



Factors associated with cervical cancer screening among women living with HIV in the Kilimanjaro region, northern Tanzania: A cross-sectional study

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ABSTRACT

Despite cervical cancer being a highly preventable disease, it is the fourth most common cancer among women in both incidence and mortality. Cervical cancer screening is crucial in preventing the disease. Women living with HIV (WLHIV) are at higher risk of cervical cancer because of their immune-compromised state. We aimed to determine factors associated with cervical cancer screening among WLHIV in the Kilimanjaro region, northern Tanzania.

A cross-sectional study was conducted in the Kilimanjaro region among 297 WLHIV attending care and treatment centers (CTC) in northern Tanzania between August 21 and September 3, 2020; and interviewed using a questionnaire. Logistic regression model determined factors associated with cervical cancer screening at 5% significance level.

Half (50.2 %) of the 297 WLHIV had ever screened for cervical cancer. WLHIV with positive attitudes towards cervical cancer screening (AOR = 3.48, 95 % CI 1.86, 6.51) and those who received information on cervical cancer from Health Care Providers (HCP) (AOR = 17.31, 95 % CI 6.00, 50.22) had higher odds of ever being screened for cervical cancer. Lower odds of screening (AOR = 0.50, 95 % CI 0.27, 0.96) were among women diagnosed with HIV within the past three years.

WLHIV having a positive attitude towards screening and received cervical cancer screening information from HCP, were likely to have ever screened. Women newly diagnosed with HIV are less likely to have ever screened. HCPs at CTC are an important source of information about screening and for promoting cervical cancer screening among WLHIV. Special attention should be given to women newly diagnosed with HIV.

1. Introduction

Cervical cancer is the fourth most common cancer in incidence and mortality among women worldwide, with an estimated 604,000 new cases and 342,000 deaths in 2020 (WHO, 2021; Sung et al., 2021). The majority (90 %) of these cases occur in Low and Middle-Income Countries (LMIC), with Sub-Saharan Africa having the highest regional burden in both incidence and mortality (WHO, 2021; Sung et al., 2021). In 2020 an estimated 54,560 new cases of cervical cancer were reported in East Africa, accounting for 26.7 % of all cancer-related incidences among women in the region, with 16.1 % of the incidences occurring in Tanzania (Sung et al., 2021). In Tanzania, the incidence and mortality

were 34.3 % and 21.8 %, respectively (Sung et al., 2021).

Persistent infection with Human papillomavirus (HPV) – a sexually transmitted virus is highly associated with the majority (99 %) of cervical cancer cases. However, the virus is only a necessary but not sufficient factor to cause the disease (WHO, 2021; Sung et al., 2021; Vaccarella et al., 2013; Mokhele et al., 2016; Liu et al., 2018). Other important cofactors include sexually transmitted diseases (such as HIV and chlamydia trachomatis), cigarette smoking, high parity, and long-term oral contraceptives use (Sung et al., 2021). Women living with HIV (WLHIV) are disproportionately at a higher risk of developing the disease because of their immune-compromised state (Kafuruki et al., 2013; Anderson et al., 2015; Chambuso et al., 2017; Ghebre et al., 2017;

Abbreviations: AOR, Adjusted Odds Ratio; CTC, Care and Treatment Clinic; HCP, Health Care Providers; IPH, Institute of Public Health; IQR, Interquartile range; KCMU-CRERC, Kilimanjaro Christian Medical University College Research and Ethics Review Committee; WLHIV, Women Living with HIV.

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Mapanga et al., 2018; Bray et al., 2018). Cervical cancer prevalence among WLHIV is substantially high in Sub-Saharan Africa. In Tanzania, the prevalence ranges from 7.3 % in Mwanza to 11 % in Morogoro (Kafuruki et al., 2013; Chambuso et al., 2017). This high prevalence might be partly contributed to by poor cervical cancer screening among women (Kimondo et al., 2021).

Screening women at risk and mass HPV vaccination for young girls is essential to reduce cervical cancer incidence and mortality (Sung et al., 2021; WHO, 2014; Wanyenze et al., 2017). The integration of cervical cancer screening into HIV care and treatment services (CTC) in Tanzania has been a critical milestone to increase the uptake of screening services (MoHCDEGEC, 2017). Women are supposed to be screened for cervical cancer soon after HIV diagnosis regardless of age and on annual basis (MoHCDEGEC, 2017). Due to its low cost, Visual Inspection with Acetic acid (VIA) is the widely used mode of cervical cancer screening in Tanzania. Despite the integration, only half of WLHIV attending CTC in the Kilimanjaro region screened for cervical cancer (Kimondo et al., 2021). Knowledge and attitude towards cervical cancer screening, patient – health care provider (HCP) relationship, and fear of the test results are among of the factors reported to affect cervical cancer screening (Kasraeian et al., 2020).

