Probing the Seroprevalence of HIV infection Among Persons Attending Healthcare Facilities in Port Harcourt, Rivers State, Nigeria

Comment [MF1]: Because the definition of **Seroprevalence**, you need to add (specific time point)
I suggest (January 2022 to December, 2023).

Abstract

Background

The ascertainment of prevalence of HIV infections is important in the formulation of policies and programmes aimed at the protection of healthcare workers from infections associated with occupational hazards. This study was thus conceived to determine the seroprevalence of HIV infection Among Persons Attending Healthcare Facilities in Port Harcourt, Rivers State, Nigeria.Data were cleaned using Excel spreadsheet 2016, and analyzed using IBM SPSS Statistics version 25. Descriptive and inferential statistics were employed in results presentation and interpretation.

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Methodology

This was a cross-sectional retrospective study for the review of the medical laboratory records of 345 persons including 167 males and 178 females who attended public and private healthcare facilities in Port Harcourt between January 2022 to December, 2023. The inclusion criteria provided for the review of the records of only persons who reside within Port Harcourt metropolis, and within the study period, conducted serological laboratory investigations for HIV 1/2 antibodies at Diagnostix and Scientifique Laboratories, Port Harcourt. Persons who were not resident in Port Harcourt or did not perform the HIV tests and those with incomplete records were excluded.

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Results

The overall prevalence of HIV in this study was 14.5%. Within the age brackets, the highest prevalence of 26.0% was found with the 26-30 age bracket, while the least was 7.0% among the 41–45-year-old age brackets. The males had a prevalence of 12.6%; and the females (16.3%). The residents of low-density areas recorded a prevalence of 12.1%, while those living in high density areas had 15.7%; the persons who attended public healthcare facilities had a prevalence of 14.8%, while those who went to private healthcare facilities had 14.4%.

Conclusion

The high prevalence of HIV among persons attending healthcare facilities makes imperative the implementation of stringent measures for prevention and control measures to safeguard thelives of healthcare workers.

Introduction

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The human immunodeficiency virus (HIV) has remained a major global public health threat, since 1983 when it was discovered among men having sex with men (MSM) in Los Angeles, United States of America.[1] The virus has claimed an estimated 42.3 million lives across the world; and by the end of 2023, about 39.9 million people are living with HIV, worldwide, with 65% of them residing in the WHO African Region. Within the same year, about 630 000 people died from HIV-related causes, while 1.3 million people were infected with the virus.[1]

HIV is a retrovirus, belonging to the *Retroviridae*. family of viruses; which is transmitted through the exchange of certain bodily fluids, destroys various immune cells and contributes to an overall weakened immune system. If left untreated, HIV progresses to acquired immunodeficiency syndrome (AIDS) - a chronic, life-threatening condition that puts patients at risk for opportunistic infections.[2]

The spread of HIV infection is multifactorial, dominated by an interplay of multifarious social factors HIV testing had to contend with ethical principles of having to protect the patient's confidentiality given the stigma and discrimination trails the disease in many societies which is still subsisting in many places. Handling the issue of HIV was not an easy task for many developing countries particularly in Africa where the healthcare systems were already overburdened. Efforts at curtailing the virus including the use of condoms, prevention of mother-to-child transmission, voluntary male medical circumcision and community awareness campaigns have been less successful than anticipated perhaps due to underlying systemic issues [3]

The global burden of HIV remains a major concern with millions of persons affected globally. Though significant progress has been made in understanding the mechanisms of the infection, diagnosis, treatment, and prevention. HIV/AIDS continues to put extensive pressure on healthcare policies, budgets and infrastructures at local and global levels, particularly in sub-Saharan Africa, with the is highest prevalence of the infection. The infection also directly affects the well-being of individuals and societies, thereby creating and expanding social and economic inequities and disruptions.[4]

