




# Prevalence of HIV, Hepatitis B, and Hepatitis C in Rivers State University, Port Harcourt: Outcome of a Medical Outreach

Ibioku Elekima<sup>1</sup> , Moore Ikechi Mike-Ogburia<sup>1\*</sup> , Chinyere Omereji-David<sup>1</sup>, Beatrice Wobiarueri Moore-Igwe<sup>1</sup>, Easter Godwin Nwokah<sup>1</sup>, Ibitoroko Maureen George-Opuda<sup>1</sup>, Nkemkanma Vivian Agi<sup>1</sup>, Tombari Pius Monsi<sup>1</sup>, Ollor Amba Ollor<sup>1</sup>, Ozioma Chiagoziem Okoro<sup>2</sup> , Ngozi Brisibe<sup>1</sup>, Adline Erinma Ben-Chioma<sup>1</sup>

<sup>1</sup>Department of Medical Laboratory Science, Rivers State University, Port Harcourt, Nigeria

<sup>2</sup>Department of Medical Laboratory Science, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria

Email: \*moore.mike-ogburia@ust.edu.ng

**How to cite this paper:** Elekima, I., Mike-Ogburia, M.I., Omereji-David, C., Moore-Igwe, B.W., Nwokah, E.G., George-Opuda, I.M., Agi, N.V., Monsi, T.P., Ollor, O.A., Okoro, O.C., Brisibe, N. and Ben-Chioma, A.E. (2023) Prevalence of HIV, Hepatitis B, and Hepatitis C in Rivers State University, Port Harcourt: Outcome of a Medical Outreach. *Advances in Infectious Diseases*, 13, 692-705.

<https://doi.org/10.4236/aid.2023.134056>

**Received:** September 13, 2023

**Accepted:** December 26, 2023

**Published:** December 29, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Background:** Infectious diseases associated with Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) continue to pose significant public health challenges that necessitate continuous surveillance and interventions. This study investigates the prevalence of HIV, HBV and HCV infections within the academic community of Rivers State University, Port Harcourt, Nigeria. Given the potential for transmission in university settings and the importance of early detection and intervention, this research explores the extent of these infections and evaluates the outcomes of a medical outreach program aimed at addressing them. **Methodology:** A cross-sectional study design was employed to recruit 513 participants using a convenience sampling approach between the 20<sup>th</sup> and 22<sup>nd</sup> of April 2022. Participants included students and staff members who voluntarily consented to the medical outreach and study. Serological assays were utilized to identify HIV, HBV and HCV infections. The medical outreach program's design, implementation, and outcomes were evaluated, focusing on testing uptake, counselling utilization, and linkage to care. Statistical analysis employed GraphPad Prism version 9 software. **Result:** The study revealed low prevalence rates of HIV (0.6%), HBV (1.2%), and HCV (0.6%) infections within the university population. Age-based analysis indicated a slightly higher prevalence in the 15 - 24 age group. Gender-wise, HBV showed a marginal difference, with 1.3% among females and 0.9% among males. The medical outreach program achieved a testing uptake of 80.8%, with 75% utilizing counselling services, and 75% of those identified with infections successfully

linked to care. **Conclusion:** This study provides valuable insights into the prevalence of infections and the effectiveness of a medical outreach program within a university community. While low prevalence rates are encouraging, the findings emphasize the continued importance of awareness and prevention efforts. The success of the outreach program in encouraging testing, providing counselling, and facilitating care linkage underscores its potential as a model for future interventions. Further research should delve into determinants of infection prevalence and barriers to care linkage for a more comprehensive understanding and improved intervention strategies.

## Keywords

HIV, Hepatitis B, Hepatitis C, Medical Outreach

---

## 1. Introduction

Infectious diseases, particularly those caused by Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV), pose significant challenges to global health that necessitate ongoing surveillance and intervention efforts. The prevalence of these infections varies across regions and populations [1]-[5], necessitating localised studies to inform targeted public health interventions.

The virulence of HIV [6], HBV [7], and HCV [8] infections highlights their potential for substantial morbidity and mortality, necessitating vigilant surveillance and proactive preventive measures. This is especially important in academic institutions such as Rivers State University, where there is a concentration of young adults who may be predisposed to high-risk behaviours that could facilitate the transmission of blood-borne pathogens [9] [10] [11].

The prevalence of HIV, HBV, and HCV infections in university populations varies across different regions and countries. Several studies have provided insights into the prevalence rates of these infections among university students. In Namibia, a study found that the prevalence of HIV among university students was 1.8% [12] while a Kenyan study reported the prevalence of HIV among university students to be 3.04% [13]. As regards HBV infection, a study in Nigeria indicated a prevalence of 2% among university students [14] whereas a study in Hong Kong reported a prevalence of 2.9% for HBV infection among university students [15]. As for HCV, a study conducted in Egypt found a prevalence of 1% among university students [16] while a Nigerian study reported an even lower prevalence of 0.7% [17]. The prevalence of HIV, HBV, and HCV infections in university populations varies globally, with variations in their associated risk factors, however, there remains a paucity of literature on the design, implementation and outcome of a medical outreach aimed at addressing these infectious diseases, particularly within university communities in Nigeria.

