsy was done using Mindray Digi/Prince®(DP-6600)-Germany 2007/2008 for all patients recruited. The frequency of the transrectal probe was set at 6.5 MHz to scan the prostate and for biopsy. Twelve (12) biopsy cores were obtained from lateral to medial parts of each prostate lobe, targeting suspicious nodules visualized on TRUS. The specimen was appropriately labelled and sent in 10% formaldehyde to the Histopathologist. Haematoxylin and Eosin (H&E) slides were prepared and examined under the microscope (Olympus BX51 with low power X40 and medium power X200) for tissue diagnosis. The histopathologist determined the histology and the Gleason grade/score of the benign and malignant prostate tissue respectively.

RESULTS

Forty men with histological diagnosis of prostate cancer and forty age-matched adult males with negative biopsy were recruited for this study.

Patients' age distribution in the CaP group ranged from 50 to 89 years, with a mean of 69.38 ± 8.08 years. The peak age incidence in the CaP group was in the 8th decade (71-80 years). Similarly, patients' age range in the negative biopsy group was 50 to 99 years, with a mean of 65.43 ± 9.68 years). There was a statistically significant difference in the age distribution of both groups ($p=0.003$).

Table 1: Clinical parameters of study participants

Variables	Prostate Cancer Group n=40(%)	Negative biopsy Group n=40(%)	p-value
LUTS			
Yes	30(75.0)	34(85.0)	0.264
No	10(25.0)	6(15.0)	
Family history of Prostate cancer			
Negative	4(10.0)	11(27.5)	0.898
Positive	2(5.0)	2(5.0)	
Digital rectal examination			
Unaware	34(85.0)	27(67.5)	<0.001
Benign	4(10.0)	22(53.8)	
Suspicious	36(90.0)	18(46.2)	

Table 2: Procedural (TRUS Guided biopsy) assessment

Variables	Prostate Cancer Group n=40(%)	Negative biopsy Group n=40(%)	p-value
Prostate capsule Integrity			
Intact/Uniform	6(15.0)	22(55.0)	
Breach/Irregular	34(85.0)	18(45.0)	
Prostatic Nodules			
Yes	31(77.5)	15(37.5)	<0.001
No	9(22.5)	25(62.5)	
Echogenicity of Prostate			
Hyperechoic	0(0.0)	5(12.5)	0.003
Hypoechoic	22(55.0)	11(27.5)	
Isoechoic	5(12.0)	14(35.0)	
Mixed	13(32.5)	10(25.0)	
TRUS Prostate Volume(g)	67.32±52.50	57.19±34.06	0.382

Serum Total PSA Levels and Histopathological Characteristics of Study Participants

Among the Prostate cancer patients, the serum total PSA ranged from 6.25 to 114.67 ng/ml with a mean of 82.93 ± 35.02 , while the serum total PSA in the negative biopsy group ranged from 0.88 to 115.17 ng/ml with a mean of 28.85 ± 30.92 which was significantly lower than the CaP group ($p<0.001$). The majority of the CaP group patients (34, 90%) had PSA values greater than 20ng/ml.

All the patients in the study group had a histological diagnosis of adenocarcinoma of the prostate. The Gleason score of CaP patients in this study ranged from 6 to 10, with a modal score of 6. Twenty-one (52.5%) of these patients had a score of 8 and above (Figure 1). The least Gleason score was 6, accounting for 13(32.5%) men in the CaP group.

Table 3: Gleason score distribution and ISUP Grading among patients with Prostate Cancer.

Variable	Frequency	Percentage	
Gleason Score	6	13	32.5
	7	6	15.0
	8	6	15.0
	9	12	30.0
	10	3	7.5
Total	40	100	
ISUP Gleason Categories	I	13	32.5
	II(3+4)	1	2.5
	III(4+3)	5	12.5
	IV(8)	6	15.0
	V(≥ 9)	15	37.5
Total	40	100	

ISUP: International Society of Urological Pathology

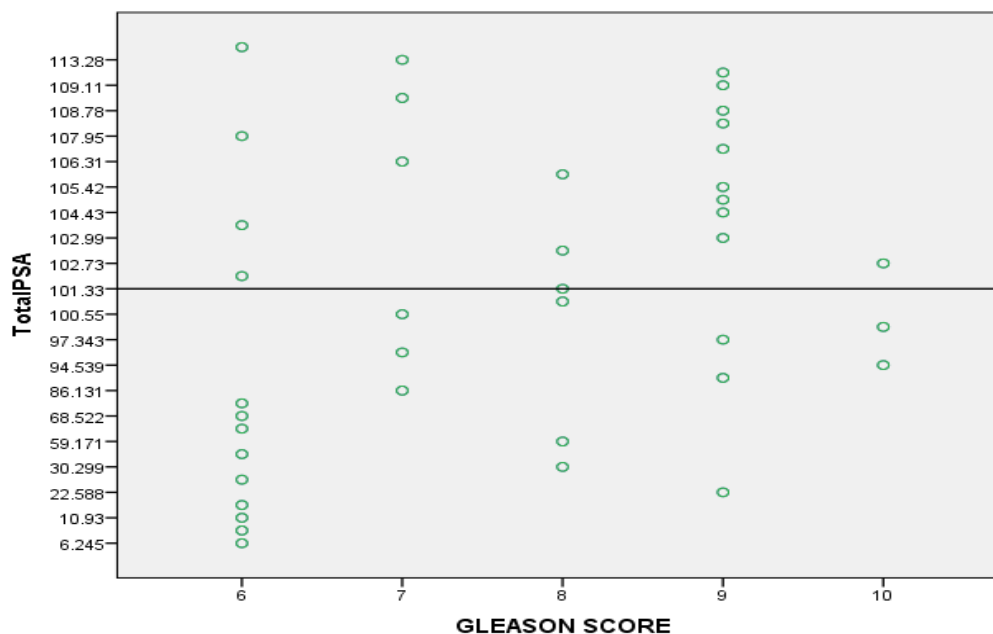
Correlation between Serum levels of Total Prostate Specific Antigen (tPSA) to Gleason Score in patients with Prostate Cancer.

Forty (40) study patients with adenocarcinoma of the prostate had an assessment of their Gleason's score (Mean = 7.65 ± 1.41) and assayed serum levels of prostate-specific antigen (PSA) (Mean = 82.93 ± 35.02). Spearman's correlation analysis showed a moderate positive correlation ($r_s = 0.442$) between Gleason's score and assayed serum levels of total prostate-specific antigen (tPSA). Therefore, there was a strong positive association between Gleason score and assayed serum levels of total PSA and was statistically significant ($p=0.004$).

However, there was a moderate positive correlation between serum total PSA and the Gleason score among men with CaP with higher total PSA levels found

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

Figure 1 : Correlation between serum level of Total PSA and Gleason Score in Patients with Prostate cancer.



among men with higher Gleason scores (Table 4) ($R^2=0.442$, $p=0.004$).

DISCUSSION

The manifestation of prostate disease is usually amongst the middle-aged and elderly groups. The development of adenocarcinoma of the prostate increases with age, peaking at 60-69 and 70-79 years, respectively.^{26, 27} The highest incidence of prostatic diseases in this study was in the 6th and 7th decades but among patients with negative biopsy occurred a decade earlier than the Prostate cancer group. This is because prostate diseases occur in the elderly population. These findings were similar to global surveys and studies in other parts of Nigeria, Ghana and South Korea.²⁸⁻³¹

The serum total PSA was significantly higher in patients with prostate cancer than in those with negative biopsy. This finding is comparable to

studies by Prcic *et al.*³², Froehner *et al.*³³ and Orakwe *et al.*³⁴, where the malignant prostate tumour group had a significant increase in the mean serum level of total prostate-specific antigen(PSA) compared with the controls($p<0.0001$). This is due to the abnormal leakage of PSA into the circulation further influencing its expression in malignant epithelium following a distorted prostatic glandular architecture.³⁵

In this study, prostate cancer patients had a Mean Gleason's Score and tPSA of 7.65 ± 1.41 and 82.93 ± 35.02 , respectively. Amongst the CaP group, twenty-one (52.5%) patients with a Gleason score of 8 and above, with thirteen (32.5%) patients having a Gleason score of 6 and below. This study showed a high Gleason score in most patients, similar to a survey by Okolo *et al.*, Nakandi *et al.* and Jalloh *et al.*³⁶ reporting that prostate cancer patients in sub-Saharan countries have high Gleason scores when compared to those in developed countries. The high Gleason score found in

the current study underscores the more aggressive behaviour of prostate cancer in men of African descent irrespective of place of birth or residence and this observation may be due to the genetic susceptibility of people of this race to the disease.³⁷ However, it may just be due to the peculiar cultural and religious practices leading to late presentation to the hospital for treatment.¹⁶

In this study, a moderate positive correlation ($r_s=0.442$) was observed between Gleason's score and assayed serum levels of total prostate-specific antigen among patients with CaP. This moderate positive correlation was statistically significant ($p=0.004$). This finding is in keeping with a previous study by Okolo *et al.*³⁸ from Ibadan-South western Nigeria, who also observed a moderate positive correlation ($r_s=0.400$) between Gleason's score and assayed serum levels of PSA, which was also statistically significant at $p=0.001$.

Patients presenting with suspicious findings were more likely to have a histopathological diagnosis of prostate cancer. Most of the patients in the CaP group had suspicious DRE findings ($p<0.001$), giving a cancer detection rate of 90% when compared to studies by Lee *et al.*³⁹ and Cooner⁴⁰ with a detection rate of 43.8% and 32.6% respectively. Thus the value of DRE in detecting prostate cancer in this study was higher than in previous studies which may be a result of the late presentation among our patients with advanced disease. Although 46.2% of the patients in the negative biopsy group had suspicious findings on DRE, a previous study had explained similar occurrences with a significant proportion of patients with DRE findings suggestive of malignancy turning out to be negative for malignancy after histological evaluation.⁴¹

This study supports the utility of DRE as an important and simple adjunctive bedside or office procedure in the diagnostic workup of patients with an enlarged prostate. This may be a trigger for

prostate biopsy and thus a diagnosis of prostate cancer as has been reported from other parts of the world among family care physicians.⁴²⁻⁴⁴

Digital rectal examination may thus be a handy tool for the general practitioner and the urologists, especially in most Sub-Saharan Africa hospitals, where there are no organized screening programs or advanced diagnostic tools for the detection of prostate cancer. This observation is pertinent as most patients in the region of study present late with advanced disease that induce changes in the prostate adjourning and rectal mucosa are usually remarkable and can easily be detected during DRE.

Transrectal ultrasonography (TRUS) since its introduction into clinical practice four decades ago has been an important armamentarium in the evaluation of the patient with a symptomatic enlarged prostate as it enables the assessment of prostate volume, echotexture, capsular integrity, changes in the urinary bladder as well as a tool for guided biopsy.^{45,46}

This study revealed a mean prostate volume of 67.32g with a range of 13.0-282g with the majority of patients having hypoechoic echogenicity (55.0%). Ahmed *et al.*⁴⁷ in Zaria-Nigeria found a mean prostate size of 66.8g with a range of 15-219g while Isiwele *et al.*⁴⁸ reported a mean prostate volume of 88.5cm³ with a range of 13.0cm³ 376.0 cm³. These were at variance with a similar study done in Norway by Eric *et al.*⁴⁹ with a mean prostate volume of 58.0g and a range of 26.6164.8g. In this study, lower prostate volumes were noted in the negative biopsy compared with the prostate cancer group, which is at variance with a previous study⁵⁰ however it was not statistically significant ($p>0.005$). Therefore, it is logical to take a higher number of core biopsies in larger prostates to detect cancerous foci as prostate cancer may coexist with benign prostate hyperplasia. TRUS is the most commonly available and utilized imaging modality in the diagnosis of prostate cancer with sonographic features such as hyperechoic, isoechoic and

hypoechoic though malignancy mostly demonstrates hypoechoic lesions, especially in the peripheral zone.^{46, 51, 52} More than half of the CaP group patients had prostate glands with hypoechoic features, followed closely by mixed echogenic elements. The highest proportion (55.0%) of patients with hypoechoic nodules had CaP compared with none and 32.5% (hyperechoic and mixed echogenicity) respectively. The highest predictive value in detecting prostate cancer is associated with peripherally located hypoechoic nodules.⁵³ The correlation of hypoechoic nodules to the histological diagnosis of CaP was noted in a previous study.⁴⁸ This was corroborated by a study done by Ahmed *et al.*⁴⁷ and Lee *et al.*³⁹ with hypoechoic lesions correlating more with a histologic diagnosis of CaP however, this current study revealed that all the hyperechoic lesions were benign. Performing a biopsy of only hypoechoic lesions would have misdiagnosed 27.5% of the patients with prostate cancer whose results were negative on histology.

A higher proportion of patients with an irregular prostate outline have CaP than 15.0% of those with intact/uniform capsules. This implies that the presence of irregular prostate outlines on TRUS strongly suggests the presence of CaP. The majority of the patients in the CaP group had a TRUS diagnosis of prostate cancer, giving a cancer detection rate of 77.5%. In a similar study by Lopes *et al.*⁵⁴ in Brazil, most of the patients with suspicious nodules in the CaP group had a malignant prostate on histology with a positive predictive value of 74%. A similar study by Gupta *et al.*⁵⁵ in India confirms identical inferences.

CONCLUSION

There is a significantly higher serum total PSA and Gleason score in the patients with prostate cancer in our population. Furthermore, suspicious findings on digital rectal examination and TRUS-guided biopsy were suggestive of malignancy in patients with prostate cancer suggesting the role of DRE in an

environment like ours.

Limitations of the Study

Some of the patients included in the negative biopsy group may have prostate cancer despite the negative TRUS biopsy result.

Declarations

Ethical approval and patient consent to participate in the study were sought from the institution's health and research committee and a copy is attached. All authors have their signatures appended.

Availability of data and material for the study: The datasets used and/or analyzed during the current study are available from the corresponding author on request.

Competing interests: The authors declare that they have no competing interests.

Funding: No source of funding.

Authors' contributions: EUO conceptualized the study, and analyzed and interpreted the patient data regarding prostatic diseases and biopsy. UA/KA/ASM/NPA thoroughly reviewed the manuscript and made corrections.

All authors read and approved the final manuscript.

Acknowledgements: I want to acknowledge Drs. KJ Awosan, Bilkisu Gulma and Ijapa Adamu for their assistance concerning statistical analysis. Mr Kabiru and Mr Mustapha assisted with the laboratory analysis.

REFERENCES

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, *et al.* Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *International Journal of Cancer*. 2015;136:E359-386.
2. Ferlay J, Parkin DM, Steliarova-Foucher E. Estimates of cancer incidence and mortality in Europe in 2008. *European Journal of Cancer (Oxford, England : 1990)*. 2010;46:765-

- 781.
3. Saibu GM, James BA, Adu OB, Faduyile F, Adedayo OF, Morounke SG, *et al.* Epidemiology and Incidence of Common Cancers in Nigeria. *Journal of Cancer Biology and Research.* 2017;1105.
 4. Yawe KT, Tahir MB, Nggada HA. Prostate cancer in Maiduguri. *West African Journal of Medicine.* 2006;25:298-300.
 5. Akang EE, Aligbe JU, Olisa EG. Prostatic tumours in Benin City, Nigeria. *West African Journal of Medicine.* 1996;15:56-60.
 6. Afolayan EA. Five years of Cancer Registration at Zaria (1992-1996). *The Nigerian Postgraduate Medical Journal.* 2004;11:225-229.
 7. Mohammed AZ, Edino ST, Ochicha O, Gwarzo AK, Samaila AA. Cancer in Nigeria: a 10-year analysis of the Kano cancer registry. *Nigerian Journal of Medicine.* 2008;17:280-284.
 8. Akinremi TO, Ogo CN, Olutunde AO. Review of prostate cancer research in Nigeria. *Infectious Agents and Cancer.* 2011;6(Suppl 2):S2-S8.
 9. Sahabi SM, Abdulahi K. Epidemiological Survey of Malignant Neoplasms in Sokoto, Nigeria. *World Journal of Research and Review.* 2017;4:10-15.
 10. Mohammed AZ, Edino ST, Ochicha O, Gwarzo AK, Samaila AA. Cancer in Nigeria: a 10-year analysis of the Kano cancer registry. *Nigerian Journal of Medicine.* 2008;17:280-284.
 11. Halpern JA, Oromendia C, Shoag JE, Mittal S, Cosiano MF, Ballman KV, *et al.* Use of Digital Rectal Examination as an Adjunct to Prostate Specific Antigen in the Detection of Clinically Significant Prostate Cancer. *The Journal of Urology.* 2018;199:947-953.
 12. Song JM, Kim CB, Chung HC, Kane RL. Prostate-specific antigen, digital rectal examination and transrectal ultrasonography: a meta-analysis for this diagnostic triad of prostate cancer in symptomatic Korean men. *Yonsei Medical Journal.* 2005;46:414-424.
 13. Odubanjo MO, Banjo AAF, Ayoola S, Abdulkareem FB, Anunobi CC, Olayinka AA. The Clinicopathologic Pattern of Prostatic Carcinoma in Lagos, Nigeria. *North American Journal of Medicine and Science.* 2013;6:71-75.
 14. Odubanjo MO, Banjo AAF, Ayoola S, Abdulkareem FB, Anunobi CC, Olayinka AA. The Clinicopathologic Pattern of Prostatic Carcinoma in Lagos, Nigeria. *North American Journal of Medicine and Science.* 2013;6:71-75.
 15. Ajape A, Ibrahim K, Fakeye J, Abiola O. An overview of cancer of the prostate diagnosis and management in Nigeria: The experience in a Nigerian tertiary hospital. *Annals of African Medicine.* 2010;9:113-117.
 16. Bowa K, Kachimba J, Labib M, Mudenda V, Chikwenya M. The changing pattern of urological cancers in Zambia. *Medical Journal of Zambia.* 2008;35:157-159.
 17. Awosan KJ, Yunusa EU, Agwu NP, Taofiq S. Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria. *Asian Journal of Medical Sciences.* 2018;9:51-56.
 18. Wu JT, Liu GH. Advantages of replacing the total PSA assay with the assay for PSA- α 1- antichymotrypsin complex for the screening and management of prostate cancer. *Journal of Clinical Laboratory Analysis.* 1998;12:32-40.
 19. Bul M, Schröder Fh. Screening for prostate cancer The controversy continues, but can it be resolved? *Acta Oncologica.* 2011;50(Suppl 1):4-11
 20. Humphrey PA, Andriole GL. Prostate cancer diagnosis. *Missouri medicine.* 2010;107:107-112.
 21. Gordetsky J, Epstein J. Grading of prostatic adenocarcinoma: current state and prognostic implications. *Diagnostic Pathology.* 2016;11:25.
 22. Jędroszka D, Orzechowska M, Hamouz R, Górnjak K, Bednarek Ak. Markers of epithelial-to-mesenchymal transition reflect tumor biology according to patient age and Gleason score in prostate cancer. *PLOS ONE.* 2017;12:e0188842.
 23. Ibrahim T. Sample size determination. In: *Research Methodology and Dissertation Writing for Health and Allied Health Professionals.* Abuja, Nigeria: Cress Global Link Limited; 2009:70-75
 24. Amayo A, Obara W. Serum prostate specific antigen levels in men with benign prostatic hyperplasia and cancer of prostate. *East African Medical Journal.* 2004;81:22-26.
 25. Ojewola RW, Tijani KH, Jeje EA, Ogunjimi MA, Anunobi CC, Adesanya AO. An evaluation of usefulness of prostate specific antigen and digital rectal examination in the diagnosis of prostate cancer in an unscreened population:

