

## **Risk Factors of Cervical Cancer and Improving Access to Preventive Care among Females Living with HIV/AIDS in Wuse District Hospital, Abuja, Nigeria**

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### **Abstract**

*Cervical cancer remains a significant public health issue, especially among women living with HIV/AIDS. This dissertation explores the risk factors contributing to the increased prevalence and severity of cervical cancer in this population. To achieve this objective, a cross-sectional retrospective study design was used to determine the risk factors of cervical cancer in females living with HIV between January 2022 to December 2023. Data was collected by use of folders and clients' records, well-articulated personal interviews, questionnaires and forms. A random sampling method was adopted to make sure that all important groups are captured including different age grades, socioeconomic status, cultural beliefs, tribe, marital status, educational level, religion, sexual behavior, and parity. Data extracted was inputted in Microsoft Excel 2010, analysis was done using statistical software SPSS (Statistical Package for Social Sciences). At the end of this analysis, the result showed that the risk factors of cervical cancer among females living with HIV/AIDS in Abuja include age (25-29 and 40-44), non-employment, no source of income, living in rural areas, illiteracy, low CD4 count/unsuppressed viral load, Muslim religion, marriage and large number of children. This indicates that cervical cancer is a significant public health issue among HIV-positive women in Abuja. By preventing these risk factors in this vulnerable population, cervical cancer prevalence can be reduced to the barest minimum.*

**Keywords:** *Abuja, Cervical Cancer, Preventive Care, Risk Factors, Women Living with HIV/AIDS.*

### **Introduction**

Cervical cancer is the fourth most common cancer among women globally. Its incidence and mortality rates are disproportionately high in low- and middle-income countries, where access to preventive measures and treatment is limited. Among women living with HIV/AIDS, the risk of developing cervical cancer is significantly elevated. Cervical cancer is the type of cancer seen in females only and is seen occurring in the cervical cells. Cervical cancer is the second most common cancer in women worldwide and the leading cause of cancer deaths in developing countries [2]. In Sub-Saharan (SSA) cervical cancer is the leading

cause of cancer deaths amongst women. The region carries the greatest burden, with 24.55% of the global mortality from cervical cancer [17]. Cervical cancer is the second most common cancer in Nigeria and second to breast cancer among its female population [3]. Cervical cancer remains an important challenge in global health especially affecting women in low- and medium-income countries where there is limited or even, no access to screening and treatment services. According to the Global Cancer Incidence, Mortality and Prevalence (GLOBOCAN), approximately 570,000 cases and 311,000 deaths of cervical cancer were estimated to have occurred in 2018 worldwide

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[27]. Among the vulnerable populations, females living with Human Immunodeficiency Virus (HIV) are at a higher risk of cervical cancer because of immunosuppression and persistent infection with high-risk Human Papillomavirus (HPV) strains. Abuja, the Federal Capital Territory of Nigeria, constitutes a minute part of this issue, where both issues of HIV and cervical cancer pose substantial health burden on these individuals and an excessive demand on the limited healthcare resources. A systematic review on cervical cancer incidence and mortality rate shows that the scarcity of information reveals a substantial need for further studies on cervical cancer prevalence and mortality with associated risk factors [10]. The relationship between HIV and cervical cancer presents a compound health outline. Females living with HIV are at a very high risk of having cervical cancer as against the general population. Studies show that the prevalence of cervical cancer among HIV-positive women is much higher than among HIV-negative females. According to [25], females living with HIV have higher risk of having cancer of the cervix as against women without HIV and globally, about 6% of women with cancer of the cervix have HIV and less than 5% of people that have cancer of the cervix are due to HIV. This high propensity is mainly due to the compromised immune system in HIV-positive individuals, which facilitates persistent HPV infection leading to the development of precancerous lesions and eventually cervical cancer. Studies have shown that the prevalence of cervical cancer is 2-4 times higher in HIV-positive women. Women infected with human immunodeficiency virus (HIV) suffer from precancerous cervical lesions and severe invasive cervical cancer (ICC) at rates that far exceed those of their HIV-free counterparts [4]. The widespread use of ART has improved the overall health and life expectancy of HIV-positive individuals. However, even with ART, the risk of cervical cancer remains elevated. Studies indicate that while ART helps in partial

immune reconstitution, it does not completely eliminate the increased risk of cervical cancer in HIV-positive women [9].

