Factors Affecting Cervical Cancer Screening Among Women Living with HIV in Ndola District.

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ABSTRACT

The cervix is the lower, narrow part of the uterus in the female reproductive system and connects the uterus to the vagina, forming part of the birth canal. In 2018, Zambia had the third highest incidence of cervical cancer in the world with 66.4 new cases per 100,000 women despite the establishment of the Cervical Cancer Prevention Program in Zambia (CCPPZ) in 2006. The high incidence of cervical cancer is linked to the heavy burden of HIV and AIDS. Globally, approximately 311,000 women died from cervical cancer in 2018, with over 570,000 living with the disease. Although there is substantial literature on factors affecting cervical cancer (CACX) screening among women living with HIV worldwide, there is inadequate knowledge on this topic in Ndola District of the Copperbelt Province. This descriptive cross-sectional study was conducted in Ndola District using a quantitative data collection method through a semi-structured questionnaire administered to women living with HIV aged above 15 years. Participants were selected using simple random sampling and were clients on ART for at least 12 months at their respective facilities. Data were entered in Excel and imported into STATA version 14.0 statistical software, where descriptive, chi-square, and logistic regression analyses were performed using a 95% confidence level. Out of the 400 participants, 67% had not been screened for CACX in the past 12 months while only 33% had been screened, indicating that screening coverage remains below the 75% target. The main reasons cited for not accessing screening were fear of pain during the procedure (43%), being shy (30.75%), lack of awareness of the service (13%), long distance to the facility (11.25%), and lack of qualified staff (2%). The study revealed low uptake of CACX screening services among women living with HIV, mainly associated with fear of pain and shyness.

Keywords: Cervical cancer screening (CACX), Uptake of screening services, Barriers to screening, HIV and AIDS, Women living with HIV

INTRODUCTION

Cervical cancer arises following a human papillomavirus (HPV) persistent infection with oncogenic or high-risk types (Schiffman et al., 1993). HPV types 16 and 18 cause nearly 75% of cervical cancer cases, while HPV types 31 and 45 are responsible for 10% of cervical cancers worldwide (Qureshi et al., 2015). HPV spreads from skin to skin or through sexual contact between mucous membranes of people with the infection (Nindl & Stockfleth, 2020). In persistent “high-risk” HPV infections, the virus can damage the deoxyribonucleic acid (DNA) and cause cells to divide and continue growing out of control leading to cancer (Arbyn et al., 2018). Cervical cancer is one of the most typical cancers worldwide, with an estimated 604,000 new cases and 342,000 deaths in 2020 (Sung et al., 2021). It disproportionately affects Human Immunodeficiency Virus (HIV) infected women compared to uninfected ones (Sung et al., 2021). The development of cervical cancer is linked to various risk factors, including multiple sexual partners, unprotected sex, and coitus with uncircumcised sexual partners (Small et al., 2017). Other factors include smoking, prolonged use of combined oral contraceptives, and engaging

in early sexual practices (Torre et al., 2016). Women with HIV infection tend to have a higher risk of persistent oncogenic HPV infection due to lowered immunity (Jacob, 2015). Women living with HIV infection are six times more likely to get cervical cancer than those without HIV infection (Stelzle, Tanaka, Lee, Ibrahim Khalil et al., 2021). The reported high incidence of cervical cancer in Zambia is linked to the heavy burden of HIV infection (Nyambe & Lubeya, 2021; Palefsky et al., 2018). Although cervical cancer early screening and treatment can decrease morbidity and mortality, most women in Zambia report to the hospital late (Chanda et al., 2020; WHO, 2020). We speculate that this could partly be explained by a lack of awareness, knowledge, and poor women's attitude towards cervical cancer screening. Between 2019 and 2023, Zambia targets to provide 2,275,621 women with cervical cancer screening services and attain a national coverage rate of 65% (WHO, 2020). This ambitious rollout will require massive sensitization of the population, particularly the women living with HIV infection, due to their high risk of developing cervical cancer. According to one study, only 27% of women aged 30 to 49 in Zambia have received screening for cervical cancer (sreenivas, 2022).

In 2018, Zambia had the third highest incidence of cervical cancer in the world with 66·4 new cases per 100 000 women, despite having established the Cervical Cancer Prevention Program in Zambia (CCPPZ) in 2006. According to WHO, the high incidence of cervical cancer is linked to the heavy burden of HIV and AIDS (WHO, 2020). Considering that cervical cancer can be prevented by primary (human papillomavirus [HPV] vaccination), secondary (cervical screening and HPV DNA testing), and tertiary (cancer treatment and management) methods, it is plausible that other factors, such as HIV, have contributed to the increased disease burden. Zambia's goal is to have 65% screening coverage between 2019 and 2023, by targeting women with HIV aged 15–59 years, and women aged 25–59 years who are HIV-negative. In 2018, Zambia began integrating cervical cancer screening in HIV treatment and care services. Around 235 000 women living with HIV have been screened from November 2020 to October 2021. The country has seen an increase of over 30% in cervical cancer screening rates among women living with HIV over the past year though there is still more work to be done if the country is to achieve the set target of 65% by the end of 2023 (WHO, 2021).

Despite these possibilities, it is evident that Zambia healthcare system is currently not able to screen all the women living with HIV for cervical cancer. This has been demonstrated with a failure to reach the WHO target of 65 % of which we have barely managed 30% coverage of CACX screening among women living with HIV. Undetected cases continue to spread and increase the prevalence in general population. Early diagnosis and initiation of effective treatment is an important control measure for CACX infection control. Zambia has continued to record low CACX screening services due to a number of factors that are yet to be determined using this research. There is a lot of literature that has covered factors affecting screening services of CACX of women living with HIV around the world, however there is inadequate knowledge on the same topic in Ndola District of the Copperbelt.

It is from this background that this study seeks to find out the factors that could be contributing to low CACX screening coverage among women living with HIV. From the six facilities that conduct Cervical Cancer screening services in Ndola, only 1107 clients out of 3307 eligible ART clients have been screened for Cervical Cancer representing 33% coverage from October 2022 to May 2023. This picture shows that there is still a lot of work that needs to be done to address the factors contributing to low coverage of Cervical Cancer screening. If the above target is to be attained, it is therefore important that the factors affecting cervical cancer screening are identified and addressed as quickly as possible. Therefore, conducting this research will help us explore the factors affecting screening of CACX among women living with HIV in selected sites of Ndola District as well as contribute to the body of academic knowledge. Hence, there is need to explore factors affecting CACX screening among women living with HIV in selected sites of Ndola District.

The main objective of this study is to explore factors affecting CACX screening among women living with HIV in Ndola District. The specific objectives are to determine the prevalence of CACX screening services among women living with HIV in Ndola District, to identify social demographic factors affecting CACX screening among women living with HIV in Ndola District, and to identify cultural factors affecting CACX screening among women living with HIV in Ndola District.

LITERATURE REVIEW

Overview

The aim of this chapter was to compare, contrast and summarize factors contributing to low CACX screening among women living with HIV in different parts of the world and narrow it down to specific health facilities within Ndola District. A search on online databases and the Internet for published articles on CACX reports in several countries to give a global as well as a regional perspective on factors that lead to low CACX screening among women living with HIV was undertaken. Priority was placed to the extent to which various regions are affected by CACX.