- experience in a Nigerian teaching hospital. *West Afr J of Med.* 2013;32:8-13.
26. Chodak GW, Keller P, Schoenberg HW. Assessment of screening for prostate cancer using the digital rectal examination. *The Journal of urology.* 1989;141:1136-1138.
27. Parsons JK, Kashefi C. Physical activity, benign prostatic hyperplasia, and lower urinary tract symptoms. *European Urology.* 2008;53:1228-1235.
28. Olajide A, Eziyi A, Kolawole O, Sabageh D, Ajayi I, Olajide F. A comparative study of the relevance of digital rectal examination, transrectal ultrasound, and prostate-specific antigen in the diagnostic evaluation of patients with advanced carcinoma of the prostate in a resource poor environment. *Sahel Medical Journal.* 2016;19:27-31.
29. Lee SWH, Chan EMC, Lai YK. The global burden of lower urinary tract symptoms suggestive of benign prostatic hyperplasia: A systematic review and meta-analysis. *Scientific reports.* 2017;7:7984.
30. Chokkalingam AP, Yeboah ED, Demarzo A, Netto G, Yu K, Biritwum RB, et al. Prevalence of BPH and lower urinary tract symptoms in West Africans. *Prostate cancer and prostatic diseases.* 2012;15:170-176.
31. Goh HJ, Kim SA, Nam JW, Choi BY, Moon HS. Community-based research on the benign prostatic hyperplasia prevalence rate in Korean rural area. *Korean Journal of Urology.* 2015;56:68-75.
32. Precic A, Begic E, Hiros M. Usefulness of Total PSA Value in Prostate Diseases Diagnosis. *Acta Informatica Medica.* 2016;24:156-161.
33. Froehner M, Hakenberg OW, Koch R, Schmidt U, Meyer A, Wirth MP. Comparison of the clinical value of complexed PSA and total PSA in the discrimination between benign prostatic hyperplasia and prostate cancer. *Urologia Internationalis.* 2006;76:27-30.
34. Orakwe DE, Tijani KH, Jeje EA, Ogunjimi MA, Ojewola RW. Comparison of the pre-treatment testosterone levels in benign prostatic hyperplasia and prostate cancer patients. *African Journal of Urology.* 2017;23:105-108.
35. Nogueira L, Corradi R, Eastham JA. Prostatic specific antigen for prostate cancer detection. *International Brazilian Journal of Urology.* 2009;35:521-529.
36. Jj Y. Clinical and Histopathological Profile of Patients with Prostate Cancer in Kampala, Uganda. *Medical Journal of Zambia.* 2019;46:19-27.
37. Ahmed RO, Sewram V, Oyeseun AR, Ayele B, Van Wyk A, Fernandez P. A comparison of clinicopathologic features of prostate cancer between Nigerian and South African black men. *African Journal of Urology.* 2022;28:1-8.
38. Okolo CA, Akinosun OM, Shittu OB, Olapade-Olaopa EO, Okeke LI, Akang EEU, et al. Correlation of serum PSA and Gleason score in Nigerian men with prostate cancer. *African Journal of Urology.* 2008;14:15-22.
39. Lee F, Gray JM, Mcleary RD, Mchugh TA, Solomon MH, Kumasaka GH, et al. Prostatic evaluation by transrectal sonography: criteria for diagnosis of early carcinoma. *Radiology.* 1986;158:91-95.
40. Cooner WH, Mosley BR, Rutherford Cl Jr, Beard JH, Pond HS, Terry WJ, et al. Prostate cancer detection in a clinical urological practice by ultrasonography, digital rectal examination and prostate specific antigen. *The Journal of Urology.* 1990;143:1146-1152.
41. Simmons MN, Berglund RK, Jones JS. A practical guide to prostate cancer diagnosis and management. *Cleveland Clinic Journal of Medicine.* 2011;78:321-331.
42. Jones D, Friend C, Dreher A, Allgar V, Macleod U. The diagnostic test accuracy of rectal examination for prostate cancer diagnosis in symptomatic patients: a systematic review. *BMC Family Practice.* 2018;19:79.
43. Soares SCM, De Camargo Cancela M, Migowski A, De Souza DLB. Digital rectal examination and its associated factors in the early detection of prostate cancer: a cross-sectional population-based study. *BMC Public Health.* 2019;19(1):1573.
44. Walsh AL, Considine SW, Thomas AZ, Lynch TH, Manecksha RP. Digital rectal examination in primary care is important for early detection of prostate cancer: a retrospective cohort analysis study. *The British Journal of General Practice.* 2014;64:e783-787.
45. Muhammad AS, Abdulwahab-Ahmed A, Agwu NP, Yunusa G, Abdullahi K, Mungadi IA. Use of transrectal ultrasound in the management of urologic diseases in a tertiary hospital in North-Western Nigeria. *The Nigerian Postgraduate Medical Journal.* 2018;25:172-176.
46. Shariat SF, Roehrborn CG. Using biopsy to detect prostate

- cancer. *Reviews in Urology*. 2008;10:262-480.
47. Ahmed M, Maitama H, Bello A, Kalayi G, Mbibu H. Transrectal ultrasound findings in patients with advanced prostate cancer. *Annals of Nigerian Medicine*. 2010;4:59-61.
 48. Isiwale EM, Ikpeme AA. Predictive Value of Transrectal Ultrasound in the Diagnosis of Prostate Cancer. *International Journal of Contemporary Medicine Surgery and Radiology*. 2018;3:C66-69.
 49. Eri LM, Thomassen H, Brennhovd B, Håheim LL. Accuracy and repeatability of prostate volume measurements by transrectal ultrasound. *Prostate Cancer and Prostatic Diseases*. 2002;5:273-278.
 50. Doluoğlu ÖG, Öztekin ÇV, Karabakan M, Akdemir AÖ, Çetinkaya M. The importance of prostate volume in prostate needle biopsy. *Turkish Journal of Urology*. 2013;39:74-77.
 51. Akduman B, Crawford ED. Transrectal ultrasound-guided prostate biopsy: current approach. *Turkish Journal of Urology*. 2010;36:25-32.
 52. Chen FK, De Castro Abreu AL, Palmer SL. Utility of Ultrasound in the Diagnosis, Treatment, and Follow-up of Prostate Cancer: State of the Art. *Journal of Nuclear Medicine*. 2016;57:13-18.
 53. Pinto F, Totaro A, Palermo G, Calarco A, Sacco E, D'addressi A, et al. Imaging in prostate cancer staging: present role and future perspectives. *Urologia Internationalis*. 2012;88:125-136.
 54. Lopes PM, Sepúlveda L, Ramos R, Sousa P. The role of transrectal ultrasound in the diagnosis of prostate cancer: new contributions. *Radiol Bras*. 2015;48:7-11.
 55. Gupta S, Gupta DK, Lamba H. Histopathological Study of 100 Cases of Prostatic Nodules. *International Journal of Medical Science and Education*. 2016;3:173-181.

Prevalence and Pattern of Infectious (Septic) Arthritis in Immunocompromised Patients in a Tertiary Institution in Southern Nigeria

Chukwuemeka N CHIBUZOM,¹ Chukwuemeka S. EGELE,² Bafor ANIREJUORITSE.³

ABSTRACT

Background: Infectious (septic) Arthritis in immunocompromised (HIV/AIDS) patients can lead to mortality if not diagnosed early and treated properly. The incidence of this condition across the globe is wide and varied. There is paucity of epidemiologic data in our environment. **Objectives:** The purpose of this study was therefore to evaluate the prevalence and pattern of presentation of infectious (septic) arthritis in our local environment and compare it with the global trend. **Materials and Methods:** Blood samples from 360 HIV/AIDS patients aged 19 to 67years suspected to have infectious (septic) arthritis were analyzed for Full blood count, ESR, CD4 count, and blood culture. Synovial fluid from the involved joint was analyzed for white cell count, microscopy culture and sensitivity, and assay for tuberculosis using the ZN stain technique. Mantoux test was done in those suspected to have tuberculous arthritis. Data were analysed using SPSS version 25. **Results:** Sixteen of the 360 participants had infectious (septic) arthritis involving twenty joints of the appendicular skeleton, and three spinal involvements. 50% of these had acute septic arthritis, 25% had HIV associated arthritis, 12.5% had tuberculosis of the spine, while 6.25% each had tuberculous arthritis, and tuberculous arthritis coexisting with tuberculosis of the spine. 62.5% had staphylococcus aureus, 25% streptococcus pyogenes, while 12.5% were Klebsiella Species. ZN stain was positive in two cases. **Conclusion:** The prevalence of infectious (septic) arthritis in HIV/AIDS immunocompromised patients in our environment was 4.4%. Acute septic arthritis was commonest infectious arthritis in this group of patients with Staphylococcus aureus being the commonest organism isolated. The knee joint was the most commonly affected joint.

Keywords: Acute septic arthritis. HIV associated arthritis. Tuberculous arthritis. Tuberculosis of the spine.

OPEN ACCESS

Affiliation

¹Nnamdi Azikiwe University, Nnewi Campus. ²Dalhatu-Arafat Specialist Hospital, Lafia Nasarawa. ³University of Benin Teaching Hospital, Benin, Edo State.

*Correspondence

Chukwuemeka Ndubuisi Chibuzom

Tel: +23400000000000.

Email: buzom4christ@yahoo.com

Article Metrics

Date Submitted: 12 July 2022

Date Accepted: 19 Sept 2022

Date Published: Jan-June 2023

Journal Metrics

p- ISSN: xxx-xxx | e- ISSN: 1115-0521

Website: www.orientjom.org.ng

E-mail: editorojm@gmail.com

Publisher:

cPrint, Nig. Ltd

E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7133549

How to cite this article

Chibuzom CN, Egede CS, Anirejuoritse B. Prevalence and Pattern of Infectious (Septic) Arthritis in Immunocompromised Patients in a Tertiary Institution in Southern Nigeria. *Orient J Med*, 2023;35(1-2):11-19. DOI:10.5281/zenodo.7133549

INTRODUCTION

Infectious (septic) arthritis is inflammation of infectious origin occurring in a native or prosthetic joint, which may be acute or chronic, and may affect one or more joints at the same time.^[1] It may be due to bacterial organism when it is properly referred to as acute septic arthritis. It may however be viral, fungal, or even be due to tuberculosis. There is also a variant of infectious arthritis which is seen in HIV/AIDS patients in which there is inflammatory joint pain often in the absence of microorganism and usually responsive to a course of steroid therapy and is referred to as HIV associated arthritis.

Acquired immunodeficiency syndrome is a syndrome of Retro-viral origin characterized by profound immune depression resulting in opportunistic infections.^[2] Infectious arthritis is thought to be more common in patients with HIV/AIDS due to the background immunosuppression, or additional risk factors such as intravenous drug use, hemophilia, and multiple blood transfusion.^[3] The burden of HIV/AIDS in sub-Saharan Africa is high with about 24.7million of the world burden living in the sub-region in 2013.^[4] The prevalence rate at Benin City is put at 3.8%, while the National seroprevalence is 3.34%.^[5, 6] It is a huge burden on limited medical economy because of its wide and varied clinical manifestations as a result of profound immunosuppression.^[7]

Infectious (septic) arthritis is often an orthopedic emergency. When it is not diagnosed and treated early, it may result in complete joint destruction and severe morbidity, or even mortality for the patient.^[8] Chronic disability such as painful stiff joint as well as deformity could result in poor quality of life. Death could result from septicemia, septic shock, or multiple organ dysfunction syndrome complicating infectious arthritis. Early diagnosis and proper treatment may result in

complete resolution of symptoms and restoration of normal joint function.^[9] Human Immunodeficiency virus infectious has also been documented to be associated with a wide range of rheumatological complications.^[10] Patients with HIV/AIDS are more likely to have complicated and severe forms of infectious (septic) arthritis which may affect their quality of life even more adversely hence making a documentation of the pattern of infectious arthritis in this patient group of vital importance. It is also the case that this group of patients are commonly seen by internal medicine specialists, and orthopedic referral made only late when severe forms are more likely to have set in.

Therefore the knowledge of the epidemiology of this condition in HIV/AIDS patients will aid in early diagnosis and treatment in order to reduce or prevent complicated forms and the attendant morbidity and mortality. The epidemiology of infectious arthritis in HIV/AIDS patients in our local population is not known or documented. Few studies have focused on infectious arthritis in this group of patients. There are few descriptions in the literature of the infective organisms involved as well as the diagnostic criteria in musculoskeletal infections in this patient group.

This study will evaluate the prevalence and nature of organisms involved, relationship between the CD4 cell count and infectious arthritis, nature of joint aspirates, serological investigations and radiologic investigations; all of which require further investigation especially in our environment. HIV/AIDS may modify the course of infectious arthritis, and severe complicated forms more likely. The challenge of late diagnosis as the orthopedic surgeon may only be consulted late gives further impetus for this study. The authors are not aware of any similar study from our local population on the subject prior to the conclusion of this study.

METHODOLOGY

Approval was obtained from the ethics and research committee of the University of Benin Teaching Hospital, Benin City, Edo State, Nigeria, before the study was commenced.

All HIV/AIDS positive patients seen between August 2016 and September 2017 at the outpatient clinics of the departments of Medicine, Orthopedics and Trauma, as well as the United States President's Emergency Plan for AIDS Relief (PEPFAR) clinics with complaints of joint pains, swelling or deformity, were eligible for inclusion in the study. We also included patients who were on in-patient admission during the study period. Patients with features of Rheumatoid arthritis, Systemic lupus erythematosus, trauma to the joint, co-morbid immunosuppressive conditions such as diabetes or cancer, as well as those on immunosuppressive drugs or prolonged antibiotic therapy were excluded from the study. Informed consent was obtained from all study participants.

A structured interviewer-administered questionnaire was developed and validated by two independent Orthopedic Surgeons for data collection in the study. It was pre-tested among ten participants before being used in the study. The questionnaire was administered in English language, occasionally an interpreter was used to ensure patients understanding before entry is made.

All patients were clinically assessed for general physical health status and wellbeing. Concurrent chronic ill health and other markers of debility were ascertained. The WHO clinical stage of the HIV/AIDS was also assessed and documented. Pain severity was graded using the visual analogue pain score ranging from 0 to 10, where 0 is no pain and 10 the most severe pain. The musculoskeletal system for each patient was evaluated for painful joint swellings, differential warmth, tenderness, painful limitation of motion, and deformity of the joints and spine.

Ten mls of venous blood was drawn under strict aseptic conditions from each patients forearm vein to confirm the HIV status where this was not already done, to determine the full blood count and Erythrocyte Sedimentation Rate, and to determine the CD4 cell count, and for Blood culture.

Two mls of synovial fluid was also obtained by aseptic arthrocentesis and analyzed for the Total white cell count, Microscopy, culture, and sensitivity as well as assay for Tuberculosis using the Ziehl-Neelsen stain for Acid Fast Bacilli (AFB) when there was significant joint effusion. All samples were transported to the laboratory in a cold box. A Mantoux test was done for each patient. Sample was also stained with 10% potassium hydroxide solution and viewed under direct microscope for fungus.

X-rays of the involved joints were done in those suspected to have infectious (septic) arthritis. Standard antero-posterior (AP) and lateral view x-rays were done. Joint space widening of greater than 2mm was considered significant. In addition, ultrasonography of the suspected joints was done. The presence of echogenic joint effusion was deemed significant.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Continuous variables were analyzed using descriptive statistics. Mean values were compared using Students T test. Categorical variables were compared using the non-parametric Chi-squared test. Significance level was set at $p < 0.05$ at 95% confidence interval

RESULTS

Three hundred and sixty (360) patients whose ages ranged from 19 to 67 years were recruited into the study (figure 1). The study population was made up of 164 (45.6%) males and 196 (54.4%) females. Sixteen (4.4%) patients had infectious (septic) arthritis involving twenty joints of the appendicular skeleton (9 ankles, 11 knees), and 3 spinal involvements, see figure 2. Nine (56.3%) of these were females while 7

Table 1: Summary of Laboratory profile for different types of infectious (septic) arthritis (mean values)

Type of arthritis	WBC (synovial fluid) cells/ml	WBC (blood) cells/L	ESR mm/hour	CD4 count cells/ul	ZN Stain	Mantoux test
Acute septic arthritis	4962	2.75 x 10 ⁹	85.5	50	-	-
HIV associated arthritis	787.5	3.78 x 10 ⁹	42	97.5	-	-
TB arthritis	6100	3.0 x 10 ⁹	94.5	98.5	+ve	-ve
TB spine	-	3.5 x 10 ⁹	74	82.5	-	-

Figure 1: Age distribution of patients with infectious (septic) arthritis.

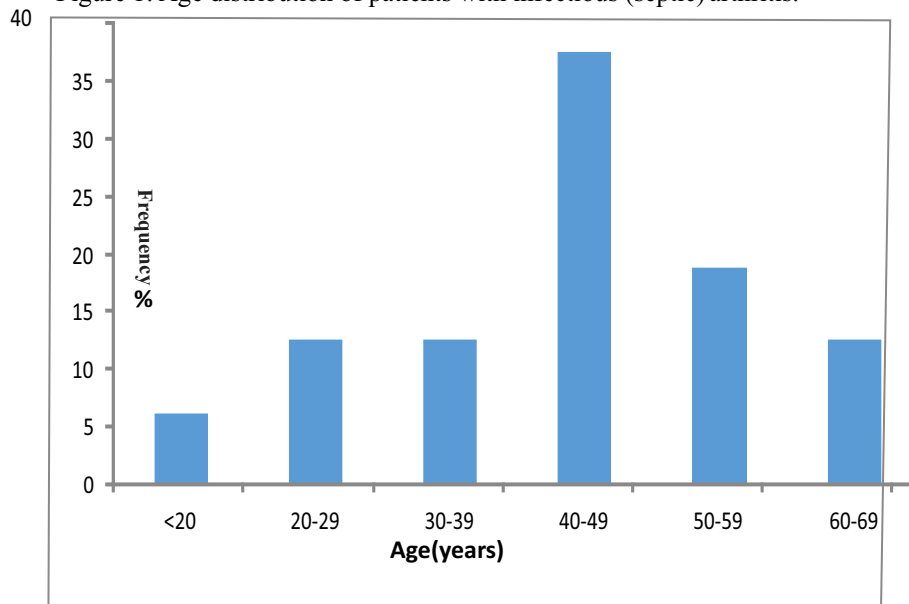


Figure 2: Types of joints involved in infectious arthritis

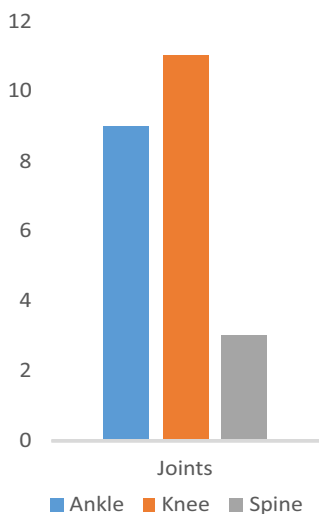
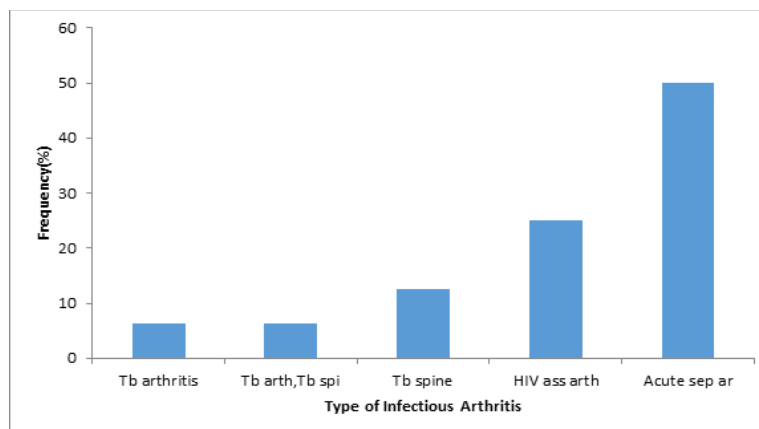


Table 2: Pathogens isolated from the synovial aspirate of those with acute septic arthritis.

Isolated Pathogen	Frequency(n)	Frequency%
Staphylococcus Aureus	5	62.5
Streptococcus Pyogenis	2	25
Klebsiella Spp.	1	12.5
Total	8	100

(43.7%) were males. Eight (50%) of those with infectious arthritis had Acute septic arthritis, four (25%) had HIV associated Arthritis, one (6.25%) had tuberculous Arthritis and another had TB arthritis and TB spine, while two (12.5%) had tuberculosis of the Spine (figure3).

HIV-associated arthritis was diagnosed based on a sterile pattern on synovial fluid analysis with elevated WBC count in contrast to acute septic

Figure 3: Types of infectious arthritis diagnosed among the population

Key: Tb arthritis-Tuberculous arthritis; Tb arth, Tb spine-Tuberculous arthritis and Tuberculosis of the spine; Tb spine-Tuberculosis of the spine; HIV ass arth-HIV associated arthritis; Acute sep ar-Acute septic Arthritis

arthritis¹¹

Six of the 8 patients with acute septic arthritis had a mono-articular joint infection (4 involving the ankle joint and 2 involving the knee joint), while 2 had a bilateral ankle involvement. Pain was of severe intensity. The synovial fluid aspirate was purulent and yielded gram-positive organisms in all cases. Staphylococcus aureus was the infecting organism in 5 of the 8 cases, Streptococcus Pyogenes was cultured in 2 cases, while Klebsiella Spp was cultured in 1 case. The mean synovial fluid white cell count was, 4962/ml (see table 1). Full blood count showed mean white cell count [WBC] of 2.75×10^9 cells/L, while the mean erythrocyte sedimentation rate (ESR) was 85.5mm/hour. The mean CD4 cell count was 50 cells/ul. There was radiographic joint space narrowing in all, while significant joint effusion was seen on ultrasound.

Four patients with HIV associated arthritis had sub-acute joint pain of moderate intensity involving both knees. Two of this group were on Highly Active antiretroviral Therapy (HAART) prior to presentation. Synovial fluid aspirate was straw colored in this group and yielded no organisms. The

mean synovial white cell count was 787.5 cells/ml. Full blood count revealed mean white cell count of 3.78×10^9 cell/L while the mean ESR was 42 mm/hr, and the mean CD4 cell count was 97.5 cells/ul. There was no radiographic or ultrasonography changes in this group.

One patient had tuberculous arthritis of the left knee alone while another had tuberculous arthritis of the ankle as well as tuberculosis of the spine. Joint pain was of severe intensity. The synovial fluid aspirate was cloudy with a mean WBC count of 6100 cells/ml. ZN staining was positive for AFB, and the Mantoux test was negative. Full blood count showed a mean WBC of 3.0×10^9 cells/L, a mean ESR of 94.5 mm/hr, and a mean CD4 cell count of 98.5 cells/ul. There was radiographic evidence of joint space destruction and effusion on ultrasound.

Two of the patients had tuberculosis of the spine. Pain was of severe intensity. There was leucopenia with relative lymphocytosis. The mean WBC was 3.5×10^9 cells/L. The mean ESR was 74 mm/hr and the mean CD4 count was 82.5 cells/ul. Radiographs showed

wedge collapse of involved vertebra T12-L1. None of the patients was on HAART.

No cases of gonococcal or fungal arthritis were found in this study. A summary of the laboratory parameters for the study subjects is shown in table I and the isolated pathogens in table 2.