The current study investigates the prevalence of HIV, HBV, and HCV at Riv-

ers State University in Port Harcourt, Nigeria, as well as the outcomes of a comprehensive medical outreach initiative aimed at addressing these infections. Examining the prevalence of these infections among university students and faculty, in conjunction with a medical outreach intervention, provides a valuable opportunity to evaluate the effectiveness of targeted health education, testing, and counselling initiatives. In addition, the results of this study have the potential to inform the development of evidence-based policies tailored to the specific health requirements of this academic community.

In accordance with the overarching objective of public health initiatives, understanding the prevalence of these infections is essential for assessing their impact, identifying potential areas of vulnerability, and developing containment and control strategies. The convergence of epidemiological investigation and community engagement within the context of a medical outreach provides a holistic approach to understanding the dynamics of these infections and designing interventions that can be feasibly integrated into campus life.

By elucidating the outcomes of this medical outreach programme, this study contributes to the existing body of knowledge on the prevalence of infectious diseases in academic settings, thereby enhancing the health and well-being of the academic community and society as a whole.

## **2. Materials and Methods**

### **2.1. Study Design**

This research employed a descriptive cross-sectional study design to investigate the prevalence of Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) infections within the academic community of Rivers State University, Port Harcourt between 20<sup>th</sup> and 22<sup>nd</sup> April 2022. Additionally, the study evaluated the outcomes of a medical outreach program conducted to address these infections.

### **2.2. Design of the Medical Outreach**

The medical outreach program was meticulously designed to address the prevalence of Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) infections within the academic community of Rivers State University, Port Harcourt. The design encompassed a strategic framework that aimed to engage, educate, and provide medical services to the university population.

The program's primary objectives were to raise awareness about HIV and viral hepatitis infections, encourage voluntary testing among participants, provide counselling services, and facilitate appropriate medical care for individuals identified with infections. The program also aimed to assess the effectiveness of these interventions in enhancing infection knowledge, testing behaviours, and linkage to care.

The outreach activities comprised a combination of health education sessions,

voluntary testing, post-test counselling, and referral services. Health education sessions focused on disseminating accurate information about HIV, HBV, and HCV infections, emphasizing prevention strategies and dispelling misconceptions. Voluntary testing stations were strategically set up within the university premises to maximize accessibility. Post-test counselling services were provided to individuals receiving their test results, offering emotional support, clarification, and guidance on subsequent steps.

The outreach program leveraged a multidisciplinary team of healthcare professionals, counsellors, and volunteers who were well-versed in infectious diseases. The team worked collaboratively to ensure the smooth execution of various activities. Resources including testing kits, educational materials, and informational pamphlets were prepared in advance to support the outreach's objectives.

