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Uptake of cervical cancer screening and the associated factors among women living with HIV in Northern Tanzania.

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Abstract

Background: HIV infection is a common risk for developing cervical cancer (CC). Routine screening for CC among women living with Human Immune Deficiency Virus (WLHIV) is recommended for early detection and control of pre-malignancies. Evidence on CC uptake and its associated factors is scanty among WLHIV in Tanzania similar to other sub-Saharan Africa (SSA) countries. This study therefore aimed to assess the uptake of CC screening and its associated factors among WLHIV in Tanzania.

Methods: This cross-sectional study was conducted between June and September 2020 among WLHIV attending Care and Treatment Center (CTC) at the Kilimanjaro Christian Medical Center (KCMC). Data was collected through face to face interview using a pre-tested standardized questionnaire interviewed in Swahili. Analyses were conducted using descriptive statistics to establish the CC uptake and using regression analyses to characterize the CC screening uptake and factors associated with the CC uptake through SPSS version 23 software. Associations with $P < 0.05$ were considered statistically significant.

Results: A total of 341 WLHIV with mean age 45.6 years (SD 10.8) were recruited for interview. Of them, 184 (54%) WLHIV reported ever being screened for cervical cancer. After adjusting for confounders, knowledge of the screening methods was one of the factors associated with uptake of CC screening [AOR=15.61, (95% CI: 7.93-30.72), $p < 0.0001$]. Other factors included living with HIV for at least 10 years since diagnosis [AOR=2.83; (95% CI: 1.11-7.26), $P=0.030$]; having knowledge of CC [AOR= 1.75, (95% CI: 1.02-3.01), $p=0.041$]; and having knowledge of the signs or symptoms of CC [AOR=1.95, (95% CI: 1.17-3.27), $p=0.011$].

Conclusion: More than four in ten WLHIV attending CTC at KCMC have never been screened for cervical cancer. Knowledge of the available screening methods, the disease condition, and duration since first HIV diagnosis were associated with CC uptake of the screening. Addressing low CC screening uptake in Tanzania call strengthening WLHIV's knowledge on cervical cancer screening methods, its signs, symptoms and their risk profiles. Moreover, strengthening CC screening capacity through integrated care and strengthening health providers' capacity for counseling and screening will lead into a sustainable and effective care.

Introduction

Cervical cancer (CC) is the major global cause of death, responsible for nearly 570,000 new cases annually¹. The burden of this disease is higher in developing countries compared to developed countries, especially in the Eastern and Western parts of sub-Saharan Africa². The high prevalence of human papillomavirus (HPV) has been reported in the most African countries, and accounts for the majority of cases of CC, along with other risk factors such as human immunodeficiency virus (HIV) infection³.

Like in other countries in the Sub Saharan Africa, Tanzania has a high incidence of CC which remains the most common cause of deaths among women of reproductive age⁴. For example, while about 7,300 women in Tanzania are diagnosed annually, more than half of them die from the disease. Such unprecedented case fatality rates is caused by late diagnosis and therefore care and treatment^{5,4}. The World Health Organization (WHO) reported limited access to effective screening tools for CC in most developing countries, resulting in late diagnosis with poor outcome and high mortality⁶.

The risks associated with CC have been well studied⁴. They include early first sexual intercourse, multiple male sexual partners, and HIV infection, among others⁴. These can lead to chronic HPV infection, transforming cervical epithelial lining, and therefore progression to CC. A higher incidence of HPV infection has been found among HIV positive women, which can develop into premalignant lesions of the cervix⁷. The WHO report highlights the needs for routine screening among WLHIV who are at a 10 years earlier risk of developing invasive CC compared to their counterparts². In a nearby country, evidence suggested that WLHIV were twice as much more likely to have pre-cancerous pathology compared to their negative counterparts⁸.