DISCUSSION

Among those that have infectious arthritis in this study, 43.7% were males while 56.3% were females. This gives a male to female (m:f) ratio of 1:1.3. This differs with the m:f ratios obtained in some studies done in the western countries, which range from 4:1-25:1^{[12][13][14]} This observation is thought to be because the mode of transmission of HIV is predominantly homosexual in western countries while it is predominantly heterosexual in Africa.^[15] Our observation also differs from previous studies on this subject done in Nigeria, which range from 1.5:1-2.9:1¹⁶⁻¹⁹ This observed difference may be due to the fact that all the previous studies were done in predominantly pediatric population whereas our study is on an adult population. Moreover all the previous studies were done in the normal population whereas our study was specific to immunocompromised HIV/AIDS patients. This is however similar to the m:f ratio of 1:1.4 obtained in a similar study done in Rwanda.^[20]

Sixteen out of the 360 patients studied constituting a prevalence rate of 4.4% had infectious arthritis $p < 0.001$. This suggests that infectious (septic) arthritis in this patient subgroup is not uncommon being present in one out of every twenty-five patients. This compares well with some similar studies done previously which reported prevalence rates of 0-3%.^[21, 22, 23, 24, 25, 26] However, a similar study done in Kenya in 2008 reported a prevalence rate as high as 17.1%. This higher observed prevalence may be due to the fact that none of the patients in this study was on HAART.^[27]

The mean CD4 count in this study is 143 cells/ul

which is significantly different from the CD4 count of 248.4 cells/ul in those patients who do not have infectious arthritis. This may be either that infectious arthritis occurs in this patient group whose CD4 count is below a critical value or that the presence of infectious arthritis in this patient group further depresses an already suppressed immune system. This finding is similar to results obtained in the study by Casado E *et al* where infectious arthritis always occurred in patients when the CD4 cell count was below 200 cells/ul.^[28] It was observed by Edwina and Karen that although there seems to be no clear relationship between CD4 count and infectious arthritis, however more opportunistic organisms occur when the CD4 count is less than 200 cells/ul, than when it is greater than 200 cells/ul when the traditional organisms such as *Staphylococcus Aureus* are seen more.^[29] Similarly, U. A. Walker *et al* in their review found that pyogenic organisms predominate at CD4 counts >250 cells/ul, while opportunistic organisms predominate when the CD4 count is <100 cells/ul.^[30] We did not isolate opportunistic organisms in this study, and this may be because the average CD4 count in this study is above 100 cells/ul (143 cells/ul).

The white cell count was either low or on the low side of normal, range 1.1 to 4.3×10^9 cells/L in all patients with infectious arthritis. This may be due to the immune-compromised state thus they are unable to mount appropriate response to microbial insults. The mean of 2.75×10^9 cells/L observed in those who have acute septic arthritis seems to suggest a more profound immune-suppression than among those with HIV associated arthritis where it was 3.78×10^9 cells/L. This may be because HIV associated arthritis is thought to be inflammatory rather than infective in origin. Leucopenia was also the finding in a similar study done by Barziliai A *et al*.^[31]

The ESR was elevated in all patients with infectious arthritis where the mean ESR is 75 mm/hr as against a mean value of 45 mm/hr in those without infectious arthritis.

Synovial fluid analysis yielded *Staphylococcus Aureus* as the most common isolate (62.5%) followed by *Streptococcus pyogenes* (25%) in this study. This agrees with the findings made by Zalavran CG *et al* and Casado E *et al* in similar studies where *Staphylococcus aureus* was the most commonly isolated pathogen from the synovial aspirate.^[32, 28] This however is in contrast with the findings made by Saraux A *et al* where *Streptococcus Pneumonia* and *Neisseria gonorrhoea* were the most common pathogens isolated from the synovial aspirates culture and also with Gilks *et al* who found *Pneumococcal* and *Salmonella* arthritis more common.^[33,34]

We found no case of gonococcal or fungal arthritis in this study. Similarly Zalavran CG *et al* found no fungal arthritis in their study.^[32] Barziliai A *et al* found fungal arthritis among a subset of their patients who used intravenous drugs.^[31] None of our patients agreed to have used any intravenous drug. Saraux A *et al* found *Neisseria gonorrhoea* as one of the most common isolates in their series.^[33] Rasha Maharaj and Girish Mody reported only 2 cases of gonococcal arthritis in their series. They concluded that although gonococcal arthritis may be seen among HIV positive patients, however the disseminated form of gonococcal arthritis is rare in this patient group.^[35]

The knee joint was the most commonly involved joint in this study, in keeping with the findings of Saraux *et al* and Zalavran *et al*.^[32-33] Bilateral involvement was also common in this study than in other studies: all 4 patients who had HIV associated arthritis had bilateral knee involvement, and 2 of the 8 cases that had septic arthritis had bilateral ankle involvement. There was no case involving the hip or shoulder in this study, and there was no case of poly-articular involvement. This may be because the hip, shoulder, and joints of the upper limb are more commonly involved in patients below 15 years.^[16-19,24, 36]

Limitations

This study had some limitations. Some patients did not give consent to be recruited into the study due to traditional attitudes and beliefs about HIV/AIDS and its social stigmatization. This might have affected the outcome. We also did not do histology in this study, especially for those suspected of having tuberculous arthritis which could have improved the yield and might have ultimately affected the pattern of infectious arthritis we obtained in this study.

It is also necessary to establish conclusively whether the low CD4 count observed in patients with infectious (septic) arthritis is as a result of the septic arthritis or a predisposition in this group of patients to infectious (septic) arthritis.

CONCLUSION

The prevalence rate found for infectious (septic) arthritis among HIV/AIDS patients in our population was 4.4%. Females were more commonly affected, and the age group 40-49 years were most affected. *Staphylococcus Aureus* was the most implicated pathogen, and half of the cases were acute septic arthritis. The knee joint was the most affected joint, and this was often bilateral. There were no cases of fungal or gonococcal arthritis and ESR was significantly elevated in all patients, with a mean value of 75mm/hr and the CD4 count was significantly lowered, with a mean value of 143 cells/ul.

Financial support and sponsorship: Nil

Conflict of interest: There are no conflicts of interest

Acknowledgements

We acknowledge the contributions of the head department of Orthopaedics and Trauma University of Benin Teaching Hospital, Benin City, Edo State, Nigeria, Professor A O Ogbemudia during the period this work was done. We also acknowledge the guidance of professor P F A Umebese for his kind contributions in making this research work a reality. Our thanks also goes to the departments of internal Medicine as well as PEPFAR for allowing us use their patients for this

study.

REFERENCES

1. Mark ES, Jon TM. Acute Septic Arthritis. *Clinical Microbiology Reviews* Oct. 2002; 15(4): 527-544.
2. Abbas A. *Diseases of immunity*. In: Abbas A, Vinay K; Abul K; Nelson F. Robbins and Cotran Pathologic basis of diseases, 7th ed. Philadelphia: Saunders; 2004. P193-268
3. Louis S, Srinivasan H, Tuli S, *et al*. Infection. In: Louis S, David W, Selvadurai N. *Apley's System of Orthopaedics and Fractures*. 9th ed. London: Hodder Arnold; 2010. p29-58
4. Global HIV/AIDS statistics. Available from: https://www.aids.gov/hiv-aids-basics/hiv-aids-101/global-statistics.29th_ [Last accessed July 2015]
5. HIV prevalence trends by state from 1991-2010: In 2010 National HIV Sero-prevalence Sentinel Survey; Federal Ministry of Health: Department of Public Health National AIDS/STI Control Program Technical Report. pp 1-110
6. Adebobola B, Patrick N, Peter N, Kawu I, Ngige E, Ogundiran A, *et al.*, A description of HIV prevalence trends in Nigeria from 2001 to 2010: what is the progress, where is the problem? *Pan Afr Med J*. 2014; 18 (suppl 1): 3
7. Ogun SA. Current concepts in the diagnosis and management of HIV/AIDS. *Nig J Clin Pract*. 2000; 3:63-74.
8. Julien F, El Samad Y, Brunschweiler B, Grados F, Nassima DR, Sejourne A, *et al.*, Morbimortality in adult patients with septic arthritis: a three year hospital-based study. *BMC Infect Dis* 2016 June 1; 16: 239
9. Mue DD, Salihu MN, Yongu WT, Ochoga M, Kortor JN, Elachi IC. Paediatric Septic Arthritis in a Nigerian Tertiary Hospital: a 5-year Clinical Review. *West Afr J Med*. May-Aug 2018; 35(2):70-74
10. Buskila GD. Musculoskeletal manifestations of infection with human immunodeficiency virus. *Rev Infect Dis* ,1990;12:223-235
11. Adizie T, Moots RJ, Hodgkinson B, French N, Adebajo AO. Inflammatory arthritis in HIV positive patients: A practical guide. *BMC Infect Dis*. 2016 Mar 1; 16:100. Doi: 10.1186/s12879-016-1389-2. PMID:26932524;PMCID:PMC4774153.]
12. Munoz FS, Cardenal A, Balsa A, Quiralte J, Pena JM, Barbado FJ, *et al.* Rheumatic manifestations in 556 patients with human immunodeficiency virus infection. *SemArth Rheum* 1991; 21:3039.
13. Calabrese LH, Kelley DM, Myers A, Oconnell M, Easley K. Rheumatic symptoms and human immunodeficiency virus infection. The influence of clinical and laboratory variables in a longitudinal cohort study. *Arth Rheum* 1991; 34:257263.
14. Berman A, Espinoza LR, Diaz JD, Aguilar JL, Rolando T, Vasey FB, *et al.* Rheumatic Manifestations of Human Immunodeficiency Virus infection. *Am J Med* 1988; 85(1): 59 - 64.
15. Packard RM, Epstein P. Epidemiologists, Social Scientists, and the structure of medical research on AIDS in Africa. *Social Sciences and Medicine* 1991; 33(7): 771-783
16. Ikpeme AI, Ngim EN, Anthonia AI, Afiong OO. Septic Arthritis: a need to strengthen the referral chain in a developing economy. *Open Journal of Orthopedics* 2013; 3(2): 110-118
17. Alhaji MA, Mamuda A, Bello B, Usman MI, Shamsudeen M.. Pattern of Septic Arthritis in a Tertiary Hospital in Northern Nigeria: a retrospective study. *Afr J Med Health Sci* 2016; 15(1): 36-40
18. Njoku IO, Akputa AO. Childhood Pyogenic Septic Arthritis as seen in a Teaching Hospital South East Nigeria. *Nigerian Journal of Surgery* 2017; 23(1): 26-32
19. Johnson DO, Olugbemenusola OO, Lawrence MO, Olowookere JA. Septic arthritis in a Nigerian Tertiary Hospital. *Iowa Orthop J* 2006; 26: 45-47
20. Blanche P, Sicard D, Saraux A, Taelman H, Menkes Cj.. Arthritis and HIV infection in Kigali, Rwanda, and Paris, France. *J Rheumatol* 1997; 24(7):144950.
21. Solinger AM, Hess EV. Rheumatic disease and AIDS: is the association real? *J. Rheumatol* 1993; 20: 678-83
22. Berman A, Cahn P, Perez H, Spindler A, Lucero E, Paz S, *et al.* Human Immunodeficiency Virus infection associated Arthritis: clinical characteristics. *J Rheumatol*. 1999; 26(5): 1158 -62.
23. Vassilopoulos D, Chalasani P, Jurado RL, Workowski K, Agudelo CA. Musculoskeletal infections in patients with human immunodeficiency virus infection. *Medicine*

- (Baltimore) 1997; 76:28494.
24. Morgan DS, Fisher D, Merianos A, Currie BJ. An 18 year clinical review of septic arthritis from tropical Australia. *Epidemiol. Infect* 1996; 117:42328.
25. Goldenberg DL, Reed JI. Bacterial arthritis. *N. Engl. J. Med.* 1985; 312:76471.
26. HIV infection as a risk factor for septic arthritis. Available From: <http://www.researchgate.net/publication/14084312>. [Last accessed July 2015].
27. Ekwom PE, Oyoo GO, Amayo EO, Muriithi IM. Prevalence and characteristics of articular manifestation in human immunodeficiency virus infection. *East Afr Med J.* 2010 Oct; 87(10): 408-14
28. Casado E, Olive' A, Holgado S, Perez-Andres R, Romeu J, Lorenzo JC, *et al.* Musculoskeletal manifestations in patients positive for human immunodeficiency virus: correlation with CD4 count. *J Rheumatol* 2001;28(4):80204
29. Lawson E, Walker-Bone K. *British Medical Bulletin* 2012; 103: 119
30. Walker UA, Tyndall A, Daikeler T. Rheumatic conditions in human immunodeficiency virus infection. *Rheumatology* 2008;47:952-59
31. Barzilai A, Varon D, Martinowitz U, Heim M, Schulman S. Characteristics of septic arthritis in human immunodeficiency virus-infected hemophiliacs' versus other risk groups. *Rheumatology (Oxford)*. 1999 Feb;38(2):139-42
32. Zalavras CG, Dellamaggiora R, Patzakis MJ, Bava E, Holtom PD. Septic Arthritis in patients with Human immunodeficiency virus. *Clin orthop Relat Res.* 2006 Oct;451:46-49
33. Saraux A, Taleman H, Blanche P, Batungwanayo J, Clerinx J, Kagame A, *et al.* HIV Infection as a risk factor for septic arthritis. *Br J Rheumatol* 1997;36(3):333-37
34. Gilks CF, Brindle RJ, Otieno LS, Simani PM, Newnham RS, Bhatt SM, *et al.* Life threatening bacteremia in HIV-1 seropositive adults admitted to hospital in Nairobi, Kenya. *Lancet* 1990; 336:545-549.
35. Rasha M, Girish M. Rarity of Gonococcal arthritis in association with HIV infection. *J infect Dev ctries.* 2014;8(9):1222-27
36. Eyichukwu GO, Onyemaechi NOC, Onyegbule EC. Outcome of management of Non-gonococcal Septic Arthritis at National Orthopaedic Hospital Enugu, Nigeria. *Niger. J Med.* Jan-March 2010; 19(1):69-76

orient



Quality of Life of Patients with Obstructive Sleep Apnea on CPAP Treatment in South West Nigeria: A Preliminary Report

Oluwafemi T OJO,¹ Adeola O AJIBARE,¹ Akinola O DADA,¹ Ramon MOROKOLA,¹ Ayoola ODEYEMI,¹ Temitope FAPOHUNDA,¹ Abiona ODE.²

ABSTRACT

Background: Obstructive sleep apnea (OSA) is rising in Africa. The treatment of the disease involves the use of continuous positive airway pressure (CPAP) machine. Information on the quality of life of patients with OSA on CPAP therapy in Nigeria is scarce. **Objectives:** This study assessed the quality of life of patients with OSA on CPAP treatment in Lagos. The study also evaluated the daytime wakefulness, perception of quality of night sleep as well as the physical and emotional activities of the patients. **Methodology:** This was a cross-sectional study using a semi-structured questionnaire done at Lagos State University Teaching Hospital from September 2021 to December 2021. All consenting patients with previous diagnosis of OSA with polysomnography who have been regular on CPAP therapy for at least three months were recruited. Patients were contacted via WhatsApp, telephone or physical interview. **Results:** A total of 23 patients were contacted, of which 19 patients consented. There were 13 males and 6 females with a mean age of 53.63±13.1 years. All the participants had improvement in their general state of health. Majority of the patients had improvement in their sleep quality, day-time sleepiness and snoring (n=17:89.5%, n=14:72% and n=12:63.2% respectively). Majority of the patients have no physical limitation on moderate activities (n=12:63.2%) while 47.4% of responders have no social activities interference. **Conclusion:** CPAP usage in patients with obstructive apnea is associated with improved snoring, sleep quality, day-time somnolence and general quality of life.

Keywords: CPAP, apnea, Obstructive sleep apnea, CPAP outcome, CPAP benefits.

OPEN ACCESS

Affiliation

¹ Department of Medicine, Lagos State University Teaching Hospital, Ikeja, Lagos. ² Department of Medicine, College of Health Sciences, Osun State University, Osogbo.

*Correspondence

Dr. Ojo Oluwafemi Tunde.
Department of Medicine, Lagos State University Teaching Hospital, Ikeja, Lagos

Tel: +2348038344342

Email: ojofemi911@yahoo.com

Orcid: 0000-0002-5846-2457

Article Metrics

Date Submitted: 30 July 2022

Date Accepted: 19 Sept 2022

Date Published: Jan-June 2023

Journal Metrics

e-ISSN: 1115-0521

Website: www.orientjom.org.ng

E-mail: editorojm@gmail.com

Publisher

cPrint, Nig. Ltd

E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7140881

How to cite this article

Ojo OT, Ajibare AO, Dada AO, Morokola A, Odeyemi A, Fapohunda T et al., Quality of Life of Patients with Obstructive Sleep Apnea on CPAP Treatment South West Nigeria: A Preliminary Report. *Orient J Med*, 2023;35(1-2):21-27. DOI:10.5281/zenodo.7140881

INTRODUCTION

Obstructive sleep apnea is a respiratory sleep disorder characterized by intermittent upper-airway collapse during sleep.^[1] The burden has doubled over the years in the developing countries including Nigeria where the prevalence is about 19-34% among a population of 200 million people.^[2-4]

The major consequence of OSAS is excessive daytime sleepiness, low energy, impaired cognition and altered mood.^[5] Patients are also prone to accidents while driving or working, and most of them report poor social functioning and reduced quality of life.^[5,6] The long-term sequelae of OSA include increased risk of cardiovascular, cerebrovascular and metabolic syndrome disorders that may ultimately lead to premature death if untreated.^[7]

The main treatment for obstructive sleep apnea (OSA) is the use of continuous positive airway pressure (CPAP). Conventional CPAP device is applied by means of a nasal or face mask and it generates nasal pressure that maintains a constant positive airway pressure to the patient during sleep.^[8] This has been proven to improve outcomes including daytime sleepiness, cognitive performance, blood pressure, glucose control, cardiovascular status, quality of life and mortality.^[9-11]

Information on quality of life of patients with OSA on CPAP therapy in Nigeria is scarce. The objective of this study was to assess the quality of life of patients with OSA on CPAP treatment in Lagos. The study also described the quality of night sleep and daytime wakefulness as well as physical and emotional activities of the patients.

METHODOLOGY

Study design

This was a cross-sectional descriptive study.

Study site

The study was carried out in Lagos State University Teaching Hospital (LASUTH) Ikeja, which is one of

the three tertiary centers that receive referrals from all parts of the Lagos metropolis and its environs. Participants were recruited from the respiratory clinic of the hospital where an average of 70-100 patients are seen per week including about one case of obstructed sleep apnea.

Inclusion criteria

Participants aged > 18 years with moderate to severe obstructive sleep apnea diagnosed with polysomnography with an apnea-hypopnea index(AHI) >15 on CPAP machine therapy for at least 3 months and compliant were recruited for the study. Moderate OSA is defined by AHI between 15 and 29.9 events/h, while severe OSA is defined by AHI as greater than 30 events/hour.^[12]

Exclusion criteria

Individuals with kyphoscoliosis or neuromuscular disorders, acute illness, chronic alcoholics, those on mandibular devices or on treatment for weight loss or those receiving medications that could cause drowsiness were excluded.

Sampling technique

Convenient sampling method was used in this study. All the eligible patients were recruited after taking their consent.

Data collection

Each participant was assisted by the researcher or a trained research assistant to complete the interviewer-administered questionnaire adapted from previous studies which sought information about the socio-demographics, and perceptions about the outcomes of CPAP therapy including the sleep quality, snoring, daytime sleepiness assessed using Epworth sleepiness scale^[13,14], and general quality of life assessed with a short form health survey (SF-12).^[13,14]

SF12 Questionnaire is a health related quality of life (HRQoL) questionnaire. It consists of twelve questions that measure eight health domains to assess

physical and mental health. The physical health-related domains include general health, physical functioning, physical and body pain. The mental health-related domains include vitality, social functioning, emotional and mental health.^[15,16] This instrument has been validated across a number of chronic diseases and conditions. Each item was scored 1-5 and then recoded from 0 - 100 in reverse order. The total score was calculated.^[16] A score of 50 and above has been recommended as a cut-off to determine good quality of life.^[17]

Epworth sleepiness scale (ESS) is a subjective measure of a patient's sleepiness with 8 items. The test is a list of eight situations in which tendency to become sleepy is rated on a scale of 0, no chance of dozing, to 3, high chance of dozing. The values of all the responses were added up. The ESS score (the sum of 8 item scores, 0-3) can range from 0 to 24. The scale estimates whether the patient is experiencing excessive sleepiness. Patients were grouped into 4 categories depending on ESS score: 0-10 as normal, 11-14 as having mild sleepiness, 15-17 as having moderate sleepiness and 18-24 as having severe sleepiness.^[4,18]

Epworth score of < 10 and SF 12 > 50 indicate good outcomes. Improved report on snoring and sleep quality also indicates good outcome.

Data analysis

The data were analyzed using SPSS version 26. The numerical variables such as the age of the subjects, Epworth and SF-12 scores were summarized as mean and standard deviation. Categorical variables such as gender were summarized as frequencies and percentages.

Ethical approval

Ethical approval was obtained from Lagos State University Teaching Hospital (LASUTH) Ethics and Research Committee.

RESULTS

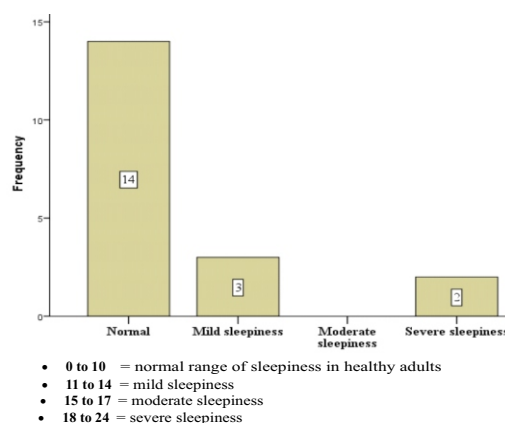
A total of 19 moderate to severe OSA patients on CPAP participated in the survey. There were 13 males and 6 females with a mean age of 53.63±13.1 years. The majority of the participants had tertiary education (n=17, 89.5%). Thirteen patients earned more than 200,000 naira (about \$500) per month. Seventeen participants had other co-morbidities. (Table 1).

