

Pervasiveness of Human Immuno-Deficiency Virus (HIV), among Individuals in Wukari, Taraba State, North-East Nigeria

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Abstract

Globally Human immune-deficiency virus and Acquired Immune Deficiency Syndrome (AIDS) epidemic, originating in the 1980s and since then, it has continued to pose a significant public health challenge most especially in Sub-Sahara Africa and particularly in Nigeria. Despite advancements, challenges persist, including disparities in treatment access and emerging issues like the intersection with the Ebola and COVID-19 pandemic. This study focuses on determining HIV pervasiveness in Wukari, Taraba State, North East, Nigeria, given its historical burden and progress. The study, conducted in Wukari Town, Southern Taraba, had 100 (35 Males and 65 Females) individuals aged 11-60 participating. HIV rapid test kit was used for the analysis of blood samples collected from participants using standard serological techniques. The results obtained indicated an overall HIV prevalence of 18%, with females (12%) showing higher rates than males (6%). The age group 21-30 had the highest number of positive cases, representing 10% for both males and females. Comparisons with previous studies suggest evolving prevalence patterns, raising concerns about potential underdiagnosis. Gender disparities reflect global trends, emphasizing the vulnerability of women, particularly in Sub-Saharan Africa. Understanding age-specific risks is crucial, with the 21-30 age group requiring targeted interventions. The absence of cases in the 51-60 age group prompts an examination of the effectiveness of prevention measures. This study accentuates the dynamic nature of HIV prevalence, advocating for ongoing research to inform tailored interventions and adapt strategies based on evolving demographic landscapes. This research study further re-affirms the need for routine baseline screening for this serological marker, as it is a major consideration in the commencement and choice of highly active anti-retroviral therapy. Hence, the results of the study implies that patients should be encouraged to go for screening and know their status for proper management and take steps to avoid infecting other individuals. Also, for those that are seropositive,

early diagnosis and treatment are recommended measures. Finally, there is need for vigorous awareness campaigns on the routes of transmission of these infections and to educate people living in developing regions as to the deadly effect of these infections.

Keywords: Age-specific Risks, Gender Disparities, HIV/AIDS, Pervasiveness, Wukari.

Introduction

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) epidemic has left an indelible mark on the global landscape, representing a complex and evolving public health challenge since its emergence in the early 1980s [1]. HIV is a complex medical condition that attacks the immune system. If untreated, it progresses to AIDS, characterized by severe immune system damage [2]. The virus primarily spreads through unprotected sexual intercourse, sharing contaminated needles, and from mother to baby during childbirth or breastfeeding [3].

Globally, the burden of HIV remains a significant public health challenge, with a cumulative toll of 40.4 million lives lost [4]. Despite declines in new infections, some countries are now experiencing increasing trends. As of 2022, an estimated 39.0 million people were living with HIV, with the WHO African Region bearing two-thirds of this burden [5]. In the same year, 630,000 people succumbed to HIV-related causes, and 1.3 million people acquired HIV [4].

Turning to Nigeria, ranking third globally in HIV burden, the nation faced a prevalence of 1.9 million cases in 2018 [6]. Within this complex landscape, subpopulations like individuals in prisons and people who inject drugs experienced disproportionately higher prevalence rates of 2.8% and 9%, respectively, surpassing the 1.4% observed in the general population in 2019 [6]. Notably, Nigeria demonstrated commendable progress with an overall

decrease in prevalence from 3.2% in 2016 to 1.4% in 2018 [6,7].

This reduction underscores advancements in addressing the epidemic at large, emphasizing the need for targeted interventions to further diminish prevalence rates within high-risk subgroups and advance comprehensive strategies for HIV prevention and care in Nigeria. In the early years, the epidemic unfolded amidst an atmosphere of uncertainty, fear, and rampant stigmatization [8]. As the virus spread globally, disproportionately affecting marginalized communities, efforts to comprehend and respond to the crisis faced numerous obstacles. The late 1980s marked a critical juncture when the world began to recognize the magnitude of the HIV/AIDS threat [9].

International organizations, notably the World Health Organization (WHO), stepped into the arena, signaling a concerted effort to coordinate a response [4]. The introduction of antiretroviral therapy (ART) in the 1990s marked a transformative phase in the HIV/AIDS narrative, shifting the outlook from a dire prognosis to a manageable condition with appropriate medical intervention [10].