### **The Biological Mechanisms Linking HIV/AIDS to Cervical Cancer**

HIV-positive women have higher human papillomavirus (HPV) prevalence and cervical cancer (CC) incidence than HIV-negative women, partly due to HIV's modifying effect on HPV pathogenesis [11]. HIV and HPV co-infection lead to synergistic effects that exacerbate the oncogenic potential of HPV. HIV-induced immune suppression allows for the unchecked activity of HPV's oncogenes, accelerating the progression from infection to malignancy [1]. Cervical cancer development is primarily initiated by persistent infection with high-risk types of human papillomavirus (HPV), particularly HPV 16 and 18. The progression from HPV infection to cervical cancer involves several mechanisms one of which are, viral oncogenes. HPV's high-risk types encode oncogenes E6 and E7, which interfere with tumour suppressor proteins p53 and retinoblastoma (pRb) respectively [5]. E6 promotes the degradation of p53, leading to the inhibition of apoptosis, while E7 binds to pRb, releasing E2F transcription factors that drive cell cycle progression and proliferation. Also, persistent HPV infection causes chronic inflammation, which promotes a microenvironment conducive to cancer development. Studies carried out by [14] says that reactive oxygen species (ROS) are crucial signaling molecules in inflammatory disorders, where increased ROS production by polymorphonuclear neutrophils (PMNs) at inflammation sites lead to endothelial dysfunction and tissue injury.

### **Increased Susceptibility to HPV Infection in HIV-Positive Individuals**

The interaction between HIV and HPV significantly increases the risk of cervical cancer in HIV-positive females due to increased

HPV persistence. HIV-positive women have a higher prevalence of persistent HPV infections. The immunosuppressive nature of HIV impairs the body's ability to clear HPV, leading to persistent infections that are more likely to progress to cervical cancer [22]. Immunosuppression is a critical factor in the increased risk of cervical cancer among HIV-positive women via CD4+ T Cell depletion. HIV infection leads to the depletion of CD4+ T cells, which play a crucial role in the immune response against HPV [6]. Low CD4 counts are associated with higher rates of HPV persistence and progression to cervical intraepithelial neoplasia (CIN) and cervical cancer [13]. The compromised immune system in HIV-positive individuals play a crucial role in the progression of cervical cancer. HIV targets and depletes CD4+ T cells, which are essential for maintaining an effective immune response against infections, including HPV. Low CD4 counts are associated with an increased risk of HPV persistence and progression to cervical intraepithelial neoplasia (CIN) and cervical cancer [6]. Again, the overall reduction in immune surveillance due to HIV allows HPV-infected cells to evade immune detection and destruction. This escape from immune control facilitates the accumulation of genetic mutations and the transformation of normal cells into cancerous ones [13]. HIV infection also leads to chronic immune activation and inflammation, which creates an environment that supports cancer development. Although antiretroviral therapy effectively controls human immunodeficiency virus (HIV) replication, a residual chronic immune activation/inflammation persists throughout the disease [12]. CD4 cell count has been reported to have a strong association with progression to AIDS-related illness or death [15]. HIV-positive women have higher risk of acquiring HPV, with risk inversely associated with CD4 count [11].