Table 1: Socio-demographic and CPAP-related characteristics of patients

Variables	Frequency (n=19)	Percentage
Age group (years)		
≤45	7	36.8
46-65	8	42.1
>65	4	21.1
Gender		
Male	13	68.4
Female	6	31.6
Educational status		
None	1	5.3
Primary	0	0
Secondary	1	5.3
Tertiary	17	89.5
Average income per month (Naira)		
<100,000	3	15.8
100-200,000	3	15.8
>200,000	13	84.2
Presence of other medical conditions		
Yes	17	89.5
No	2	10.5

The mean Epworth sleepiness questionnaire score was 7.95 ±3.6. Improvement in daytime sleepiness from Epworth sleepiness scale score of less than 10 was recorded in 14 (72%) of the participants in Figure 1.

Fig 1: Grade of sleepiness using Eppworth Sleepiness Scale



Significant improvement in snoring was reported by 12(63.2%) and improvement in sleep quality was reported by 17 (89.5%) subjects. (Figure 2).

The mean SF-12 was 83.87 +/- 11.56. All the patients have good general state of health. Majority of the patients have no physical limitation on moderate activities (12:63.2%). About a third (n=7, 36.8%) of the patient had no pain limitation, while others have varying degree of pain. Majority of the patients have a lot of energy most of the time (n=13, 68.4%). More than a third (n=9, 47.4%) have not felt downhearted and had no social activities interference. (Table 2)

Figure ii: Overall quality of life

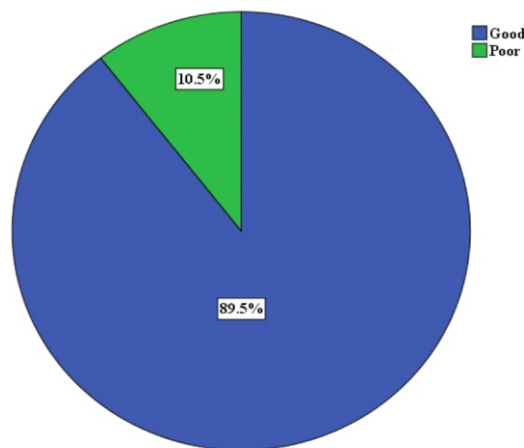


Table 2: Short Form Health Survey of the participants (SF12)

Variables	Frequency (n=19)	Percentage
In general, state of health		
Excellent	4	21.1
Very good	11	57.8
Good	4	21.1
Does health limit you in moderate activities		
Yes limited a little	7	36.8
No, not limited at all	12	63.2
Does health limit you in climbing several flight of stairs		
Yes limited a lot		
Yes limited a little	3	15.8
No, not limited at all	8	42.1
Accomplished less than you would due to physical health		
Yes	8	42.1
No	5	26.3
	14	73.7
Were limited in the kind of work or other activities due to physical health		
Yes	6	31.6
No	13	68.4
Accomplished less than you would like due to emotional problems		
Yes	5	26.3
No	14	73.7
Didn't do work or other activities as carefully as usual due emotional problems		
Yes	3	15.8
No	16	84.2
How much did pain interfere with your normal work		
Not at all	7	36.8
A little bit	6	31.6

DISCUSSION

The aim of the study was to investigate the different outcomes of CPAP therapy including quality of life in patients with obstructive sleep apnea. The significant improvement in snoring and sleep quality recorded in this study is similar to the findings of Beninati *et al* who measured the effect of treatment of OSA on their

partners. He reported that elimination of snoring and OSA in these patients were associated with an improvement in the quality of their bed partners' sleep.^[19] Similarly, Loredo *et al* investigated the short-term effectiveness of continuous positive airway

pressure (CPAP) in improvement of sleep quality in patients with obstructive sleep apnea (OSA) and found an association between CPAP and an improvement in sleep quality.^[20] Mcardle *et al* also determined the impact of CPAP treatment of OSA patients on their partners and reported only subjective sleep quality benefits from the treatment.^[21] Ancoli-Israel *et al* in another study investigated the effectiveness of CPAP therapy in improvement of sleep quality in patients with OSA and confirmed the effectiveness of CPAP in lowering the number of arousals, and raising the oxygen saturation of these patients during the night.^[22]

Our findings on improvement in daytime somnolence in majority of patients are comparable to findings of Heater *et al* who investigated the benefits from CPAP in OSA patients and found significant improvement in Epworth sleepiness scales score, road traffic accident and CPAP use.^[23] Likewise, Habukawa *et al* studied the relationship between (OSA), depressive symptoms, and the effect of CPAP therapy and found significant correlations among the improvement rates in sleep score and night respiratory events with CPAP treatment.^[24] He noted that these findings may result in a significant improvement of residual depressive symptoms due to the improvement of daytime sleepiness in these patients.^[24] Sforza *et al* performed modified maintenance of wakefulness test in 58 patients with obstructive sleep apnea (OSA) syndrome before treatment and after long-term (554 ± 28 days) home therapy with nasal continuous positive airway pressure (CPAP) and found significant improvement in daytime alertness which correlated with the reduction in sleep fragmentation after CPAP treatment.^[25] However, Bhat *et al* found no predictive relationship between improvements in daytime sleepiness, fatigue and CPAP use in patients with OSA. This may be due to measurements of daytime sleepiness after just one month of CPAP use.^[26] However, this study gives evidence that first time CPAP application for titration can lead to a general

increase in perceived well-being.

The findings of this study show improvement in all the domains of SF12 in majority of our patients and this is similar to the report of Lo *et al* who studied the effectiveness of CPAP treatment on perceived HRQoL in patients with OSA and demonstrated that participants with greater adherence to therapy reported a higher quality of life improvement.^[27] Similarly, Campos *et al* investigated the effect of CPAP on QoL in women with moderate to severe OSA and reported improved QoL, mood state, anxiety and depressive symptoms, and daytime sleepiness after 3 months of CPAP therapy.^[28] On the contrary, Bjornsdottir *et al* compared the quality of life between the general population and untreated patients with obstructive sleep apnea and changes of quality of life among patients with obstructive sleep apnea after 2 years of positive airway pressure treatment and did not find significant overall differences between full and non-users of positive airway pressure in improvement of quality of life from baseline to follow-up.^[29] However, there was a trend towards more improvement in physical quality of life for positive airway pressure-adherent patients, and the most obese subjects improved their physical quality of life more.^[29] The results suggests that co-morbidities of obstructive sleep apnea, such as obesity, insomnia and daytime sleepiness, have a great effect on life qualities and need to be taken into account and addressed with additional interventions.

There are certain limitations to our study. The sample size was small because of limited number of patients on treatment for obstructive sleep apnea in Lagos. Hence, the test of associations via a vis compliance, co-morbidities and socio-demographics could not be done at this time. Secondly, this is a questionnaire-based study which may be subject to recall bias.

CONCLUSION

Continuous positive airway pressure (CPAP) usage in patients with obstructive apnea in Lagos is associated

with improved snoring, sleep quality, daytime somnolence and general quality of life. There is a need for future study with a larger sample size, probably multicenter, for objective assessment of quality of life and its determinants for obstructive sleep apnea patients on CPAP machine.

REFERENCES

1. Juma K, Juma PA, Shumba C, Otieno P, Asiki G. Non-communicable diseases and urbanization in African cities: A narrative review. *Public Health in Developing Countries-Challenges and Opportunities*. 2019;15:31-50.
2. Adewole OO, Hakeem A, Fola A, Anteyi E, Ajuwon Z, Erhabor G. Obstructive sleep apnea among adults in Nigeria. *J Natl Med Assoc*. 2009;101(7):720-7255.
3. Obianuju BO, Njideka UO, Ayesha OA, Oluwadamilola OO, Chinyere NA, Casmir A, et al. Prospective assessment of the risk of obstructive sleep apnea in patients attending a tertiary health facility in Sub-Saharan Africa. *PAMJ*. 2014;17:302.
4. Ozoh O, Okubadejo N, Akanbi M, Dania M. High-risk of obstructive sleep apnea and excessive daytime sleepiness among commercial intra-city drivers in Lagos metropolis. *Nigerian Medical Journal*. 2013;54(4):224-9.
5. Rajagopal KR, Bennett LL, Dillard TA, Tellis CJ, Penholder MF. Overnight nasal CPAP improves hypersomnolence in sleep apnea. *Chest*. 1986;90(2):172-6.
6. Engleman HM, Martin SE, Douglas N, Deary I. Effect of continuous positive airway pressure treatment on daytime function in sleep apnoea/hypopnoea syndrome. *The Lancet*. 1994;343(8897):572-5.
7. Marin-Oto M, Vicente EE, Marin JM. Long term management of obstructive sleep apnea and its comorbidities. *Multidisciplinary respiratory medicine*. 2019;14(1):1-9.
8. Farré R, Montserrat JM, Ballester E, Navajas D. Potential Rebreathing After Continuous Positive Airway Pressure Failure During Sleep. *Chest*. 2002;121(1):196-200.
9. Giles TL, Lasserson TJ, Smith B, White J, Wright JJ, Cates CJ. Continuous positive airways pressure for obstructive sleep apnoea in adults. *Cochrane Database of Systematic Reviews*. 2006(1).
10. Sopkova Z, Dorkova Z, Tkacova R. Predictors of compliance with continuous positive airway pressure treatment in patients with obstructive sleep apnea and metabolic syndrome. *Wiener Klinische Wochenschrift*. 2009;121(11):398-404.
11. Antic NA, Catcheside P, Buchan C, Hensley M, Naughton MT, Rowland S, et al. The effect of CPAP in normalizing daytime sleepiness, quality of life, and neurocognitive function in patients with moderate to severe OSA. *Sleep*. 2011;34(1):111-9.
12. Salepci B, Caglayan B, Kiral N, Parmaksiz ET, Comert SS, Sarac G, et al. CPAP Adherence of Patients With Obstructive Sleep Apnea. *Respiratory Care*. 2013;58(9):1467-73.
13. Hussain SF, Irfan M, Waheed Z, Alam N, Mansoor S, Islam M. Compliance with continuous positive airway pressure (CPAP) therapy for obstructive sleep apnea among privately paying patients- a cross sectional study. *BMC Pulmonary Medicine*. 2014;14(1):188.
14. Hoffstein V, Viner S, Mateika S, Conway J. Treatment of obstructive sleep apnea with nasal continuous positive airway pressure. *Am Rev Respir Dis*. 1992;145(841):e5.
15. Larson CO. Use of the SF-12 instrument for measuring the health of homeless persons. *Health Serv Res*. 2002;37(3):733-50.
16. Libman E, Bailes S, Fichten CS, Rizzo D, Creti L, Baltzan M, et al. CPAP Treatment Adherence in Women with Obstructive Sleep Apnea. *Sleep Disorders*. 2017 Mar 2;2017.
17. Ware J, Kosinski M, Keller S. SF-36 physical and mental health summary scales. A user's manual. 2001;1994.
18. Jiménez-Correa U, Haro R, González-Robles RO, Velázquez-Moctezuma J. How is the Epworth Sleepiness Scale related with subjective sleep quality and polysomnographic features in patients with sleep-disordered breathing? *Sleep and Breathing*. 2011;15(3):513-8.
19. Beninati W, Harris CD, Herold DL, Shepard Jr JW, editors. The effect of snoring and obstructive sleep apnea on the sleep quality of bed partners. *Mayo Clinic Proceedings*. 1999; 74(10):955-958.
20. Loreda JS, Ancoli-Israel S, Kim E-J, Lim WJ, Dimsdale JE. Effect of Continuous Positive Airway Pressure Versus Supplemental Oxygen on Sleep Quality in Obstructive

- Sleep Apnea: A Placebo-CPAP- Controlled Study. *Sleep*. 2006;29(4):564-71.
21. McArdle N, Kingshott R, Engleman H, Mackay T, Douglas N. Partners of patients with sleep apnoea/hypopnoea syndrome: effect of CPAP treatment on sleep quality and quality of life. *Thorax*. 2001;56(7):513-8.
22. Ancoli-Israel S, Dimsdale JE. Effect of continuous positive airway pressure vs placebo continuous positive airway pressure on sleep quality in obstructive sleep apnea. *Chest*. 1999;116(6):1545-9.
23. Engleman HM, Asgari-Jirhandeh N, McLeod AL, Ramsay CF, Deary IJ, Douglas NJ. Self-reported use of CPAP and benefits of CPAP therapy: a patient survey. *Chest*. 1996;109(6):1470-6.
24. Habukawa M, Uchimura N, Kakuma T, Yamamoto K, Ogi K, Hiejima H, et al. Effect of CPAP treatment on residual depressive symptoms in patients with major depression and coexisting sleep apnea: Contribution of daytime sleepiness to residual depressive symptoms. *Sleep medicine*. 2010;11(6):552-7.
27. Sforza E, Krieger J. Daytime sleepiness after long-term continuous positive airway pressure (CPAP) treatment in obstructive sleep apnea syndrome. *Journal of the neurological sciences*. 1992;110(1-2):21-6.
26. Bhat S, Gupta D, Akel O, Polos PG, DeBari VA, Akhtar S, et al. The relationships between improvements in daytime sleepiness, fatigue and depression and psychomotor vigilance task testing with CPAP use in patients with obstructive sleep apnea. *Sleep Medicine*. 2018;49:81-9.
27. Lo Bue A, Salvaggio A, Iacono Isidoro S, Romano S, Insalaco G. OSA and CPAP therapy: Effect of gender, somnolence, and treatment adherence on health-related quality of life. *Sleep and Breathing*. 2020;24(2):533-40.
28. Campos-Rodriguez F, Queipo-Corona C, Carmona-Bernal C, Jurado-Gamez B, Cordero-Guevara J, Reyes-Nuñez N, et al. Continuous positive airway pressure improves quality of life in women with obstructive sleep apnea. A randomized controlled trial. *American journal of respiratory and critical care medicine*. 2016;194(10):1286-94.
29. Bjornsdottir E, Keenan BT, Eysteinsdottir B, Arnardottir ES, Janson C, Gislason T, et al. Quality of life among untreated sleep apnea patients compared with the general population and changes after treatment with positive airway pressure. *Journal of sleep research*. 2015;24(3):328-38.

orient



Basic Life Support Skills Training Among Healthcare Workers in Nigeria: A State-Wide Evaluation in the Niger-Delta Region

Queeneth N KALU,¹ Teresa A EDENTEKHE,¹ Ogban E OMORONYIA,² Bassey E NAKANDA,³ Roseline A ESHIEMOMOH,³ Arit A ARCHIBONG.⁴

ABSTRACT

Background: Healthcare systems are designed to efficiently minimize morbidity and mortality, especially through employment of diverse skills, including provision of Basic Life Support (BLS). Unfortunately, many healthcare workers (HCWs) lack BLS skills, which are essential for the reduction of preventable sudden deaths resulting from sudden cardiac arrest. **Objective:** A statewide assessment of the proportion of HCWs with BLS training, as well as the number available for such training in public primary and secondary healthcare facilities in Cross River State, Southern Nigeria, a low-middle income country (LMIC) setting. **Methodology:** By total enumeration, public primary and secondary healthcare facilities, in each of the 18 Local Government Areas (LGAs) in Cross River State, Southern Nigeria, were studied using descriptive cross-sectional design. Structured proforma was used to obtain data on number of doctors, nurses, Community health officers (CHOs) and Community Health Extension workers (CHEWs) as well as the number that have been trained on BLS/CPR in each facility. The Cross River State Research Ethics Committee approved the study, which was conducted for eight (8) weeks. The proportion of healthcare facilities with at least 1 doctor, nurse and staff trained on BLS/CPR were determined. Chi-square inferential statistic was used to compare these proportions between the three districts of the state. Also, Analysis of variance (ANOVA) was used to compare the mean number that had been trained on BLS per facility between these districts. P-value was set at 0.05. **Results:** Two hundred and five (205) healthcare facilities within the 18 L.G.A.s were surveyed. Sixteen (16) health facilities (7.8%) had staff that were trained on BLS. Seventy-five (75) staff had training on BLS, yielding average of 0.37 trained staff per facility. Approximately one-tenth of facilities (10.2%) had a doctor, while one-third (34.1%) had a nurse. Less than one-tenth (9.3%) of health facilities had at least a doctor and nurse that may be available for BLS

OPEN ACCESS

Affiliation

¹ Department of Anaesthesiology, University of Calabar/University of Calabar Teaching Hospital Calabar, Nigeria. ² Department of Community Medicine, University of Calabar, Calabar Nigeria. ³ Department of Anaesthesia, University of Calabar Teaching Hospital Calabar, Nigeria. ⁴ Department of Family & Emergency Medicine, Faith Foundation Medical Calabar, Nigeria.

*Correspondence

Dr Queeneth N KALU.
Department of Anaesthesia, University of Calabar Teaching Hospital Calabar, Cross River State, Nigeria.

Tel: +234 803 704 5989

Email: queenidine@gmail.com

Article Metrics

Date Submitted: 25 April 2022

Date Accepted: 28 June 2022

Date Published: Jan-June 2023

Journal Metrics

e- ISSN: 1115-0521

Website: www.orientjom.org.ng

E-mail: editorojm@gmail.com

Publisher

cPrint, Nig. Ltd

E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7236954

How to cite this article

Kalu QN, Edentekhe TA, Omoronyia OE, Nakanda BE, Eshiemomoh RA, Archibong AA. Basic Life Support Skills Training Among Healthcare Workers in Nigeria: A State-Wide Evaluation in the Niger-Delta Region. *Orient J Med*, 2023;35(1-2):29-36. DOI: 10.5281/zenodo.7236954

training. There were community health officers and community health extension workers in both rural and urban facilities but none was a trained BLS provider. There was also no staff trained on BLS in any health facility located in seven LGAs. A relatively higher proportion of facilities with staff trained on BLS was found in Odukpani (16.7%), Yakurr (20.0%) and Bekwarra (16.7%). In comparison with the southern and northern districts, there was a higher average number of staff trained on BLS per facility in the central district ($p < 0.00$). **Conclusion:** There is gross lack of BLS trained HCWs in most healthcare facilities in Cross River State. Considering the high and increasing burden of cardio-metabolic diseases and sudden cardiac arrest events in Nigeria, this largely unmet need for BLS training warrants concerted efforts at institutionalization of the requisite skill acquisition among HCWs in the region.

Keywords: Basic Life Support, Healthcare workers, Training, Nigeria

INTRODUCTION

Across diverse global settings, there is a high and increasing prevalence of cardio-metabolic diseases, including coronary heart disease as key causes of sudden death.¹ In low-middle income countries (LMICs) which have fragile healthcare systems, there is also a rapid increase in the burden of associated risk factors such as obesity, hypertension and diabetes, suggesting the possibility of an overwhelming burden of sudden deaths in the near and remote future.² As cardiac arrest precedes sudden death, prompt initiation of the chain of survival saves lives and is applicable in out-of-hospital(OOH) as well as in-hospital settings for all age groups.^{3,4}

The chain of survival for in-hospital cardiac arrest encompasses: surveillance and prevention, recognition of cardiac emergency and activation of emergency response system, early high quality CPR, early defibrillation, integrated post cardiac arrest care and recovery. Prior training in this foundational skill for health professionals and the quality of its use determines the outcomes of care and survival post-resuscitation.^{5,6} While most developed countries have systems in place for the prevention and management of events of sudden cardiac arrests, this is lacking in most LMICs, with the attendant high burden of preventable deaths occurring even among productive young people.^{7,8} The provision of Basic Life Support (BLS), is one of such cost-effective means of

managing events of sudden cardiac arrests.⁹

Healthcare workers (HCWs) mainly comprising medical doctors and nurses, are at the forefront of providing BLS during in-hospital cardiac arrests, as well as building the capacity of laypersons to provide such services during out-of-hospital events of sudden cardiac arrests. The HCWs level of knowledge, skills and practice regarding BLS is crucial as they form a critical mass of individuals required to ensure effective skilled attendance to needy victims of sudden cardiac arrests, in and out of the hospital settings.^{10,11} In other words, during any event of sudden cardiac arrest, a victim will have a higher chance of being attended to and surviving, if he is in a setting with a high proportion of BLS-trained HCWs and lay persons, compared to where this essential competence is lacking.

The capacity to provide BLS may be hampered by the lack of certain equipment and requisite devices in some LMIC's public health facilities.¹¹ Unfortunately, there is a paucity of literature on the proportion of HCWs with the capacity to provide BLS in many developing countries, including Nigeria. This study was therefore aimed at a statewide assessment of the proportion of HCWs with BLS training, as well as the number available for such training in public health facilities in Cross River State, Southern Nigeria.

METHODOLOGY

Study Design and Settings

By total enumeration, we set out to study all public primary and secondary healthcare facilities, in each of the 18 Local Government Areas (LGAs) in Cross River State, Southern Nigeria, using descriptive cross-sectional design. These LGAs make up the southern, central and northern senatorial districts. Southern district comprises Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar South and Odukpani LGAs. Central district comprises Abi, Boki, Etung, Ikom, Obubra and Yakurr LGAs. Northern district comprises Bekwarra, Obanliku, Obudu, Ogoja and Yala LGAs.

Typically, each ward has a Primary Healthcare Center (PHC) overseen by the LGA with oversight from the National Primary Health Care Development Agency (PHCDA), while each LGA had a General Hospital run by the state government. Data were obtained from the PHCDA and State Ministry of Health about the number of PHCs and Secondary health care centres.

Instrument and Data Analysis

Structured proforma was used to obtain data on the number of doctors and nurses, as well as the number that have been trained on BLS/CPR in each facility. The numbers of CHOs and CHEWs per facility, the proportion of health facilities with at least 1 doctor, nurse as well as the total number of nurses and doctors trained on BLS/CPR were determined. Chi-square inferential statistic was used to compare these proportions among the three senatorial districts of the state. Also, Analysis of variance (ANOVA) was used to compare the mean number of trained BLS providers per facility among these districts. *P*-value was set at 0.05. The Cross River State Research Ethics Committee approved the statewide study, which was conducted for Eight (8) weeks in August and September 2021.