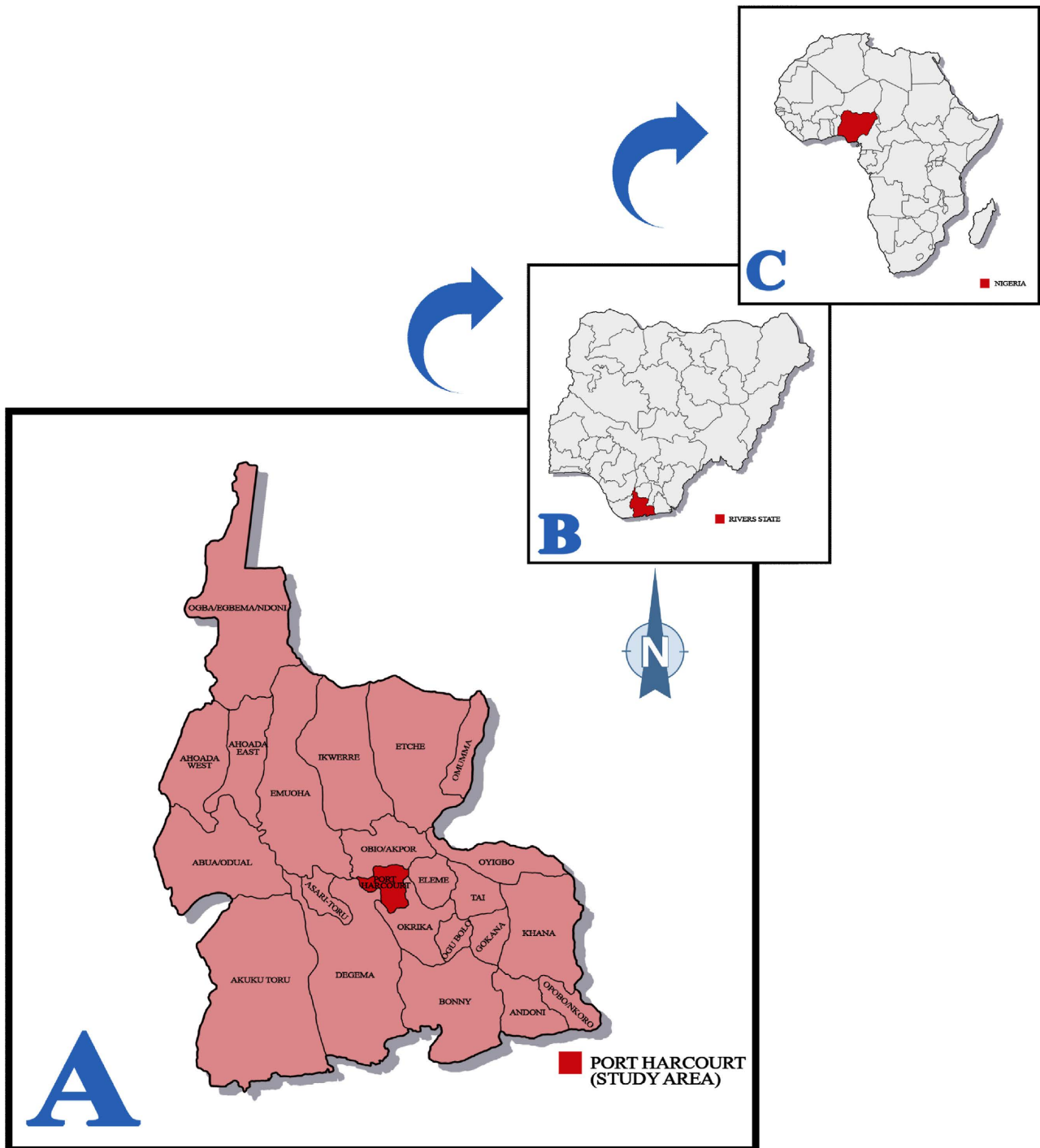
### 2.3. Study Area

The study was conducted within the confines of Rivers State University, located in Port Harcourt, Nigeria (**Figure 1**). Situated in the heart of the Niger Delta region, the university serves as a hub of academic excellence, cultural diversity, and student engagement. Its urban location within Port Harcourt, a major economic and cultural centre in Nigeria, contributes to its status as a dynamic and vibrant academic community. The university's student and staff population reflects a diverse cross-section of Nigerian society. Students from various states across the country contribute to the cultural tapestry of the institution. The academic community encompasses a wide range of ages, backgrounds, and disciplines, fostering an environment conducive to both academic excellence and social interaction.

Rivers State University is equipped with state-of-the-art academic facilities, research centres, and libraries that cater to a multitude of disciplines. The campus landscape is a blend of modern infrastructure and natural surroundings, providing students and staff with a conducive environment for learning, collaboration, and personal growth. The university's dynamic social environment is characterized by various associations and extracurricular activities that contribute to the holistic development of students. This environment presents both opportunities and challenges in terms of health-related behaviours and disease transmission dynamics.

### 2.4. Study Population and Sampling

The study population encompassed students and staff members of Rivers State University, situated in Port Harcourt, Nigeria. This academic community represented a diverse range of individuals pursuing various disciplines and roles within the university. Students included undergraduates and postgraduates from different faculties and departments, while staff members consisted of academic and administrative personnel as well as other residents of the university campus.



**Figure 1.** (A): Map of Rivers State highlighting Port Harcourt (Study Area); (B): Map of Nigeria highlighting Rivers State; (C): Map of Africa highlighting Nigeria [18].

The demographic variation within the study population allowed for the investigation of infection prevalence across a wide spectrum of ages, backgrounds, and professional roles.

The study enrolled a total of 513 participants, comprising both students and staff members from Rivers State University, Port Harcourt. The sample size was

not predetermined through a calculated method but was determined by those who participated in the medical outreach program and voluntarily provided consent to be part of the study. This pragmatic approach considered the feasibility of recruitment within the university community, where individuals willing to engage with the outreach efforts formed the basis of the study cohort.

A convenience sampling strategy was employed for participant recruitment. This method involved selecting individuals who were readily accessible and expressed a willingness to participate. Participants were drawn from the pool of those engaged in the medical outreach program, ensuring that the sample reflected the diversity of the university community.

### **2.5. Inclusion and Exclusion Criteria**

The study included students and staff members of Rivers State University who voluntarily consented to participate and undergo testing for HIV, Hepatitis B, and Hepatitis C infections. Participants were required to be officially registered with the university, and their willingness to test was essential. Excluded from the study were individuals who were physically or mentally incapacitated, individuals without official affiliation to the university, and participants who did not consent to the use of their data for research purposes.

### **2.6. Ethical Considerations**

Approval to carry out the medical outreach was obtained from the management of Rivers State University. Informed consent was obtained from all participants before data collection, ensuring confidentiality and anonymity. Participants were duly informed that the obtained data would be utilised for research purposes as well. Data storage and handling complied with established data protection regulations.

