



# Sero-prevalence of Human Immunodeficiency Virus among Students Undergoing Medical Examination in a Tertiary Institution

Hanson Asikiya Huldah <sup>a\*</sup> and Briggs Bieye Renner <sup>a</sup>

<sup>a</sup> Department of Health Services, Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State, Nigeria.

## Authors' contributions

This work was carried out in collaboration between both authors. Both authors designed the study, performed the statistical analysis, wrote the protocol, and first draft of the manuscript. Author HAH managed the analyses of the study. Author BBR managed the literature searches. Both authors read and approved the final manuscript.

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## ABSTRACT

**Aims:** To assess the prevalence of human immunodeficiency virus among students undergoing medical checkup in a tertiary institution.

**Study Design:** The investigation utilised a cross-sectional study design technique.

**Methodology:** In this present study, 2114 participants were included in the age range 15-49 years. Serological method was used to detect the presence of HIV using a rapid diagnostic technique using determine. Tile method was used to determine the ABO and Rhesus D antigens in the individuals.

**Results:** Out of the 2114 participants sampled, the population studied according to various departments within the university were ME 95 (5%), EM 181 (9%), LIB 101 (5%), SPE 63 (3%),

\*Corresponding author: Email: [asikiyahanson@yahoo.com](mailto:asikiyahanson@yahoo.com), [asikiya.hanson@gmail.com](mailto:asikiya.hanson@gmail.com);

ENG 296 (14%), BIO 423 (20%), CHE 150 (7%), COM 305 (14%), MGT 236 (11%) and ACC 236 (12%). The prevalence of HIV among tertiary institution students is 1%.

**Conclusion:** This research gives an insight into the prevalence of HIV among students in tertiary institution for strategic intervention.

*Keywords: Medical check; HIV; student population.*

## 1. INTRODUCTION

Viruses are microscopic entities that have a core of genetic material, either DNA or RNA. The core is covered with a capsid, a protective coat made of proteins. Around the coat there may be a spiky covering known as the envelope. These spikes are proteins that enable viruses to bind to and enter the host cells (<https://www.medicalnewstoday.com>). The human immunodeficiency virus (HIV) is a chronic viral infectious disease that damages the immune system of the infected individual. It progresses to the development of Acquired Immune Deficiency Syndrome (AIDS) and death without proper medical attention [1]. It is an enveloped lentivirus within the family Retroviridae. Its genetic material has a single nucleic acid structure which is known as an RNA virus [2]. HIV can be transmitted through direct inoculation into the bloodstream, or after contact and attachment through mucosal surfaces. It can also be transmitted through direct contact with a bodily fluid containing HIV such as blood, semen, vaginal fluid, and breastmilk [3], the transmission could involve anal, vaginal or oral sex, blood transfusion, contaminated hypodermic needles, exchange between mother and child during pregnancy, childbirth or breastfeeding [4-5]. An infection can result when the virus crosses the body epithelial barriers into the fluid compartments, due to the blood, semen, vaginal secretion of infected subjects, harbours high level of free virus and infected leukocytes, which are significant factors in sexual transmission pathway. Its mode of transmission is similar to other kinds of viral infection such as hepatitis, Ebola virus, Lassa fever virus.

HIV is a global health tragedy that has affected over 36.9 million persons in 2019 which translates to 0.5% of global population [6]. In 2018, 20.6 million people in the southern and eastern Africa were living HIV and the western and central Africa was 5.0 million [7]. Nigeria has the second largest number of people living with HIV/AIDS in Africa accounting for 9.0% of the global burden with prevalence of 3.2%, and burden of 3.1 million people living with HIV [8,6]. This burden impacts negatively on the health

system. Report of HIV research in Nigeria showed that Rivers State has the highest HIV prevalence (15.2%) among the states in the country [9]. The generalized prevalence of HIV is approximately 3.6% but there are significantly higher rates among most-at-risk-populations (MARPs) [10]. These MARPs include illicit intravenous drug users, commercial sex workers and men who have sex with men.

Despite the high burden of HIV among residents within Nigeria, the level of testing and management is poor and varies among the different strata of Governments [11-13]. This variation occurs at the local government, state and national levels and could be a result of knowledge gap about transmission in addition to poor management strategies (O'Brien-Carelli et al., 2019).

A large HIV population-based survey conducted in Nigeria demonstrated the relevance of geographic disparities across the healthcare settings [14]. The study revealed a prevalence of 1.3% among individuals aged 15 to 49 years. This prompted the Nigerian government to revise its strategic framework by classifying states into focal point for identification and treatment of HIV/AIDS-infected persons (United states 2019).