We aimed to determine factors associated with cervical cancer screening among WLHIV in the Kilimanjaro region, northern Tanzania. The study was conducted three years after integrating cervical cancer screening services with CTC services in the country. Findings from this study will assist the healthcare providers, particularly at CTC, in promoting the uptake of cervical cancer screening services among WLHIV, focusing on the key factors affecting the screening uptake.

2. Methods

The methods applied in this study are also published elsewhere (Kimondo et al., 2021). Briefly, we carried out a health facility-based cross-sectional study design in the Kilimanjaro region between August 21 and September 3, 2020. CTC is one gateway where people living with HIV can access HIV care, treatment and support services (MoHCDEGEC, 2017). We included WLHIV aged 18 to 55 years (eligible age for cervical cancer screening in Tanzania) attending CTC in the Kilimanjaro region and provided informed consent. In Tanzania, women living with HIV are supposed to screen for cervical cancer immediately after HIV diagnosis (MoHCDEGEC, 2017). We excluded women who were severely ill and had undergone total hysterectomy because severely ill women could not respond to the questions. The women with total hysterectomy had their cervix surgically removed.

The study included a minimum sample of 271 participants. A simple random sampling technique selected Hai district among the rural districts. In contrast, Moshi municipality was purposively selected to represent an urban district in the Kilimanjaro region. We purposefully selected one CTC in each district with the highest number of enrolled women. At CTCs, we selected all women attending the clinic for inclusion.

Face to face interviews was used for data collection using an electronic questionnaire. The questionnaire was adapted and modified from previous studies (Nega et al., 2018; Jassim et al., 2018). The questionnaire collected information on participant social-demographic characteristics, knowledge and attitudes on cervical cancer screening, and cervical cancer screening practices. Trained doctor of medicine students collected data who administered the interviews using Swahili (local) language. The data collectors conducted the interviews in a quiet place around the CTC clinics after obtaining informed consent.

The dependent variable in this study was cervical cancer screening practice. Women were asked whether they had ever screened for cervical cancer or not, and responses recorded as Yes/No. The independent variables were participant socio-demographic characteristics and knowledge and attitudes on cervical cancer screening. Social-demographic characteristics were age in years (<35, 35–44 and ≥ 45),

the highest education level (primary education or less, secondary education or above), marital status (single, married/ cohabiting, divorced/separated/ widowed), occupation (employed, peasant, unemployed) and having health insurance (Yes/No).

Knowledge on cervical cancer was measured by asking WLHIV if they ever heard of cervical cancer and knowledge on causes, signs, risk factors, and prevention as also described elsewhere (Kimondo et al., 2021). Final scores were categorized into adequate knowledge (≥50 % of the scores) and inadequate if otherwise (Liu et al., 2018; Kimondo et al., 2021). The attitude was measured using ten questions concerning thoughts and feelings towards cervical cancer screening (Kimondo et al., 2021; Adibe and Aluh, 2018) and later categorized as positive vs negative attitudes based on the mean score (Kimondo et al., 2021; Bulto et al., 2019).

The study obtained ethical approval number UG 090/2020 from the Kilimanjaro Christian Medical University College Research and Ethics Review Committee (KCMU-CRERC). Informed consent preceded all interviews. The data collectors provided specific information to WLHIV by clearly indicating and emphasizing their voluntary participation in this study. Participants were also informed that their participation or refusal to participate would not affect the care they needed at CTC. Participants were also allowed to refuse to answer any questions and terminate the interview when they desired. The use of unique identifiers and interviews conducted in a quiet place around the CTC clinics ensured the confidentiality of participant information.

We used SPSS version 20.0 for data cleaning and analysis. Frequencies and percentages were used to summarize categorical variables and means/ medians and standard deviations/ interquartile range for numeric variables. Binary logistic regression estimated crude and adjusted odds ratios (OR) with the 95 % confidence intervals (CI) for factors associated with cervical cancer screening adjusted for potential confounders.