## **Risk Factors**

There are behavioral and socioeconomic risk factors that significantly influence the risk of cervical cancer among HIV-positive women. They include smoking, income and access to health care, education and literacy, geographic location and sexual behaviour. Smoking is an independent risk factor for cervical cancer. It contributes to immune suppression and enhances the persistence of HPV infections. Smoking damages cervical DNA and impairs local immune responses, facilitating carcinogenesis [24]. Socioeconomic factors play a significant role in the prevalence of cervical cancer among HIV-positive women. Lower income levels limit access to healthcare services, including cervical cancer screening and treatment [7]. Financial barriers can delay diagnosis and treatment, leading to worse outcomes. Educational level is directly linked to health literacy and awareness about cervical cancer. Women with higher education levels are more likely to participate in screening programs and adhere to medical advice [16]. Urban-rural disparities significantly affect healthcare access. Globally, cervical cancer (CC) incidence is higher in rural areas than in urban areas that could be explained by the influence of many factors, including inequity in accessibility of the CC prevention measures [28]. Due to the hardship Nigerian citizens face, most females, both young and old resort to having sex in exchange for money in a bid to make ends meet. This involves both having sex early and having multiple sexual partners. The main risk factors correlated with HPV infection are early sexual debut, the number of partners, frequency and type of sexual contact and partner's sexual histories [23]. Early sexual debut increases the risk of HPV infection and subsequent cervical cancer due to prolonged exposure to HPV [26]. Nigerian government has a huge role to play in combating cervical cancer among women living with HIV. They need to build more accessible and well-equipped hospitals, especially in rural

communities and finally, subsidize or better still, make health care free. Cervical cancer screening in a few available hospitals is expensive and most people that are susceptible, especially in this vulnerable group cannot afford it. In a bid to preventive care, there are educational and economic barriers that limit this people access to health care. Geographic and financial barriers limit access to healthcare services. Moreover, many rural areas around the globe face a lack of medical and social facilities and this limits the possibility of obtaining sound advice and guidance [28]. A lack of awareness about cervical cancer and the importance of regular screening is a critical barrier. Many women do not receive adequate health education to understand the need for screening, especially in the context of HIV [16]. Healthcare systems in resource-limited settings face challenges like lack of financial resources, lack of training for healthcare professionals, and a lack of supply of essential consumables and equipment which can affect implementation of cervical cancer screening. HIV-positive women often face stigma and discrimination particularly in low- and middle-income countries like Nigeria, which can deter them from seeking medical care, including cervical cancer screening. Stigma in health facilities undermines diagnosis, treatment, and successful health outcomes. Addressing stigma is fundamental to delivering quality healthcare and achieving optimal health [18]. These women can be supported in various ways in a bid to assist them in managing both HIV and cervical cancer. Emotional support from family, friends, and support groups can alleviate stress, anxiety, and depression, which are common among women living with HIV and cervical cancer. Emotional well-being is crucial for maintaining adherence to treatment and regular medical check-ups. Access to accurate and relevant information about HIV and cervical cancer, including prevention, treatment options, and self-care practices, is vital. Informational support helps women make informed decisions

about their health and encourages proactive health-seeking behaviours. Community-based education programs can disseminate information about the importance of regular screening and early detection of cervical cancer among HIV-positive women. These programs can demystify the diseases and reduce stigma associated with both conditions.

### **Public Health Interventions and Policy Recommendations**

These aim to enhance prevention, early detection, and treatment, thereby improving health outcomes for this vulnerable population. Capacity building to train healthcare providers on cervical cancer screening techniques, HPV vaccination, and the importance of integrated care for HIV-positive women. Implement quality assurance programs and measures to ensure high standards in screening and diagnostic services. Promote and provide free or subsidized HPV vaccines for girls and young women, including those living with HIV. Focus on increasing vaccination coverage in both urban and rural areas. Educate the community about the benefits of HPV vaccination and dispel myths and misconceptions. Establish policies that mandate regular cervical cancer screening for all HIV-positive women as part of their routine HIV care. Implement national policies to provide free or low-cost HPV vaccination for all eligible girls and women. Advocate for increased government and donor funding for cervical cancer prevention, screening, and treatment programs. Ensure equitable distribution of resources to urban and rural areas to bridge the gap in healthcare access.