### **2.7. Data Collection**

Data collection consisted of two distinct phases: epidemiological assessment and evaluation of the medical outreach program. For the epidemiological assessment, participants underwent confidential, voluntary testing for HIV, HBV, and HCV infections using established serological assays. Pre-test counselling was provided to participants, ensuring informed consent and an opportunity for questions. Data on demographic characteristics were collected through structured questionnaires.

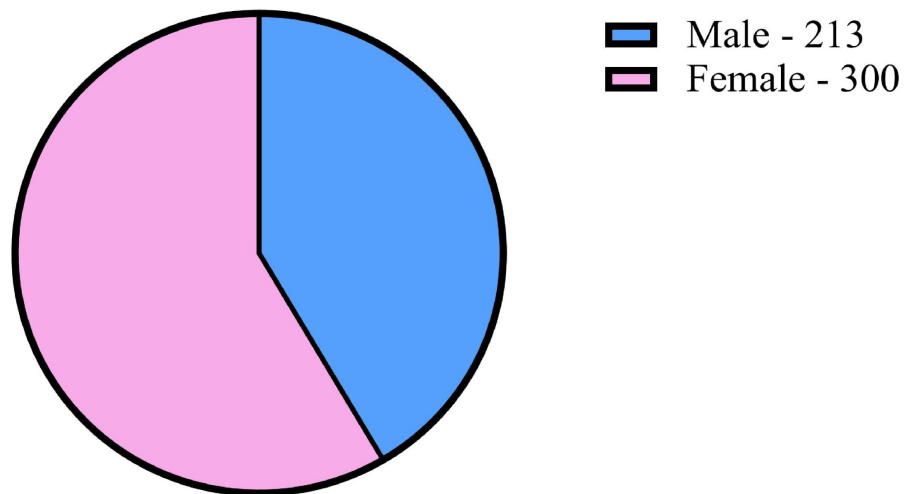
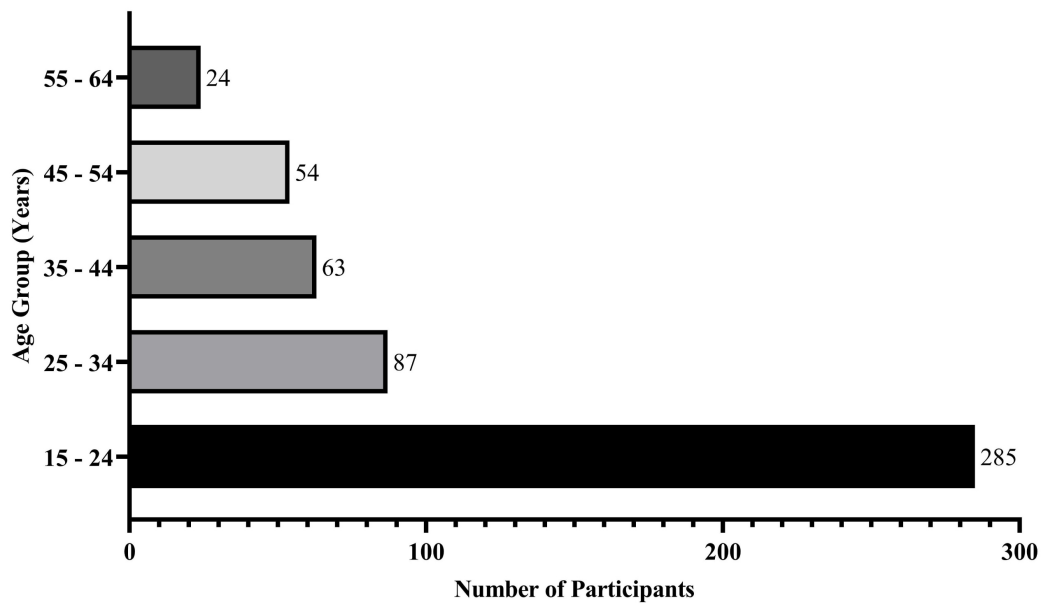
The medical outreach program evaluation encompassed an analysis of its design, implementation, and outcomes. This included assessing the number of individuals tested, the uptake of counselling services, and the subsequent linkage to care for those identified with infections.

### **2.8. Specimen Collection and Processing**

Five millilitres (5 ml) of blood were collected from each subject and dispensed

into a sterile plain container and allowed to clot. The serum obtained was used for serological diagnosis of HBsAg as well as HCV and HIV-1/2 antibodies.

The HBV and HCV assays were performed using Rapid Response™ Hepatitis B Surface Antigen (HBsAg) Test Strip and Rapid Response™ Hepatitis C Virus (HCV) Test Strip respectively. The serological protocol is a qualitative immunoassay detection of hepatitis B surface antigen and IgG antibodies of the hepatitis C virus in the sample serum respectively. Uni-Gold™ HIV, a single-use rapid immunoassay for the qualitative detection of antibodies to HIV-1 and HIV-2 in serum was used for this study as well.