In this study, we present the cross-sectional perspective of prevalence, at the grassroot level, of HIV among students undergoing medical examination in a tertiary institution. Majority of these students are between the age of 15 to 49.

## 2. METHODS

### 2.1 Study Area

This study was performed at the Ignatius Ajuru University of Education in Port Harcourt of Rivers State using students undergoing medical checkup as subjects.

### 2.2 Study Design

The study design employed in this research was cross-sectional design. The study sampled 2114 participants using simple random method which

included both male and female sex. The sample size of 2114 was determined using the Cochran formula with the prevalence of HIV at 15%.

### 2.3 Sample Collection

After pre-test counselling and explanations, venous blood was drawn aseptically from the antecubital fossa of the subject with the use of vacutainer as described by Cheesebrough [15].

### 2.4 Determination of HIV Prevalence

The rapid diagnostic technique using Determine HIV-1/2 set kit (Abbott Diagnostics Medical Co.Limited) was used to detect the presence of HIV in subjects. The blood was allowed to coagulate thereby allowing the serum to separate with the aid of a bench centrifuge (Atlas Medical). A drop of serum was added to the Determine strip. The presence of double bands indicates positive for HIV while a single band shows negative result.

### 2.5 Determination of ABO and Rh-D Blood Group of Subjects

The serological method was employed to analyse the blood group of the subjects using the tile method.

For ABO and Rh-D blood group, a drop of anti-A, anti-B, anti-AB and anti-D (Atlas Medical), each was placed in the wells on the tile A, B, AB and O. A drop of red cell was added to the part labelled A, B, AB and O and anti A, anti-B, anti-AB and anti-D was dropped in the part labelled A, B, AB and O. This was mixed gently and rocked for about 30sec and observed for agglutination. Presence of agglutination indicated a positive result while absence of agglutination indicates a negative result.

### 2.6 Data Analyses

This study data was presented as percentages. Chi-square analyses were performed where necessary.

## 3. RESULTS

The study sampled 2114 participants. Table 1 shows the age distribution of subjective from different departments. The highest number of persons sampled fall within the 15 to 25 age range group ME 85 (89%), EM 157 (87%), LIB

88 (87%), SPE 43 (68%), ENG 262 (89%), BIO396 (94%), CHE 132 (88%), COM 262 (86%), MGT 197 (83%), and ACC 250 (95%). This was followed by the age range of 26 to 25 years: ME 9 (10%), EM 14 (8%), LIB 13 (13%), SPE 15 (24%), ENG 33 (11%), BIO 27 (6%), CHE 18 (12%), COM 43 (14%), MGT 38 (16%), and ACC 14 (5%). The least population included in the study was within the age range of 35 to 45 years: ME 1 (1%), EM 10 (6%), LIB 1 (1%), SPE 5 (8%), ENG 1 (0%), BIO 0 (0%), CHE 0 (0%), COM 0 (0%), MGT 1 (1%) and ACC 0 (0%). The population studied according to various departments within the university were ME 95 (5%), EM 181 (9%), LIB 101 (5%), SPE 63 (3%), ENG 296 (14%), BIO 423 (20%), CHE 150 (7%), COM 305 (14%), MGT 236 (11%) and ACC 236 (12%).

Table 2 shows the sex distribution of the sampled populations according to males and females are: ME 29 (31%), 66 (69%), EM, 56 (31%), 125 (69%), LIB 27 (27%), 74 (73%), SPE 21(33%), 42 (67%), ENG 37 (13%), 259 (87%), BIO 71 (17%), 352 (83%), CHE 50 (33%), 100 (67%), COM 64 (21%), 241 (79%), MGT 64 (27%), 172 (73%), and ACC 62 (23), 202 (77%).

## 4. DISCUSSION

Our study comprehensively provides the prevalence of HIV among students undergoing regular medical examination. Complete reliance on national data does not portray the exact prevalence of HIV infection within every region of the country. Hence, the study assessed the prevalence of HIV and the associated ABO blood grouping for individuals attending a tertiary institution.

The prevalence of HIV in the study is 1%. This is two times higher than the global prevalence as of 2019 [7]. Part of the reason for this phenomenon is the low level of awareness within Rivers State of Nigeria. The prevalence of HIV is also lower than the current national prevalence which is 1.8% [16].

The major role of ABO blood grouping is the prevention of transfusion reactions; however, some studies have associated it with the presence of some infectious diseases [17,18]. The prevalence of HIV was highest in A<sup>-</sup> followed by AB<sup>-</sup>. This observation opposed the study by Jacobs et al. [1,19] which demonstrated higher prevalence in Rhesus positive individual [20].