The subsequent decade witnessed heightened global responses, characterized by increased funding, advocacy, and the establishment of pivotal organizations dedicated to combating the epidemic [11]. As the world entered the 2010s, prevention strategies took center stage, emphasizing innovations like pre-exposure prophylaxis (PrEP) and a renewed commitment to addressing social

determinants of health [12]. In the current decade, efforts have focused on integrating HIV responses into broader global health goals, recognizing the interconnected nature of health challenges on a global scale. The HIV evolution from a life-threatening condition to a manageable chronic health issue using ART, consistent condom use, pre-exposure prophylaxis (PrEP), and education, as a critical control tools, emphasizes the transformative impact of advancements in prevention, diagnosis, treatment, and care [13]. In 2014, UNAIDS introduced the Fast-Track strategy, unveiling groundbreaking 90-90-90 targets. These targets aimed to ensure that, by 2030, 90% of individuals with HIV would be aware of their serostatus, 90% of those aware would be receiving treatment, and 90% of those on treatment would achieve a suppressed viral load, reducing transmission risk [14].

The Fast-Track strategy also aspired to limit global new infections to fewer than 500,000 by 2020, signifying a pivotal commitment to accelerating progress and achieving impactful milestones in the global fight against HIV/AIDS within the next decade [14]. Unfortunately, the progress as of 2022 revealed percentages at 86%, 89%, and 93%, respectively, indicating persistent challenges that necessitate ongoing efforts [4]. Nonetheless, Botswana, Eswatini, Rwanda, the United Republic of Tanzania, and Zimbabwe had successfully met the ambitious 95-95-95 targets in the global fight against HIV/AIDS [5].

In 2022, HIV programs in low- and middle-income countries faced a funding shortfall, with only US\$ 20.8 billion allocated, falling short of the needed US\$ 29.3 billion by 2025 [5]. Despite considerable progress, challenges persist, demanding a comprehensive understanding of the dynamics of its

prevalence to inform present-day strategies. Stigma, disparities in treatment access, and emerging issues, including the intersection with the COVID-19 pandemic, underscore the complexity of the ongoing HIV burden. Consequently, this experimental research set to determine HIV prevalence in Wukari metropolis.

Materials and Methods

Research Area

This study investigating the prevalence of HIV among individuals was carried out in Wukari Town, Southern Taraba, North East Nigeria. The major languages spoken are Jukun, Kuteb, Tiv, Hausa, and Fulani. Wukari covers an area of 4,308 km² and population of over 10,000. The people are mainly farmers and traders. The predominant occupation of the people is agriculture, commerce and civil service [5].

Study Population

A letter of introduction was obtained from the Department of Microbiology, Federal University Wukari, and ethical approval was obtained from the hospital management and Taraba State Ministry of Health. The purpose and procedure of the study was explained to the volunteers, parents, or caregivers and written consent was obtained from participants prior to samples collection. Upon ethical approval from the research and Ethics Committee of the Federal University Wukari, Taraba State, a total of 100 (35 Male and 65 Females) volunteered individuals who are between the ages of 11 and 60 were included in this study.

Sample Collection

A 5 ml syringe was used to obtain 1ml of blood sample from each participant

and collected in a sterile tube containing Ethylenediaminetetraacetic acid (EDTA), a chemical compound that acts as anticoagulant and chelating agent. The samples were then transferred to the lab for analysis.

Procedures

A drop of whole blood was carefully added to the "S" well on the HIV rapid test kit, followed by the addition of two drops of buffer solution into the "A" well. The test is left to incubate for 20 minutes, after which results are interpreted. A positive result is confirmed when both the control and test lines exhibit a red band. In contrast, a negative result is determined when only the control band is visible. An invalid result is declared if the red band in the control line is not present.

Statistical Analysis

The data obtained from the results were analyzed using descriptive statistics.

Results

In this study, a total of 100 patients were screened for HIV as shown below. A high proportion of patients were females (65%) compared to males (35%). [Table 1](#) shows 8.57% of males and 23.1% of females tested positive resulting in an overall positivity rate of 18% across both genders. The analysis of positive cases among males and negative cases among females across different age groups, as presented in [Table 2](#), those within the age group of 21-30 had the highest number of positive cases, with 5 positive cases each for both genders, followed by the 11-20 age group with 1 positive case in males.

The 31-40 age group showed no positive cases in males, but had 3 negative cases in females. Similarly, the 41-50 age group had no positive cases in males but had 1 negative case in females. The 51-60 age group had no reported positive cases in either males or females. In total, there were 6 positive cases in males and 12 negative cases in females, providing a breakdown of the distribution of positive outcomes across age groups and gender ([Figures 1 and 2](#)).