Although it present with significant mortality risk, CC remains only gynaecological cancer that can be prevented during the pre-cancerous stage by providing early treatment⁹. The WHO recommends that all women aged 30-49 years need to be screened for CC regardless of their serostatus. Further, all sexually active girls and women should be screened once diagnosed as HIV positive¹⁰.

The age-standardized rate for CC mortality in Eastern Africa is higher than in other regions of the world¹¹. Tanzania, has a striking 9772 new cases and 6695 deaths each year¹². In Tanzania, most hospitals perform visual inspection with acetic acid to identify pre-cancerous lesion and use cryotherapy as the first modality in treatment. Despite having free cervical cancer screening services in Tanzania, the number of women accessing it is low¹³. To reduce CC mortality in Tanzania, women

need to access CC screening services and have pre-cancerous lesion treated earlier¹⁴. Despite its sheer burden and mortality, little is known about CC screening services uptake and its associated factors in Tanzania general, and particularly among HIV infected women. Therefore, this study aimed to assess the uptake of CC screening and its associated factors among women living with HIV. Thus, findings emanating from this study are expected to help policy/decision-makers, health care providers, community service providers and non-government organizations (NGOs) design strategies and implement appropriate interventions accordingly.

Methodology

Study Design and Population

This hospital-based cross-sectional study was conducted from June to September 2020 among WLHIV attending the Kilimanjaro Christian Medical Centre (KCMC) Care and Treatment Clinic (CTC). The study included women aged 18–70 years attending CTC and followed for at least 1 year from the date of HIV diagnosis.

Sample Size

The sample size was obtained using the precision approach with a single proportion¹⁵. The proportion of WLHIV who had ever been screened for CC was obtained from the previous study by Wanyenze et al. in 2017 in Uganda (30.3%)⁷. The minimum sample size was thus 325. To counteract the effect of incomplete variables, non-responses, and preserving the minimum sample size, an additional 25 participants were recruited giving a total of 350 WLHIV attending KCMC CTC.

Sampling Technique

A systematic sampling procedure was used to select eligible participants. All participants who presented at the CTC for a follow-up visit on every clinic day (Monday, Wednesday, Thursday and Friday) were checked for eligibility criteria at the entrance desk where sequential numbers were given according to the arrival order. Selection started with the first client of the day and used the sampling interval of two to select subsequent participants until the end of that clinic day. To avoid multiple enrollments of the same participants, researchers used stickers on each participant's file record.

Data collection tool and method

A pre-tested standardized questionnaire developed a prior with some questions adapted^{16, 17}, was employed in this study. The questionnaire included information on demographics (participant age, level of education, marital status, occupation and monthly income), awareness of CC (presence of the disease, risk factors, symptoms, and prevention) and participant's history of CC screening (date, screening method, and the number of screenings conducted). The questionnaire was prepared in English and translated to Swahili. We conducted two-day training for data collectors before the initiation of data collection. The training package included the study objectives, methods, and the study tool. We further pre-tested our tool with 15 women with the aim of correcting inappropriate responses. Four medical students in year 4, two diploma nurses and one master's degree graduate nurse were employed for data collection.

The participants were given an opportunity to ask questions and get whatever clarification they needed. Also, HIV data was collected (date of HIV infection, diagnosis, history of CD4 count measures, clinical stage and antiretroviral therapy use) from the CTC records of each participant.

Variables and measurements

The uptake of CC screening 'ever been screened for CC since confirmed HIV positive' was defined as a dichotomous dependent variable (yes/no). Independent variables were demographic characteristics, HIV clinical characteristics and variables related to awareness of CC (having heard about CC, being aware of the relationship between HPV and HIV, being aware of the CC prevention methods, and having been screened for CC). Participants' age was categorized as ≤ 45 years and >45 years. The age categorization was according to cut point of early reproductive age with its counterpart. Marital status was categorized as single/never married, married and divorced/widowed. The education level was categorized into three groups; primary or no formal education, secondary level for women who attend at least one class in secondary school, and university /college level. Participants' occupation was categorized into two- employed or unemployed. The number of children was dichotomized as having ≤ 2 and having ≥ 3 .