West Africa has a low HIV prevalence, estimated at 2% or less for adults within the general population, which is a low prevalence, while the adult population in Nigeria has an estimated prevalence of 1.4% for personswithin the ages of 15–49 years in the 2018 Nigeria AIDS indicator and Impact Survey (NAIIS). NAIIS is population-based survey conducted to track key national HIV-related indicators, such as progress toward the UNAIDS 95-95-95 targets as well as to guide policy and funding priorities.[5] More than 1.9 million people in Nigeria are currently living with HIV, making it the country with the heaviest HIV burden in Sub-Saharan Africa.[6] In 2020 alone, about 49 000 across all age groups died as a result AIDS-related causes.[7,8] About 80% of new HIV infections in Nigeriaare due to unprotected heterosexual intercourse, while most of the other 20% HIV infections are contributed by high-risk populations like female sex workers, men who have sex with men, injectable drug abusers and transgender persons.[9]It is important to have accurate estimates of HIV prevalence for effective tracking of the HIV epidemic, planning, developing, implementing, and assessing preventive and treatment programs, and projecting resource demands[5,10] There are two types of HIV, known as HIV-1 and HIV-2, and they have various subtypes. The HIV epidemic in Nigeria is mostly caused by HIV-1, which have subtypes A and G as the dominant subtypes in Southern and Northern Nigeria, respectively.[8] The HIV epidemic in Nigeriais the second highest across the world, with over 1.9 million people currently living with HIV, with current evidence revealing incidence as 8.0 per 10 000 persons across both genders and age groups, and a current prevalence of 1.4% among adults aged 15–49 years.[6,8]

This study was targeted at determining the prevalence of HIV among persons seeking medical attention for purposes of checkups and treatment in public and private healthcare facilities in Port Harcourt. This is based on the fact that infected persons attending healthcare facilities are potential sources of workplace infections for healthcare workers (HCWs).

Materials and Methods

Study Area

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The HIV epidemic in Nigeriais the second highest across the world, with over 1.9 million people currently living with HIV, with current evidence revealing incidence as 8.0 per 10 000 persons across both genders and age groups, and a current prevalence of 1.4% among adults aged 15–49 years.[6,8]
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The study area Port Harcourt is the capital and major city of Rivers state, Nigeria, located on Latitude: 4°46′38″ N Longitude: 7°00′48″ E on an elevation of 16mm above sea level, lying along the Bonny River.It isthe hubof the oil rich Niger Delta region, the economy of the state revolves primarily around petroleum and gas industry, with much of the urbanization and modernization in the town proceeding from its associations with the oil industry.

Study Design

This cross-sectional retrospective study was a review of the medical laboratory records of 345 persons including 167 males and 178 females who attended public and private healthcare facilities in Port Harcourtbetween January 2022 to December, 2023. The inclusion criteria provided for the review of the records of only persons who reside within Port Harcourt metropolis, and within the study period, conducted serological laboratory investigations for HIV 1/2 antibodiesat Diagnostix and Scientifique Laboratories, Port Harcourt. Personswho were not resident in Port Harcourt or did not perform the HIV tests and those with incomplete records were excluded.

Records of HIV Screening Tests

The procedure for screening tests were contained in the standard operating procedure (SOP) manual of the laboratory and World Health Organization recommendations. The serological analyses for the detection of HIV 1 /2 were conducted using Determine (Abbott Diagnostics Medical Company, Japan). Positive samples were retested withSTAT-PAK and if also positive, were recorded as confirmed positive; but if the positive determine test was negative on STAT-PAK, then Uni-Gold (Trinity Biotech) tests were used as tiebreaker. Whichever results were corroborated by Uni-Gold were recorded as the confirmed results.

Comment [MF17]: Nothing is present regarding study and laboratory procedures.

Data Analysis

Data were clarified using Excel spreadsheet 2016, and analyzed using IBM SPSS Statistics version 25. Descriptive and inferential statistics were employed in results presentation and interpretation. Associations between possible risk factors namely, gender, age residence and HIV results were determined using Pearson's Chi-Square test of independence and Fisher exact test at significance level below 0.05.