### **Screening and Early Detection**

It is important to regularly do cervical screening for HIV-positive women. Early detection is key to the management and treatment of cervical cancer. This is achieved by regular screening especially for this population that are already at risk of having cervical

cancer. As indicated by [25], to reduce new cases of cervical cancer, screening is key to help discover lesions that are likely to develop into cancers.

### **Integration of Cervical Cancer Screening into HIV Care Programs and Vaccination**

Implementing these guidelines in Nigeria poses challenges due to limited resources and healthcare infrastructure. However, some nongovernmental organizations operating in some Nigerian hospitals and working together with the Nigerian government have succeeded in integration of free, regular, yearly cervical cancer screening using VIA (visual inspection with acetic acid) /VILI (visual inspection with Lugol’s iodine) into the HIV program which is advantageously cheap and affordable. However, integrating cervical cancer screening into HIV care services can enhance access and adherence to screening recommendations [2]. Human Papillomavirus (HPV) vaccination is a critical preventive measure against cervical cancer. The vaccines target high-risk HPV types, particularly HPV 16 and 18, which are responsible for the majority of cervical cancer cases. HPV vaccines, such as Gardasil and Cervarix, have been shown to be highly effective in preventing infections with HPV types 16 and 18. Clinical trials have demonstrated that these vaccines can reduce the incidence of cervical intraepithelial neoplasia (CIN) grades 2 and 3, which are precursors to cervical cancer [21]. Strategies can be put in place to increase vaccine uptake among HIV-positive populations. Policies that advocate and ensure that HPV vaccination can be included in

national immunization programs. Fundings can be secured from government and international donors to support HPV vaccination programs. Resources can also be allocated to train healthcare providers, purchase vaccines, and run vaccination campaigns. Finally, encourage healthcare providers to routinely recommend the HPV vaccine to their HIV-positive patients. A strong recommendation from a trusted healthcare provider can significantly increase vaccine uptake. There are holistic approaches to managing HIV and cervical cancer as a co-morbidity. They include implementing free, routine cervical cancer screening (Pap smears, VIA, or VILI) for all HIV-positive women as part of their standard HIV care protocol. Regular screening helps in early detection and treatment of precancerous lesions. Also, develop and deliver targeted educational programs in communities as well to raise awareness about the link between HIV and cervical cancer. These programs should inform women about the importance of regular screenings, HPV vaccination, and early treatment. Finally, improve healthcare facilities and train health personnels to provide both HIV and cervical cancer services under one roof. This includes equipping clinics with the necessary tools for screening and treatment of cervical cancer. In the process of community outreaches, use of community health workers and peer educators to reach women in rural and underserved areas is very important. These workers can provide information, encourage screening, and assist with navigating the healthcare system.

### **Results**

**Table 1.** Risk Factors Associated with Cervical Cancer

Variables	Total N = 245	Cervical Cancer Outcome		p-value
		Negative N = 234	Positive N = 11	
<b>Age Category</b>				0.28
15 – 19 yrs	45 (18.4%)	45 (19.2%)	0 (0.0%)	
20 – 24 yrs	20 (8.2%)	19 (8.1%)	1 (9.1%)	
25 – 29 yrs	28 (11.4%)	25 (10.7%)	3 (27.3%)	