3. Results

Out of 303 women who met the inclusion criteria, 98 % of them consented to participate in the study. The median age of the 297 study participants was 44 (IQR 36–49.5) years. About half (49.2 %) were aged ≥ 45 + years, more than half (58.2 %) were widowed/divorced or separated, and 60.6 % were self-employed. About 89.2 % of the WLHIV in this study had no health insurance, and 5.1 % had a history of cervical cancer in their families (Table 1).

Nearly-three quarters (72.1 %) had inadequate knowledge of cervical cancer signs and symptoms, while two thirds (66.7 %) had a positive attitude towards cervical cancer screening. Half (50.2 %) of the WLHIV had ever screened for cervical cancer. The screening uptake differed significantly by participant's characteristics. Married/cohabiting women had a higher (61.6 %) cervical cancer screening uptake compared to those who were single (42.1 %) and those who were widowed/divorced/separated (46.2 %). On the other hand, WLHIV who had secondary education level and above had significantly lower (39.7 %) screening uptake than those with primary education or less (53.3 %). WLHIV with a positive attitude towards cervical cancer screening had significantly high (59.1 %) cervical cancer screening uptake compared to those who had a negative attitude (32.3 %) (Table 1).

Factors significantly associated with cervical cancer screening among WLHIV in the crude analysis were; age, marital status, occupation, time since HIV diagnosis, source of information on cervical cancer screening, knowledge of sign and symptoms of cervical cancer, knowledge of cervical cancer prevention and risk factors, and attitude toward screening (Table 2). Higher odds of cervical cancer screening were among WLHIV aged 35–44 years (OR = 2.04, 95 % CI 1.06, 4.00) compared to < 35 years, divorced/separated/widowed (OR = 1.87, 95 % CI 1.10, 3.16) compared to single women, employed (OR = 2.84, 95 % CI 1.14, 7.10) compared unemployed, receiving cervical cancer screening information from health care providers (OR = 16.55, 95 % CI

Table 1
Self-reported cervical cancer screening by participant characteristics (N = 297).

Variable	Total (%)	Ever screened		P-value
		No (%)	Yes (%)	
Age (Years)				0.084
<35	68 (21.2)	39 (68.9)	24 (38.1)	
35–44	88 (29.6)	39 (44.3)	49 (55.7)	
≥45	146 (49.2)	70 (47.2)	76 (52.1)	
Marital status				0.037
Single	38 (12.8)	22 (57.9)	16 (42.1)	
Married/Cohabiting	86 (29)	33 (38.4)	53 (61.6)	
Widowed/divorced/separated	173 (58.2)	93 (53.8)	80 (46.2)	
Highest education level				0.054
Primary education or less	229 (77.1)	107 (46.7)	122 (53.3)	
Secondary education or above	68 (22.9)	41 (60.3)	27 (39.7)	
Occupation				0.068
Employed	200 (67.3)	95 (47.5)	105 (52.5)	
Peasant	72 (24.2)	35 (48.6)	37 (51.4)	
Unemployed	25 (8.4)	18 (72.0)	7 (28.0)	
Have health insurance				0.852
Yes	32 (10.8)	15 (46.9)	17 (53.1)	
No	265 (89.2)	133 (50.2)	132 (49.8)	
Has a family history of cervical cancer				1.000
Yes	15 (5.1)	7 (46.7)	8 (53.3)	
No	282 (94.9)	141 (50.0)	141 (50.0)	
Own any information technology device				0.086
Yes	280 (94.3)	136 (48.6)	144 (51.4)	
No	17 (5.7)	12 (70.6)	5 (29.4)	
Received information on cervical cancer screening from HCPs				<0.001
Yes	238 (80.1)	94 (39.5)	144 (60.5)	
No	59 (19.9)	54 (91.5)	5 (8.5)	
Received information on cervical cancer from mass media				0.297
Yes	145 (48.8)	77 (53.1)	68 (46.9)	
No	152 (51.2)	71 (46.7)	81 (53.3)	
Knowledge of signs and symptoms of cervical cancer				0.038
Adequate	83 (27.9)	33 (39.8)	50 (60.8)	
Inadequate	214 (72.1)	115 (53.7)	99 (46.3)	
Knowledge of prevention of cervical cancer				0.002
Adequate	156 (52.5)	64 (41.0)	92 (59.0)	
Inadequate	141 (47.5)	84 (59.6)	57 (40.4)	
Knowledge of risk factors of cervical cancer				0.012
Adequate	114 (38.4)	46 (40.4)	68 (59.6)	
Inadequate	183 (61.6)	102 (55.7)	81 (44.3)	
				<0.001