Prevalence of Cervical Cancer Screening (CACX) among Women Living with HIV

Cervical cancer remains one of the most preventable and treatable malignant diseases, yet it is the fourth most commonly detected cancer in women worldwide, with more than half a million new cases and 311,365 deaths recorded in 2018. Nearly nine in ten women who die from cervical cancer live in low- and middle-income countries. Inequalities continue to widen as incidence rates decline in high-income countries while increasing or remaining high in many sub-Saharan African countries (Dominik et al., 2021). Cervical cancer is also the most frequently detected cancer in women living with HIV and is classified as an AIDS-defining illness. Globally, approximately 33,000 new cervical cancer cases occurred among women living with HIV in 2018, representing about 5.8% of all cervical cancer cases (Dominik et al., 2021).

The burden is particularly high in the African region, especially in Southern and Eastern Africa, which together contribute about 70% of cases among women living with HIV. Countries such as Eswatini, Lesotho, Botswana, South Africa, and Zimbabwe have reported some of the highest proportions of cervical cancer among women living with HIV. Despite the availability of screening programmes, coverage remains low in many settings. For example, a study conducted in Estonia found that the mean annual screening coverage was 20.4% among women living with HIV and 28.7% among HIV-negative women, while longitudinal coverage was only 13.9% among women living with HIV (Tisler et al., 2021). Similarly, in Zambia, the 2017 STEPS survey reported that only 16.4% of women aged 16–69 years had ever been screened for cervical cancer and only one in five women aged 30–49 years had undergone screening. These findings indicate that screening coverage remains inadequate globally and locally, highlighting the need to improve uptake of cervical cancer screening services among women living with HIV.

Socio-Demographic Factors Affecting Cervical Cancer Screening among Women Living with HIV

Socio-demographic factors play an important role in determining access to and utilization of cervical cancer screening services. Studies in sub-Saharan Africa have shown that cervical cancer accounts for approximately 20–25% of all cancers among women, with incidence rates ranging between 30 and 40 per 100,000 women (Akokuwebe et al., 2021). In South Africa, for example, approximately 5,743 women are diagnosed with cervical cancer each year and about 3,027 die from the disease. Cervical cancer is also the second most common cancer among women of reproductive age between 15 and 44 years (Akokuwebe et al., 2021).

To address the burden, the South African Department of Health introduced a national cervical cancer screening programme allowing three Pap smear tests per lifetime at 10-year intervals starting at age 30, with a target coverage of at least 70% of women nationally. However, despite the implementation of this programme, screening coverage remained low at about 20% nationally among women over the age of 30. A population-based study in rural South Africa also found that only 18% of women had ever had a Pap smear test (Akokuwebe et al., 2021).

Similarly, in Uganda, cervical cancer is among the leading cancers affecting women, with approximately 6,413 new cases and 4,301 deaths annually. Due to the increased susceptibility of women living with HIV to cervical cancer, national HIV treatment guidelines recommend annual screening for this population. However, the integration of cervical cancer screening services within HIV care programmes remains limited due to resource

constraints, leading to reduced access to screening services for many women living with HIV (Sarah Maria et al.).

Cultural and Health System Factors Affecting Cervical Cancer Screening among Women Living with HIV

In addition to socio-demographic factors, cultural perceptions and health system challenges also influence the uptake of cervical cancer screening services. Studies conducted in Uganda reported several barriers that prevent women living with HIV from accessing screening services, including long distances to screening facilities, long waiting times at health facilities, unaffordability of services, and poor quality of screening services (Sarah Maria et al.). These barriers can discourage women from seeking screening even when services are available.

In Zambia, cervical cancer remains a major public health concern due to the high prevalence of HIV and limited screening coverage. The country has one of the highest age-standardized cervical cancer incidence and mortality rates, estimated at 44.6 per 100,000 and 66.3 per 100,000 women-years respectively (Lubeya et al., 2021). Although Zambia has implemented one of the largest cervical cancer screening programmes in sub-Saharan Africa since 2006, screening services are still not available in all districts and health facilities. As of 2016, screening services were available in only 27 out of 103 districts.

Efforts have been made to improve screening coverage through the national strategic framework for cervical cancer prevention, which aims to provide screening services to eligible women aged 15–59 years for those living with HIV and 25–59 years for HIV-negative women. The strategy targets national screening coverage of 65% by expanding services to more health facilities and promoting regular screening every three years (Zambia Strategic Framework 2019–2023). Despite these efforts, cervical cancer remains prevalent in districts such as Ndola, which has been identified as one of the districts with relatively high cancer prevalence rates (Kalubula et al., 2021; Mwanza et al., 2026).

THEORETICAL FRAMEWORK

This study is guided by the Health Belief Model, which explains how individual beliefs influence health-related behaviors. The model suggests that people are more likely to take preventive health actions when they perceive themselves to be at risk of a disease (perceived susceptibility), believe the disease has serious consequences (perceived severity), recognize the benefits of taking action (perceived benefits), and identify fewer obstacles to taking that action (perceived barriers). The model also highlights the role of cues to action, which trigger individuals to seek health services, and self-efficacy, which refers to an individual's confidence in their ability to successfully perform health-related behavior. In the context of cervical cancer screening among women living with HIV, the model helps explain how different factors influence screening behavior. Individual factors such as lack of knowledge, poor health-seeking behavior, stigma, and misinterpretation of symptoms may reduce the likelihood of women accessing screening services. Sociocultural factors, including cultural beliefs, gender roles, and male dominance, can also discourage women from seeking screening and may lead some individuals to rely on traditional medicine, which delays diagnosis in health facilities. Structural factors related to the health system, such as long distances to health facilities, financial constraints, inadequate diagnostic equipment, and shortage of skilled personnel, may further limit access to screening services. The Health Belief Model is therefore appropriate for this study because it provides a framework for understanding how individual, sociocultural, and structural factors influence the utilization of cervical cancer screening services among women living with HIV.