30 – 34 yrs	31 (12.7%)	29(12.4%)	2 (18.2%)	
35 – 39 yrs	49 (20.0%)	48 (20.5%)	1 (9.1%)	
40 – 44 yrs	45 (18.4%)	42 (17.9%)	3 (27.3%)	
45 – 49 yrs	27 (11.0%)	26 (11.1%)	1 (9.1%)	
<b>Gender</b>				
Female	245 (100.0%)	234 (100.0%)	11 (100.0%)	
<b>Employment Status</b>				0.047
Self Employed	41 (16.7%)	41 (17.5%)	0 (0.0%)	
Employed	44 (18.0%)	44 (18.8%)	0 (0.0%)	
Not Employed	160 (65.3%)	149 (63.7%)	11 (100.0%)	
<b>Religion</b>				<0.001
Christian	155 (63.3%)	155 (62.2%)	0 (0.0%)	
Muslim	90 (36.7%)	79 (33.8%)	11 (100.0%)	
<b>What is your average monthly income?</b>				0.003
Not earning	110 (45.1%)	99 (42.5%)	11 (100.0%)	
#1,000 - #10,000	73 (29.9%)	73 (31.3%)	0 (0.0%)	
#11,000 - #20,000	13 (5.3%)	13 (5.6%)	0 (0.0%)	
#21,000+	48 (19.7%)	48 (20.6%)	0 (0.0%)	
<b>Type of Residence</b>				0.02
Rural	167 (68.2%)	156 (66.7%)	11 (100.0%)	
Urban	78 (31.8%)	78 (33.3%)	0 (0.0%)	
<b>What is your family size</b>				<0.001
No birth	56 (22.9%)	56 (23.9%)	0 (0.0%)	
1 - 4	30 (12.2%)	30 (12.8%)	0 (0.0%)	
5 - 9	127 (51.8%)	122 (52.1%)	5 (45.5%)	
10+	32 (13.1%)	26 (11.1%)	6 (54.5%)	
<b>Marital Status</b>				0.016
Single	82 (33.5%)	82 (35.0%)	0 (0.0%)	
Married	163 (65.5%)	152 (65.0%)	11 (100.0%)	
<b>What is your highest level of Education?</b>				<0.001
No formal education	67 (27.3%)	58 (24.8%)	9 (81.8%)	
Primary	101 (41.2%)	99 (42.3%)	2 (18.2%)	
Secondary	39 (15.9%)	39 (16.7%)	0 (0.0%)	

Tertiary	38 (15.5%)	38 (16.2%)	0 (0.0%)	
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**Table 2.** ART Status

ART Status	Number	Percentage
Positive	294	100%
Negative	0	0%

**Table 3.** Results of Last Viral Load

Latest Viral load	Number (294)	Percentage
Suppressed (<1000copies/ml)	181	62%
Unsuppressed (>1000copies/ml)	113	38%

**Table 4.** Duration of HIV Infection

Duration of HIV infection	Number (294)	Percentage
<1year	31	11%
1 -4 years	40	14%
5 – 9 years	80	27%
10 years and above	143	49%

## Discussion

Table 1 above shows the distribution of cervical cancer cases across different age groups indicates that women aged 25-29 and 40-44 years have the highest percentages of positive cases (27.3%). This suggests that women in these age categories are at a higher risk, potentially due to longer exposure to risk factors such as HPV and the cumulative effects of immunosuppression caused by HIV. Unemployment is significantly associated with cervical cancer positivity, as all positive cases were among those who are not employed. This indicates that economic insecurity and lack of employment are critical risk factors, possibly due to reduced access to healthcare services, including regular screenings and timely treatments. Other factors, including poor health care infrastructure, lack of resources and competing needs for limited health care resources, also mitigate against widespread adoption of cervical cancer screening in low resource countries [20]. All positive cases were

among Muslim women, highlighting a significant association between religious affiliation and cervical cancer prevalence. This may be attributed to cultural or religious barriers that affect health-seeking behaviour, awareness, and access to preventive healthcare services. Income level is a significant risk factor, with all positive cases being among women with no earnings. This underscores the role of economic status in accessing healthcare services, including cervical cancer screenings. Women with no income are less likely to afford medical services, contributing to delayed diagnosis and treatment. All positive cases were from rural areas, highlighting the disparity in healthcare access between rural and urban settings. Rural areas often lack adequate healthcare infrastructure, trained personnel, and necessary medical supplies, making it challenging for women to receive regular screenings and timely treatment. Studies carried out by [28] says that women in rural areas are least likely to get cervical cancer screenings due