Discussion

The findings of this study reveal noteworthy patterns in the distribution of HIV positivity among participants, emphasizing the importance of gender and age considerations in the screening process. The presented data indicates an overall HIV prevalence of 18%, with a higher percentage of positive cases among females (23.1%) compared to males (8.57%). These figures underscore the gender disparities in HIV prevalence within the studied population. This outcome is higher in prevalence than that of previous study conducted by Imarenezor *et al.* [15] in Wukari which was 8%. This notable increase suggests a dynamic shift in HIV prevalence within the region. The possibility of underdiagnosis has been raised as a potential factor contributing to this disparity [16]. Underdiagnosis implies that some cases may not have been accurately identified or reported, leading to a potential underestimation of the true prevalence. Factors such as limitations in testing infrastructure, limited healthcare access, stigma around HIV testing, and varying testing protocols between studies may contribute to the observed differences [17].

Table 1 Total number and percentage of infected and non-infected male and female patients

Sex	Number examined	Number not examined	Infected
Male	35	32(39.02)	5(27.7)
Female	65	50(60.97)	13(72.2)
Total	100	82(99.99)	18(99.9)

Table 2 Total number and percentage of infected male and females attending hospital

Age Group	Number Sampled	Male	Female
01-10	0	0(0)	0(0)
11-20	17	1(5.5)	3(16.6)
21-30	34	5(27.7)	5(27.7)
31-40	25	0(0)	3(16.7)
41-50	18	0(0)	1(5.5)
51-60	6	0(0)	0(0)
Total	100	33.5	66.5

Table 3 Total number and percentage of non-infected males and females attending hospital

Age Group	Number Sampled	Male	Female
01-10	0	0(0)	0(0)
11-20	17	7(8.3)	8(9.75)
21-30	34	11(13.4)	12(14.6)
31-40	25	8(9.75)	13(15.85)
41-50	18	7(8.53)	10(12.19)
51-60	6	1(1.21)	5(6.097)