Conceptual Framework

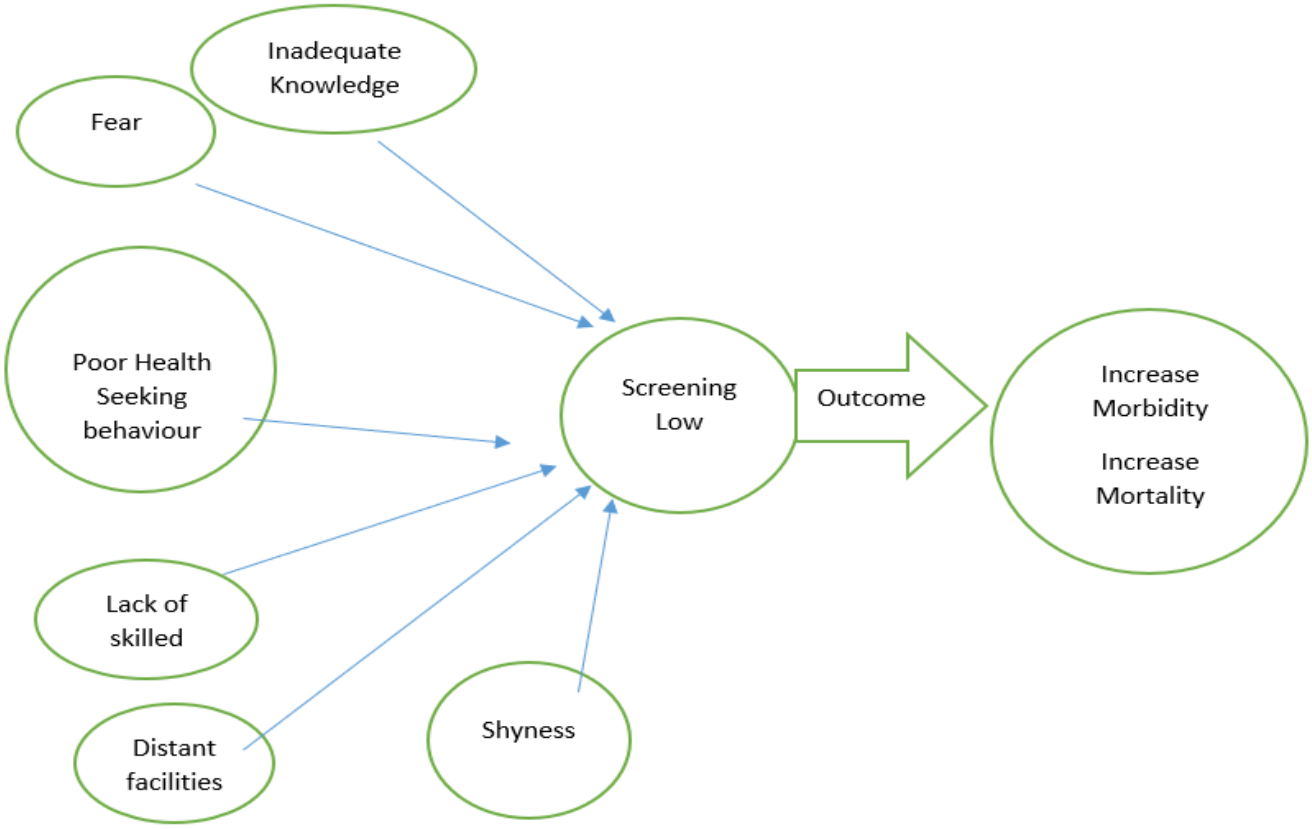

Figure 1 illustrates how various factors contributing to low cervical cancer screening among women living with HIV and the resulting health outcomes. The framework shows that Individual and structural factors such as fear, shyness, inadequate knowledge, poor health-seeking behavior, distant health facilities, and lack of skilled health personnel influence the uptake of screening services. These factors act as barriers that discourage women from accessing cervical cancer screening, leading to low screening coverage. When screening uptake remains low, early detection and treatment of cervical cancer are reduced. As a result, this leads to increased morbidity and increased mortality associated with cervical cancer. Therefore, the framework shows that addressing these barriers is essential for improving screening uptake and reducing the burden of cervical cancer among women living with HIV.

RESEARCH METHODOLOGY

Overview

This chapter explains the research methodology employed in the research study. It explains the research design, study area, target population, sample size and sampling techniques, data collection instruments and procedures and data analysis methods.

Study Design

This research employed a cross-sectional study. The study used quantitative method, as it looked at women living with HIV in Ndola District and conducted face to face interviews with clients in the identified facilities.

Study Area

The study was conducted in Ndola District from selected health facilities providing ART services. Out of the 33 health facilities providing ART services in Ndola District, eight (08) health facilities where the study was conducted were purposively sampled for convenience purposes and easy accessibility. The facilities sampled needed to be a static ART site for the past 12 months and has active ART clients of at least 300.

Target Population

The target population comprised of 37,167 women living with HIV who are receiving ART treatment and care in Ndola District from 33 health facilities. The sample comprised of all women living with HIV who are 15 years and above.

Study Sample

The sample consisted of respondents who are receiving ART treatment from the selected health facilities for more than 12 months. The study targeted the women living with HIV and had been receiving treatment for more than 12 months from these facilities.

Sample Size Determination

The standard formula for sample size calculation for finite population was used for this study and it is as shown below. The sample size was determined using the Taro Yamane formula at 95% confidence level:

Confidence level (α) of 95%,

N = population size,

e = margin of error_ 5%(0.05)

N = Population Size where the study is being conducted_ 37,167

n = 37167/ [1+37167(0.05) ^2]

n = 37167/ [1+37167(0.0025)]

n= 37167/ [1+ 92.9175]

n= 37167/ 93.9175

n= 395.7409

n= 396

The sample size (with finite population correction) was equal to 396. However, it was adjusted to 400 to account for possible non-response and incomplete questionnaires

Sampling Technique

Purposive sampling technique was used to select the eight (08) health facilities where this study was conducted within Ndola district for easy accessibility. This sampling technique was used because the focus was on facilities that have ART clinic and have at least a minimum of 300 clients in care at the time the study was being conducted. The facilities needed also to have static ART services for the past 12 months. Simple random sampling technique was used to select the clients from the client ART registers and one on one interview was conducted to establish those who have been screened for cervical cancer in the past 12 months.

Data Collection Instruments

During data collection procedure, a structured questionnaire was used to collect data around cervical cancer screening services among women living with HIV. The questionnaire collected information on socio-demographic characteristics, knowledge and awareness of cervical cancer, perceptions towards CACX screening, and barriers affecting utilization of screening services.

Data Collection Procedure

Data collection was conducted through face-to-face interviews with the selected respondents. Prior to data collection, the researcher scheduled appointments with potential participants at the health facilities. At the agreed date, time, and venue, the researcher administered the questionnaire to the respondents. Participants were informed about the purpose of the study before the interview commenced. In cases where a selected participant was unavailable, another eligible participant from the ART register was selected to replace the individual.

Data Analysis

Data were analysed using STATA version 14. Descriptive statistics were used to summarize participant characteristics. Bivariate analysis using Pearson's chi-square test was conducted to assess associations between independent variables and screening uptake. To identify independent predictors of cervical cancer screening uptake, a multivariable logistic regression model was fitted. Variables with $p < 0.20$ at bivariate level and those of theoretical relevance were included in the model. Adjusted odds ratios (AORs) with 95% confidence intervals were reported, and statistical significance was set at $p < 0.05$. This approach allowed for control of confounding and provided a more robust understanding of factors influencing screening uptake.

Data Quality Assurance

To ensure data quality, the data was cleaned using the STATA Software version 14. To ensure confidentiality of the respondents, no name was recorded on the questionnaire. The data collection tools were securely stored in a lockable cabinet to avoid unauthorized access to the information.

Potential Sources of Bias

This study may be subject to several limitations. First, selection bias may have arisen due to purposive sampling of health facilities, which may limit generalizability beyond similar settings. Second, response bias may have occurred as data were self-reported, potentially leading to underreporting or overreporting of screening behaviour. Third, the cross-sectional design limits causal inference, as associations do not imply temporality.