to a lack of awareness about its risks. Socioeconomic deprivation, inadequate hygiene, poor sanitation, early marriages, and multiple pregnancies increase their susceptibility to cervical cancer. Additionally, the lack of medical and social facilities in these areas limit access to proper advice and guidance. High parity is a significant risk factor, with positive cases predominantly among women with large families (5-9 and 10+ children). Frequent childbirth can cause cervical trauma, increasing the risk of cervical cell changes and cancer development. The economic burden of large families may also limit resources for healthcare. All positive cases were among married women, suggesting that marital status, which often correlates with increased sexual activity and higher parity, is a significant risk factor. Married women may also face cultural expectations that prioritize family size over health screenings. Lack of formal education is strongly associated with positive cervical cancer cases. Women with no formal education constitute 81.8% of positive cases, highlighting the critical role of education in health awareness and access to preventive services. Low education levels and low financial status are among the two significant social risk factors of cervical malignancy as it leads to poor access to disease screening services and resistance against screening visits [19]. Educated women are more likely to understand the importance of regular health check-ups and screenings. An important indicator of risk factors for cervical cancer, sexual behaviour, was dropped as a question because information was difficult to extract from these respondents in the questionnaire as they were finding it shy to answer the question of how many sexual partners they have, if or not they are wayward and so on. Most respondents claimed they had no sexual partners both single and married while some refused to answer even after confidentiality and secrecy were assured. The tables (2, 3, 4) and data presented above provide a detailed overview of the ART status,

results of last viral load, and duration of HIV infection among the study population of HIV-positive females living in Abuja. This information is crucial for understanding the prevalence and associated risk factors of cervical cancer in this vulnerable group. All 294 participants are HIV-positive, indicating that the entire cohort is already compromised by the immunosuppressive nature of HIV. This universal positivity underscores the importance of monitoring and managing cervical cancer risks in HIV-positive populations, as HIV infection itself is a significant risk factor for persistent HPV infection and subsequent cervical cancer development. Viral load is a critical indicator of the effectiveness of ART and the overall immune status of HIV-positive individuals. In this cohort, 62% have a suppressed viral load, which is encouraging as it suggests effective ART management for the majority. Suppression of the viral load reduces the immunosuppressive impact of HIV, potentially lowering the risk of persistent HPV infection and cervical cancer. 38% have an unsuppressed viral load, indicating poor ART adherence or resistance. This group is at a higher risk for cervical cancer due to ongoing immunosuppression, which facilitates persistent HPV infections and the progression to cervical cancer. The duration of HIV infection is a significant factor in the risk of developing cervical cancer: 49% of the participants have been living with HIV for 10 years or more. Prolonged HIV infection leads to chronic immunosuppression, increasing the likelihood of persistent HPV infections and the development of cervical cancer. As heterosexual transmission is a key pathway for HIV spread in Sub Saharan Africa, younger women were diagnosed with HIV, setting them at increased risk for cervical cancer, particularly as the number of years of immunosuppression lengthened [8]. 27% have been infected for 5-9 years. This group also faces substantial risks as they have been living with compromised immunity for an extended period. 14% have



been infected for 1-4 years, and 11% for less than a year. While these groups are relatively newer infections, they still face significant risks, especially if ART adherence is poor or if they have other co-morbid conditions.

## Conclusion

This paper has highlighted the multifaceted nature of cervical cancer risk among women living with HIV/AIDS in Abuja. By addressing these risk factors and improving access to preventive care, enhancing screening programs, and fostering supportive policies, it is possible

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to reduce the burden of cervical cancer in this vulnerable population.

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## Conflict of Interest

We, the authors declare that we do not have any conflict of interest.

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