Knowledge about the risk of CC was considered good if a respondent mentioned at least 3 from listed 10 known risk factors; otherwise, was considered to have poor knowledge on the risk of CC. Knowledge on the signs/symptoms of CC was considered good if the participant mentioned at least 3 from listed 6 known signs/symptoms; otherwise, she was considered to have poor knowledge on the

signs/symptoms of CC. Knowledge of CC prevention was considered good if the participant mentioned at least 3 out of 5 known prevention methods; otherwise, they were regarded as having poor knowledge about CC prevention. Knowledge about screening methods for CC was considered good if the participant reported having ever heard of at least 1 of the known methods, i.e. VIA or Pap smear, otherwise they were classified as having poor knowledge about screening methods of CC. The time since HIV diagnosed was categorized into three modalities; <5 years, 5-9 years and \geq 10 years. Current HIV staging was categorized according to WHO references as stage I, II, III, and IV.

Data management and analysis

The completed questionnaires were reviewed and cross-checked before entry into SPSS 23.0 for statistical analysis. Descriptive analysis was reported using proportion and percentages. Bivariate logistic regression analysis was done for the crude odds ratio (COR) to determine the independent factors associated with uptake of CC screening. From the bivariate analysis, variables which showed statistically significant associations with the uptake at $p < 0.05$ were run using multivariate logistic regression analysis for the adjusted odds ratio (AOR). Multivariate analysis was conducted to control for the possible attributed factors (confounders and modifiable factors). Variables with 95% CI that did not include 1 or $P < 0.05$ were regarded as statistically significant factors for the uptake of CC screening.

Results

Schematic presentation of the study participants

A total of 350 WLHIV attending CTC clinic at KCMC were enrolled in this study. Nine of them were not eligible and were excluded in the analysis. Thus, a total of 341 WLHIV were included in the final analysis. Focusing on screening assessment, 184 reported ever screened for CC in their lifetime since confirmed HIV positive; this indicates an uptake of 54%.

Characteristics of women living with HIV enrolled in the study

The participants had mean age of 45.6 years, with a standard deviation (SD) of 10.8 years, more than half 175 (51.3%) were aged above 45 years old. The marital status of the participants, 124 (36.4%) were married while 149 (43.7%) were widowed/divorced. The majority 219 (64.2%) had primary or no formal education. An average duration since confirmed HIV positive was 10 years with a standard deviation of 5 years. The majority (59.5%) had at least ten years since being confirmed HIV positive. The length on ART was 9 years on average, with an interquartile range of 5-13 years since initiated ART. Majority 298 (87.4%) were on the first-line treatment.

Factors associated with cervical cancer screening uptake among WLHIV

Positive associations were observed among women aged above 45 years who had 1.24 times higher odds of screening uptake as compared to the younger group aged less than 45 years, but this was not statistically significant [COR=1.24, 95% CI: (0.81-1.90)]. Married women and divorced/widow were more likely to have been screened for CC compared to single/never married [COR=1.30; 95% CI: (0.71-2.35)] and [COR: 1.16, 95% CI: (0.65-2.06)] respectively, although its association was not significant. Women with moderate income (>300,000 Tsh. per month) were 1.73 more likely to have screening uptake compared to women with lower income earners (<150,000 Tsh. per month), although this association did not reach a statistically significant level (p=0.840). The influence of partners seems to contribute to the uptake of CC screening; women with partners had 1.10 times higher odds of screening compared to those with no partners [COR=1.10; 95%CI: (0.71-1.69)].