Operational Definition and Measurement of Key Variables

To enhance clarity and reproducibility, key study variables were clearly defined and operationalized as follows:

1. **Awareness of Cervical Cancer Screening**-Awareness referred to the respondent's knowledge regarding the availability, purpose, and importance of cervical cancer screening services. It was assessed using multiple items, including knowledge of service availability, understanding of the purpose of screening, and awareness of recommended screening frequency. Responses were scored and summed to generate a composite awareness score. Participants scoring at or above the mean were classified as having adequate awareness, while those scoring below the mean were categorized as having low awareness.
2. **Fear of Screening**-Fear was defined as the emotional concern or anxiety associated with cervical cancer screening, including fear of pain, discomfort, or receiving a positive diagnosis. It was measured using self-reported responses to structured questions and categorized as binary (Yes/No).
3. **Cultural Factors**-Cultural factors referred to socially influenced beliefs and practices affecting screening behaviour, including preference for female health providers, shyness, and partner influence. These were measured using perception-based questionnaire items and categorized into binary or categorical variables.
4. **Screening Uptake (Dependent Variable-**Screening uptake was defined as whether a respondent had undergone cervical cancer screening within the past 12 months. This variable was coded as binary (1 = screened, 0 = not screened).

Ethical Considerations

The researcher requested for permission from the University of Lusaka Research Ethics Committee to get ethical clearance before commencing the study. Thereafter permission was sought from Ndola District Health Office (DHO). During data collection permission was requested from participants by means of written consent. The

respondents were given information about the study prior to obtaining a written consent from them so that they make an informed decision to take part in the study. Completed interview schedules of participants were kept strictly under "lock and key" to avoid unwarranted viewing of the data that was gathered. Anonymity and confidentiality were observed during the interviews by use of codes and not names. Each respondent was interviewed in privacy. Codes were used on the questionnaire for each respondent to protect the identity of each participating respondent.

RESULTS AND DISCUSSIONS

This study examined factors influencing cervical cancer screening uptake among women living with HIV in Ndola District. The findings revealed persistently low screening coverage, with only one-third of participants reporting screening within the past 12 months. This pattern reflects broader trends observed across sub-Saharan Africa, where structural, cultural, and psychological barriers continue to limit screening uptake despite the availability of services.

Demographic Characteristics of Respondents

Age Distribution of Respondents

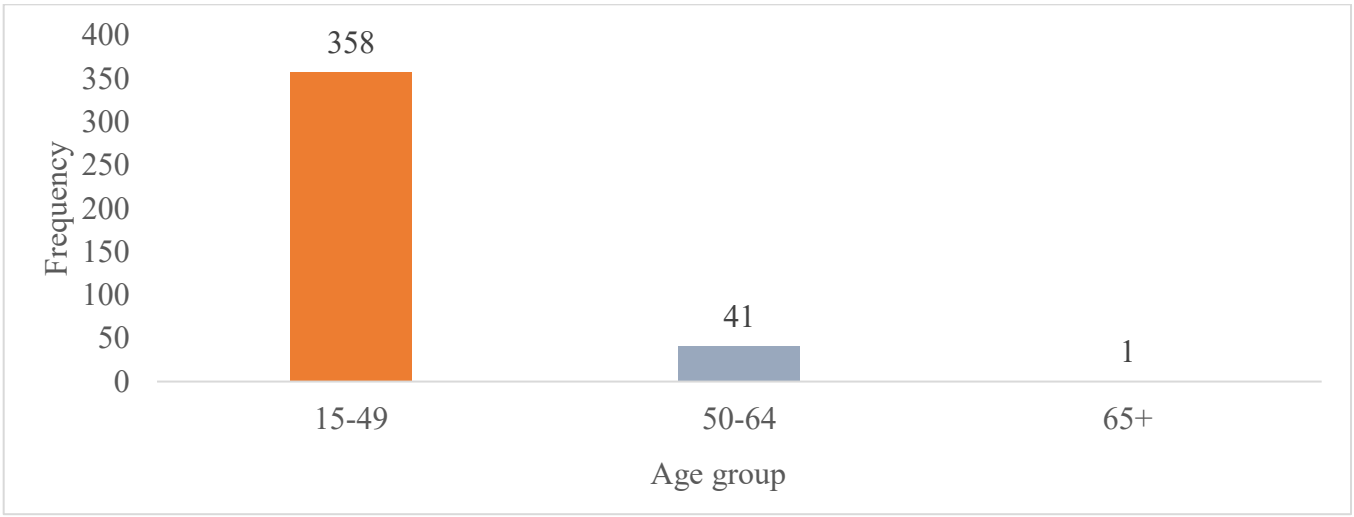

Figure 2: presents the age distribution of respondents who participated in the study.

The results indicate that the majority of respondents were within the 15–49 years age group, representing 358 participants of the total sample. This was followed by the 50–64 years age group, which accounted for 41 participants. Only 1 participant was aged 65 years and above. These results show that most of the respondents who participated in the study were within the reproductive age group.

Marital Status Distribution of Respondents

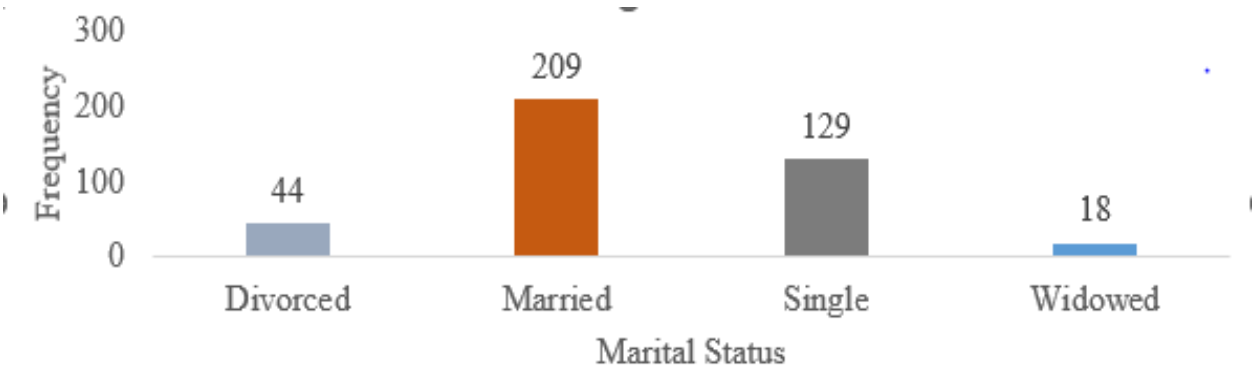

Figure 3, illustrates the Marital Status distribution of respondents who participated in the study

The results presented in Figure 3 show that the majority of respondents were married, accounting for 209 participants of the total sample. This was followed by single respondents, who constituted 129 participants. A smaller proportion of respondents were divorced, representing 44 participants, while 18 respondents were widowed.