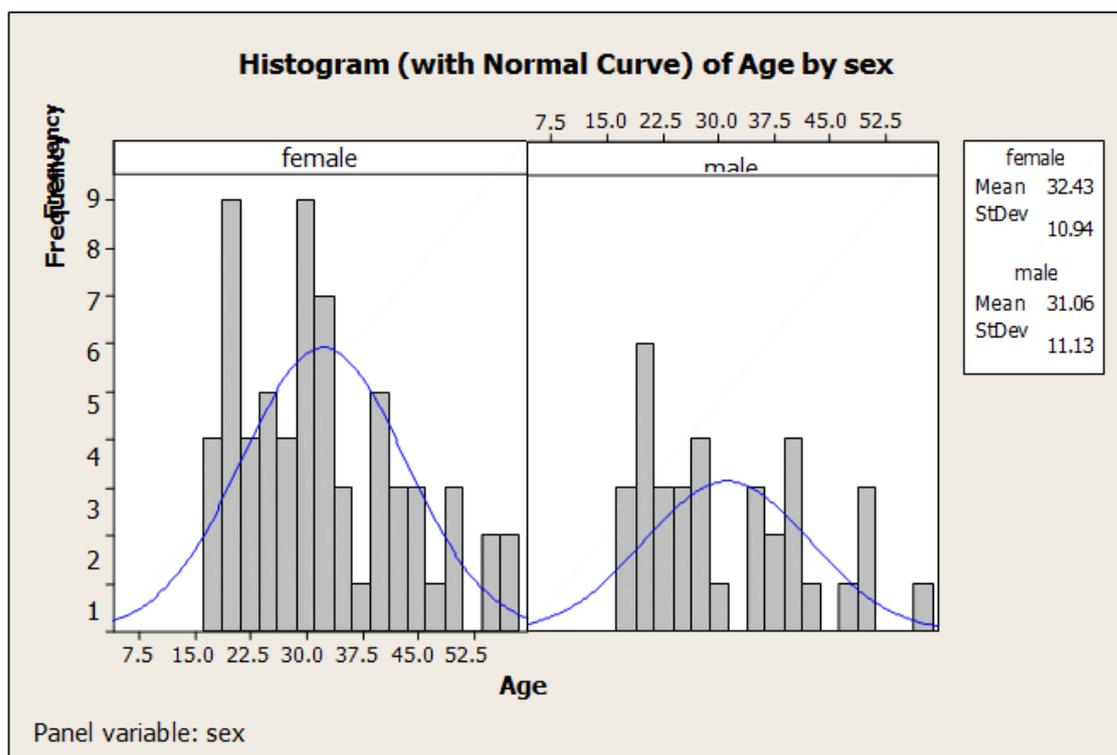


Figure 1 Appearance of age by sex of tested patients for HIV

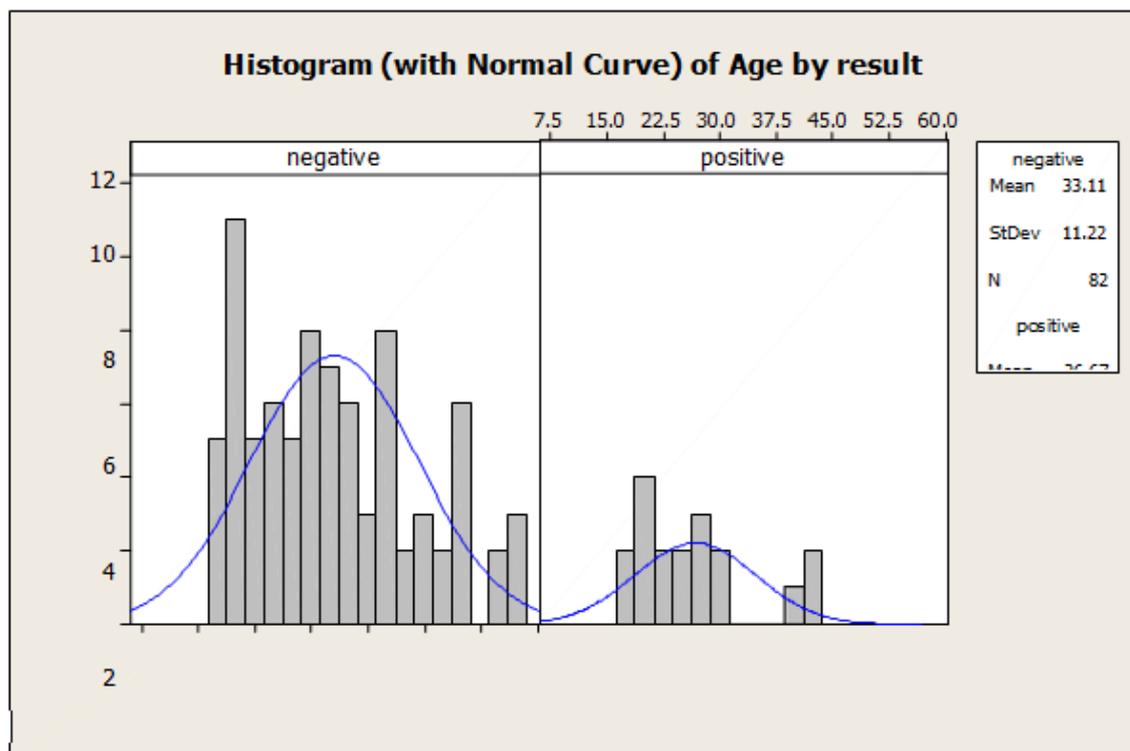


Figure 2 Appearance of age by result of tested patients

Further research is essential to comprehensively understand these evolving patterns and inform targeted public health interventions for more accurate assessment and effective mitigation of HIV in the studied population. The positive results from the HIV screening indicate that 5 out of the 35 males (8.57%) and 12 out of the 65 females (23.1%) tested positive for HIV. The provided data highlights the disproportionate impact of HIV on women and girls globally, particularly in sub-Saharan Africa.

This finding similar to a 2022 UNAIDS report [5], indicating that nearly half of all new HIV infections in Africa occurred among women and girls, with adolescent girls and young women in the 15-24 age group accounting for over three-quarters of new infections in that category. The statistics reveal a significant gender disparity, with these young women being more than three times as likely to acquire HIV compared to their male counterparts. Women are deemed more

biologically vulnerable to HIV infection during heterosexual intercourse [18]. The larger mucosal surface area in the female genital tract may heighten the likelihood of virus transmission [19].

This biological susceptibility emphasizes the importance of targeted preventive measures, such as increased access to female-controlled preventive methods and awareness of transmission risks during sexual activity [20]. Sociocultural factors, including gender inequality, contribute significantly to the higher prevalence of HIV among females [21].

In many societies, women may experience limited control over sexual decision-making, rendering them more susceptible to engaging in unprotected sex and facing a higher risk of HIV transmission. Addressing gender-based disparities is integral to empowering women with the ability to negotiate safer sexual practices and promoting gender-equitable norms. Geographic areas with age disparities in sexual activity between

males and females may witness an increased rate of HIV transmission among females [22].