Some sociodemographic factors showed negative associations with the uptake of CC. These included women who reached college/University; they had 62% less uptake of CC screening as compared to women who reached primary school or non-formal education. [COR=0.48, 95% CI: (0.22-1.03)]. Unemployed women were about 40% less likely to do CC screening as compared to formal employed [COR=0.60, 95% CI: (0.32-1.13)]. Women having at least 3 children had 10% less uptake of CC screening as compared to those who had 2 or fewer children [COR 0.90, 95% CI: (0.59-1.39)]. However, none of the sociodemographic factors were significantly associated with the uptake of CC screening, (Table 1).

With regards to clinical factors, variables which were significantly associated with the uptake of CC screening included length or duration of living with HIV since confirmed positive ≥ 10 years and 5 to 9 years as compared to those who had less 5 years [COR=4.83; 95% CI: (2.37-9.84), P<0.0001] and [COR=2.36, 95% CI: (1.10-5.06), P=0.0228] respectively. Women who were on ART for a duration 2 years or above were 4 times more likely to be screened compared to those on ART at a duration less than 2 years [COR=4.02, 95% CI: (1.54-10.48), P=0.0021]. Women with a CD4 cell count 500 or above had 4.58 times more likely to be screened as compared to women whose last CD4 cell count was less than 200, [95% CI: 1.19-17.70, P=0.0153]. Other factors such as HIV staging II, III and IV had higher odds of screening uptake but the associations did not reach any statistically significant level. The results also showed lack of statistical evidence on regimens, but those who were on second-line had 1.40 times higher odds of CC screening uptake as compared to first-line of treatment (0.72-2.74) 0.3189 (Table 1).

Table 1: Bivariate logistic regression analysis for the factors associated with cervical cancer screening uptake among WLHIV

Variables	N	Never screened	Ever screened	COR(95%CI)	P-value
Age in years					
≤45	85	81(48.8)	85(51.2)	1.00	
>45	175	76(43.4)	99(56.6)	1.24(0.81-1.90)	0.3210
Marital status					
Single	68	34(50.0)	34(50.0)	1.00	
Married	124	54(43.5)	70(56.5)	1.30(0.71-2.35)	0.3921
Divorced/widowed	149	69(46.3)	80(53.7)	1.16(0.65-2.06)	0.6143
Education					
Primary/below	219	96(43.8)	123(56.2)	1.00	
Secondary	90	44(48.9)	46(51.1)	0.82(0.50-1.34)	0.4183
College/University	32	17(53.1)	15(46.9)	0.69(0.33-1.45)	0.3248
Occupation					
Employed	48	17(35.4)	31(64.6)	1.00	
Unemployed	293	140(47.8)	153(52.2)	0.60(0.32-1.13)	0.1116
Number of children					
≤2	200	90(45.0)	110(55.0)	1.00	
≥3	141	67(47.5)	74(52.5)	0.90(0.59-1.39)	0.6465
Average monthly income (Tsh) (n=270)					
<150,000	186	88(47.3)	98(52.7)	1.00	
150,000-300,000	46	21(45.7)	25(54.3)	1.07(0.56-2.05)	0.8403
>300,000	38	13(34.2)	25(65.8)	1.73(0.89-3.60)	0.1400
Ethnicity					
Chagga	217	102(47.0)	115(53.0)	1.00	
Other	124	55(44.4)	69(55.6)	1.11(0.71-1.73)	0.6372
With partner					
Yes	191	86(45.0)	105(55.0)	1.10(0.71-1.69)	0.6718
No	150	71(47.3)	79(52.7)	1.00	
Partner's education (n=190)					
Primary	89	38(42.7)	51(57.3)	1.00	
Secondary	60	22(36.7)	38(63.3)	1.29(0.65-2.53)	0.4632
College/University	41	25(61.0)	16(55.3)	0.48(0.22-1.03)	0.0536
Duration living with HIV (years)					
<5	52	38(73.1)	14(36.9)	1.00	
5-9	86	46(53.5)	40(46.5)	2.36(1.10-5.06)	0.0228
≥10	203	73(36.0)	130(64.0)	4.83(2.37-9.84)	<0.0001
Duration on ART (n=338)					
<2 years	25	19(76.0)	6(24.0)	1.00	
≥2 years	313	138(44.1)	175(53.9)	4.02(1.54-10.48)	0.0021
Current HIV regimen (n=339)					
First-line	298	141(47.3)	157(52.7)	1.00	
Second line	41	16(39.0)	25(61.0)	1.40(0.72-2.74)	0.3189
Current IHV stage (n=339)					