**Table 1. Age distribution of subjects from different departments**

<b>Age Range</b>	<b>ME n(%)</b>	<b>EM n(%)</b>	<b>LIB n(%)</b>	<b>SPE n(%)</b>	<b>ENG n(%)</b>	<b>BIO n(%)</b>	<b>CHE n(%)</b>	<b>COM n(%)</b>	<b>MGT n(%)</b>	<b>ACC n(%)</b>
15-25	85 (89)	157 (87)	88 (87)	43 (68)	262 (89)	396 (94)	132 (88)	262 (86)	197 (83)	250 (95)
26-35	9 (10)	14 (8)	13 (13)	15 (24)	33 (11)	27 (6)	18 (12)	43 (14)	38 (16)	14 (5)
35-45	1 (1)	10 (6)	1 (1)	5 (8)	1 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)
<b>Total</b>	<b>95</b>	<b>181</b>	<b>101</b>	<b>63</b>	<b>296</b>	<b>423</b>	<b>150</b>	<b>305</b>	<b>236</b>	<b>264</b>

*\*ME – Marketing Education, EM – Education Management, LIB – Library and Information Science, SPE -Special Unit, ENG – English, BIO – Biology, COM – Computer, MGT – Management, ACC – Accounting*

**Table 2. Sex distribution of subjects from different departments**

Departments	Male n(%)	Female n(%)	Total n(%)
ME	29 (31)	66 (69)	95 (4)
EM	56 (31)	125 (69)	181 (9)
LIB	27 (27)	74 (73)	101(5)
SPE	21(33)	42 (67)	63 (3)
ENG	37 (13)	259 (87)	296 (14)
BIO	71 (17)	352 (83)	423 (20)
CHE	50 (33)	100 (67)	150 (7)
COM	64 (21)	241 (79)	305 (14)
MGT	64 (27)	172 (73)	236 (11)
ACC	62 (23)	202 (77)	264 (12)

\*ME – Marketing Education, EM – Education Management, LIB – Library and Information Science, SPE -Special Unit, ENG – English, BIO – Biology, COM – Computer, MGT – Management, ACC – Accounting

**Table 3. Prevalence of blood group distribution of subjects from different departments**

Departments	O <sup>+</sup> n(%)	O <sup>-</sup> n(%)	A <sup>+</sup> n(%)	A <sup>-</sup> n(%)	B <sup>-</sup> n(%)	B <sup>+</sup> n(%)	AB <sup>+</sup> n(%)	AB <sup>-</sup> n(%)	Total n(%)
ME	60	2	17	2	0	13	1	0	95 (4)
EM	98	6	50	1	0	25	1	0	181 (9)
LIB	53	3	25	0	0	15	4	0	101(5)
SPE	46	2	9	0	1	3	2	0	63 (3)
ENG	158	10	72	2	3	46	5	0	296 (14)
BIO	229	16	108	1	1	62	6	0	423 (20)
CHE	103	3	20	3	0	15	6	0	150 (7)
COM	168	10	68	1	0	54	4	0	305 (14)
MGT	150	7	40	1	1	36	1	0	236 (11)
ACC	144	14	65	3	1	35	2	0	264 (12)
Total	1209	73	474	14	7	304	32	0	

\*ME – Marketing Education, EM – Education Management, LIB – Library and Information Science, SPE -Special Unit, ENG – English, BIO – Biology, COM – Computer, MGT – Management, ACC – Accounting