Results

The review of the laboratory records focused on the data of 345 persons including 167 (48.4%) males and 178 (51.6%) females who met the research criteria. The ages ranged from 6 years to 68 years, the mean age was 34.6 ± 1.882, the median age was 33 years while the least modal age was 27. Their records of residential area show that 116 (33.6%) live in low density areas while 229 (66.4%) livedin high-density areas of Port Harcourt; also 108 (15.7%) had attended public healthcare facilities, while 237 (14.4%) had been to private healthcare facilities. (Fig. 1; Fig. 2; Table 1)

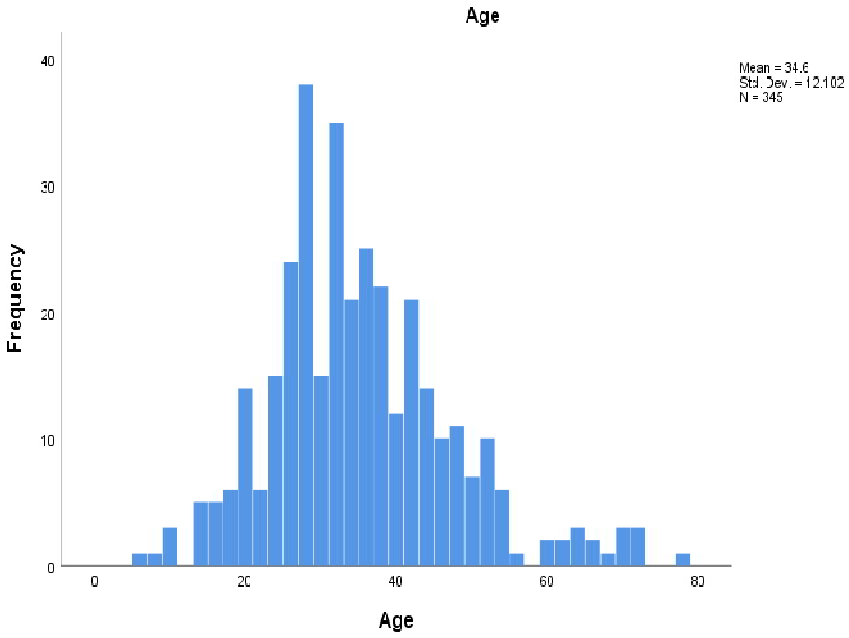

Figure1: The distribution of Ages among Persons attending public and Private Healthcare Facilities

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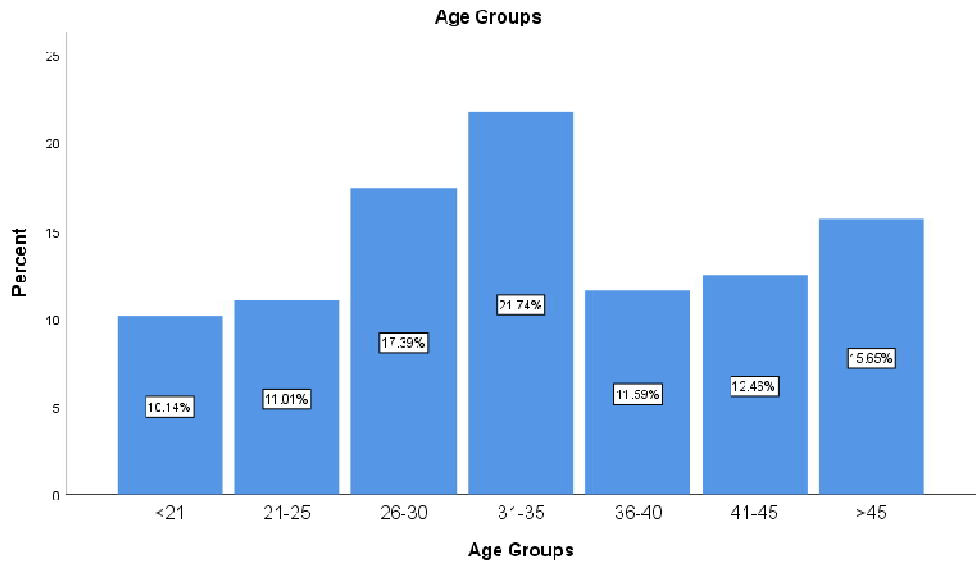

Figure 2: The distribution ofPersons attending public and Private Healthcare Facilities in Age Brackets