**Figure 2.** Age and gender distribution of participants.

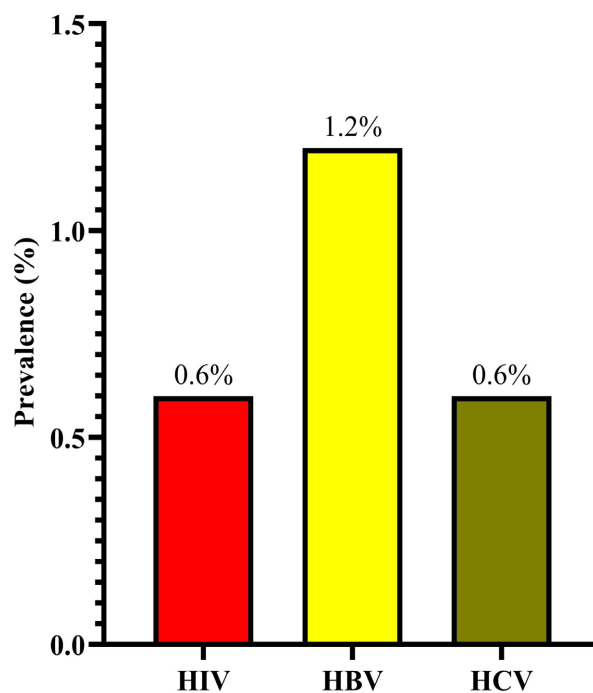
## 2.9. Data Analysis

The data analysis encompassed two primary components: a comprehensive evaluation of the medical outreach program and an assessment of infection prevalence rates. The medical outreach program underwent scrutiny in terms of its design, implementation, and outcomes, which involved evaluating its reach, testing uptake, counselling service utilization, and the subsequent linkage to care for identified infections. Concurrently, infection prevalence rates for HIV, Hepatitis B, and Hepatitis C were calculated based on the outcomes of serological tests. The statistical analysis was conducted using GraphPad Prism version 9 software, allowing for a robust examination of the program's impact and providing precise estimates of infection prevalence rates, accompanied by corresponding confidence intervals to gauge the level of precision.

## 3. Results

A total of 513 participants aged between 15 and 64 participated in the study. Most of the subjects were between the ages of 15 - 24 years (55.6%) and females predominated in the study (58.5%) (Figure 2).

The prevalence of HIV, HBV, and HCV infections across the entire study population was 0.6%, 1.2%, and 0.6% respectively (Figure 3). The prevalence of HIV, HBV, and HCV infections among the study participants was determined based on age and sex. Among the participants aged 15 - 24 years, 1.1% were found to be HIV positive, 1.1% were HBV positive, and 2.1% were HCV positive. No positive cases were recorded in the other age categories. In terms of



**Figure 3.** Prevalence of HIV, HBV, and HCV infections among participants.



gender distribution, 0.5% of males were HIV positive, 0.9% were HBV positive, and 0.5% were HCV positive. Among females, 0.6% were HIV positive, 1.3% were HBV positive, and 0.6% were HCV positive (**Table 1**).

The medical outreach program demonstrated promising participation rates, with 80.8% of the participants opting to undergo testing for infections. Of the participants identified with infections, 75% utilized the counselling services provided, while 25% declined. In terms of linkage to care, 75% of those identified with infections were successfully linked to appropriate medical care, while 25% experienced challenges in linkage (**Table 2**).

**Table 1.** Age and gender-based prevalence of HIV, HBV and HCV among the participants.

Variable	N	HIV Positive (%)	HBV Positive (%)	HCV Positive (%)
<b>Age</b>				
15 - 24	285	3 (1.1)	3 (1.1)	6 (2.1)
25 - 34	87	0 (0)	0 (0)	0 (0)
35 - 44	63	0 (0)	0 (0)	0 (0)
45 - 54	54	0 (0)	0 (0)	0 (0)
55 - 64	24	0 (0)	0 (0)	0 (0)
Total	513	3 (0.6)	6 (1.2)	3 (0.6)
<b>Sex</b>				
Male	213	1 (0.5)	2 (0.9)	1 (0.5)
Female	300	2 (0.6)	4 (1.3)	2 (0.6)
Total	513	3 (0.6)	6 (1.2)	3 (0.6)

**Table 2.** Evaluation of the medical outreach program.

Variable	Frequency	Percentage
<b>Testing Uptake</b>		
Participated	513	80.8
Declined	122	19.2
Total	635	100
<b>Counselling Services</b>		
Utilised	9	75
Declined	3	25
Total	12	100
<b>Linkage to Care</b>		
Successfully linked	9	75
Unsuccessful linked	3	25
Total	12	100

## 4. Discussion

Infectious diseases present substantial obstacles to global health, specifically those induced by Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV). Constant monitoring and intervention endeavours are required to address these challenges. The findings of this study provide valuable insights into the prevalence of HIV, Hepatitis B (HBV), and Hepatitis C (HCV) infections within the academic community of Rivers State University, Port Harcourt. Additionally, the evaluation of the medical outreach program sheds light on its effectiveness in addressing these infections.