RESULT

The State has 196 Primary Health Care Centres and 24 public Secondary Health Facilities. Two hundred and five (93.2%) healthcare facilities having 49 doctors, 612 nurses (senior cadre HCWs), 223 CHOs and 636 CHEWs (junior cadre HCWs) within the 18 L.G.A.s were surveyed.

Fifteen (6.8%) facilities in security challenged areas including Bakassi and other LGAs sharing borders with Cameroun were inaccessible. Sixteen (16) health facilities (7.8%) had some staff that were trained on BLS. Among the senior cadre HCWs as shown in Table 1, a total of seventy-five (11.3%) in all the facilities had received training on BLS, yielding an average of 0.37 trained staff per facility ranging from 0 to 25. Approximately one-tenth of facilities (10.2%) had a doctor, while one-third (34.1%) had a nurse. There were no staff trained on BLS in any of the facilities visited in seven LGAs comprising Akamkpa, Akpabuyo, Bakassi, Boki, Etung, Ogoja and Yala. A relatively higher proportion of facilities with staff trained on BLS were found in Odukpani (16.7%), Yakurr (20.0%) and Bekwarra (16.7%).

There was no significant difference in the proportion of health facilities with at least 1 doctor ($p:0.57$), both doctor and nurse ($p:0.64$), and staff trained on BLS, comparing the three districts ($p:0.88$).

However, compared with central and southern districts, there was a significantly higher proportion of facilities with at least one nurse in the northern district ($p<0.00$). Also, compared with the southern and northern districts, there was a higher average number of doctors and nurses trained on BLS per facility in the central district ($p<0.00$). Among the junior cadre of HCWs as shown in Table 2, there were community health officers and community

health extension workers in all the health facilities but none was trained on BLS.

Table 1. Health facility Doctors/Nurses with BLS/CPR training in each L.G.A of Cross River State

LGA	PHC/ CHC	PHC with at least 1 doctor	PHC with at least 1 nurse	PHC with both doctor and nurse	PHCs with staff trained on BLS	Staff trained on BLS/ CPR	Average number of staff trained on BLS in a facility
Southern District							
Akamkpa	9	1 (11.1)	5 (55.6)	1 (11.1)	0 (0.0)	0	0
Akpabuyo	8	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)	0	0
Bakassi	7	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0	0
Biase	11	2 (18.2)	3 (27.3)	2 (18.2)	1 (9.1)	3	0.27 (0-3)
Calabar Municipal*	13	1 (7.7)	3 (23.1)	0 (0.0)	1 (7.7)	2	0.15 (0-2)
Calabar South*	9	2 (22.2)	3 (33.3)	2 (22.2)	1 (11.1)	3	0.33 (0-3)
Odukpani	12	0 (0.0)	1 (8.3)	0 (0.0)	2 (16.7)	4	0.33 (0-2)
<i>Sub-total</i>	<i>69</i>	<i>6 (8.7)</i>	<i>17 (24.6)</i>	<i>5 (7.2)</i>	<i>5 (7.2)</i>	<i>12</i>	<i>0.17 (0-3)</i>
Central District							
Abi	11	2 (18.2)	4 (36.4)	2 (18.2)	1 (9.1)	2	0.18 (0-2)
Boki	13	1 (7.7)	4 (30.8)	1 (7.7)	0 (0.0)	0	0
Etung	10	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0	0
Ikom	13	1 (7.7)	6 (46.2)	1 (7.7)	1 (7.7)	16	1.23 (0-16)
Obubra	11	1 (9.1)	4 (36.4)	1 (9.1)	1 (9.1)	25	2.27 (0-25)
Yakurr	20	2 (10.0)	4 (20.0)	2 (10.0)	4 (20.0)	13	0.65 (0-6)
<i>Sub-total</i>	<i>78</i>	<i>7 (9.0)</i>	<i>22 (28.2)</i>	<i>7 (9.0)</i>	<i>7 (9.0)</i>	<i>56</i>	<i>0.72 (0-25)</i>
Northern District							
Bekwarra	12	2 (16.7)	6 (50.0)	1 (8.3)	2 (16.7)	3	0.25 (0-2)
Obanliku	12	2 (16.7)	6 (50.0)	2 (16.7)	1 (8.3)	2	0.17 (0-2)
Obudu	11	1 (9.1)	9 (81.8)	1 (9.1)	1 (9.1)	2	0.18 (0-2)
Ogoja	10	2 (20.0)	6 (60.0)	2 (20.0)	0 (0.0)	0	0
Yala	13	1 (7.7)	4 (30.8)	1 (7.7)	0 (0.0)	0	0
<i>Sub-total</i>	<i>58</i>	<i>8 (13.8)</i>	<i>31 (53.4)</i>	<i>7 (12.1)</i>	<i>4 (6.9)</i>	<i>7</i>	<i>0.12 (0-2)</i>
TOTAL	205	21 (10.2)	70 (34.1)	19 (9.3)	16 (7.8)	75	0.37 (0-25)
Chi-square comparison of proportions between districts		0.57	0.00	0.64	0.88		0.00 ^{##}

PHC=Primary Healthcare Center; CHC=Comprehensive Healthcare Center; NDA=No Doctor Available; NNA=No Nurse Available; * UCTH and Navy Ref. Hospitals excluded (since they are reference facilities); ##=ANOVA p-value

Table 2. Distribution of Community Health Officers /Community Health Extension Workers in each L.G.A. of Cross River State

LGA	PHC / CHC	CHEWs	CHOs	Total number Trained on BLS
Southern District				
Akamkpa	9	26	12	0
Akpabuyo	8	38	4	0
Bakassi	7	9	5	0
Biase	11	14	11	0
Calabar * Municipal	13*	57	26	0
Calabar South*	9*	41	15	0
Odukpani	12	12	12	0
<i>Sub -Total</i>	<i>69</i>	<i>197</i>	<i>85</i>	<i>0</i>
Central District				
Abi	11	24	11	0
Boki	13	50	8	0
Etung	10	33	5	0
Ikom	13	29	14	0
Obubra	11	52	7	0
Yakurr	20	59	16	0
<i>Sub-Total</i>	<i>78</i>	<i>247</i>	<i>61</i>	<i>0</i>
Northern District				
Bekwarra	12	26	21	0
Obanliku	12	29	13	0
Obudu	11	61	20	0
Ogoja	10	43	7	0
Yala	13	33	16	0
<i>Subtotal</i>	<i>58</i>	<i>192</i>	<i>77</i>	<i>0</i>
TOTAL	205	636	223	0

PHC=Primary Healthcare Centre; CHC=Comprehensive Healthcare Centre; CHEWs= Community health extension workers; CHOs=Community Health Officers * UCTH and Navy Ref. Hospitals excluded (since they are reference facilities)

DISCUSSION

Basic life support training, certification and periodic retraining is a mandatory pre-requisite for license and practice among all frontline medical doctors and nurses in developed countries. 12,13,14 This study found a very low number of BLS-trained doctors, nurses and other HCWs in all facilities across the senatorial districts of Cross River State. This finding indicates that various healthcare regulatory bodies have not made it mandatory to inculcate these trainings regularly into their continuing professional development programmes. It is also not a requirement for career progression of healthcare workers in public healthcare facilities.14,15 Perhaps insufficient awareness, lack of sponsorship or out-of-pocket cost of attendance of BLS training, which is offered only in a few centers, may be significant deterrents that have remained overlooked by the government and employers in the Nigerian healthcare sector. Yet, the lack of prioritization of BLS training may be due to a potentially overwhelming presence of other competing needs for available scarce resources, including the high burden of malaria, tuberculosis and HIV among others.16

The lack of skilled personnel to provide BLS services, may worsen the menace of the high burden of disease and sudden death. This will yield much more disability-adjusted life years (DALY) and years of life lost (YLL), especially among potentially productive teeming youths, who constitute the future adult population.17,18 The implications of a lack of skilled manpower to manage sudden cardiac arrest situations in Nigeria, is being made worse by the ongoing severe brain drain of highly skilled healthcare workers to more advanced countries.19 Also, considering that the general population largely depends on healthcare workers for their eventual knowledge-base and capacity building on BLS, lack of skilled personnel may imply deficiency in provision of out-of-hospital care by laypersons, during events of sudden cardiac arrests.20

In this study, unavailability of at least one doctor and/nurse was identified in most facilities across all senatorial districts of the state. This finding implies that BLS training may only be provided to the lower cadre of healthcare workers, comprising mainly the community health officers (CHOs) and community health extension workers (CHEWS).21-23 Although task-shifting is generally recommended by the WHO, especially as a last resort in the face of scarce healthcare personnel in LMICs, the quality of BLS training, facility-based service delivery and step-down training to laypersons for out-of-hospital service delivery, may be poor and inefficient among such lower cadre compared to higher cadre of healthcare workers.22,23,24 In other words, improvement in staffing of public health facilities with doctors and nurses remains an essential prerequisite for effective training and actualization of efficient attendance to events of sudden cardiac arrest in our settings. Task shifting has however been employed successfully in some developed countries by engaging nurse practitioners who undergo additional training to perform traditional physician roles. This model has been shown to provide high-quality, affordable care, especially for chronic and multi-morbid patients.25 It is unclear if this will be duplicated in emergency care.

The lack of HCWs trained on the provision of BLS in 7 out of the 18 LGAs though similar to findings by other researchers in LMICs,26 should be addressed strategically. In their study, Olusegun-Joseph and colleagues listed the shortage of trained emergency medical personnel among other factors as responsible for the mortality within the first 24 hours in the Emergency Department.27 Studies have shown that regular BLS training and yearly reinforcement improves knowledge and skills for the management of cardiac arrest.4,28,29 A regulated training plan and policy through certification and recertification in BLS should be a compulsory requirement for the renewal of practicing licenses by both the Medical and Dental Council and the Nursing and Midwifery Council of Nigeria. The Life Resuscitation Society of Nigeria

(LIRESON) could be supported by the government to function like the American Heart Association in facilitating this training. This form of training can be organized as train-the-trainer program where those trained will be expected to step down the training to a stipulated catchment area. There is, however, need for periodic evaluation to ensure that the step down training takes place and is effective. The State Ministry of Health can handle this monitoring and evaluation through the instrumentality of her clinical governance department.

In this regard, LIRESON should domesticate the guidelines and advisory statements of the International Liaison Committee on Resuscitation (ILCOR) to suit our local realities. This will entail research to ascertain evidence-based options to guide the production of Local Algorithms. International support and non-governmental organizations sponsored trainings are also encouraged. However, for sustainability, the government at all levels should show commitment by having a training budget and using it for that purpose. Local funds need to be mobilized. This is, however, a big challenge as demonstrated by other beneficiaries of programs involving external funding.³⁰

In this study, CHOs and CHEWs were available in both urban and rural facilities unlike the nurses and doctors. This finding of inequitable distribution of higher cadre of healthcare workers, mainly results from the relative lack of basic amenities required to attract and retain such a workforce to rural settings.^{31,32} The absence of such amenities as good housing, security, supermarkets, schools, road networks, potable water and recreational centers, has remained the key rationale for higher concentration of healthcare workers in urban compared with rural areas. The lack of financial and/or non-financial incentives for rural service delivery, as well as the poorly equipped status of most rural health facilities, also constitute disincentives towards the relocation of doctors and nurses to these settings.^{31,32} This

disparity in the distribution of nurses and doctors has implications for highly skilled healthcare access.

Prompt access to life saving interventions is very essential as demonstrated by a previous investigation in Cross River State, Nigeria where 48.7% of HCWs in various in-hospital units reported a return to spontaneous circulation (ROSC) when CPR was initiated after a witnessed cardiac arrest.³³ Unfortunately, the scenario of deficient staffing in health facilities, contributes to a high burden of quackery and counterproductive management of sudden cardiac arrest situations, especially by traditional and spiritual healers in these settings.³⁴

The limitation of this study is that although total enumeration was planned, 6.8% of the healthcare facilities were inaccessible due to security challenges. We however, do not think that this limitation significantly alters the findings of this study. Another limitation was the lack of a database on deaths attributable to inadequate cardiopulmonary resuscitation in our State and indeed Nigeria.

CONCLUSION

There is a gross lack of BLS training among HCWs in most health facilities in Cross River State. There is therefore an urgent need for training and retraining of health care personnel in primary and secondary health facilities by certified trainers as in-facility first responders in the first instance to maintain the chain of survival until more specialized care is available or the patient is transferred to a more adequately resourced facility. This will improve the health indices in our communities.

We propose sponsorships for BLS training and further research on Modalities and options for cost-effective capacity building on BLS. Considering the high and increasing burden of cardio-metabolic diseases and sudden cardiac arrest in Nigeria, this largely unmet need for BLS skills warrants concerted efforts at institutionalization of the requisite training of all

cadres of HCWs in the region.

Acknowledgement

We are very grateful to our dutiful research assistants; Mrs. Genevieve Kanu, Mr. Ibiang Arikpo, Mr. Henry Effiong and Mr. Ediom Udoh who went through the entire State to gather the data even in very remote and dangerous areas. We thank the Commissioner for Health Dr. Beta Edu and the Director General of the Primary Health Development Agency in the State, Dr. Janet Ekpenyong as well as all the Medical Superintendents and PHC Coordinators.

Disclosure

Financial support: This work was supported by the Tertiary Education Trust Fund (TETFUND) with QNK as the Principal Investigator, while TAE and BEN are co-researchers.

REFERENCES

1. Wong CX, Brown A, Lau DH, Chugh SS, Albert CM, Kalman JM. Epidemiology of sudden cardiac death: global and regional perspectives. *Heart, Lung and Circulation* 2019;28(1):6-14.
2. Roth GA, Mensah GA, Johnson CO, Addolorato G, Ammirati E, Baddour LM, et al. Global burden of cardiovascular diseases and risk factors, 1990-2019: update from the GBD 2019 study. *Journal of the American College of Cardiology* 2020;76(25):2982-3021.
3. Perkins GD, Travers AH, Berg RA, Castren M, Considine J, Escalante R, et al. Part 3: adult basic life support and automated external defibrillation: 2015 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Circulation* 2015;132(S16):S51-83.
4. Nolan JP, Maconochie I, Soar J, Olasveengen TM, Greif R, Wyckoff MH, et al. Executive summary: 2020 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Circulation*. 2020;142(S16):S2-57.
5. Yasunaga H, Horiguchi H, Tanabe S, Akahane M, Ogawa T, Koike S, et al. Collaborative effects of bystander-initiated cardiopulmonary resuscitation and prehospital advanced cardiac life support by physicians on survival of out-of-hospital cardiac arrest: a nationwide population-based observational study. *Critical Care* 2010;14(6):1-8.
6. Herlitz J, Svensson L, Holmberg S, Ångquist KA, Young M. Efficacy of bystander CPR: intervention by lay people and by health care professionals. *Resuscitation* 2005;66(3):291-295.
7. Perkins GD, Jacobs IG, Nadkarni VM, Berg RA, Bhanji F, Biarent D. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update of the Utstein resuscitation registry templates for out-of-hospital cardiac arrest: a statement for healthcare professionals from a task force of the International Liaison Committee on Resuscitation. *Circulation*. 2015;132(13):1286-1300.
8. Cappuccio FP, Miller MA. Cardiovascular disease and hypertension in sub-Saharan Africa: burden, risk and interventions. *Internal and Emergency Medicine* 2016;11(3):299-305.
9. Perkins GD, Handley AJ, Koster RW, Castrén M, Smyth MA. European Resuscitation Council Guidelines for Resuscitation 2015: Section 2. Adult basic life support and automated external defibrillation. *Resuscitation* 2015; 95(6):81-99.
10. Xie CY, Jia SL, He CZ. Training of basic life support among lay undergraduates: Development and implementation of an evidence-based protocol. *Risk Management and Healthcare Policy* 2020; 13:1043-1054.
11. Friesen J, Patterson D, Munjal K. Cardiopulmonary resuscitation in resource-limited health systems considerations for training and delivery. *Prehospital and disaster medicine* 2015;30(1):97-101.
12. Couper I, Ray S, Blaauw D, Ng'wena G, Muchiri L, Oyungu E. Curriculum and training needs of mid-level health workers in Africa: a situational review from Kenya, Nigeria, South Africa and Uganda. *BMC Health Services Research* 2018;18(1):1-12.
13. Dolamo BL, Olubiyi SK. Nursing education in Africa: South Africa, Nigeria, and Ethiopia experiences. *International Journal of Nursing and Midwifery* 2013;5(2):14-21.
14. Iheduru-Anderson KC, Wahi MM. Experiences of Nigerian internationally educated nurses transitioning to United States health care settings. *Journal of Transcultural Nursing* 2018;29(6):603-610.
15. Alenoghena I, Aigbiremolen AO, Abejegah C, Eboeime E. Primary Health Care in Nigeria: Strategies and constraints in

- implementation. *International Journal of Community Research* 2014;3(3):74-79.
16. Oni T, Unwin N. Why the communicable/non-communicable disease dichotomy is problematic for public health control strategies: implications of multimorbidity for health systems in an era of health transition. *International Health* 2015;7(6):390-9.
 17. Bagnall RD, Weintraub RG, Ingles J, Duflou J, Yeates L, Lam L. A prospective study of sudden cardiac death among children and young adults. *New England Journal of Medicine* 2016;374(25):2441-2452.
 18. Coute RA, Nathanson BH, Panchal AR, Kurz MC, Haas NL, McNally B. CARES Surveillance Group. Disability-adjusted life years following adult out-of-hospital cardiac arrest in the United States: A burden of disease estimate. *Circulation: Cardiovascular Quality and Outcome* 2019;12(3):467-77.
 19. Anetoh BC, Onwudinjo VG. Emigration and the problem of brain drain in Nigeria: a philosophical evaluation. *Journal of African Studies and Sustainable Development* 2020;3(1):5-13.
 20. Breckwoldt J, Lingemann C, Wagner P. Resuscitation training for lay persons in first aid courses: transfer of knowledge, skills and attitude. *Der Anaesthesist* 2015;65(1):22-29.
 21. Ingram M, Reinschmidt KM, Schachter KA, Davidson CL, Sabo SJ. Establishing a professional profile of community health workers: results from a national study of roles, activities and training. *Journal of Community Health* 2012;37(2):529-37.
 22. Wennerstrom A, Johnson L, Gibson K, Batta SE, Springgate BF. Community health workers leading the charge on workforce development: lessons from New Orleans. *Journal of Community Health* 2014;39(6):1140-1149.
 23. Jones TM, Schulte A, Ramanathan S, Assefa M, Rebala S, Maddox PJ. Evaluating the association of state regulation of community health workers on adoption of standard roles, skills, and qualities by employers in select states: a mixed methods study. *Human Resources for Health* 2021;19(1):1-7.
 24. Seidman G, Atun R. Does task shifting yield cost savings and improve efficiency for health systems? A systematic review of evidence from low-income and middle-income countries. *Human Resources for Health* 2017;15(1):1-6.
 25. Martínez-González NA, Djalali S, Tandjung R, Huber-Geismann F, Markun S. Substitution of physicians by nurses in primary care: a systematic review and meta-analysis. *BMC Health Services Research* 2014;14(1):1-7.
 26. Solagberu BA, Ofoegbu CK, Abdur-Rahman LO, Adekanye AO, Udoffa US. Pre-hospital care in Nigeria: a country without emergency medical services. *Nigerian Journal of Clinical Practice* 2009;12(1):29-33.
 28. Olusegun-Joseph AD, Akande O, Otofranowei E, Nwoye EO, Olopade OB, Ajuluchukwu JN. Medical mortality in an emergency department in Nigeria: the transition is obvious. *African Health Sciences* 2021;21(1):172-9.
 29. Adekola OO, Menkiti DI, Desalu I. How much do we Remember after CPR Training? Experience from a Sub-Saharan Teaching Hospital. *Analg Resusc: Curr Res* 2013;4(3):5-16.
 30. Edomwonyi NP, Isesele TO, Edobor FE, Esangbedo S, Afolayan J. A survey of the knowledge of cardiopulmonary resuscitation and the impact of training on nurses at the University of Benin teaching hospital, Nigeria. *West Afr J Med* 2013;32(2):239-42.
 31. Omotayo A, Chikwendu OD, Adebayo K. Two decades of World Bank assisted extension services in Nigeria: lessons and challenges for the future. *The Journal of Agricultural Education and Extension* 2001;7(3):143-52.
 32. Oleribe OO, Momoh J, Uzochukwu BS, Mbofana F, Adebisi A, Barbera T. Identifying key challenges facing healthcare systems in Africa and potential solutions. *International Journal of General Medicine*. 2019;12(7):395-409.
 33. Strasser R, Kam SM, Regalado SM. Rural health care access and policy in developing countries. *Annual Review of Public Health* 2016;37(3):395-412.
 34. Kalu QN, Oboko OO, Stephen O, Nwaogburu KN. Witnessed Cardiac Arrest by Nigerian Health Workers; Improving the Outcomes. *Glob J Anesth* 2018;5(1):7-12.
 35. Edeh AJ, Okenwa WO, Osondu CT. Cases of Brought in Dead (BID) in the Accident and Emergency Department of a Tertiary Hospital in Enugu, Nigeria: A Retrospective Study. *Age* 2018;91(100):1-13.