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Prevalence of HIV among Persons Attending Public and Private Healthcare Facilities

The overall prevalence of HIV in this study was 14.5%. Within the age brackets, the highest prevalence of 26.0% was found with the 26-30 age bracket, while the least was 7.0% among the 41–45-year-old age brackets. The males had a prevalence of 12.6%; and the females (16.3%). The residents of low-density areas recorded a prevalence of 12.1%, while those living in high density areas had 15.7%; the persons who attended public healthcare facilities had a prevalence of 14.8%, while those who went to private healthcare facilities had 14.4% (Fig.2, Table 1)

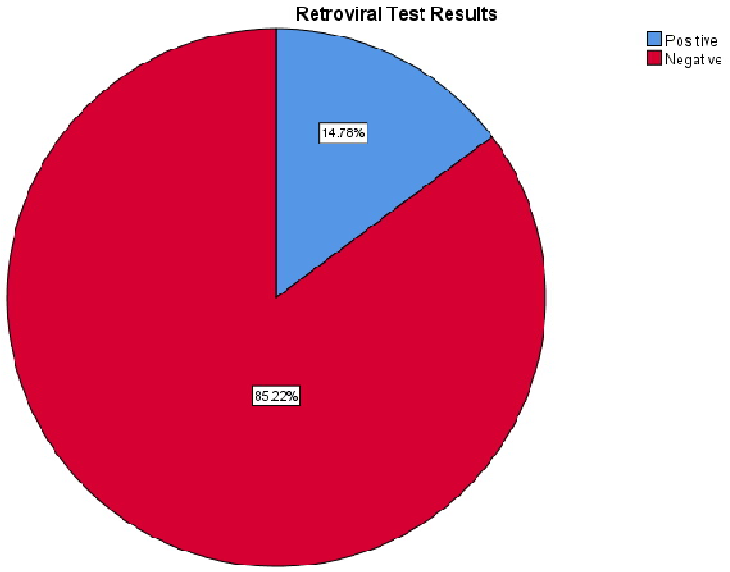

Figure 3: The Prevalence of HIV among Persons Attending Public and Private Healthcare Facilities

Table 1: Distribution of Frequency and Prevalence of HIV among Persons Attending Public and Private Healthcare Facilities

Characteristics	Number Tested	Positive	Prevalence %
Age Bracket			
<20	35	4	11.4
21-25	38	6	15.8
26-30	50	13	26.0
31-35	75	10	13.3
36-40	40	9	22.5
41-45	43	3	7.0
>45	54	5	9.3
Gender			
Males	167	21	12.6
Females	178	29	16.3
Residence			
Low Density Area	116	14	12.1
High Density Area	229	36	15.7
Healthcare Facility			
Public Facility	108	16	14.8
Private Facility	237	34	14.4
Total	**345**	**50**	**14.5**

Statistical Analysis

Pearson's Chi-square test of independence and Fisher's exact testwereused to ascertain the existence of associations between the age, gender, residence, and healthcare facility, on one hand and the prevalence of HIV infection on the other side. The associationsbetween age, gender, residence, and healthcare facility were found not be statistically significant, given that the p values were not less than 0.05, we therefore fail to reject the null hypothesis which states that the variables are independent. In other words, there was no sufficient evidence to conclude population of persons attending healthcare facilities in Port Harcourt, Nigeria

Discussion

This was not a study on the prevalence of HIV infection on the general population in Port Harcourt, a focus on a segment of the population comprising of persons who attended healthcare facilities within the study period and conducted HIV investigations, either by recommendation of their healthcare practitioner, or based on complaints or on personal volition. The HIV prevalence Rivers state is 3.6%, while the nationwide prevalence for Nigeria is 1.4%.[11]

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These general population rates are much lower than the population segment prevalence of 14.5% obtained in this study.