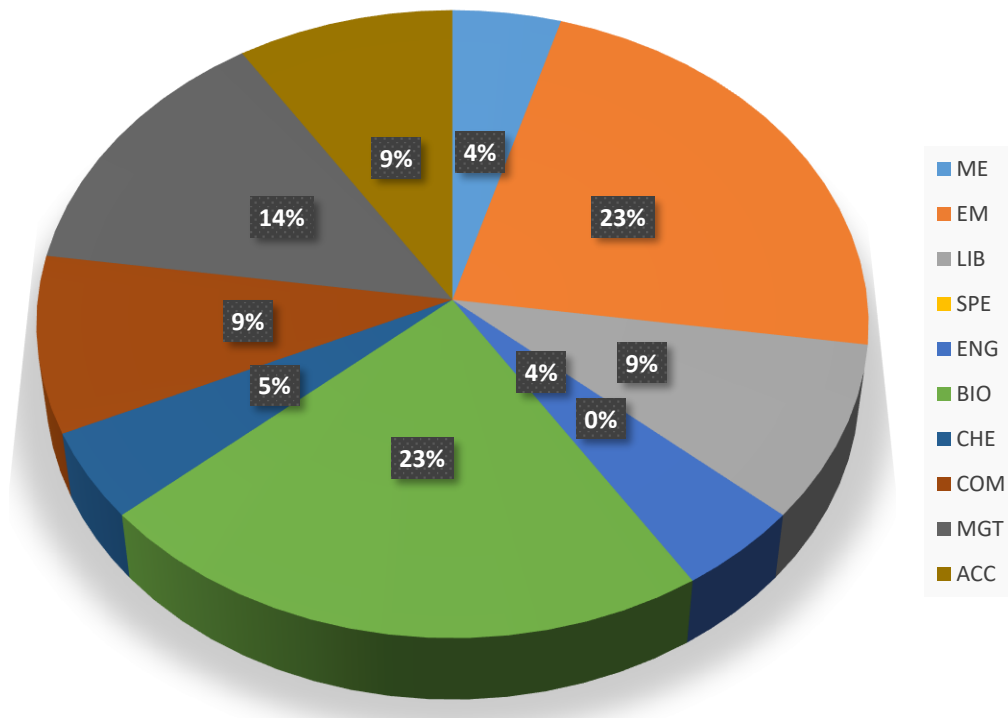
**Table 4. Prevalence of HIV among subjects across different departments**

Departments	Positive n(%)	Negative n(%)	Total n(%)
ME	1 (1)	94 (99)	95 (4)
EM	5 (3)	176 (97)	181 (9)
LIB	2 (2)	99 (98)	101(5)
SPE	0(0)	63 (100)	63 (3)
ENG	1 (0)	295 (100)	296 (14)
BIO	5 (1)	418 (99)	423 (20)
CHE	1 (1)	149 (99)	150 (7)
COM	2 (1)	303 (99)	305 (14)
MGT	3 (1)	233 (99)	236 (11)
ACC	2 (1)	262 (99)	264 (12)
Total	22	2092	

\*ME – Marketing Education, EM – Education Management, LIB – Library and Information Science, SPE -Special Unit, ENG – English, BIO – Biology, COM – Computer, MGT – Management, ACC – Accounting

**Table 5. HIV prevalence across blood groups**

Departments	O <sup>+</sup> n(%)	O <sup>-</sup> n(%)	A <sup>+</sup> n(%)	A <sup>-</sup> n(%)	B <sup>-</sup> n(%)	B <sup>+</sup> n(%)	AB <sup>+</sup> n(%)	AB <sup>-</sup> n(%)	Total n(%)
Prevalence %	0	2	4	5	3	2	2	4	22



**Fig. 1. Prevalence of HIV among subjects across different departments**

The findings of this study highlight the importance of understanding the prevalence of HIV among students in tertiary institutions. The sero-prevalence rate observed underscores the need for targeted interventions, including HIV education, counseling, and testing services, within this population. The identification of associated risk factors can inform the development of comprehensive prevention strategies tailored to the specific needs of students. Limitations of the study, such as sampling bias is evident due to the location. Future research should explore longitudinal studies to monitor trends in HIV prevalence among students and evaluate the effectiveness of interventions aimed at reducing HIV transmission risk [21].

Finally, this study contributes to our understanding of the sero-prevalence of HIV among students undergoing medical examination in a tertiary institution. The findings underscore the importance of proactive measures to

address HIV transmission risk factors and promote the health and well-being of students. Efforts to enhance HIV prevention and support services within tertiary institutions are crucial in mitigating the impact of HIV on young adults and fostering a healthy campus environment [22-23].

## 5. CONCLUSION

The study demonstrates that the prevalence of HIV according to the departments at Ignatius Ajuru University of Education are ME 1 (1%), EM 5 (3%), LIB 2 (2%), SPE 0(0%), ENG 1 (0%), BIO 5 (1%), CHE 1 (1%), COM 2 (1%), MG 3 (1%) and ACC 2 (1%). The average prevalence of the study was 2.2 in 2114 or 0.0.

## CONSENT

All authors declare that written informed consent was obtained from the subjects.