Stage I	69	38(55.1)	31(44.9)	1.00	
Stage II	65	32(49.2)	33(50.8)	1.26(0.64-2.50)	0.5003
Stage III	125	50(40.0)	75(60.0)	1.84(1.01-3.36)	0.0441
Stage IV	80	36(45.0)	44(55.0)	1.50(0.78-2.88)	0.2217
Last CD4 cell count (n=319)					
<200	12	9(75.0)	3(25.0)	1.00	
200-499	72	40(55.6)	32(44.4)	2.40(0.59-9.82)	0.2086
≥500	235	93(39.6)	142(60.4)	4.58(1.19-17.70)	0.0153

The Influence of knowledge and beliefs on uptake of cervical cancer screening among WLHIV

Knowledge of CC was found to have a significant contribution to the screening uptake. Women with a general good knowledge of CC had 1.98 times higher odds of CC screening uptake as compared to poor knowledge [COR=1.98, 95% CI: (1.27-3.09), P=0.0021]; Participants with good knowledge on risk factors for CC had higher odds for the uptake of CC screening [COR=2.43, 95% CI: (1.36-4.36), p=0.0020]; Women who were having good knowledge of symptoms/signs of CC had almost three times odds for attending CC screening compared to their counterpart [COR=2.63, 95% CI: (1.68-4.14), p<0.0001]; Study participants who were having good knowledge on prevention of CC had higher odds of uptake [COR=2.20; 95% CI: (1.40-3.45),p=0.0004]. Also, knowledge of screening methods was significantly associated with the uptake of CC screening [COR=16.07; 95% CI: (8.23-31.38), p<0.0001]. There was no statistical significance relationship of beliefs on screening methods to the uptake of CC screening (Table 2).

Table 2: Influence of knowledge and beliefs on uptake of cervical cancer screening among WLHIV

Variables	Never screened	Ever screened	COR(95%CI)	P-value
General knowledge on cervical cancer				
Poor	102(53.4)	89(46.6)	1.00	
Good	55(36.7)	95(63.3)	1.98(1.27-3.09)	0.0021
Knowledge on risks for cervical cancer				
Poor	39(63.9)	22(36.1)	1.00	
Good	118(42.1)	162(57.9)	2.43(1.36-4.36)	0.0020
Knowledge on signs or symptoms				
Poor	97(58.1)	70(41.9)	1.00	
Good	60(34.5)	114(65.5)	2.63(1.68-4.14)	<0.0001
Knowledge on prevention of cervical cancer				
Poor	80(57.6)	59(42.4)	1.00	
Good	77(38.1)	125(61.9)	2.20(1.40-3.45)	0.0004

Aware of at least one screening method				
No	129(75.9)	41(24.1)	1.00	
Yes	28(16.4)	143(83.6)	16.07(8.23-31.38)	<0.0001
Believes on screening methods				
Negative	99(44.4)	124(55.6)	1.00	
Positive	58(49.2)	60(50.8)	0.83(0.53-1.29)	0.4024

Multivariate logistic regression analysis for the factors associated with uptake of cervical cancer screening among WLHIV

The variables with significant findings from the bivariate analysis were included in the multivariate logistic regression analysis to control for possible attributed factors on CC screening uptake. In multivariate analysis, knowledge of the screening methods was the strongest factor associated with uptake of CC screening [AOR=15.61, (95% CI: 7.93-30.72), p<0.0001]. Other factors that remained significantly associated with the uptake of CC screening in multivariate analysis were living with HIV at least 10 years since confirmed positive [AOR=2.83; (95% CI: 1.11-7.26), p=0.030]; having good knowledge on CC in general [AOR= 1.75, (95% CI: 1.02-3.01), p=0.041]; and having good knowledge of signs or symptoms of CC [AOR=1.95, (95% CI: 1.17-3.27), p=0.011]. Factors such as duration on ART, HIV stage, CD4 cell count, knowledge on risk factors and prevention of CC lost statistical significance in multivariate analysis (**Table 3**).