Table 1 (continued)

Variable	Total (%)	Ever screened		P-value
		No (%)	Yes (%)	
Attitude towards cervical cancer screening				
Positive	198 (66.7)	81 (40.9)	117 (59.1)	
Negative	99 (33.3)	67 (67.7)	32 (32.3)	

6.38, 42.88). Also, WLHIV having adequate knowledge of cervical cancer signs and symptoms (OR = 1.76, 95 % CI 1.05, 2.95), prevention (OR = 2.12 95 % CI 1.33, 3.37) and risk factors (OR = 1.86, 95 % CI 1.16, 2.99) and having a positive attitude towards screening (OR = 3.02, 95 % CI 1.82, 5.02) had higher odds of screening. Women diagnosed with HIV within the past three years had lower odds (OR = 0.37 95 % CI 0.22, 0.61) of cervical cancer screening compared to those diagnosed more than the past three years ago (Table 2).

In the adjusted analysis, time since HIV diagnosis, receiving information on cervical cancer screening from HCPs, and attitude towards screening were the only factors significantly associated with cervical cancer screening. Higher odds of cervical cancer screening was among women with a positive attitude towards cervical cancer screening (AOR = 3.48, 95 % CI 1.86, 6.51) and those who received information on cervical cancer screening from HCPs (AOR = 17.31, 95 % CI 6.00, 50.22). Women diagnosed with HIV within the past three years were less likely to have screened for cervical cancer (AOR = 0.50, 95 % CI 0.27, 0.96) compared to those diagnosed more than three years preceding the survey (Table 2).

4. Discussion

Half of the WLHIV had ever screened for cervical cancer and was independently associated with receiving screening information from HCPs, positive attitude towards screening, and HIV diagnosis within the past three years. Women who received cervical cancer screening information from HCP had 17.3 times higher odds of screening than those who received information from other sources. Similar results have been reported by studies in Ghana, Ethiopia (Tchounga et al., 2019; Dal Maso et al., 2010), other LMIC (Kasraeian et al., 2020), and those in Spain and Italy (Stuardo, 2013; Mahande et al., 2021). The role of healthcare providers in facilitating cervical cancer screening through counseling and education cannot be overemphasized. HCPs should continue creating awareness, providing counseling and education on cervical cancer screening among WLHIV at CTC. This intervention is likely to decrease screening missed opportunity among these women given their regular CTC attendance, where they also meet the HCPs. Community-based studies demonstrated the feasibility and acceptability of human papillomavirus self-sampling in the general population (Gizaw et al., 2020; Assefa et al., 2019), an intervention that may increase uptake of screening intervention, especially among WLHIV in Tanzania.

Similarly, having a positive attitude towards cervical cancer screening had over three times higher odds of screening than women who had negative attitudes. These results are consistent with findings from Ethiopia (Dessalegn Mekonnen, 2020 (2020)). Similarly, a literature review done in LMIC indicated that having a positive attitude towards screening have a prominent role in enhancing women's decision to cervical cancer screening (Kasraeian et al., 2020). Therefore, it is essential to promote positive attitudes towards screening among WLHIV, which is likely to increase cervical cancer screening uptake.

Women diagnosed with HIV more than three years preceding the survey had two higher odds of screening compared to those diagnosed within the past three years, similar to a study in Ethiopia (Nega et al., 2018; Dessalegn Mekonnen, 2020). This may be because women with long duration since HIV diagnosis may have frequently encountered

Table 2
Factors associated with cervical cancer screening among WLHIV.