Early initiation of sexual activities among females compared to males can contribute to higher vulnerability. Tailoring educational programs to address age-specific risks and promoting sexual health awareness among young populations becomes essential to mitigate these disparities. The heightened risk of sexual violence, including forced or non-consensual sex, represents a significant factor contributing to the gender disparity in HIV transmission [23]. Females, especially in certain contexts, may face an increased risk of sexual violence, further elevating their susceptibility to HIV. Combating sexual violence requires comprehensive strategies, including legal measures, awareness campaigns, and support services for survivors. Although, gender distribution in the study population demonstrated a higher representation of females (65%) compared to males (35%). There are arguments that gender imbalance in research may have implications for public health interventions [24].

This highlights the need for targeted awareness campaigns and preventive measures, especially among females who constituted the majority of the study cohort. Therefore, understanding these gender-related differences is crucial for tailoring prevention strategies and ensuring equitable access to healthcare resources. Examining the distribution of positive cases across age groups further refines the understanding of the epidemiological landscape. The 21-30 age range emerges as a critical demographic, with the highest number of positive cases for both males and females. This finding may be indicative of specific social or behavioral factors contributing to higher vulnerability in this age group [26].

One plausible explanation for the elevated HIV prevalence in the 21-30 age range could be associated with lifestyle factors, such as changes in social dynamics, increased independence, and exploration of intimate relationships [27]. This age group often experiences a transition period marked by increased sexual activity, experimentation, and a potential lack of awareness about safe sex practices. In addition, factors like lower condom use, multiple sexual partners, and inadequate knowledge about HIV transmission may contribute to the higher incidence of positive cases in this demographic [28].

To address the challenges posed by the concentration of positive cases in the 21-30 age group, targeted interventions are crucial. Education and outreach programs tailored to the specific needs and preferences of individuals in this age range can be highly effective [29]. These initiatives should not only focus on providing information about HIV transmission and prevention, but also address the broader socio-cultural context influencing sexual behaviors. Emphasizing the importance of regular testing, promoting safe sex practices, and debunking myths and misconceptions surrounding HIV can be key components of such interventions [30].

Moreover, understanding the role of technology and social media in shaping sexual behaviors among young adults is essential [31]. Leveraging these platforms for disseminating accurate information, fostering open conversations, and promoting positive sexual health practices can enhance outreach efforts. The findings also highlight the need for collaboration between healthcare providers, community organizations, and educational institutions to create a comprehensive approach. Engaging with local communities and incorporating cultural sensitivity in intervention

strategies can enhance their acceptance and effectiveness [32].

Contrasting to the findings from this current study that HIV is more prevalent among females, the occurrence of positive cases in males and negative cases in females within specific age groups, particularly in the 31-40 and 41-50 age ranges, highlights the intricate dynamics of HIV transmission. This observed pattern suggests that socio-cultural, economic, and behavioral factors play a crucial role in influencing testing behaviors and exposure risks. To comprehend the underlying reasons behind these distinct patterns, a nuanced exploration is necessary. Factors such as gender-specific societal expectations, economic disparities, and varying attitudes towards healthcare-seeking behaviors may contribute to the observed disparities [33].

Understanding the multifaceted nature of these influences is essential for tailoring targeted interventions that address the specific needs and challenges within these age groups, ultimately contributing to more effective HIV prevention strategies. The absence of positive HIV cases in the 51-60 age group prompts a critical examination of the effectiveness of prevention measures in this demographic. This phenomenon raises questions about whether successful public health campaigns, accessible testing facilities, and increased awareness have collectively contributed to minimizing the risk of HIV transmission among individuals aged 51-60. Alternatively, the absence of reported cases may signal potential underreporting or underdiagnosis, necessitating efforts to destigmatize HIV, promote regular testing, and ensure healthcare accessibility [16].

Further investigation into the behavioral and lifestyle factors within this age group is essential to gain insights into unique prevention needs [34]. This

analysis will not only inform the refinement of prevention strategies, but may also uncover underlying factors contributing to the observed pattern, enabling the development of targeted and responsive public health interventions for this demographic.

Conclusion

The pervasiveness of HIV in Wukari shows their endemicity and potential rising profile in apparently healthy individuals with the consequent risk of transmission of this virus to a potential susceptible host. The observed prevalence of HIV among apparently healthy individuals in Wukari emphasizes the significance of early detection of disease agents in prevention and effective management of the infection especially in resource limited settings.

This study also highlights the complex nature of HIV pervasiveness, emphasizing the need for tailored interventions based on gender and age considerations. The findings from this study underscore the importance of ongoing surveillance and research to adapt prevention and treatment strategies to the evolving landscape of HIV transmission within specific demographic groups. In addition, this study provides a foundation for future investigations into the factors influencing HIV incidence and the effectiveness of public health interventions.

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Competing Interests

The authors have declared that no competing interests exist in this study.

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