Table 3: Multivariate logistic regression analysis for the factors associated with uptake of cervical cancer screening among WLHIV

Variables	AOR	95%CI	P-value
Duration living with HIV (years)			
<5	1.00		
5-9	1.70	0.65-4.42	0.276
≥10	2.83	1.11-7.26	0.030
Duration on ART (n=338)			
<2 years	1.00		
≥2 years	0.96	0.43-2.05	0.949
Current HIV stage (n=339)			
Stage I	1.00		
Stage II	0.94	0.43-2.05	0.868
Stage III	1.33	0.65-2.72	0.431
Stage IV	1.22	0.56-2.64	0.617
Last CD4 cell count (n=319)			
<200	1.00		
200-499	2.54	0.47-13.74	0.278
≥500	4.30	0.82-22.63	0.086

General knowledge on cervical cancer			
Poor	1.00		
Good	1.75	1.02-3.01	0.041
Knowledge on risks for cervical cancer			
Poor	1.00		
Good	1.06	0.50-2.22	0.884
Knowledge on signs or symptoms			
Poor	1.00		
Good	1.95	1.17-3.27	0.011
Knowledge on prevention of cervical cancer			
Poor	1.00		
Good	1.43	0.81-2.54	0.215
Knowledge on screening method			
Poor	1.00		
Good	15.61	7.93-30.72	<0.0001

Discussion

More than four in every ten WLHIV attending CTC in KCMC had never been screened for cervical cancer. Such low uptake of CC screening (54%) is worrisome and calls for efforts to address factors associated with, to ensure longevity of WLHIV in Tanzania and countries with similar epidemiological context. The World health organization and Tanzania Ministry of health recommends women who living with HIV to go for CC screening at least once in every three years¹⁰. Among the maternal characteristics included in our analysis, women aged above 45 years had 1.24 times higher odds of screening uptake as compared to the younger group aged less than 45 years. Partner's education level at college/university showed a statistical significant associated with uptake of CC screening. Women with partners had higher odds of CC screening uptake as compared to their counterpart.

The findings of the current study are in contrast with a study in Côte d'Ivoire in West Africa which reported higher uptake of CC screening among WLHIV⁹. Furthermore WLHIV who had the CC screening procedure done within the CTC have shown a good response in uptake which is different from the findings of the current study where the CC screening are done outside CTC building and makes majority of women fails to attend. Most CC screening services are advised to be in cooperated within CTC services.

The low uptake of CC screening from this study is in line with other study conducted in most developing countries ^{7, 18, 19, 20}. The low uptake in these studies is comparable with a systematic review and meta-analysis that included seven articles in Ethiopia by Mekonnen in 2020 which found a very low percentage (18%) of women who were screened for CC since confirmed HIV positive ²⁰. These studies indicates that majority of women might be lacking awareness on the importance of CC screening and risk of HIV in the development of CC. Also, there might be an unfortunate attitude to some women regarding CC screening methods. This is supported by Wanyenze who did a cross-sectional survey in Uganda among WLHIV and identified that about 50 women lacked knowledge on CC screening ⁷.

The findings from the current study did not show the significant influence of sociodemographic factors on CC screening uptake. This observation is different from other studies which reported education status (post-primary education) and partner support were significant positive factors for the uptake of CC screening ^{9, 18, 19, 20}. The observed variation could be due to different socio demographic and economic status of the study participants. Lack of awareness and counselling might be areason for low uptake. Another difference might be the differences in data collection technique.