Employment Status of Respondents

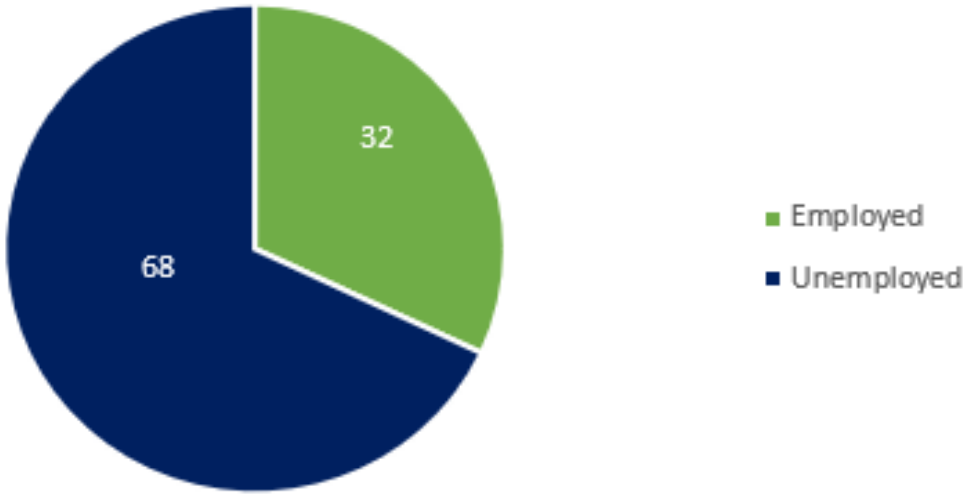

Figure 4: presents the Occupation distribution of respondents.

The results presented in Figure 4 show that the majority of respondents were unemployed, accounting for 68% of the study participants. In contrast, 32% of the respondents were employed. This indicates that most of the women living with HIV who participated in the study did not have formal employment at the time the research was conducted.

Distance of Respondents from Health Facilities

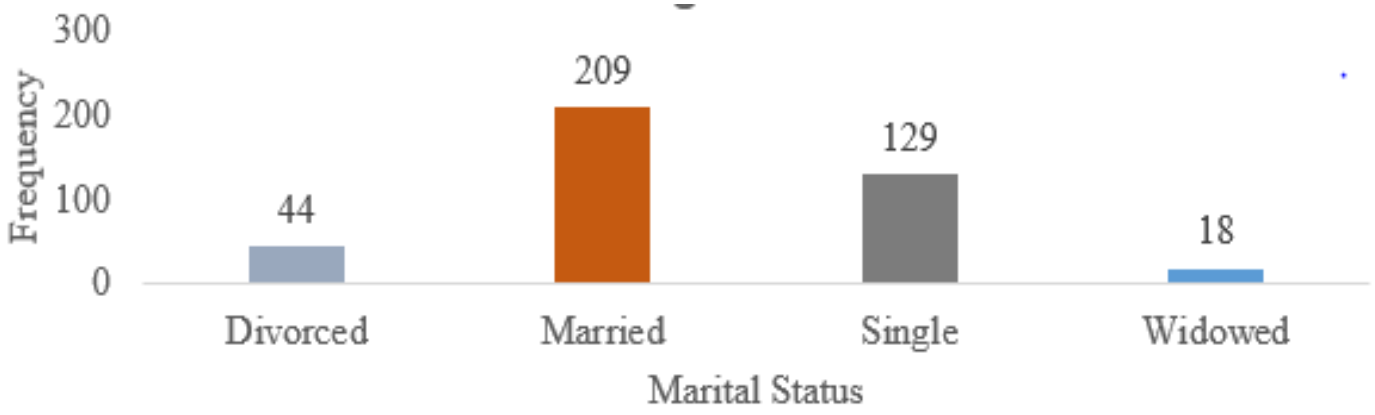

Figure 5: Presents the distance of respondents from Health Facilities

The findings presented in figure 5 show that the majority of respondents lived between 1–3 km from the health facility, accounting for 207 participants. This was followed by 128 participants who lived between 3–6 km from the health facility. A smaller proportion of respondents lived between 6–10 km, representing 47 participants, while only 18 participants lived between 10–20 km away from the facility. These results indicate that most respondents resided relatively close to the health facilities providing ART services and cervical cancer screening services.

Prevalence of Cervical Cancer Screening among Women Living with HIV

Cervical Cancer screening uptake among women living with HIV

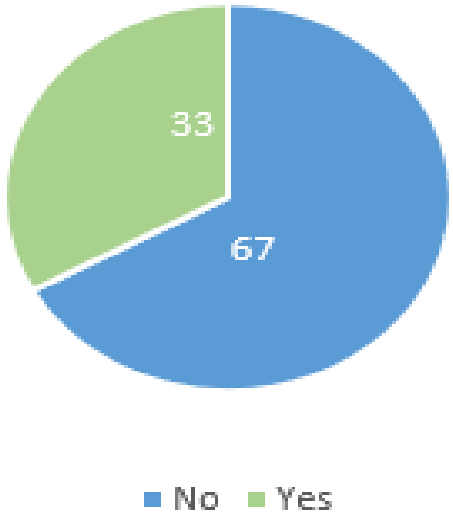

Figure 6: Presents screening uptake

The results presented in Figure 6 indicate that 67% of respondents had not been screened for cervical cancer in the past 12 months, while 33% had been screened.

The findings show low uptake of cervical cancer screening among women living with HIV in Ndola District. This low screening coverage indicates that cervical cancer prevention programs are not reaching the recommended coverage targets despite integration with HIV services. Similar findings have been reported in other studies conducted in Sub-Saharan Africa where screening uptake among women living with HIV remains low due to various social, cultural, and health system barriers.

Fear of cervical Cancer screening among women living with HIV

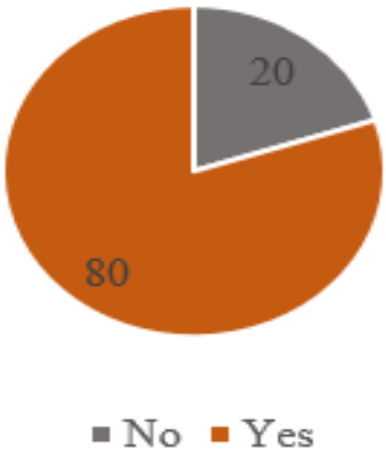

Figure 7: presents the distribution of respondents who feared cervical cancer screening

Figure 7 show that 80% of the respondents indicated that fear affects their willingness to undergo cervical cancer screening, while 20% of the respondents indicated that fear does not affect their decision to be screened. These findings suggest that fear is a common perception among women living with HIV regarding cervical cancer screening services.

The findings indicate that fear is a major factor influencing cervical cancer screening among women living with HIV. The high proportion of respondents who reported fear suggests that many women may avoid screening services due to concerns about the screening procedure, possible pain during the examination, or fear of receiving a positive diagnosis. Fear of medical procedures and anxiety about potential health outcomes may discourage women from seeking preventive health services such as cervical cancer screening. Among women living with HIV, fear may also be intensified by concerns about their existing health condition and the possibility of developing additional illnesses. This suggests the need for health education and counselling programs in reducing fear and misconceptions about cervical cancer screening. Providing accurate information about the screening procedure and its benefits may help improve screening uptake among women living with HIV.

Socio-Demographic Factors Affecting CACX Screening

Table 1: Age and cervical cancer screening among Women Living with HIV.