The observed prevalence rates of 0.6% for HIV, 1.2% for HBV, and 0.6% for HCV indicate a relatively low overall burden of these infections within the study population. The low prevalence rates suggest that awareness and prevention efforts have had some impact within the University community, however, it is important to note that even low prevalence rates can have significant public health implications, and targeted interventions remain crucial. The low HIV prevalence in this study is comparable to the findings of De Beer *et al.* (2012) [12] as well as the study by Aleruchi *et al.* (2014) [19] but at variance with the findings from a Kenyan study [13]. The HBV prevalence in this study was lower than the observations among intending blood donors in Port Harcourt [20] as well as the findings among students in a study in the Nigerian Capital [14] and Hong Kong [15]. The findings of Okafor *et al.* (2021) [21] were similar to the current study as regards HBV and HCV infections as the authors reported a low prevalence of HBV and HCV infections. The findings of this study as regards HCV infection were comparable to the reports by Omolade & Adeyemi (2018) [17].

The prevalence rates exhibited variations across age groups, with a slight increase in the 15 - 24 age group. This is consistent with regional and global trends where young adults are considered a vulnerable population due to lifestyle factors and risky behaviours [5] [21] [22].

The gender-based analysis revealed a higher prevalence of HIV, HBV and HCV among females (0.6%, 1.3% and 0.6%) compared to males (0.5%, 0.9% and 0.5%), emphasizing the importance of gender-specific strategies for prevention and awareness campaigns. These observations are similar to the report by Okonko *et al.* (2015) [14] but vary from the reports by Aleruchi *et al.* (2014) [19], Mike-Ogburia *et al.* (2023) [4], and Vito-Peter *et al.* (2023) [5]. The relatively higher prevalence of HBV compared to HIV and HCV underscores the significance of HBV as a health concern in this population.

The participation rate of 80.8% in the medical outreach program demonstrates a commendable level of engagement within the academic community. This high participation rate suggests that the outreach program effectively captured the attention and interest of students and staff. This is indicative of the program's ability to mitigate potential barriers to testing, such as stigma or fear, which can hinder engagement in similar initiatives. Similarly successful medical outreach programs have been reported in Nigeria among varying populations

[23] [24].

The utilization of counselling services by 75% of participants who underwent testing reflects the program's success in providing comprehensive support to individuals receiving their test results. This observation was contrary to the findings of Ogaji *et al.* (2013) [25] where only 26.5% of students in a Southern University in Nigeria had undergone voluntary HIV testing counselling. Counselling services play a pivotal role in addressing the psychological and emotional aspects of testing [26], and the high uptake suggests the perceived value of these services among participants.

The successful linkage to care for 75% of those identified with infections is an encouraging outcome of the program. Timely linkage to care is vital for the management and prevention of disease progression [27], and this rate signifies that the program was effective in facilitating access to necessary healthcare services.

## 5. Conclusion

This study offers important insights into infection prevalence and the effectiveness of a medical outreach program within the university setting. The low prevalence rates suggest that awareness and prevention efforts have had some impact, but continued vigilance and targeted interventions are necessary to maintain and further reduce infection rates within this academic community. The success of the medical outreach program in encouraging testing, providing counselling, and facilitating care linkage underscores its potential as a model for future interventions within similar contexts.

## 6. Limitations of the Study

The absence of comprehensive sociodemographic data, risk behaviour assessments, and qualitative insights limited the depth of the analysis. Additionally, the cross-sectional nature of the study provides a snapshot of infection prevalence at a specific point in time and does not establish causality. While the convenience sampling approach facilitated practicality and ease of recruitment, it is acknowledged that this method may introduce selection bias and limit the generalizability of the findings.

Future research endeavours should explore the determinants of infection prevalence in greater detail, considering factors such as sexual behaviour, vaccination status, and socioeconomic background. Exploring more sophisticated sampling techniques, such as stratified random sampling, to enhance the representativeness of the sample and extend the applicability of the study outcomes to broader populations will be beneficial to future studies. Additionally, qualitative studies could delve into the reasons behind testing decisions, the experiences of counselling, and the barriers to care linkage.

## Acknowledgements

The authors appreciate the participants for taking advantage of this medical

outreach as well as consenting to participate in this study. We are also grateful to the multidisciplinary volunteers who devoted their time and effort to the success of the medical outreach. The authors are also grateful to the members of the Association of Medical Laboratory Scientists of Nigeria, Rivers State University Chapter, the management of the Rivers State University as well as the Head of the Department, Staff and Students of the Department of Medical Laboratory Science, Rivers State University, Port Harcourt for their roles in the medical outreach and by extension facilitating this study.

### Conflicts of Interest

The authors declare no conflict of interest.