## ETHICAL APPROVAL

Ethical approval was obtained from the (ethical committee of Health Services Department, Ignatius Ajuru University of Education, Port Harcourt).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Jacobs G, Van den Berg K, Vermeulen M, Swanevelder R, Custer B, Murphy EL Association of ABO and RhD blood groups with the risk of HIV infection. *PLoS One*. 2023;18(4):e0284975. Available:<https://doi.org/10.1371/journal.pone.0284975>
2. Tomezsko PJ, Corbin VDA, Gupta P. Determination of RNA structural diversity and its role in HIV-1 RNA splicing. *Nature*. 2020;582:438–442. Available:<https://doi.org/10.1038/s41586-020-2253-5>
3. Azuonwu O, Erhabor O, Obire O. HIV among military personnel in the Niger Delta of Nigeria. *Journal of Community Health*. 2012;37:25-31.
4. Talarok P, Talaro A. The RNA viruses of medical importance. *Foundation in microbiology*. 4TH (EDT), Milgraw Hill, New York. 2002;750-789.
5. Centre for disease control and prevention, HIV and its transmission; 2003.
6. Govender RD, Hashim MJ, Khan MA. Global epidemiology of HIV/AIDS: A resurgence in North America and Europe. *Journal of Epidemiology and Global Health*. 2021;11:296–301.
7. World Health Organization. Global Health Observatory (GHO) data: Summary of the global HIV epidemic; 2019. Available:<https://www.who.int/gho/hiv/en/>. Accessed On:12 Dec 2023.
8. Endalamaw A, Mekonnen M, Geremew D. HIV/AIDS treatment failure and associated factors in Ethiopia: meta-analysis. *BMC Public Health*. 2020;20:82 .
9. Awofala AA, Ogundele OE. HIV epidemiology in Nigeria. *Saudi Journal of Biological Sciences*. 2018;25(4):697-703.
10. Federal Ministry of Health; 2012. Available:[www.health.gov.ng](http://www.health.gov.ng). Accessed On:12 January 2024.
11. Dwyer-Lindgren L, Cork MA, Sligar A, Steuben KM, Wilson KF, Provost NR. Mapping HIV prevalence in sub-Saharan Africa between 2000 and 2017. *Nature*. 2019;570:189–193. PMID:31092927
12. Cuadros DF, Li J, Branscum AJ, Akullian A, Jia P, Mziray EN. Mapping the spatial variability of HIV infection in Sub-Saharan Africa: Effective information for localized HIV prevention and control. *Scientific Reports*. 2017;7:9093. PMID:28831171
13. Coburn BJ, Okano JT, Blower S. Using geospatial mapping to design HIV elimination strategies for sub-Saharan Africa. *Science Translational Medicine*. 2017; 9. PMID:28356504.
14. Nigeria—Nigeria HIV/AIDS Indicator and Impact Survey 2018, NAIIS 2018. Available:[https://nigerianstat.gov.ng/nada/index.php/catalog/68/related\\_materials](https://nigerianstat.gov.ng/nada/index.php/catalog/68/related_materials) Accessed On:23 Dec2020.
15. Cheesbrough M. *District laboratory practice in tropical countries Part 1*. 2nd Edition, Cambridge University Press, Cambridge. 2009;195-216.
16. Onovo AA, Adeyemi A, Onime D, Kalnoky M, KagniniwaB, Dessie K, Lee L, Parrish D, Adebobola B, Ashefor G, Ogorry O, Goldstein R. Estimation of HIV prevalence and burden in Nigeria: a Bayesian predictive modelling study. *Lancet*. 2023; 62:102098.
17. Cooling L. Blood groups in infection and host susceptibility. *Clinical Microbiology Reviews*; 2015. PMID:26085552
18. Anstee DJ. The relationship between blood groups and disease. *Blood*; 2010. PMID:20308598
19. Helina Meri. United States President's Emergency Plan for AIDS Relief (PEPFAR). Nigeria Country Operational Plan (COP) 2019 Strategic Direction Summary. 2019; 2020. Available:[https://www.state.gov/wpcontent/uploads/2019/09/Nigeria\\_COP19Strategic-Directional-Summary\\_public.pdf](https://www.state.gov/wpcontent/uploads/2019/09/Nigeria_COP19Strategic-Directional-Summary_public.pdf) Accessed On:28 Mar2020.
20. Hilly M, Adams ML, Nelson SC. A study of digit fusion in the mouse embryo. *Clin Exp Allergy*. 2002;32(4):489-98.
21. McLaren PJ, Fellay J. HIV-1 and human genetic variation. *Nature Review Genetics* 2021;22,645–657.

- Available:<https://doi.org/10.1038/s41576-021-00378-0>
22. O'brien-Carelli C, Steuben K, Stafford KA, Aliogo R, Alagi M, Johanns CK. Mapping HIV prevalence in Nigeria using small area estimates to develop a targeted HIV intervention strategy. *PLoS One* 2022;17(6):e0268892.
23. Weiss RA. How does HIV cause AIDS? *Science*. 1993;260:1273-1279.

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