Age	Not Screened	Screened	Total
15-49	242 (67.6%)	116 (32.40%)	358 (100%)
50-64	25 (60.98%)	16(39.02%)	41 (100%)
65+	1(100%)	0 (0%)	1 (100%)
Total	268 (67%)	132 (33%)	400 (100%)
Note: Pr = 0.542		Pearson chi2(2) = 1.2234	

Table 1 presents the association between age and CACX screening among women living with HIV in Ndola District. Out of the 400 participants, 358 (89.5%) were in the 15–49 years age group, 41 (10.25%) were in the 50–64 years age group, and 1 (0.25%) was aged 65 years and above. Among women aged 15–49 years, 242 (67.6%) had not been screened for CACX in the past 12 months, while 116 (32.40%) had been screened. In the 50–64 years age group, 25 (60.98%) had not been screened, while 16 (39.02%) had been screened for CACX. For the 65 years and above age group, the single participant (100%) had not been screened for CACX in the past 12 months. Overall, the results show that 268 (67%) of the participants had not been screened, while 132 (33%) had been screened for CACX in the past 12 months. The Pearson Chi-square test showed that age was not significantly associated with CACX screening, with a Chi-square value of 1.2234 and a P-value of 0.542, which is greater than the 0.05 significance level at 95% confidence interval. The findings of this study show that age was not significantly associated with CACX screening uptake among women living with HIV, as indicated by a P-value of 0.542, which is greater than the 0.05 level of significance. This suggests that the likelihood of being screened for cervical cancer was relatively similar across the different age groups included in the study.

Table 2: Marital Status and CACX Screening Services

Marital Status	Not Screened	Screened	Total	
Divorced	28(63.64%)	16(36.36%)	44(100%)	
Married	140(66.99%)	69(33.01%)	209(100%)	
Single	87(67.44%)	42(32.56%)	129(100%)	
Widowed	13(72.22%)	5(27.78%)	18(100%)	
Total	268(67%)	132(33%)	400(100%)	
Note: Pr = 0.928		Pearson chi2(3) = 0.4586		

Table 2 presents the association between marital status and CACX screening services among women living with HIV in Ndola District. Among the divorced respondents, 28 (63.64%) had not been screened for CACX in the past 12 months while 16 (36.36%) had been screened. Among the married respondents, 140 (66.99%) had not been screened while 69 (33.01%) had been screened for CACX. Among the single respondents, 87 (67.44%) had not been screened, while 42 (32.56%) had been screened. For the widowed respondents, 13 (72.22%) had not been screened, while 5 (27.78%) had been screened. Overall, out of the 400 participants, 268 (67%) had not been screened for CACX in the past 12 months while 132 (33%) had been screened.

The result shows that Marital Status is not significant as it has a P-value of 0.928 which is greater than 0.05 at 95% confidence level. This means that marital status is not associated with low CACX screening services. These findings suggest that interventions aimed at improving cervical cancer screening among women living with HIV should target all women rather than focusing on specific marital groups, since the low screening uptake appears to affect women across different marital categories

Table 3: Religion and CACX Screening Services

Religion	Not Screened	Screened	Total
Christian	264(67.52%)	127(32.48%)	391(100%)
Islam	4(57.14%)	3(42.86%)	7(100%)
Others	0 (0%)	2(100%)	2(100%)
Total	268(67%)	132(33%)	400(100%)
Note:			Pearson chi2(2) = 4.4159 Pr = 0.110

Table 3 presents the association between religion and CACX screening services among women living with HIV in Ndola District. Among the Christian respondents, 264 (67.52%) had not been screened for CACX in the past 12 months while 127 (32.48%) had been screened. Among respondents who belonged to the Islam religion, 4 (57.14%) had not been screened, while 3 (42.86%) had been screened for CACX. Among respondents classified as others, none had not been screened, while 2 (100%) had been screened for CACX. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The statistical test shows that religion is not associated with low CACX screening because the P-value is not significant. It has a P-value of 0.110 which is greater than 0.05 at 95% confidence level.

Table 4: Education Level and CACX Screening Services

Level of Education	Not Screened	Screened	Total
College/ University	28(59.57%)	19(40.43%)	47(100%)
None	27(77.14%)	8(22.86%)	35(100%)
Primary	130(69.89%)	56(30.11%)	186(100%)
Secondary	83(62.88%)	49(37.12%)	132(100%)
Total	268(67%)	132(33%)	400(100%)
Note:			Pearson chi2(3) = 4.5185 Pr = 0.211

Table 4 presents the association between education level and CACX screening services among women living with HIV in Ndola District. Among respondents with College/University education, 28 (59.57%) had not been screened for CACX in the past 12 months while 19 (40.43%) had been screened. Among respondents with no formal education, 27 (77.14%) had not been screened, while 8 (22.86%) had been screened. Among respondents with Primary education, 130 (69.89%) had not been screened, while 56 (30.11%) had been screened. Among respondents with Secondary education, 83 (62.88%) had not been screened, while 49 (37.12%) had been screened. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The result show that education level is not significant because it has a P-value of 0.211 which is greater than 0.05 at 95% confidence level. This means that education level is not associated with low CACX screening services according to this study. The findings indicate that education level was not significantly associated with CACX screening among women living with HIV in this study, as shown by the P-value of 0.211, which is greater than the 0.05 significance level. This suggests that the differences observed in screening uptake across education levels are not statistically significant. Implying that education alone may not be a strong determining factor influencing the uptake of CACX screening services among women

living with HIV in this setting. Even among women with higher levels of education, screening uptake remains relatively low.

Table 5: Occupation and CACX Screening Services

Occupation	Not Screened	Screened	Total
Employed	75(58.14%)	54(41.86%)	129(100%)
Unemployed	193(71.22%)	78(28.78%)	271(100%)
Total	268(67%)	132(33%)	400(100%)
Note:		Pearson chi2(1) = 6.7609 Pr = 0.009	

Table 5 presents the association between occupation and CACX screening services among women living with HIV in Ndola District. Among the employed respondents, 75 (58.14%) had not been screened for CACX in the past 12 months while 54 (41.86%) had been screened. Among the unemployed respondents, 193 (71.22%) had not been screened, while 78 (28.78%) had been screened. Overall, out of the 400 participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The result show that occupation is significant because it has a P-value of 0.009 which is less than 0.05 at 95% significance level. This means that employment status is associated with low CACX screening services. Out of the 271 who were not employed, 193 (71.22%) had never been screened before, while 78 (28.78%) had been screened for CACX in the past 12 months. The study measured association of occupation with CACX screening services, and it was discovered that it actually affects uptake of CACX screening services. The result in table 3 shows that occupation is significant because it has a P-value of 0.009 which is less than 0.05 at 95% significance level. This means that employment status is associated with low CACX screening services. This result is in line with the study done by Kim SJ, Han KT and Park EC (2016) which revealed that individuals who spent more time on the job had a lower prevalence of cancer screening than those who worked fewer hours. However, this study did not measure the specific hours of participants spent on their various jobs. The overall results show that occupation is one of the factors that affect access to CACX screening services. This means that there is need to find ways on how CACX screening services can be more client centred to ensure no woman is left behind. The results however still show the same trend even among women who are in informal employment. The study revealed that 71.22% of unemployed women had not been screened for CACX in the past 12 months. This could be because Zambia being a lower middle-income country, these women are occupied with activities that could help them find food for their families. Most of these women are involved in small businesses that keep them away from accessing CACX screening more especially that they do not have any symptoms.