### References

- [1] Hessou, P.S., Glele-Ahanhanzo, Y., Adekpedjou, R., Ahouada, C., Johnson, R.C., Boko, M., Zomahoun, H.T.V. and Alary, M. (2019) Comparison of the Prevalence Rates of HIV Infection between Men Who Have Sex with Men (MSM) and Men in the General Population in Sub-Saharan Africa: A Systematic Review and Meta-Analysis. *BMC Public Health*, **19**, Article No. 1634. <https://doi.org/10.1186/s12889-019-8000-x>
- [2] Eluwa, G.I., Adebajo, S.B., Eluwa, T., Ogbanufe, O., Ilesanmi, O. and Nzelu, C. (2019) Rising HIV Prevalence among Men Who Have Sex with Men in Nigeria: A Trend Analysis. *BMC Public Health*, **19**, Article No. 1201. <https://doi.org/10.1186/s12889-019-7540-4>
- [3] Lawal, M.A., Adeniyi, O.F., Akintan, P.E., Salako, A.O., Omotosho, O.S. and Temiye, E.O. (2020) Prevalence of and Risk Factors for Hepatitis B and C Viral Co-Infections in HIV Infected Children in Lagos, Nigeria. *PLOS ONE*, **15**, e0243656. <https://doi.org/10.1371/journal.pone.0243656>
- [4] Mike-Ogburia, M.I., Vito-Peter, B., Hart, G.M., Dio, A., Nwogu, V.C., Okoro, O.C., Obunwo, C.O., *et al.* (2023) The HIV and Syphilis Seroprevalence and Associated Risk Factors among Incarcerated Individuals in Port Harcourt. *Journal of Infectious Diseases & Case Reports*, **4**, 1-13. <https://doi.org/10.4236/aid.2023.132016>
- [5] Vito-Peter, B., Hart, G.M., Dio, A., Nwogu, V.C., Ideozu, N.O., Okoro, O.C., Albert, O.C., Mike-Ogburia, A.C., Ogbakiri, P.A., Obunwo, C.O. and Mike-Ogburia, M.I. (2023) Seroprevalence and Associated Risk Factors of Hepatitis B and C among Inmates of Port Harcourt Maximum Security Custodial Centre. *Advances in Infectious Diseases*, **13**, 159-182. <https://doi.org/10.4236/aid.2023.132016>
- [6] Wymant, C., Bezemer, D., Blanquart, F., Ferretti, L., Gall, A., Hall, M., Brouwer, A.E., *et al.* (2022) A Highly Virulent Variant of HIV-1 Circulating in the Netherlands. *Science*, **375**, 540-545.
- [7] Chuang, Y.C., Tsai, K.N. and Ou, J.H.J. (2022) Pathogenicity and Virulence of Hepatitis B Virus. *Virulence*, **13**, 258-296. <https://doi.org/10.1080/21505594.2022.2028483>
- [8] Luciani, F. and Alizon, S. (2009) The Evolutionary Dynamics of a Rapidly Mutating Virus within and between Hosts: The Case of Hepatitis C Virus. *PLOS Computational Biology*, **5**, e1000565. <https://doi.org/10.1371/journal.pcbi.1000565>
- [9] Shiferaw, Y., Alemu, A., Assefa, A., Tesfaye, B., Gibermedhin, E. and Amare, M. (2014) Perception of Risk of HIV and Sexual Risk Behaviors among University Stu-