Socio-Demographic Correlates of Antiretroviral Treatment Adherence among Paediatric HIV Patients Under Care at A Tertiary Health Institution in South-East Nigeria

Cletus O AKAHARA,¹ Emeka C NWOLISA,¹ Ifeoma EGBUONU,² Chijioko E EZEUDU,² Joseph EZEUGU,¹ Jacinta C ELO-ILO,² Bonaventure I OBI,³ Chidi J OKORO.⁴

ABSTRACT

Background: Antiretroviral treatment adherence is the strongest predictor of successful treatment outcome among HIV-infected patients on treatment. **Objective:** To determine the correlation between the socio-demographic factors of our HIV-infected patients and their antiretroviral treatment adherence, at a tertiary hospital in South-East Nigeria. **Methodology:** This is a cross-sectional survey of 210 HIV-infected children accessing care at a tertiary hospital in South-East Nigeria using self-report method of adherence assessment. Adherence to combined antiretroviral therapy (cART) is defined as when a patient did not miss more than 1 dose of the prescribed cART medication in the preceding 2 weeks prior to the study. **Result:** Majority, 191 (91%), of the subjects adhered. There was a significant relationship between cART adherence and educational level (0.004), duration of treatment (0.001), but not to the socio-economic status (0.001). **Conclusion:** The cART adherence level in this study was 100% in 91% of the subjects studied. There was no statistically significant relationship between cART adherence and the socio-economic status of the subjects.

Keywords: Antiretroviral, Adherence, Socio-demographic, South-east, Nigeria.

INTRODUCTION

Human Immunodeficiency Virus (HIV) infection and the resultant Acquired Immunodeficiency Syndrome (AIDS) has remained a significant public health concern especially in sub-Saharan Africa where it still contributes significantly to childhood morbidity and mortality.¹ There are yet no curative drugs but the use of combined antiretroviral therapy

OPEN ACCESS

Affiliation

¹ Department of Paediatrics Federal Medical Centre Owerri Imo state, Nigeria. ² Department of Paediatrics Nnamdi Azikiwe University Awka, Anambra State, Nigeria. ³ Department of Ophthalmology Imo State University Teaching Hospital Orlu, Imo State Nigeria. ⁴ Department of Paediatrics Imo State University Teaching Hospital Orlu, Imo State Nigeria.

*Correspondence

Dr Chijioko E Ezeudu.
Department of Paediatrics, Nnamdi Azikiwe University Awka.
Tel: +2348035091112
Email: ce.ezeudu@umizik.edu.ng

Article Metrics

Date Submitted: 15 Feb. 2022
Date Accepted: 24 April 2022
Date Published: Jan-June 2023

Journal Metrics

e- ISSN: 1115-0521
Website: www.orientjom.org.ng
E-mail: editorojm@gmail.com

Publisher

cPrint, Nig. Ltd
E-mail: cprintpublisher@gmail.com

How to cite this article

Akahara CO, Nwolisa EC, Egbuonu I, Ezeudu CE, Ezeogu J, Elo-Ilo JC, et al., Socio-Demographic Correlates of Antiretroviral Treatment Adherence among Paediatric HIV Patients Under Care at A Tertiary Health Institution in South-East Nigeria. *Orient J Med*, 2023;35(1-2):37-43. DOI: 10.5281/zenodo.7236990



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7236990

(cART) has ensured better outcomes. Combined antiretroviral therapy consists of the use of mostly three antiretroviral agents, and good adherence is the most important determinant of success and positive outcome.²

With regard to antiretroviral therapy (ART), an adherence level of 95% or more is required in order to obtain successful outcome.^{3,4} Non-adherence can lead to incomplete viral suppression, emergence of resistant viral strains, and treatment failure⁵ Paediatric adherence relies not only on the child but also on his/her caregiver and as such is especially challenging^{6,7,8,9,10}.

Given that adherence is the strongest predictor of successful treatment outcome, a clear understanding of the relationship between subjects' socio-demographic correlates and cART adherence is very crucial in the bid to develop measures to support and sustain patients' drug adherence in the clinical care of HIV-infected children²

Several methods have been used to measure adherence and they include Therapeutic Drug Monitoring (TDM), Directly Observed Therapy (DOT), Pill counts, Self-report respectively and others.^{11,12,13,14} It is very important to emphasize here that there is no 'gold standard' for assessing cART adherence, and rates may differ depending on the method used.^{13,14,15}

In the self-report method, the older patient or caregiver (in the case of younger child) gives information on how the drugs are taken and reports on missed doses. This method hinges on the client providing true and accurate information.¹⁴

This study was carried out to assess the relationship between subjects' socio-demographic factors and cART adherence at the Paediatric HIV Clinic of the Federal Medical Centre, Owerri, South-East Nigeria.

METHODOLOGY

Study Design and Setting

This was a cross sectional hospital based study of 210 children aged ten to 180 months attending the Paediatric HIV Clinic of the Federal Medical Centre Owerri, South-East, Nigeria.

Federal Medical Centre Owerri is one of the tertiary institutions in Imo state and SouthEast Nigeria. The hospital is a multidisciplinary health facility which provides health services for clients from Imo state, and neighboring Abia, Anambra and Rivers states. The Centre has a comprehensive Paediatric HIV care and treatment clinic which receives logistics and technical support from Clinton foundation and Family Health International. It attends to an average of forty-five HIV children every week who are either on treatment (on ART) or as HIV exposed babies. Counseling, nutritional assistance, psychological support and social support are also provided by the Clinic.

Ethical Considerations

Ethical approval was obtained from the Research and Ethics Committee of Federal Medical Centre, Owerri. Informed written consent/assent was obtained from the caregivers/ children.

Sample Size Determination

The sample size was determined with the formula

$$N = \frac{Z^2 Pq}{d^2}$$

Where; N = Minimum sample size,
Z = Standard normal deviation taken to be 1.96 at 95% confidence level
P = Prevalence of ART adherence which is 86% from a study done in south- west Nigeria¹⁶

$$q = 1 - P$$

$$d = \text{degree of accuracy} = 0.05$$

$$N = \frac{(1.96)^2 \times 0.68 \times 0.14}{(0.05)^2}$$

$$= 185$$

Considering 10% attrition rate, sample size will be

203. Thus minimum sample size was 203.

Data Collection

Data were collected with a pre-tested interviewer administered questionnaire. The information sought for included the caregiver's related factors such as age, educational level, occupation, relationship to subject, and treatment duration. Also the patient's related factors like age, gender, education, orphan status and missed medication(s) were sought. Adherence here was determined using the self-reporting method. Adolescent patients and parents/caregivers (for the younger subjects below 10 years of age) were asked to recall how many times they missed their drugs as prescribed in the last two weeks preceding the study. Patients were classified as having cART adherence if they scored $\geq 95\%$ (not missing more than 1 dose in the last 2 weeks). Social class was determined using the socioeconomic indices of the parents as described by Oyedeji¹⁷

Data Analysis

The data from the questionnaire was cleaned and analyzed using the SPSS version 20.0, Chicago, Illinois, USA. The data was further subjected to descriptive and analytical statistics to generate frequencies and percentages. Chi square was used to test for association between two categorical

variables. P-value < 0.05 was considered to be statistically significant.

RESULTS

A total of 210 patients who met the inclusion criteria were recruited for the study. Of these, 108 (51.4%) were males and 102 (48.6%) were females giving a male to female ratio of 1.05:1. Their age ranged from 10 to 180 months. Those in the age range between 60 to 119 months constituted the largest proportion (36.7%). One hundred and six (50.6%) have been on treatment for 12 to 35 months while 12 (5.7%) have been on treatment for less than 12 months. Table 1 shows the general characteristics of the subjects. One hundred and forty-six (69.5%) had their drugs administered by their biological parents, while 64 subjects (30.5%) lost one of the parents each, and 22 (10.5%) lost both. One hundred and ninety-one (91%) had 100% adherence and 12 (5.7%) had 95% adherence. Seven (7), 3%, were non-adherent. There was a significant association between adherence and subjects' educational level ($p = 0.004$) and duration of treatment ($p = 0.001$). One hundred and nine (58.3%) of the caregivers were aged between 30 to 50 years and 90 (48.1%) had tertiary education. Ninety-eight (52.4%) were males while 55 (29.4%) were of the social class V. Table 2 shows the sociodemographic characteristics of the caregivers.

Table 1: General characteristics of the Subjects (n =210)

Characteristics	Number (n=210)	Adh(191)	NAdh(19)	Chi-square	p value
Age (months)					
10 -12	3 (1.4%)	3	0	6.32	0.097
13 – 59	59 (28.1%)	57	2		
60 – 119	77 (36.7%)	71	6		
120-180	71 (33.8%)	60	11		
Gender					
Male	108 (51.4%)	97	11	0.12	0.750
Females	102 (48.6%)	94	8		
Educational level					
None/pre-Primary	65 (31.0%)	64	1	10.81	0.004*
Primary	85 (40.5%)	78	7		
Secondary	60 (28.5%)	49	11		
Treatment duration (months)					
<12	12 (5.7%)	12	0	29.91	0.001*
12 – 35	106 (50.6%)	103	3		
35 – 59	68 (32.4%)	61	7		
>60	24 (11.4%)	13	9		
Who administered the medication?					
Self (age ≥11years)	26 (12.4%)	19	7	12.60	0.006
Biological parent	146 (69.5%)	138	8		
Biological grandparent	31 (14.8%)	28	3		
Others (aunt, 1familyfriend)	7 (3.3%)	6	1		
Orphan status					
Both parents alive	124 (59.0%)	117	7	23.30	0.001*
One parent alive	64 (30.5%)	50	4		
Both parents dead	22 (10.5%)	14	8		
Missed doses (last 2 weeks)					
None	191 (91%)			140.87	0.001*
Yes	19 (9%)				
	12 1 dose} 7{>1dose}]				

Adh =Adherence; NAdh= Non -adherence; * statistically significant

Table 2. Socio-demographic characteristics of the caregivers that administered drugs to the subjects (n= 184 i.e. 210– 26 self-administrators)

Characteristics	Number(n=184)	Adh(172)	NAdh(12)	Chi-square	p value
Age (years)					
<30	34(18.2%)	31	3	15.96	0.001*
30 – 50	109(58.3%)	108	1		
>50	44(23.5%)	36	8		
Gender					
Male	98(52.4%)	92	6	0.001	1.000
Female	89(47.6%)	83	6		
Educational level					
Primary	15 (8.0%)	12	3	5.66	0.059
Secondary	82(43.9%)	79	3		
Tertiary	90(48.1%)	84	6		
Occupation					
Civil service	73(39.0%)	69	4	1.32	0.520
Self- employed	99(52.9%)	93	6		
Unemployed	15(8.0%)	13	2		
Social class					
I	23(12.3%)	21	2	4.51	0.340
II	32(17.2%)	31	1		
III	27(14.4%)	233	4		
IV	50(26.7%)	48	2		
V	55(29.5%)	52	3		
Relationship to patient					
Biological parent	146(78.1%)	138	8	0.98	0.61
Biological grandparent	31(16.6%)	28	3		
Others (aunts 9, family friends 1)	10(5.3%)	9	1		

Adh =Adherence ; NAdh = Non - adherence ; * =statistically significant.

DISCUSSION

The adherent rate of 91% in the present study is higher than those documented by Iroha *et al*¹⁶ in Lagos, Mukhtar-Yola *et al*¹⁸ and Zubayr *et al*¹⁹ both in Kano State Nigeria where they documented adherence rates of 86%, 80%, and 91% respectively. However, this finding is lower than that documented by Ugwu and Eneh in Port-Harcourt, Nigeria.²⁰ Even though these studies all employed the use of self-reporting method in assessment of adherence, the lower adherence rates found in both Kano and Lagos studies may be attributable to the sample sizes and shorter periods of medication adherence assessment in the two studies. Conversely, the higher adherence rates reported by Ugwu and Eneh may be due to the longer recall period employed in their study.²⁰ Whereas the present study assessed adherence by recall over the two weeks prior to the study, Ugwu and Eneh assessed adherence by recall over a one-month period.²⁰

Importantly, adherence was found to be decreasing with increasing age and this is in agreement with finding from other studies^{21,22} This is understandable as children would likely not take drugs every day over a long period of time either because of peer pressure or due to the tedious nature of swallowing pills every day. Despite socio-cultural preference for male child by the Igbos of South-Eastern and the Yorubas of South-Western Nigeria, this study observed higher adherence among the females than males, although the difference was not statistically significant ($p=1.00$). This observation is similar to earlier reports in Port Harcourt and Kano states of Nigeria.^{19,20} The implication is that gender may not have any influence on cART adherence.

Adherence was higher in patients whose biological parents administered the drugs when compared to those administered by other relatives. and this was statistically significant. This finding is in agreement with the Kano study.¹⁸ The usual bonding between

parent and their children could explain this.

Adherence to medication was found to be better among secondary school certificate holders than other educational classes. The study also found a better adherence among children whose parents or caregivers were civil servants than the other occupational classes. Even though there were no immediate explanation for these, however, these findings were not statistically significant.

There was no positive correlation between adherence and the socio-economic status of the parents/caregivers and adherence to treatment. Mohammed *et al*²³ in a study in rural Louisiana documented similar finding. Also, Singh *et al*,²⁴ in a multicenter study of Caucasians and the Non-Caucasians population found no statistical relationship between the social class and adherence to cART treatment. This could mean that irrespective of social class parents and caregivers are eager to make sure that their children are adherent. Conversely, Weiser *et al*²⁵ in Botswana study observed a statistically significant relationship between the components of the socio-economic status and cART adherence but not with social class status in general.

CONCLUSION

The adherence level in this study was 100% among 191(91%) of the subjects studied, 12(5.7%) reported 95% adherence while 7(3.3%) were non-adherent. Most of the subjects were from the lower socio-economic class. In general, the socio-economic status of the subjects in this study has no statistical correlation with their cART adherence.

Disclosure

Conflict of interest: None

Financial support: None

REFERENCES

1. WHO-HIV-AIDS: Fact Sheet No. 360, November 2014. Available at <https://www.who.int/news-room/fact-sheets/detail/hiv-aids>. Updated 30 November 2021. Accessed 18th April 2022
2. WHO Consolidated guidelines 2013 on the use of antiretroviral drugs for treating and preventing HIV infection. Available at www.who.int/hiv/pub/guideline/arv2013/en/ Accessed 18th April 2022
3. Guidelines for the use of antiretroviral agents in HIV-1 infected adults and Adolescents. AIDS info. HIV and its treatment: Treatment Adherence. [Http:// aidsinfo.nih.gov/guidelines](http://aidsinfo.nih.gov/guidelines). Accessed 19th April 2022
4. Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C *Et al*. Adherence to protease inhibitor therapy and outcomes in patients with HIV-infection. *Ann Intern Med* 2000; 133:21 - 30.
5. Nabukeera-Barungi N. Factors affecting ART uptake, adherence and prevention of transmission among HIV positive children and adolescents in Uganda. Tech. Rep., USAID, 2007.
6. Center for Disease Control and Prevention, Evaluation of adherence to ART in children in Nigeria. *AIDS* 2008; 22:23712380.
7. Marhefka L, Farley JI, Rodrigue JR, Sandrik LL, Sleasman JW, and Tepper VI. Clinical assessment of medication adherence among HIV-infected children: examination of the Treatment Interview Protocol (TIP). *AIDS Care Psychological and Socio-Medical Aspects of AIDS/HIV* 2004; 16(3):323337.
8. Weigel R, Makwiza I, Nyirenda J, Chiunguzeni D, Phiri S, and Theobald S. Supporting children to adhere to antiretroviral therapy in urban Malawi: multi method insight. *BMC Pediatrics* 2009; 9: 45.
9. Shah CA, Adherence to High Activity Antiretroviral Therapy (HAART) in pediatric patients infected with HIV: issues and interventions. *Indian J Pediatr* 2007; 74(1):5560.
10. Goode M, Mcmaugh A, Crisp J, Wales S, Ziegler JB, Adherence issues in children and adolescents receiving highly active antiretroviral therapy. *AIDS Care* 2003; 15(3):403408.
11. Aardex group. Medication adherence-patient compliance. Available at www.aardex.com. Accessed 19th April, 2022.
12. Biadgilign S, Deribew A, Amberbir A, Deribe K. Adherence to highly active antiretroviral therapy and its correlates among HIV infected pediatric patients in Ethiopia. *BMC Pediatr* 2008;6(8): 53
13. Wutoh AK, Elekwacki O, Clark-Tasker V, Daftary M, Powell NJ, Campusano G. Assessment and predictors of antiretroviral adherence in older HIV-infected patients. *AIDS* 2000; 14:35-47.
14. Simoni JM, Kurth AE, Pearson CR, Pantolone DW, Merrill JO, Frick PA. Self-report measures of antiretroviral therapy adherence: a review with recommendations for HIV research and clinical management. *AIDS Behav* 2006; 10:227-245.
15. Paterson DL, Potoski B, Capitano B. Measurement of adherence to antiretroviral medications. *Clin Infect Dis* 2001; 33:386.
16. Iroha E, Esezobor CI, Ezeaka C, Temiye EO, Akinsulie A, Adherence to antiretroviral therapy among HIV-infected children attending a donor-funded clinic at a tertiary hospital in Nigeria. *Afr J AIDS Res* 2010; 9(1):2530.
17. Oyedemi GA. Socioeconomic and cultural background of hospitalized children in Ilesha Nigeria. *Nig J Paediatr* 1985; 12: 111-117.
18. Mukhtar-Yola M, Adeleke S, Gwarzo D, Ladan ZF, Preliminary investigation of adherence to antiretroviral therapy among children in Aminu Kano Teaching Hospital, Nigeria. *AJAR* 2006; 5(2):141144.
19. Zubayr B, Ibrahim M, Jumare J, Hasssan-Hanga F, Gambo MJ, Dakum PS, *et al*. Adherence to highly active antiretroviral therapy among HIV-infected children in Kano, Nigeria, *J Hum Virol & Retrovirol* 2015; 2(2):16.
20. Ugwu R, Eneh A, Factors influencing adherence to Paediatric antiretroviral therapy in Port Harcourt, South-South Nigeria. *Pan African Medical Journal* 2013; 16:30.
21. Biadgilign, A. Deribew, A. Amberbir, and K. Deribe. Adherence to highly active antiretroviral therapy and its correlates among HIV infected pediatric patients in Ethiopia. *BMC Pediatrics* 2008; 8:5365.
22. Davies MA, Boule A, Fakir T, Nuttall J, Elley B. Adherence to antiretroviral therapy in young children in Cape Town,

- South Africa, measured by medication return and caregiver self-report: a prospective cohort study. *BMC Pediatrics* 2008; 8:34.
23. Mohammed H, Kiertica L, Richardson-Alston G, Magnus M, Fawal H, Vermund SH, *et al.* Adherence to HAART among HIV-infected persons in rural Louisiana. *AIDS patients care STD* 2004; 18(5):289-296.
24. Singh N, Berman SN, Swindells S, Justis JC, Mohr JA, Squier C. Adherence of HIV-infected patients to antiretroviral therapy. *Clin Infect Dis* 1999. 29(4):824-830.
25. Weiser S, Wolfe W, Gilbert P, Bangsberg D, Markhema J, Thior I. Barriers to antiretroviral adherence for patients living with HIV infection and AIDS in Botswana. *J Acquir Immune Defi Syndr.* 2003; 34(3):281-288.

orient



Knowledge, Beliefs and Misconceptions about Epilepsy and its Treatment in a Rural Community in South-Eastern Nigeria

Chinomso C NNEBUE,^{1,4} Ernest O NWAZOR,² Paul O NWANI,³ Callistus O IFEZULUMBA,⁴ Eayobaseta O EWA,⁴ Favour E IWERE,⁴ Ngozi L ONYEBUCHI.⁴

ABSTRACT

Background: Epilepsy is not only one of the oldest known neurological disorder but also one of the most prevalent chronic brain disorder worldwide. The social pathology associated with epilepsy drives the people with epilepsy (PWE) and their families into the shadows and widens epilepsy treatment gap. How much the social aspects of epilepsy and epilepsy care has changed in rural African communities in the globalized world is yet to be fully elucidated. **Objectives:** This study aims to determine the level of knowledge and attitude towards epilepsy and the people living with epilepsy (PWE) by adult inhabitants of a rural south-eastern Nigerian community. **Methodology:** This was a cross sectional door-to-door population survey. Interview on select aspects of knowledge and attitude to epilepsy was conducted using a pretested semi-structured questionnaire. **Results:** Three hundred and seven (90.3%) of the respondents reported awareness of epilepsy, 61(18%) had good knowledge on epilepsy but attitude towards epilepsy was negative. The key source of information on epilepsy for 133 (43.3%) respondents was health workers, while 125 (40.7%) reported that epilepsy was a medical disease. Associations existed between level of knowledge on epilepsy and gender ($p=0.0023$); marital status ($p=0.0012$) and educational attainment ($p=0.0476$). **Conclusions:** Awareness of epilepsy though high among the rural inhabitants yet a wide gap still exist regarding the knowledge and attitude towards epilepsy. It is hoped that with adequate culturally appropriate educational programs, channelled through the media and health workers in rural communities the existing gap in knowledge and treatment will be bridged.

Keywords: Treatment gap, shadows, rural Nigeria, education

OPEN ACCESS

Affiliation

¹ Department of Community Medicine and Primary Health Care, Faculty of Medicine, Nnamdi Azikiwe University, Awka, Nigeria. ² Department of Internal Medicine Federal Medical Centre Owerri Nigeria. ³ Neurology Unit, Department of Internal Medicine, Faculty of Medicine, Nnamdi Azikiwe University, Awka, Nigeria. ⁴ Department of Community Medicine, Madonna University Elele, Nigeria.

*Correspondence

Dr P. O NWANI. Neurology Unit. Department of Internal Medicine, Nnamdi Azikiwe University, PMB 5025, Awka, Anambra State, Nigeria. Postal code: 42026.

Email: paul.nwani@yahoo.com

Article Metrics

Date Submitted: 10 Feb. 2022
Date Accepted: 21 April 2022
Date Published: Jan-June 2023

Journal Metrics

e- ISSN: 1115-0521
Website: www.orientjom.org.ng
E-mail: editorojm@gmail.com

Publisher

cPrint, Nig. Ltd
E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7293670

How to cite this article

CC Nnebue, EO Nwazor, PO Nwani, CO Ifezulumba, EO Ewa, FE Iwere et al., Knowledge, Beliefs and Misconceptions about Epilepsy and its Treatment in a Rural Community in South-Eastern Nigeria. *Orient J Med*, 2023;35(1-2):45-55.
DOI:10.5281/zenodo.7293670.