Variable	COR* (95 %CI)	AOR** (95 % CI)
Age (years)		
<35	1.00	1.00
35–44	2.04 (1.06, 4.00)	1.62 (0.62, 4.27)
≥45	1.76 (0.97, 3.23)	1.22 (0.47, 3.19)
Marital status		
Single	1.00	1.00
Married/Cohabiting	0.85 (0.42, 1.72)	0.92 (0.31, 2.75)
Widowed/divorced/separated	1.87 (1.10, 3.16)	0.33 (0.11, 0.99)
Parity		
0	1.00	1.00
1–2	1.02 (0.41, 2.53)	0.81 (0.23, 2.81)
≥3	2.40 (0.98, 5.90)	1.52 (0.40, 5.74)
Highest education level		
Primary education or less	1.00	1.00
Secondary education or above	0.58 (0.33, 1.00)	0.62 (0.28, 1.34)
Occupation		
Employed	2.84 (1.14, 7.10)	3.20 (0.98, 10.45)
Peasant	2.72 (1.01, 7.30)	2.04 (0.58, 7.25)
Unemployed	1.00	1.00
Have health insurance		
Yes	1.00	1.00
No	0.89 (0.42, 1.83)	1.19 (0.44, 3.47)
Has a family history of cervical cancer		
Yes	1.00	1.00
No	0.89 (0.31, 2.48)	0.96 (0.25, 3.71)
Own any information technology device		
Yes	1.00	1.00
No	0.89 (0.14, 1.15)	0.93 (0.24, 3.69)
Time since HIV diagnosis		
≤3 years	0.37 (0.22, 0.61)	0.50 (0.27, 0.96)
>3 years	1.00	1.00
Received information on cervical cancer screening from HCPs		
Yes	16.55 (6.38, 42.88)	17.31 (6.00, 50.22)
No	1.00	1.00
Received information on cervical cancer from mass media		
Yes	0.77 (0.49, 1.22)	0.72 (0.40, 1.31)
No	1.00	1.00
Knowledge of signs and symptoms of cervical cancer		
Adequate	1.76 (1.05, 2.95)	1.22 (0.60, 2.46)
Inadequate	1.00	1.00
Knowledge of prevention of cervical cancer		
Adequate	2.12 (1.33, 3.37)	1.48 (0.75, 2.92)
Inadequate	1.00	1.00
Knowledge of risk factors of cervical cancer		
Adequate	1.86 (1.16, 2.99)	1.33 (0.67, 2.64)
Inadequate	1.00	1.00
Attitude towards cervical cancer screening		
Positive	3.02 (1.82, 5.02)	3.48 (1.86, 6.51)
Negative	1.00	1.00

*COR: Crude Odds Ratio. **AOR: Adjusted Odds Ratio.

HCPs during CTC visits. These women are likely to be counseled on cervical cancer screening and hence increased their screening opportunities compared to those diagnosed recently. Special attention should be given to women newly diagnosed with HIV, focusing on educational and awareness creation campaigns, mainly through the HCPs.

In this study, knowledge on cervical cancer was not significantly associated with screening practice. These findings are different from other studies where WLHIV knowledge on cervical cancer was associated with cervical cancer prevention (Wanyenze et al., 2017; Kasraeian et al., 2020; Dessalegn Mekonnen, 2020; Ogunwale et al., 2016). Educating WLHIV is essential to increase their knowledge of the risk factors, signs and symptoms, and prevention for informed decisions. This study has demonstrated that CTC clinics in Tanzania are a viable environment for educational interventions and increasing screening uptake among WLHIV.

5. Strength and limitations

This study provides vital information on factors associated with cervical cancer screening among WLHIV in the Kilimanjaro region. These findings may contribute to improving cervical cancer screening uptake among this high-risk group of women. The key limitations of this study include the fact that it was hospital-based, including women who attended CTC, hence affecting the generalization of findings to the whole WLHIV population in Tanzania. Also, the study is prone to self-desirability bias because the knowledge, attitude and cervical cancer screening practices were self-reported by the study participants. Lastly, the study was cross-sectional; hence could not establish whether receiving information on cervical cancer screening from HCP increased the screening chance or whether screened women were more likely to have been informed by HCPs during their CTC visits. Similarly, women who underwent screening may have developed a positive attitude towards screening rather than positive attitudes necessarily leading to uptake of cervical cancer screening services.

6. Conclusion and recommendation

WLHIV, with a positive attitude towards screening and received cervical cancer screening information from HCPs, were more likely to be screened. Women newly diagnosed with HIV are less likely to report screening for cervical cancer than those diagnosed within the past three years preceding the survey. HCPs at CTC are an important source of information about screening and for promoting cervical cancer screening practice among WLHIV. Special attention should be given to women newly diagnosed with HIV. Adequate education on cervical cancer and cervical cancer screening will also enhance positive attitudes among the WLHIV, encouraging their screening uptake.

CRedit authorship contribution statement

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Caroline Amour: Conceptualization, Methodology, Project administration, Validation, Supervision, Writing – review & editing.
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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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