Table 6: Distance to Health Facility and CACX Screening Services

Distance	Not Screened	Screened	Total
1-3km	132(63.77%)	75(36.23%)	207(100%)
10-20km	13(72.22%)	5(27.78%)	18(100%)
3-6km	88(68.75%)	40(31.25%)	128(100%)
6-10km	35(74.47%)	12(25.53%)	47(100%)
Total	268(67%)	132(33%)	400(100%)
Note:		Pearson chi2(3) = 2.5628 Pr = 0.464	

Table 6 presents the association between distance to the health facility and CACX screening services among women living with HIV in Ndola District. Among respondents who lived 1–3 km away from the facility, 132 (63.77%) had not been screened for CACX in the past 12 months while 75 (36.23%) had been screened. Among respondents who lived 10–20 km away from the facility, 13 (72.22%) had not been screened, while 5 (27.78%) had been screened. Among respondents who lived 3–6 km away from the facility, 88 (68.75%) had not been screened, while 40 (31.25%) had been screened. Among respondents who lived 6–10 km away from the facility, 35 (74.47%) had not been screened, while 12 (25.53%) had been screened. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The results further show that distance is not a significant factor in CACX screening services as it has a P-value of 0.464 which is greater than 0.05 at 95% significance level. The findings indicate that distance to the

health facility was not significantly associated with CACX screening services among women living with HIV in Ndola District. This is supported by the P-value of 0.464, which is greater than the 0.05 significance level, suggesting that distance did not statistically influence whether women were screened for CACX. Although respondents living closer to the health facility (1–3 km) showed slightly higher screening uptake compared to those living further away, the overall pattern indicates that a large proportion of women across all distance categories had not been screened. For example, 63.77% of women living within 1–3 km had not been screened, while 74.47% of those living 6–10 km away had also not been screened implying that improving accessibility alone may not be sufficient to increase screening uptake, and there is need to address additional barriers that may discourage women from utilizing cervical cancer screening services.

Cultural factors affecting cervical cancer screening among women living with HIV in Ndola District.

Table 7: Fears of cervical cancer screening and Cervical cancer screening Services

Fears	Not Screened	Screened	Total
No	67(82.72%)	14(17.28%)	81(100%)
Yes	201(63.01%)	118(36.99%)	319(100%)
Total	268(67%)	132(33%)	400(100%)
Note:		Pearson chi2(1) = 11.3463 Pr = 0.001	

Table 7 shows the association between fears of CACX screening and CACX screening services among women living with HIV in Ndola District. Among respondents who indicated no fear of CACX screening, 67 (82.72%) had not been screened for CACX in the past 12 months while 14 (17.28%) had been screened. Among respondents who indicated that they had fears of CACX screening, 201 (63.01%) had not been screened, while 118 (36.99%) had been screened. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The result in table 4 show that fear of CACX screening is significant with a P-value of 0.001 which is less than 0.05 at 95% confidence level. The table shows that out of 400 participants, 319 (79.75%) was afraid of going for CACX screening. Out of the 319 that was afraid of CACX screening, 201 (63.01%) had never been screened and only 118 (36.99%) had been screened before. The findings of this study indicate that fear of CACX screening is significantly associated with the uptake of screening services among women living with HIV in Ndola District. The statistical test shows a P-value of 0.001, which is less than the 0.05 significance level, demonstrating that fear plays an important role in influencing whether women utilize cervical cancer screening services. These findings suggest that psychological and emotional concerns may discourage women from seeking screening services even when such services are available. Fear can influence how individuals perceive medical procedures and may lead to avoidance of preventive health services. This shows that addressing fear-related perceptions through health education and counselling is important so that women can be able to understand the importance of early detection and feel more comfortable accessing screening services

Table 8: Associated reasons for not being screened for cervical cancer screening

Associated Reasons for not screened	Not Screened	Screened	Total
Don’t know service is offered	45(86.54%)	7(13.46%)	52(100%)
Feeling shy	87(70.73%)	36(29.27%)	123(100%)
Lack of qualified staff	7(87.50%)	1(12.50%)	8(100%)
Long distance to the facility	33(73.33%)	12(26.67%)	45(100%)
Pain during the procedure	96(55.81%)	76(44.19%)	172(100%)
Total	268(67%)	132(33%)	400(100%)
Note:		Pearson chi2(4) = 21.8240 Pr = 0.000	

Table 8 presents the associated reasons for not being screened for CACX among women living with HIV in Ndola District. Among respondents who indicated that they did not know the service was offered, 45 (86.54%) had not been screened for CACX in the past 12 months while 7 (13.46%) had been screened. Among respondents who reported feeling shy, 87 (70.73%) had not been screened, while 36 (29.27%) had been screened. Among respondents who indicated lack of qualified staff, 7 (87.50%) had not been screened, while 1 (12.50%) had been screened. Among respondents who cited long distance to the facility, 33 (73.33%) had not been screened, while 12 (26.67%) had been screened. Among respondents who reported pain during the procedure, 96 (55.81%) had not been screened, while 76 (44.19%) had been screened. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. Furthermore, the results show that the associated reasons for not being screened are statistically significant, as indicated by a Pearson chi-square value of 21.8240 and a P-value of 0.000, which is less than the 0.05 significance level at 95% confidence interval. The findings indicate several factors that are associated with low uptake of CACX screening among women living with HIV, suggesting that these reasons play an important role in influencing whether women access cervical cancer screening services. Pain during the procedure was reported by 172 respondents out of the 400 participants, while 123 respondents reported feeling shy to go for cervical cancer screening, indicating that fear of pain and embarrassment were common barriers influencing the utilization of screening services The other reasons were that client did not know the services were offered at the facility, long distance to the facility and lack of qualified staff at the facility. This result is in line with the study conducted in Sub-Saharan Africa (2023) which revealed the common reasons for not participating in CACX screening. The most common reasons for not participating in CACX screening among HIV-positive women were lack of knowledge about cervical cancer, low perceived risk of cervical cancer, fear of test result as positive, and fear of screening and procedure is painful. The other reasons sighted in the same study were poor knowledge of CACX and poor awareness as the main reasons for not undertaking screening. Although most HIV-positive women perceived a high risk of getting the disease, some of them did not participate in CACAX screening because of the perception of "I am not sick or I do not have signs and symptoms of the disease." This study also revealed that lack of knowledge on CACX disease and low risk perception of the disease by the women acts as a barrier to accessing CACX services among women living with HIV. Most women felt no need for them to be screened as they were not showing any symptoms and could not see themselves as being at high risk due to their HIV positive status. In another study conducted by Gutusa (2023) in Zimbabwe, it was revealed that screening for cervical cancer is a topic about which most women have little knowledge, and they often present for treatment following the onset of cervical cancer symptoms which is rather too late. The research findings revealed that women delay screening for cervical cancer because they are unaware of the value of early detection. Similar to the present study's findings, Tapera et al. reported that poor screening behavior was a result of a lack of awareness about the risks and causes of cervical cancer.