INTRODUCTION

Epilepsy is one of the most prevalent chronic brain disorder worldwide. It affects an estimated 50 million people worldwide and about 80% of cases reside in developing countries.¹ The prevalence of epilepsy in Nigeria from community based studies ranges from 4.5 to 37 per 1,000 with a wide regional variation.^{2, 3, 4} Epilepsy affects persons of all age groups, tends to be more prevalent in rural communities and localities with endemic proportions of parasitic infections such as neurocysticercosis, onchocerciasis amongst others.⁵

The social consequences of epilepsy leaves the sufferers with varying level of stigmatization and discrimination by the public thus driving them and their families into the shadows.⁶ This social consequences stems from the superstitious and socio-cultural beliefs about epilepsy which are based on several unfounded historical connotations.^{6,7,9} These superstitious and socio-cultural beliefs also influences the health seeking behaviour and management of PWE in rural African communities and widens epilepsy treatment gap. Studies have shown that majority of people living with epilepsy in the rural communities seek care firstly from unorthodox traditional healers and spiritual homes before orthodox treatments using antiepileptic medications.^{9,10}

With the global village paradigm and increasing access to information through the electronic/digital especially social media in almost all aspects of life, how much of these age long superstitious beliefs about epilepsy are still upheld by the adult population in rural Africa communities remains a question to be answered. The increased access to information through the electronic/digital media, also present a new frontier of misinformation from these sources. However, appropriately managed the media will offer a good avenue for appropriate community education regarding epilepsy and care for people living with epilepsy.

Lack of appropriate information, low literacy level which are all common in rural communities have all been reported to negatively impact on the care of people with epilepsy.^{11,12,13} Adequate knowledge of epilepsy in the rural communities will improve the attitude towards epilepsy and care of people living with epilepsy. To achieve this accurate documentation of the extent of the problem in rural communities where most people with epilepsy live will be the first step followed by the development of comprehensive culturally appropriate educational plans and policies to bridge the gap. The present study therefore aimed to determine the knowledge and attitude of a rural South-eastern Nigerian community dwellers to epilepsy and its treatment.

METHODOLOGY

Study Area: This study was conducted in Ogbaku a rural community in Mbaitoli Local Government Area of Imo State, Southeast Nigeria between June 2021 and December 2021. Ogbaku is located at about 14km from Owerri, the capital of Imo State and has an area of 84km² and a projected total population of 164,425 persons with a 2011 population density projected at 2004.5 persons per sq. km.¹⁴ The Southeast Nigeria is home for the Igbo speaking people of Nigeria with their numerous traditional religious beliefs and practices that held sway before the introduction of the Christian religion. Though many households in Ogbaku community now practice Christianity there are still a few loyalist of the traditional African religion and some Muslims in the community. The residents are mainly traders, farmers and artisans with a few civil servants working in the schools in the community and the health centre. The town hosts the comprehensive Primary Health Centre of the department of Community Medicine, Imo State University.

Study Design: This was a community-based cross-sectional descriptive study.

Study Population: This study was conducted among

adult members of households that were resident in Ogbaku, Imo state.

Sample Size Estimation: The minimum sample size was calculated using the Cochran formula $n = \frac{z^2 pq}{d^2}$, where; n=minimum sample size, Z= standard normal deviate corresponding to 95% confidence interval = 1.96, p= proportion of the target population that had positive or good attitude relating to epilepsy, d = tolerable error of margin, set at 0.05. From a study conducted by Akpan, et al.¹⁵, in Akwa Ibom State, South-South Nigeria, p= 0.28 for attitude towards epilepsy (16), q=1 - p (q = 0.72), so that the estimated sample size n= 310 households. However, to make up for attrition, the unadjusted sample size was divided by (1-0.1) i.e. 0.9 for non-response rate is taken as 10% giving us a total of 340 households.

Sampling Technique: Multi stage sampling technique was used to select participants. In the first stage, stratified sampling technique was used to split the rural community studied into four according to the four zones. The second stage involved the selection of the villages studied under the four selected zones by simple random sampling. Each select village was regarded as a cluster. The sample size calculated was proportionately allotted to each cluster. Thirdly, a central place in each area was located (market/village hall) and an empty bottle was spun on the ground (the bottle made a minimum of three complete turns before stopping). When it ceased to move, the direction of the neck of the bottle was taken as the starting point. The researchers walked in a line then began again, for the inclusive households. Then systematic sampling technique was used through consecutive enrolment of households to select eligible (head of households or their nominee) and consenting participants from each household within the select village in the respective zones. When the selected participant was absent, the next eligible and available was enrolled.

Data Collection: Interviewer-assisted community-based door-to-door data collection using semi-

structured questionnaire, was done. The questionnaires were administered using face-to-face interviews, by four PHC workers (community health extension workers) who were recruited and trained as research assistants. This questionnaire was adapted from tools used in previous epilepsy surveys and were found useful.^{16,17,18} The questionnaire comprised four sections namely: (a) socio demographic characteristics of respondents, (b) awareness and knowledge of epilepsy, (c) attitude towards epilepsy and (d) relationship between socio-demographics and level of knowledge of epilepsy. To ensure data quality, training of data collection team, field monitoring and day end reviews were conducted.

Inclusion Criteria: Any adult member of a household aged between 18 and 65 years who have resided in Ogbaku community for at least one year prior to the time of study qualified to represent the household in the survey.

Approval for Study: Approval for study was obtained from relevant authorities including the Madonna University Ethical Review Board, through the Head Department of Community Medicine, the traditional ruler of Ogbaku community and council of leaders of the community. The survey was preceded by several visits and advocacy meetings with the traditional leaders, religious leaders and family heads in the community. The purpose and objectives of the study were explained to the participants prior to the interview, consent obtained and confidentiality was maintained.

Data Management and Analysis: The data were entered into the computer, cleaning and consistency checks were done. In order to assess the overall distribution for and factors associated with level of knowledge of epilepsy, five knowledge items were generated. First, a score one (1) was assigned for those giving correct answers or having some knowledge about epilepsy and zero (0) if on the contrary. Then a total was obtained from which a percentage score was calculated, ranging from (0% to 100%). Individuals

with lower percentage values than the mean percentage score (50%) were considered as having poor knowledge about the condition. Similarly, those with higher percentage values than the mean percentage score were considered as having fair knowledge if 51-70 and good knowledge if 71-100.

All statistical analyses were performed using statistical package for social sciences (SPSS) Windows version 22.0.¹⁹ Descriptive statistics of mean, frequency, and percentages were used to summarize data on socio-demographic variables and knowledge of and attitude to epilepsy. Tests of statistical significance were carried out using Chi square and Fishers tests as appropriate for proportions. A p value of ≤ 0.05 was considered significant.

RESULTS

A total of 340 questionnaires were administered to selected households, all of which were retrieved and analysed, giving a response rate was 100%. Table 1 shows the socio-demographic and household characteristics of the respondents. The modal age group 144 (42.4%) was 21-30 years. Majority of them 240 (60%) were females, 182 (53.5%) not currently married, while 100 (29.4%) of them had tertiary education.

Table 2 shows the awareness and knowledge of epilepsy among respondents. Three hundred and seven (90.3%) of them reported awareness of epilepsy, with the key sources of information on epilepsy for 133 (43.3%) respondents as Health workers, 90 (29.3%) radio, 87 (28.3%) family members while 71 (23.1%) social media.

Out of the 307 that reported awareness of epilepsy, 237 (77.2%) reported ever seeing someone suffer an epileptic attack, 156 (50.8%) reported that the commonest cause of epilepsy is medical. Two hundred and sixty-nine (79.1%) described epilepsy

Table 1: Socio-demographic and household characteristics of the respondents.

Characteristics	Frequency (n=340)	Percentage (%)
Age(years)		
≤ 20	29	8.5
21-30	144	42.4
31- 40	107	31.5
41- 50	47	13.8
≥ 51	13	3.8
Gender		
Male	136	40
Female	204	60
Marital Status		
Married	158	46.5
Not married	135	39.7
Widowed	32	9.4
Separated/Divorced	15	4.4
Religion		
Christianity	326	95.9
Islam	10	2.9
African traditional religion	4	1.2
Highest level of education attained		
No formal education	12	3.5
Primary	51	15.0
Secondary	177	52.1
Tertiary	100	29.4
Occupation		
Trading	60	17.7
Farming	41	12.1
Teaching	34	10
Civil servants	52	15.3
Schooling	55	16.2
Artisans	35	10.3
Unemployed	63	18.5
Ethnicity		
Ibo	327	96.2
Yoruba	7	2

Table 2: Awareness and knowledge of epilepsy

Variables	Frequency***	Percentage (%)
Ever heard of epilepsy		
Yes	307	90.3
No	33	9.7
Source of information about epilepsy		
Media (electronic, digital)*	224	41.9
Health workers	133	24.8
Family members (siblings, parents)	87	16.3
Religious organisations**	74	13.8
Books	17	3.2
Reported ever seen someone suffer an epileptic seizure attack (n=307)		
Yes	237	77.2
No	70	22.8
Reported causes of epilepsy		
Medical	156	50.8
Spiritual	110	35.8
Unknown	41	18.4
Reported description of epilepsy		
Brain disorder	269	79.1
Contagious diseases	71	23.1
Reported transmission of epilepsy		
Infectious	158	51.5
Non-infectious	149	48.5
Reported epilepsy can be treated or managed		
Yes	203	66.1
No	104	33.9
Reported that epilepsy can be prevented using local gin		
Yes	55	7.9
No	252	82.1
Overall knowledge of Epilepsy (n=340)		
Poor	217	63.8
Fair	62	18.2
Good	61	18.0

* (Radio=90 (16.8%), Social media=71 (13.3%), television=63 (11.8%)) ** (Church=65, Mosque=9),

*** Responses are not mutually exclusive

Table 3: Attitude towards epilepsy

Variables	Frequency (percentage)	
	Yes	No
Would you take persons with epilepsy to hospital?	219 (64.4)	121 (35.6)
Can you associate socially with persons with epilepsy?	257 (75.6)	83 (24.4)
Should persons with epilepsy suffer stigmatization	126 (37.1)	214 (62.9)
Would you marry persons with epilepsy?	20 (5.9)	320 (94.1)
Should persons with epilepsy have children?	252 (74.1)	88 (25.9)
Should persons with epilepsy attend special schools	171 (50.3)	169 (49.7)

Table 4: The relationship between socio- demographics and level of knowledge on epilepsy

Variable	Frequency of overall knowledge grade				Test statistics	p-value
	Poor (%)	Fair (%)	Good (%)	Total (%)		
Gender						
Male	97 (28.5)	25 (7.4)	14 (4.1)	136 (35.9)		
Female	120 (35.3)	37 (10.8)	47 (13.9)	204 (64.1)	8.9768	0.0023*
Total	217 (63.8)	62 (18.2)	61 (18.0)	340 (100.0)		
Marital status						
Currently married	112 (32.9)	4 (1.2)	42 (12.4)	158 (46.5)	14.9267	0.0012**
Not currently married	105 (30.9)	58 (17.1)	19 (5.6)	182 (53.5)		
Total	217 (63.8)	62 (18.2)	61 (18.0)	340 (100.0)		
Religion						
Christianity	212 (62.4)	59 (17.4)	55 (16.2)	326 (95.9)		
Non-Christianity	5 (1.5)	3 (0.9)	6 (1.8)	14 (4.1)	0.8754	0.048**
Total	217 (63.8)	62 (18.2)	61 (18.0)	340 (100.0)		
Highest level of education attained						
At most Secondary	135 (39.7)	56 (16.5)	49 (14.4)	240 (70.6)	3.3865	0.0657
Tertiary	82 (24.1)	6 (1.8)	12 (3.5)	100 (29.4)		
Total	217 (63.8)	62 (18.3)	61 (17.9)	340 (100.0)		
Occupation						
Unemployed	20 (5.8)	31 (9.1)	14 (4.1)	65 (19.2)		
Employed	197 (57.9)	31 (9.1)	47 (12.1)	275 (80.9)	0.7043	0.4013
Total	217 (63.8)	62 (18.2)	61 (18.0)	340 (100.0)		
Ethnicity						
Ibo	211 (62.1)	61 (17.9)	55 (16.2)	327 (96.2)	7.2843	0.0068**
Non-Ibos	6 (1.8)	1(0.3)	6 (1.8)	13 (3.8)		
Total	217 (63.8)	62 (18.2)	61 (18.0)	340 (100.0)		

* Chi-squared test ** Fisher's exact test.

as a brain disorder and 71 (23.1%) as a contagious disease. One hundred and fifty-eight (51.5%) reported that epilepsy can be transmitted from person to person, 149 (48.5%) that epilepsy is a non-infectious disease 49 (16%) reported that transmission of epilepsy can be potentiated by malaria and onchocerciasis. Two hundred and three (66.1%) reported that epilepsy can be treated or managed while 55 (7.9%) reported that epilepsy can be prevented using local gin. Only sixty one (18%) respondents had good knowledge on epilepsy.

Two hundred and nineteen (64.4%) would take persons with epilepsy to hospital, 257 (75%) can associate socially with persons with epilepsy while 126 (37.1%) agree that persons living with epilepsy suffer stigmatization (Table 3). Only 20 (5.9%) respondents agreed they would marry persons with epilepsy, 252 (74.1%) agreed persons with epilepsy should have children while 171 (50.3%) respondents agree persons with epilepsy should attend special schools.

Table 4 shows the relationship between socio-demographic and level of knowledge on epilepsy among respondents. There were statistically significant associations between level of knowledge on epilepsy and these socio-demographic: [gender-males and females ($p= 0.0023$); marital status-currently married and not currently married ($p= 0.0012$); religion-Christians and non-Christians ($p= 0.048$); and ethnicity-Ibos and non-Ibos ($p= 0.0068$) respectively.

DISCUSSION

The socio-demographics in the present study are consistent with the characteristics in select studies in Africa with higher population of younger adults.²⁰ In this present study those aged below 40 years of age accounted for 82.4%. This may be accounted for by the reduced life span in the country due to disease and poverty despite the projected aging of the Nigerian population.²¹ This younger age group are

the “jet age” group acquainted with the global outburst of information flow through the internet and electronic media howbeit not isolated from the misleading and erroneous information which can also spread through these means. These younger adults will become the older adults of tomorrow so that any meaningful culturally appropriate educational and interventional programs aimed to bring epilepsy out of the shadows in the rural communities should target this subset of the population as well as the older adults and the community leaders.

There was high awareness of epilepsy (90.3%) among the participants in this present study and this is within the range of 73% to 100% reported in previous studies.^{18,20,22,23} Previous knowledge and attitude studies among Nigerian urban women, secondary school students and teachers have reported good awareness of epilepsy among the different study populations.^{16,24,25}

This current study unlike previous studies revealed the role the electronic/digital media as an increasing source of information of epilepsy especially the digital media. In this present study electronic/digital media accounted for 41.9% of responses on the source of information on epilepsy. In a study among secondary school students in Enugu southeast Nigeria in 2013 Ezeala-Adikaibe et al.¹⁶ reported that electronic media accounted for 36.4% of responses on the source of information on epilepsy while the internet (digital media) accounted for 6.2% of responses. The internet (social media) separately accounted for 13.3% of the responses on the source of information in this present study. The rising access to digital information in Nigeria in the last decade with upgrade to 3G networks in most rural communities in the country is revolutionizing information dissemination even in rural Nigeria. This transformation can be harnessed in bridging epilepsy treatment gap by dissemination of appropriate information on epilepsy through this means. In a study in southern Ethiopia the media accounted for only 12.3% of responses on the source of information on epilepsy.²⁰ However, despite the ease of

accessibility of these sources of information, the information obtained may be entirely unreliable and misleading. The print media (books) only accounted for 5.5% of the responses on the sources of information on epilepsy compared to 10.3% reported among secondary school by Ezeala-Adikaibe *et al*¹⁶, about nine years ago.

Health workers were a common source of information in this present study accounting for 24.8% of the source of information on epilepsy. This is higher than 20% reported in a community study in southern Ethiopia.²⁰ Health workers especially community health workers as seen in this present study are a huge source of health information to the rural community dwellers. Efforts at appropriate training and education of these community health workers on epilepsy has been identified as one of the means of bridging epilepsy treatment gaps.^{26, 27} Education of the health workers in rural communities on epilepsy is an effective route of disseminating culturally appropriate information about epilepsy in rural communities.^{26,27}

Other sources of information on epilepsy in this present study were family sources and religious organizations. The importance of these sources of information on epilepsy lies on the fact that most the old held beliefs on epilepsy driving the misconceptions about the disease are more likely to be transmitted through family sources. On the other hand however, information passed through the religious organisations tend to have great influence on the peoples belief, attitude and practice because of the great devotion to religion in Africa.

Only 18% of the participants in this present study have good level of knowledge of epilepsy. Poor knowledge of epilepsy despite high prevalence of awareness of epilepsy as found in this present study has also been reported by other studies in tropical Africa.^{15,22,28} This dearth of knowledge about epilepsy has important significance in the fight to bring

epilepsy out of the shadows as it affects both the people's attitude towards epilepsy and the health seeking behaviour of people living with epilepsy and their care givers.

Most participants in the study reported that the cause of epilepsy is medical, a finding similar to reports of several previous studies.^{16, 28, 29} Similarly, varying proportions of the participants in the present study also described epilepsy as a mental illness or a brain disorder and agreed that epilepsy is transmissible from person to person. The reason for this disturbing combination of false and good ideas about epilepsy found in this study with a higher population of younger adults with relatively high level of education may be explained from the unreliability of information available in the electronic/digital media and also from poorly trained and uninformed health workers which were the major sources of information about epilepsy in this present study. The implication therefore is that any meaningful effort to bring epilepsy out of the shadows in the tropics will require comprehensive culturally adapted educational programs targeted not only on disseminating correct information about epilepsy but also messages that will dissuade the false beliefs about epilepsy in tropical communities.

General attitude towards epilepsy by participants in the present study though poor, the participants demonstrated good attitude towards response to care for persons with epilepsy. About seven in every ten participants in this present study agreed to take persons with epilepsy to hospital. However, a proportions of participants demonstrated negative attitude by agreeing that persons with epilepsy should attend special school (50.3%); persons with epilepsy should suffer stigmatization (37.1%) while only 5.9% of participants agreed to marry persons with epilepsy. These negative attitudes drive high level of stigmatization and social ostracism associated with epilepsy and have been linked to the unreliable informal sources of information about the disease.^{13,28,30} Misinformation and traditional belief about epilepsy

do not only drive negative attitude towards epilepsy but has also been identified as cause of epilepsy treatment gap.³¹

The present study also examined and found statistically significant associations between participants' level of knowledge on epilepsy and their socio-demographic characteristics like gender, marital status, religion and ethnicity. These findings are consistent with that of Lim *et al.*³² and Neni *et al.*³³, who reported that the socio-demographic variables have significant association with poor level of knowledge. These findings also derive support from previous researchers, who documented that select socio-cultural and socio-demographic variables such as higher income would play a role in the level of knowledge on epilepsy.²⁴ Our study may be limited by the cross-sectional design. Thus further studies are needed in this area.

Limitations and strengths of the study: The study design was cross-sectional indicating that the associations found between variables may not necessarily be causal and may not accurately explain a change of knowledge and attitude over time in the target population. Various forms of biases such as reporting bias, social desirability bias and recall bias could result from this study. Also, self-reported practice may not match actual behaviours. These would have been minimized by the anonymity entrenched in data collection and assuring participants of strict confidentiality. Despite these limitations we think that our data increases the understanding of beliefs and misconceptions concerning epilepsy in rural Nigeria. A major strength of this study is the 100% response rate achieved.

CONCLUSION

There was high awareness of epilepsy among participants in this study however the knowledge of epilepsy was poor as well as high negative attitude towards epilepsy. The common sources of

information on epilepsy were electronic/digital media and health workers, indicating that policies targeting adequate education of health workers on epilepsy and dissemination of appropriate culturally acceptable information about epilepsy through these routes may contribute greatly to the bridging of the epilepsy knowledge gap in tropical communities.

REFERENCES

1. Ngugi AK, Bottomley C, Kleinschmidt I, Sander JW, Newton CR. Estimation of the burden of active and life-time epilepsy: a meta-analytic approach. *Epilepsia*.2010; 51:88390.
2. Mustapha AF, Preux PM, Sanya EO, Akinleye CA. The prevalence and subjective handicap of epilepsy in Ilie, a rural riverine community in South-west Nigeria: a door-to-door survey. *Epilepsy Behav*. 2014; 37:258-264.
3. Nwani P O, Nwosu M C, Asomugha L A, Enwereji K O, Arinzechi E O, Ogunniyi A O. Epidemiology of active epilepsy in a suburban community in Southeast Nigeria: A door-to-door survey. *Niger J Clin Pract*. 2015; 18:527-33. Available from: <https://www.njceponline.com/text.asp?2015/18/4/527/151789>
4. Osuntokun BO, Schoenberg BS, Nottidge VA. Research protocol for measuring the prevalence of neurologic disorders in developing countries: results of a pilot study in Nigeria. *Neuroepidemiology*. 1982; 1(9):143-153. <https://www.karger.com/Article/Abstract/110696>
5. Ovuga E, Kipp W, Mungherera M, Kasoro S. Epilepsy and retarded growth in a hyperendemic focus of onchocerciasis in rural western Uganda. *East Afr Med J*. 1992; 69:5546.
6. Ezeala-Adikaibe B.A, Achor J.U, Aneke E, Ijoma U, Onodugo O. D, Orjioko C *et al*. Pattern and determinants of self-reported enacted stigma among rural dwellers living with epilepsy attending a tertiary health facility in Enugu State Nigeria. *Seizure* 2018; 56:60-66. doi:10.1016/j.seizure.2018.02.004.
7. Sanya EO., Salami TAT., Goodman OO., Buhari OI N., Araoye MO. Perception and attitude to epilepsy among teachers in primary, secondary and tertiary educational institutions in middle belt Nigeria. *Tropical Doctor*. 2005; 35(3):153156. doi: 10.1258/0049475054620905.
8. Rwiza HT, Matuja WB, Kilonzo GP, Haule J, Mbena P, Mwang'ombola R, Jilek-Aall L. Knowledge, attitude, and practice toward epilepsy among rural Tanzanian residents. *Epilepsia*.1993; 34:101723.