The utilization of CC screening among WLHIV may also be predicted by clinical factors such as ART, HIV stage, and CD4 cell count. The study by Assefa et al. in Ethiopia found duration since HIV diagnosis was a predictor ¹⁸. Similarly the study by Nega et al., also reported that diagnosis as HIV positive ten years or more, and CD4 counts of less than or equal to 200 were significantly associated with the uptake of cervical cancer screening ¹⁹. However, the findings from our study in the multivariate analysis found that duration on ART, HIV stage, CD4 cell count, knowledge on risk factors and prevention of CC were not statistically significant. This difference can be explained by the calculation of sample size as the previous studies had bigger sample size compared to the current study.

The current study also found that knowledge of the screening methods was the strongest factor associated with uptake of CC screening. This was linked with the health information's which are shared by health care providers every clinic day before provision of CTC service. This observation is consistent with the study in Uganda by Wanyenze which also reported that the knowledge of CC screening, where to go for screening, and low perception of risk were significant factors for CC screening ⁷.

Limitations

This study's findings might be limited by self-reported information from our participants concerning the uptake of CC screening, however we verified by using cervical cancer screening cards. This study was conducted in an urban area with different characteristics compared to rural regions, including awareness and knowledge of CC. Therefore, this result may not be generalizable to other health facilities with different population characteristics from the current setting.

Conclusion and recommendations

The uptake of CC screening was low among WLHIV at the study site. Knowledge of the available screening methods was the strongest factor associated with uptake of CC screening. Other significant factors for the uptake of CC screening were the duration of HIV since diagnosis 10 years or above, and having good knowledge of CC and signs or symptoms of CC. There is a need to establish CC screening services at CTC that would help with easy counseling of WLHIV on CC screening including the increased risk of CC among WLHIV; this approach will strengthen the understanding of women on the importance of CC screening and reduce negative attitudes, and hence lower the morbidity and mortality associated with this disease.

Abbreviations

CTC	Care and treatment clinic
WLHIV	Women Living with Human Immune-deficiency Virus
CC	Cervical Cancer
CYRP	Community of young research peers
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
KCMC	Kilimanjaro Christian Medical Centre
KCMUCo	Kilimanjaro Christian Medical University College
KMCR	Kilimanjaro Medical Cancer Research
LMIC	Low and middle-income countries
SSA	Sub Saharan Africa
THET	Transforming Health Professions Education in Tanzania
UN	United nation
VIA	Visual inspection with acetic acid
WHO	World health organization

Declarations

Ethical Consideration and consent to participate

The ethical approval was sought from Kilimanjaro Christian Medical University College research ethics committee prior to the commencement of this study. This was followed by a letter to KCMC obstetrics and gynaecology department to get permission. **Informed consent was written and signed by every participant prior to the interview** and a unique identification number was used to enhance confidentiality. **All methods were carried out in accordance with relevant guidelines and regulations of BMC.**

Consent for publication

Not applicable

Availability of Data and Materials

The datasets generated and/or analysed during the current study are not publicly available as this study will progress into second phase however it can be available from the corresponding author on reasonable request.

Competing interests

There are no conflicts of interest regarding this paper to be disclosed.

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Authors' Contribution

DM: Conception of the research idea, design of the study, performed data analysis, manuscript preparation and subsequent revisions. **JN:** Advice in designing the study, analysis and revision of the manuscript. **BTS, DF, and RS:** Collected the data. **JPA:** Performed statistical analysis. **BCS and RP:** Advice in designing the study, analysis and revision of the manuscript. **BFS, EB, SM, EL and JB:** Read and commented the manuscript before submission to the journal. **BM:** Conception idea for the study, advice in designing the study, analysis and revision of the manuscript. All authors participated equally in proofreading the manuscript for the final submission.

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