- dents: Implication for Planning Interventions. *BMC Research Notes*, **7**, Article No. 162. <https://doi.org/10.1186/1756-0500-7-162>
- [10] Yang, Z., Huang, Z., Dong, Z., Zhang, S., Han, J. and Jin, M. (2015) Prevalence of High-Risky Behaviors in Transmission of HIV among High School and College Student MSM in China: A Meta-Analysis. *BMC Public Health*, **15**, Article No. 1272. <https://doi.org/10.1186/s12889-015-2614-4>
- [11] Ayinmoru, A.D., Uzobo, E., Teibowei, B.J. and Fred, J.B. (2020) Sexting and Other Risky Sexual Behaviour among Female Students in a Nigerian Academic Institution. *Journal of Taibah University Medical Sciences*, **15**, 116-121. <https://doi.org/10.1016/j.jtumed.2020.02.007>
- [12] De Beer, I.H., Gelderblom, H.C., Schellekens, O., Gaeb, E., Van Rooy, G., McNally, A., Wit, F.W. and Tobias, R.D.W.F. (2012) University Students and HIV in Namibia: An HIV Prevalence Survey and a Knowledge and Attitude Survey. *Journal of the International AIDS Society*, **15**, 9. <https://doi.org/10.1186/1758-2652-15-9>
- [13] Othieno, C.J., Okoth, R., Peltzer, K., Pengpid, S. and Malla, L.O. (2015) Risky HIV Sexual Behaviour and Depression among University of Nairobi Students. *Annals of General Psychiatry*, **14**, Article No. 16. <https://doi.org/10.1186/s12991-015-0054-2>
- [14] Lado, Z.Y., Ogbaga, C.C. and Nwagbara, O.F. (2018) Epidemiology of Hepatitis B Viral Infection among Students and Non-Teaching (Casual) Staff of Nile University of Nigeria: A 2017 Study. *Journal of Public Health and Epidemiology*, **10**, 77-86. <https://doi.org/10.5897/JPHE2017.0995>
- [15] Suen, S.S.H., Lao, T.T., Chan, O.K., Lau, T.K., Leung, T.Y. and Chan, P.K.S. (2013) Relationship between Age and Prevalence of Hepatitis B Infection in First-Year University Students in Hong Kong. *Infection*, **41**, 529-535. <https://doi.org/10.1007/s15010-012-0379-6>
- [16] Abo-Amer, Y.E.E., Abd-Elsalam, S., Eldosoky, H., ELShenawy, A.K., Awny, S., Elagawy, W., Abgeegy, M.E., Elsergany, H.F., Elashry, H. and Negm, M.S. (2018) Declining Prevalence of Hepatitis C Virus among University Students in One of the Main Governorates in Egypt. *Infection and Drug Resistance*, **11**, 2435-2441. <https://doi.org/10.2147/IDR.S183462>
- [17] Omolade, O. and Adeyemi, A. (2018) Prevalence of Hepatitis C Virus Antibody among University Students in Nigeria. *Journal of Virus Eradication*, **4**, 228-229. [https://doi.org/10.1016/S2055-6640\(20\)30307-1](https://doi.org/10.1016/S2055-6640(20)30307-1)
- [18] Mike-Ogburia, M.I., Dio, A., Nwogu, V.C., Vito-Peter, B., Hart, G.M., Ideozu, N.O., Albert, O.C., Mike-Ogburia, M.N., Obunwo, C.O., Okoro, O.C., Ogbakiri, P.A., Angala, P.O., Jumbo, U.K. and Mike-Ogburia, A.C. (2023) Prevalence and Associated Risk Factors of COVID-19 in an Incarcerated Population Burdened with HIV Infections in Port Harcourt. *World Journal of AIDS*, **13**, 28-46. <https://doi.org/10.4236/wja.2023.132004>
- [19] Aleruchi, O., Peterside, N.F. and Ezekoye, C.C. (2014) Seroprevalence of HIV Infection among Blood Donors at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. *Global Journal for Biology, Agriculture and Health Sciences*, **2**, 1-7.
- [20] Okonko, I.O., Horsefall, S.J., Okerentugba, P.O. and Frank-Peterside, N. (2015) HBV and HIV Coinfections among Intending Blood Donors in Port Harcourt, Nigeria. *Journal of Immunoassay and Immunochemistry*, **36**, 359-367. <https://doi.org/10.1080/15321819.2014.952443>
- [21] Okafor, A.C., Dan-Jumbo, A., Omunakwe, H.E. and Lawson, S.D. (2021) Transfusion Transmissible Infections among Voluntary Blood Donors in Port-Harcourt

- Metropolis, Rivers State, Nigeria. *International Journal of Environment, Agriculture and Biotechnology*, **6**, 256-260. <https://doi.org/10.22161/ijeab.61.32>
- [22] Elemchukwu, Q., Obeagu, E.I. and Ochei, K.C. (2014) The Prevalence of Human Immunodeficiency Virus, Hepatitis B Surface Antigen and Hepatitis C Virus among Pregnant Women in Port Harcourt. *IOSR Journal of Pharmacy and Biological Sciences*, **9**, 65-72. <https://doi.org/10.9790/3008-09526572>
- [23] Solomon, O., Mahafroz, K., Mashor, M., Arome, F. and Neha, D. (2014) Prevalence of HBV and HIV among Students and Staff at the University of Jos, Nigeria: Results from a Medical Outreach Screening Program. *International Journal of Scientific and Research Publications*, **4**, 1-5.
- [24] Saidu, S.I., Orimabuyaku, N., Ademola, B.A., Amadi, O.V., Olawade, D. and Oladapo, B.I. (2023) Strengthening Medical Outreach: Enhancing Healthcare Access in Developing Countries. *International Journal of Science and Research Archive*, **8**, 552-558. <https://doi.org/10.30574/ijrsra.2023.8.2.0296>
- [25] Ogaji, D.S., Oyeyemi, A.S. and Ibrahim, I. (2013) Awareness, Willingness and Use of Voluntary HIV Testing and Counseling Services by Students of a University in South-South Nigeria. *Journal of Community Medicine and Primary Health Care*, **25**, 36-44.
- [26] Alebiosu, E.O., Akintoke, V.A. and Oginni, O.I. (2021) Implications of Counselling, Psychological and Social Services on Academic Performance of Primary School Pupils in Southwest, Nigeria. *Contemporary Research in Education and English Language Teaching*, **3**, 1-8. <https://doi.org/10.33094/26410230.2021.31.1.8>
- [27] Miller, R.L., Chiaramonte, D., Strzykowski, T., Sharma, D., Anderson-Carpenter, K. and Fortenberry, J.D. (2019) Improving Timely Linkage to Care among Newly Diagnosed HIV-Infected Youth: Results of SMILE. *Journal of Urban Health*, **96**, 845-855. <https://doi.org/10.1007/s11524-019-00391-z>