9. Nwani PO, Arinzechi EO, Asomugha LA, Enwereji KO, Nwosu MC, Ogunniyi AO. Illness concept among people with epilepsy and their caregivers and preferred treatment methods in a suburban community in southeast Nigeria. *West Afr J Med*. 2013; 32(1): 26-30.
10. Coleman R, Lopyy L, Walraven G. The treatment gap and primary health care for people with epilepsy in rural Gambia. *Bull of World Health Organ*. 2002; **80**: 378383.
11. Mbuba CK, Ngugi AK, Newton CR, Carter JA. The epilepsy treatment gap in developing countries: a systematic review of the magnitude, causes, and intervention strategies. *Epilepsia*. 2008; 49:1491503.
12. Ngugi AK, Bottomley C, Kleinschmidt I, Wagner RG, Kakooza-Mwesige A, Ae-Ngibise K, *et al.* Prevalence of active convulsive epilepsy in sub-Saharan Africa and associated risk factors: cross-sectional and case-control studies. *Lancet Neurol*. 2013; 12:25363.
13. Bain LE, Awah PK, Takougang I, Sigal Y, Ajime TT. Public awareness, knowledge and practice relating to epilepsy amongst adult residents in rural Cameroon--case study of the Fundong health district. *Pan Afr Med J*. 2013; 14:32.
14. Legal Notice of Publication of 2006 Census Final Results. Vol. 96. Abuja: Extraordinary Federal Republic of Nigeria Official Gazette No. 2; 2009. p. B23.
15. Akpan MU, Ikpeme EE, Utuk EO. Teachers' knowledge and attitudes towards seizure disorder: a comparative study of urban and rural school teachers in Akwa Ibom State, Nigeria. *Niger J Clin Pract*. 2013; 16:36570.
16. Ezeala-Adikaibe BA, Achor JU, Onwukwe J, Ekenze OS, Onwuekwe IO, Chukwu O, *et al.*, Knowledge, attitude and practice towards epilepsy among secondary school students in Enugu, southeast Nigeria. *Seizure*. 2013; 22:299302. <https://pubmed.ncbi.nlm.nih.gov/23473634/>
17. Mushi D, Burton K, Mtuya C, Gona JK, Walker R, Newton CR. Perceptions, social life, treatment and education gap of Tanzanian children with epilepsy: a community-based study. *Epilepsy Behav*. 2012; 23:2249.
18. Pupillo E, Vitelli E, Messina P, Beghi E. Knowledge and attitudes towards epilepsy in Zambia: a questionnaire survey. *Epilepsy Behav*. 2014; 34:426. <https://pubmed.ncbi.nlm.nih.gov/24681384/>
19. Statistical Package for Social Sciences (IBM SPSS) 22.0 version. Armonk NY: IBM United States. IBM Corp. 2013.
20. Molla A, Mekuriaw B, Habtamu E, Mareg M. Knowledge and attitude towards epilepsy among rural residents in southern Ethiopia: a cross-sectional study. *BMC Public Health* (2021) 21:420. <https://bmcpubhealth.biomedcentral.com/articles/10.1186/s12889-021-10467-8>
21. Stein Emil Vollset, Emily Goren, Chun-Wei Yuan, Jackie Cao, Amanda E Smith, Thomas Hsiao *et al.* Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100: a forecasting analysis for the Global Burden of Disease Study. *Lancet* 2020; 396: 1285306 <https://doi.org/10.1016/>
22. Kaddumukasa M, Kayima J, Kaddumukasa MN, Ddumba E, Mugeny L, Furlan A, *et al.*, Community knowledge and attitudes of epilepsy in rural and urban Mukono district, Uganda; a cross sectional study. *Epilepsy Behav*. 2016 54: 711 doi: 10.1016/j.yebeh.2015.10.023
23. Almutairi AM, Ansar T, Sami W, Baz S. Public knowledge and attitude towards epilepsy in Majmaah. *Journal of Neurosciences in Rural Practice*, 2016; 7(4):499503.
24. Fehintola FO, Olowookere SA, Adegbenro CA, Afolabi TO, Oladapo V, Oladimeji AO, *et al.* Knowledge of and attitude towards epilepsy among women in Ile-Ife, Nigeria. *Sudan Journal of Medical Sciences*. 2019; 14(1):31-44.
25. Owolabi, L.F, Shehu, NM, Owolabi, SD. Epilepsy and education in developing countries: a survey of school teachers' knowledge about epilepsy and their attitude towards students with epilepsy in Northwestern Nigeria. *Pan African Medical Journal*, 2016; 18(255): 110.
26. Institute of Medicine 2012. *Epilepsy Across the Spectrum: Promoting Health and Understanding*. Washington, DC: The National Academies Press. Available at <https://doi.org/10.17226/13379>.
27. Sebera F, Dedeken P, Kayirangwa J, Umwiringirwa J, Kajeneza D, Alves dos Reis N, *et al.* Effectiveness of community health workers on identification and mobilization of persons living with epilepsy in rural Rwanda using a validated screening tool. *Human Resources for Health* (2022) 20:10 <https://doi.org/10.1186/>
28. Komolafe MA., Sunmonu TA., Afolabi, OT, Komolafe EO, Fabusiwa FO, Groce N, *et al.* The social and economic impacts of epilepsy on women in Nigeria. *Epilepsy &*

- Behavior, 2012;24(1):.97101.
29. Eseigbe EE, Enogela J, Adama, SJ, Nuhu FT, Sheikh TL, Eseigbe P. Perspectives of mothers on childhood epilepsy in Kaduna, Northern Nigeria. *Sub-Saharan African Journal of Medicine*. 2015.2(1):3946.
30. Mustapha A, Odu O, Akande O. Knowledge, attitudes and perceptions of epilepsy among secondary school teachers in Osogbo South-West Nigeria: a community based study. *Niger J Clin Pract*, 2013;16(1):1218.
31. Nwani PO, Nwosu MC, Enwereji KO, Asomugha AL, Arinzechi EO, Ogunniyi AO. Epilepsy treatment gap: prevalence and associated factors in southeast Nigeria. *Acta NeuroScand*. 2013: 128: 8390. <https://pubmed.ncbi.nlm.nih.gov/23425044/>
32. Lim KS., Lim CH., Tan CT. Attitudes toward epilepsy, a systematic review. *Neurol Asia*, 2011;16 (4):269280.
33. Neni, SW, Latif, AZA, Wong, SY, Lua PL. Awareness, knowledge and attitudes towards epilepsy among rural populations in East Coast Peninsular Malaysia: a preliminary exploration. *Seizure*, 2010;19,(5): 280290.

orient



Laryngeal Papillomatosis in an Adult Patient Undergoing General Anaesthesia: An Incidental Finding

Ifeatu O ORANUSI,¹ Godwin OBASIKENE,² Peace C OKEKE,³ Nnanna D UKPA.⁴

ABSTRACT

Laryngeal papillomatosis is a rare respiratory tract disease of viral aetiology. It presents with airway obstruction, cough and voice affectation. Immunodeficiency and sexual behavior are predisposing risk factors. The index patient is a 32-year-old female in whom laryngeal papillomatosis was incidentally discovered during general anaesthesia and laryngoscopy, who developed recurrent disease following excision biopsy. For diagnosis, high index of suspicion is important, the slightest symptoms should be evaluated and neck x-rays and indirect laryngoscopy are valuable. Treatment is difficult and costly, entailing repeat surgeries and adjuvant drug therapies.

Keywords: Tumour, Human Papilloma Virus, Recurrent, Respiratory tract

INTRODUCTION

Laryngeal papillomatosis is a rare benign neoplastic disease arising in the mucous membrane of the respiratory tract consisting of exophytic proliferative lesions of connective tissue covered by epithelium due to Human Papilloma Virus (HPV) types 6 and 11 infection.^{1,2} Lesions occur anywhere between the nasal cavity and the lungs.¹ It is commoner in females and children born to mothers with HPV infection, but may occur in adults. Symptoms include breathlessness, hoarseness of the voice, chronic cough, noisy breathing and dysphagia. Morbidity and mortality may occur during management.³ Cases have been reported in Africa, America, Papua New Guinea, Australia and Europe.^{1,2} Low social class is associated with the condition and is often responsible for late presentation and difficulty accessing medical care.^{4,5} The incidence is reported as 3.1 cases per year in Senegal, and 1.8 per 100,000 in adults.^{4,7} That of juvenile onset recurrent respiratory papillomatosis has been reported to be 4.3 per 100,000.⁷ Mildly symptomatic lesions may be missed or misdiagnosed

OPEN ACCESS

Affiliation

¹ Department of Anaesthesia, Nnamdi Azikiwe University /Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria. ² ENT Unit, Department of Surgery, Nnamdi Azikiwe University / Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria. ³ Department of Anaesthesia, Nnamdi Azikiwe University , Teaching Hospital Nnewi, Anambra State, Nigeria. ⁴ ENT unit, Department of Surgery, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria.

*Correspondence

Oranus O Ifeatu.
Department of Anaesthesia, College of Medicine, Nnamdi Azikiwe University, Nnewi Campus, Anambra State Nigeria.

Tel: +234 809 577 4416

Email: docifeatu@yahoo.com

Article Metrics

Date Submitted: 10 Feb. 2022
Date Accepted: 21 April 2022
Date Published: Jan-June 2023

Journal Metrics

e- ISSN: 1115-0521
Website: www.orientjom.org.ng
E-mail: editorojm@gmail.com

Publisher

cPrint, Nig. Ltd
E-mail: cprintpublisher@gmail.com



Access to the article

Website: <http://www.orientjom.org.ng>

DOI: 10.5281/zenodo.7237038

How to cite this article

Oranus IO, Obasikene G, Okeke PC, Ukpai ND. Laryngeal Papillomatosis in an Adult Patient Undergoing General Anaesthesia: An Incidental Finding. *Orient J Med*, 2023;35(1-2):57-60. DOI:10.5281/zenodo.7237038

during preanaesthetic evaluation, high index of suspicion and appropriate investigations are vital.

CASE SUMMARY

A 32-year-old female chorister presented with 2 months' history of waist pain, pelvic fullness and a 3-year history of abdominal swelling. She had occasional mild voice hoarseness and phlegm production. She had no history of dysphagia, cough or breathlessness, was not sexually active and had myomectomy 5 years prior to presentation. Examination revealed a 22 weeks sized uterus. There was adequate mouth opening, thyromental distance was 7cm, and mallampati score was 1. Retroviral screening, full blood count and renal function tests were normal. Abdominopelvic ultrasonography showed uterine fibroids. She was booked for elective myomectomy under combined spinal epidural (CSE) anaesthesia. On the day of surgery, unavailability of CSE packs forced a change of plan to general anaesthesia. During laryngoscopy, she was found to have a warty mass attached posteriorly to the vocal cords, spreading from the left vocal cord towards the midline, and obscuring the tracheal inlet. Anaesthesia was discontinued, a size 5 laryngeal mask airway was inserted for manual ventilation, she was recovered from general anaesthesia, and referred to the oto-rhino-laryngologist for evaluation.

At the ear, nose and throat (ENT) clinic, examination revealed a supple neck, central trachea, cervical lymph nodes were not palpable. Indirect laryngoscopy revealed normal appearing base of the tongue, epiglottis, arytenoids, aryepiglottic folds and a papillomatous fleshy exophytic mass on both vocal cords with a slight occlusion of the glottic rima. There was equal bilateral glottis movement of abduction and adduction on phonation. Lateral neck X-ray showed irregularly shaped soft tissue opacities at C5-C6 level, obstructing the laryngeal air column (Fig 1). She couldn't afford neck CT scan. She was diagnosed with chronic laryngitis with laryngeal papillomatosis and booked for excision biopsy.

In the perioperative period, sedatives were avoided, small sized endotracheal tubes and tracheostomy tubes were kept ready, and preparations for possible emergency tracheostomy. Standard monitoring was commenced, intravenous atropine 0.6mg and dexamethasone 8mg given, pre-oxygenation with 100% oxygen done for 5 minutes, then anaesthesia was induced with incremental halothane from 0.4% to 3% in 100% oxygen and 100mg propofol. Upon adequate mask ventilation, and deep anaesthesia, 100mg suxamethonium was used to achieve muscle paralysis. Laryngoscopy and trachea intubation with a size 6.0mm internal diameter cuffed endotracheal tube were achieved.

Anaesthesia was maintained using isoflurane, atracurium was given for muscle relaxation, fentanyl and paracetamol were administered for analgesia. At the end of surgery, muscle relaxation was reversed with neostigmine 2.5mg and atropine 1.2mg, patient was recovered from anaesthesia, extubated awake, monitored for 20minutes for immediate postoperative complications before transfer to the recovery room.

She developed postoperative hoarseness of the voice and dysphagia, and was managed with diclophenac, augmentin, prednisolone tablets and strict voice resting. Histology showed a benign neoplasm composed of numerous proliferations of papillary structures lined by well differentiated squamous epithelium overlying fibrovascular cores with neither dysplasia nor abnormal mitosis, and made an impression of laryngeal papillomatosis (Figures 2 and 3). She subsequently had myomectomy for her initial diagnosis.

Six months later, she presented with hoarseness of the voice and feeling of presence of a foreign body in the throat. Indirect laryngoscopy revealed papillomatous fleshy mass on the right vocal cord and posterior commissure. Endoscopic nasopharyngoscopy was recommended but was unaffordable to the patient.

Figure 1. Lateral X-ray of the neck showing irregularly shaped soft tissue opacity at the level of C5-C6, obstructing the laryngeal air column



Figure 2. Photomicrograph(X40) shows a benign epithelial neoplasm composed of proliferating squamous cells having slightly enlarged nuclei and abundant eosinophilic cytoplasm disposed in papillary pattern and separated by thin fibrocollagenous stroma, some of these papillae have fibrovascular core. Overall features are those of squamous papilloma.

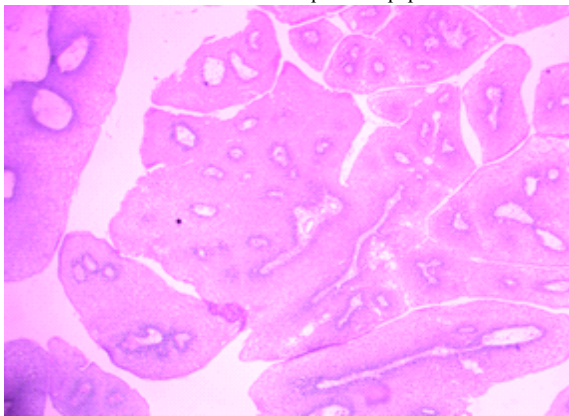
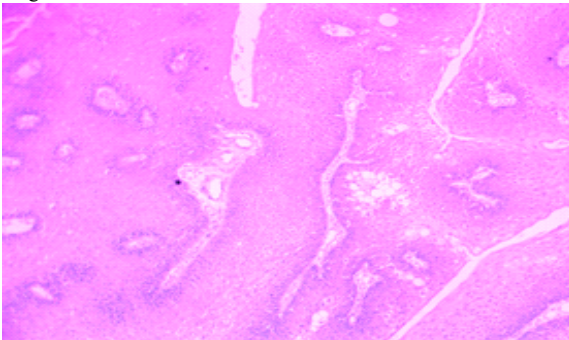


Figure 3. Photomicrograph (X100) showing the lesion at higher magnification



DISCUSSION

Laryngeal papillomatosis have a predilection for the larynx but may occur anywhere along the respiratory tract.^{1,2,6} Immunodeficiency, HPV infection, more lifetime sex partners and higher frequency of oral sex are risk factors.⁸ Patients often trivialize dysphonia, and dyspnea may occur after prolonged disease.^{4,7} Features may resemble other obstructive airway diseases; misdiagnosis and late presentation with acute airway complications are common.^{1,5,9} The index patient was neither immunocompromised nor sexually active, had lesions restricted to the larynx and attributed her hoarseness to frequent singing.

The condition is common in children below five years, affecting more males than females.¹ Adult-onset recurrent respiratory papillomatosis occurs in persons in the fourth decade of life. Our patient was a female in her 4th decade of life without childhood nor maternal historical predisposing factors.

Recurrent lesions are difficult to cure, can spread to the hypo laryngeal vestibules, epiglottis, trachea and lungs, and may lead to head and neck cancers. Surgery is aimed at ensuring airway patency, preserving underlying laryngeal tissues and maintaining an acceptable voice quality.^{2,6} Patients often require repeated surgeries which might include micro debridement, photoangiolytic laser treatment, carbon dioxide laser treatment and tracheostomy. Adjuvant pharmacological therapies aim at immunomodulation, disruption of HPV replication, control of inflammation and prevention of angiogenesis. Interferon therapy, cidofovir, bevacizumab, celecoxib, programmed cell death-1 inhibitor, HPV vaccine prolong time to recurrence.^{10,11} Cost is a major constraint and affected our patient's care.

The anaesthetic management aims at ensuring airway patency and ventilation. Communication between the anaesthetist and surgeon is important. Induction with sevoflurane, halothane or propofol may be used.^{12,13} Spontaneous ventilation ensures some degree of

muscle tone and gas exchange.¹² Mask ventilation of the patient was possible following induction, and we were able to safely intubate following administration of suxamethonium. As in this patient, small tubes should be used for endotracheal intubation and readiness for a surgical airway must always be ensured. Endotracheal intubation has been implicated in distal seeding of lesions.¹³ Anaesthesia may be maintained with propofol and remifentanyl, isoflurane or sevoflurane.

Complications include bleeding, oedema, pain, dysphagia or obstructive symptoms. Humidified oxygen should be used in the recovery room. Stridor may be managed with dexamethasone and nebulized adrenaline. For our patient, voice rest alleviated postoperative hoarseness.

A high index of suspicion during the preanaesthetic visit will ensure that subtle features of this condition are detected. Painstaking investigation and follow up are key in management. Affordability of care however constrains patient management.

Disclosure

Sources of support: None

Conflict of interest: None

REFERENCES

1. James M, Katundu D, Chussi D, Shija P. Prevalence, clinical presentations, associated risk factors and recurrence of laryngeal papillomatosis among inpatients attended at a Tertiary Hospital in Northern zone Tanzania. *Pan Afr Med J* 2018; 30:209. Doi:10.11604/pamj.2018.30.209.11211
2. Wright GR, Murthy DP, Gupta AC, Cooke RA. Comparative insitu hybridization study of juvenile laryngeal papillomatosis in Papua-New-Guinea and Australia. *J Clin Pathol* 1990;43(12):1023-1025
3. Adoga AA, Nimkur LT, Adoga AS. Recurrent respiratory papillomatosis in Jos Nigeria: clinical presentation, management and outcome. *East and Central African Journal of Surgery* 2007; 105:105-108
4. Ndour N, Maiga S, Houra A, Deguenonvo REA, Ndiaye C, Pilor N et al. Laryngeal papillomatosis in adults: Assessment for ten years at ENT department of the national university hospital of Fann (Dakar, Senegal). *International Journal of Otolaryngology* 2020; 1: 1-5.
5. Nwaorgu OG, Bakari AA, Onakoya PA, Ayodele KJ. Recurrent respiratory papillomatosis in Ibadan Nigeria. *Nigerian Journal of Medicine* 2004;13(3):235-238
6. Carifi M, Napolitano D, Morandi M, Dall'Olio D. Recurrent respiratory papillomatosis: current and future perspectives. *Therapeutics and Clinical Risk Management*. 2015; 11:731-738
7. Derkay CS. Task force on recurrent respiratory papillomas: a preliminary report. *Archives of Otolaryngology- Head and Neck Surgery* 1995; 121(12):1386-1391
8. Kashima HK, Shah F, Lyles A, Glackin R, Muhammad N, Turner L, et al. A comparison of risk factors in juvenile-onset and adult-onset recurrent respiratory papillomatosis. *Laryngoscope* 1992;102(1):9-13. doi: 10.1288/00005537-199201000-00002.PMID:1309932
9. Verma H, Solanki P, James M. Acoustic and perceptual voice profiling of children with recurrent respiratory papillomatosis. *Journal of Voice* .2016;30(5):600-605
10. Ivancic R, Iqbal H, de Silver B, Pan Q, Matrika L. Current and future management of recurrent respiratory papillomatosis. *Laryngoscope Investig Otolaryngol*. 2018;3(1):22-34
11. Young DL, Moore MM, Halstead LA. The use of quadrivalent human papillomavirus vaccine (Gardasil) as adjuvant therapy in the treatment of recurrent respiratory papilloma. *Journal of Voice* 2015;29(2):223-229. doi: 10.1016/j.jvoice.2014.08.003. Epub. 2015 Jan 22
12. Lerman J, Davis PJ, Welborn LG, Orr RJ, Rabb M, Carpenter R, et al. Induction, recovery, and safety characteristics of sevoflurane in children undergoing ambulatory surgery. A comparison with halothane. *Anesthesiology* 1996; 84:1332-1340
13. Oshan V, Walker RWM. Anaesthesia for complex airway surgery in children. *Contin Educ Anaesth Crit Care Pain*. 2013;13: 47-51.