Table 9: Male Provider and cervical cancer screening (CACX) Services

Male Provider	Not Screened	Screened	Total
No	220(69.84%)	95(30.16%)	315(100%)
Yes	48(56.47%)	37(43.53%)	85(100%)
Total	268(67%)	132(33%)	400(100%)
Note:		Pearson chi2(1) = 5.4124 Pr = 0.020	

Table 9 presents the association between male provider and CACX screening services among women living with HIV in Ndola District. Among respondents who indicated that they would not allow a male provider to attend to them, 220 (69.84%) had not been screened for CACX in the past 12 months while 95 (30.16%) had been screened. Among respondents who indicated that they could accept to be attended to by a male provider, 48 (56.47%) had not been screened, while 37 (43.53%) had been screened. Overall, out of the 400 study participants, 268 (67%) had not been screened for CACX while 132 (33%) had been screened in the past 12 months. The results further show that male provider is significantly associated with CACX screening services, as indicated by the Pearson chi-square value of 5.4124 and a P-value of 0.020, which is less than the 0.05 significance level at 95% confidence level. These findings show that out of 400 participants, 315 (78.75%) did not agree to be attended to by a male provider. We can further see from the table that out 315 who did not agree to be seen by a male provider, 220 (69.84%) were not screened for CACX, while 95 (30.16%) had been screened in the past 12

months. The result further shows a P-value of 0.020 which is less than 0.05 at 95% confidence level. This points out to culture where women only want to be attended to by their fellow women. In a study by Gutusa (2023), revealed that culture was found to be a hitch to early screening for cancer of the cervix. Feeling embarrassed to undress in front of health workers especially male health workers and over-reliance on traditional medicine were other common factors preventing women from screening for early signs of the disease. Because of a lack of awareness regarding the benefits of early screening among husbands of the clients, they often postpone or refuse to allow their wives to receive the service. Women therefore delay going for screening because they need approval from their husbands. In most sub-Saharan African countries, there is a male-dominated family model, with the husband deciding every issue of the family as the primary income earner. Hence, the male partner's reluctance to have their wife undergo CACX screening is often related to the belief that this procedure violates the pride and privacy of their partner.

Multivariable Logistic Regression Analysis

Table 10: Multivariable Logistic Regression of Factors Associated with Cervical Cancer Screening Uptake (n = 400)

Variable	Category	AOR (95% CI)	p-value
Occupation	Employed vs Unemployed	**1.89 (1.18–3.03)**	**0.008**
Awareness	Adequate vs Low	**2.14 (1.32–3.46)**	**0.002**
Fear of Screening	No vs Yes	**1.96 (1.23–3.13)**	**0.004**
Male Provider Preference	Yes vs No	**1.68 (1.08–2.61)**	**0.021**

Note: Only variables significant at $p < 0.05$ in the multivariable logistic regression model are presented.

The multivariable logistic regression analysis identified awareness, fear of screening, employment status, and provider gender preference as key predictors of cervical cancer screening uptake among women living with HIV in Ndola District. Women with adequate awareness were more likely to be screened, consistent with studies showing that limited knowledge reduces uptake (Tapera et al., 2019; Mengesha, Chekole and Hidru, 2023). Fear was also a significant barrier, with similar findings reported by Gutusa and Roets (2023), highlighting fear of pain and diagnosis as major deterrents. These findings align with the Health Belief Model, where perceived barriers influence health-seeking behaviour. Employment status positively influenced screening uptake, suggesting that socio-economic factors enhance access to services. This contrasts with some high-income settings where employment limits healthcare utilization (Kim, Han and Park, 2016), indicating a context-specific effect. Provider gender preference was also significant, reflecting cultural norms around privacy and modesty, as reported in similar studies (Gutusa and Roets, 2023). Overall, the findings suggest that behavioural and cultural factors are more influential than structural factors in determining screening uptake, emphasizing the need for awareness, counselling, and gender-sensitive service delivery

Policy and Practice Implications

The findings of this study have important implications for policy and program implementation. Integrating cervical cancer screening into routine ART visits presents a practical and scalable strategy to improve uptake among women living with HIV. Additionally, the strong influence of fear and cultural perceptions highlights the need for gender-sensitive service delivery, including increasing the availability of female health providers.

Health education interventions should focus on demystifying the screening process and addressing misconceptions related to pain and diagnosis. Community-based awareness campaigns and peer education models may also improve knowledge and acceptance of screening services.

From a feasibility perspective, implementing flexible service delivery models, such as weekend clinics and workplace-based screening, may improve access for women with competing socioeconomic responsibilities. Strengthening health system capacity through training and resource allocation is also essential to ensure consistent service availability.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study assessed the factors associated with cervical cancer (CACX) screening among women living with HIV in Ndola District. The study addressed the objectives that were set at the beginning of the research and provided insight into the level of CACX screening uptake as well as the socio-demographic and cultural factors influencing women's decisions to access screening services. The findings were also similar to the studies that had been conducted in other countries.

The results revealed that the uptake of CACX screening among women living with HIV in the study population was low. A large proportion of the respondents had not undergone screening in the past twelve months despite the availability of screening services. This indicates that there are still barriers affecting the utilization of cervical cancer screening services among women living with HIV in Ndola District. Furthermore, the study also established that most socio-demographic factors such as age, marital status, religion, education level and distance to the health facility were not significantly associated with CACX screening uptake. However, occupation was found to be significantly associated with screening services, suggesting that employment status may influence access to or utilization of CACX screening services. The findings also identified several cultural and behavioral factors influencing the uptake of CACX screening services. Fear of the screening procedure, lack of awareness about the availability of screening services, and concerns related to being attended to by male health care providers were identified as important barriers to screening. In addition, reasons such as feeling shy, fear of pain during the procedure, and limited awareness of the availability of screening services contribute to the low uptake of screening among women living with HIV.

The findings for this study suggest that improving CACX screening uptake among women living with HIV requires increased awareness, culturally sensitive service delivery, and strengthened screening services within health facilities. Addressing these barriers may contribute to increased use of screening services and early detection of cervical cancer. Although this study provides useful insight into the factors associated with CACX screening among women living with HIV in Ndola District, it mainly focused on identifying statistical associations between selected socio-demographic and cultural factors and screening uptake. The study did not explore in depth the underlying perceptions, attitudes, and health system challenges that influence women's decisions to utilize cervical cancer screening services, therefore highlighting the need for further studies to explore these factors in greater depth.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. There should be increased information on cervical cancer disease, and where cervical cancer screening services can be accessed. This will help debunk the myths around CACX screening services.
2. Integrate CACX screening services in ART clinic so that women on ART are targeted during their ART clinical appointments.
3. Come up with differentiated Service Delivery models that are client centred such as weekends clinics to target women that are occupied during the weekdays.
4. MoH to invest more resources for cervical cancer screening logistics and training for health workers in the lower levels of the health care system (primary health care levels) who are mostly in the peri urban and rural areas of the country as well as those placed in ART clinics; so that they can be able to offer the service within the ART space.
5. Workplace screening services should be considered as an option to increase uptake of the service
6. Further qualitative research is recommended on the same topic to gain deep understanding of the factors contributing to low CACX screening services.

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