The outcomes of this study are however comparable to reported outcomes studies of specific populations or persons suspected to be of high risks such as pregnant women, female sex workers among others. It aligned with the findings of a study among FSW in Port Harcourt which reported a prevalence of 14.5%.[12] It was however higher than the pooled prevalence of 7.22% reported in a systematic review and meta-analysis among pregnant women, with prevalence ranging from 6.84% to 17.04% across Nigeria.[13] The prevalence of HIV across populations and across countries and varies remarkably. A study in Nairobi, Kenya found a HIV prevalence was 28.0% among female sex workers,[14] while a continent-wide meta-analysis and systematic review among pregnant women across Africa reported a pooled prevalence of 9.3%, with subgroup prevalences between 0.7% in North Africa and 29.4% in Southern Africa.[15]There is paucity of data on the prevalence of HIV among persons attending healthcare facilities in Nigeria for persons not known to be seropositive for HIV prior to the facility visit. This could be attributable to the fact that these set of people may not be considered as high-risk group; The importance of this group lies in the fact of being not just potential reservoirs of HIV but also of other existing, emerging and re-emerging infections. A study on occupational exposure of healthcare workers to HIV reported a prevalence of 45.0% in Port Harcourt[16], while a Mexican study reported a prevalence of 0.9% for work related HIV infections.[17] It is therefore pertinent for the healthcare worker and visitors to be conscious of the prevalence of HIV is higher in the facilities environment than in the general population. This also implies a higher risk of contracting HIV infections within the healthcare facility workspace.

There were no statistically significant difference between the sociodemographic indices (age, gender, residence and healthcare facilities) and HIV infection in this study; the highest prevalence of the infection found among the 26-30 years age bracket aligned with some previous results, including arecent study in port Harcourt where the highest prevalence was found among the 20-29 years age bracket.[12]and another studywhich reported highest frequencies among ages 18-30 years.[18] A study on HIV among adolescents in South Africa reported a high increase in HIV prevalence among adolescents aged 12–19 years.[19]. In North America and Europe highest prevalence rates were found among the 20–39-year-olds group.[3] The variations in the age brackets of reported highest prevalences of HIV notwithstanding, they are expectedly, the ages of high sexual activities, with greater disposition for high-risk sexual behavior's. These are ages where people are more likely to be more adventurous in experimenting with alcohol, drugs and sexual practices.

The findings of higher prevalence in females than males were also consistent with reports of many previous studies. Females were reported to have accounted for 65.8% of new HIV cases in 2019 across the world.[20] A study on HIV control in Africa also found a higher prevalence of 52.35% among females.[21] The higher prevalence rates in women may be attributable to a number of sociocultural and biological factors, particularly in sub-Saharan Africa. The higher prevalence among FSWs may also be contributory to high female prevalence of HIV.The higher prevalence of HIV among persons living in high density areas and the health facilities attended may be attributable to socioeconomic factors as well as levels awareness, literacy ratesand other such factors.

A major strength of this study is that it focused on a HIV infection from a perspective that may have not been previously considered, but which may have salient implications in reducing the

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Comment [MF24]: the higher percent in ages above 26 years may be related to the type and the age distribution of population visiting the health care facilities.
Those in school age may have another line of health services such as school health facilities therefore they are presented in lower percentages here.

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incidence of HIV infections, worldwide. The contributions of healthcare workers in combating the HIV scourge cannot be over stressed; while the roles of persons attending healthcare facilities as potential sources of infections to HCWs be ignored. This study has highlighted these factors with the expectations that greater attentions will be paid to them in efforts to protect the HCW in the course of performing their duties.

Most of the limitations of the study are due to its retrospective nature, as the study has to be designed to fit into data provided for laboratory diagnosis of the infection even before the commencement of the study. The sociodemographic data were restrictedthe contents in the laboratory records, which are what may be required in a prospective study. There were no personal interactions or communications with the participants, and some information that may enrich the study could thus not be obtained. It is hoped that succeeding studies will be designed to overcome the shortcomings.[22]

Conclusion

The overall prevalence of HIV reported in this study was much higher than the prevalence rates of the general population. It is also comparable with the prevalence rates reported among other population segments considered as high-risks. It is recommended that these findings be integrated into preventive measures designed for the protection of HCWs from infections by HIV and other pathogens.

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Comment [MF26]: Rewrite the reference like the journal style.

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Comment [MF29]: Rewrite the reference like the journal style.