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KNOWLEDGE, PRACTICES, AND FACTORS ASSOCIATED WITH CERVICAL CANCER SCREENING AMONG WOMEN ATTENDING OUTPATIENT CLINICS IN MERU DISTRICT, ARUSHA REGION, AND NORTHERN TANZANIA

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Introduction
Cervical cancer is most prevalent in low- and middle- income countries. Inadequate knowledge on and bad attitude towards cervical cancer preclude cervical cancer screening practices. This study aimed at determining knowledge and practices of cervical cancer screening, and its associated factors among outpatient clinics in Arusha region, more specifically in Meru district.

Methods
A hospital-based cross-sectional study was conducted in Meru district between March and April 2019. A total of 706 women aged 18-55 years who attended outpatient clinics in Meru District Hospital, and the USA River Health Centre were studied. Face-to-face interview was conducted. Multivariable log-binomial regressions model was used to analyse data, and to determine factors associated with cervical cancer screening practices. Stata version 14.0 aided the analysis of data.

Results
Majority of participants had poor knowledge on signs of and risk factors for cervical cancer. Over seventy percent (77.2%) had little knowledge on signs, and 62.8% had little knowledge on risk factors for cervical cancer. However, approximately half of participants (53%) had good knowledge on cervical cancer prevention. One-third (32.9%) of participants mentioned that they happened to screen for cervical cancer. Factors associated with cervical cancer screening included, women aged 25-34 years (PR=2.11, 95% CI: 1.37-3.25) and ≥35 years (PR=3.62, 95% CI: 2.36-5.56), having health insurance (PR=1.28, 95% CI: 1.09-1.50), and good knowledge of cervical cancer signs and prevention [(PR=1.50, 95% CI: 1.25-1.80) vs. (PR=1.30, 95%CI 1.05-1.60)].

Conclusion
Few women, a third of participants happened to screened for cervical cancer. Therefore, Knowledge-based intervention is crucial to the uptake of cervical cancer screening.

Keywords: Cervical cancer, cervical cancer screening, cervical cancer knowledge.

INTRODUCTION

Cervical cancer is the fourth most common in the world. It stands the fourth after breast, colorectal, and lung cancers. However, cervical cancer is twice as high in the developing world than in the developed world, and the mortality rate is three times as high as that in the developed nations. Cervical cancer continues to be the most prevalent female cancer in most low- and middle-income countries (LMICs) (Bray et al., 2018; Small Jr *et al.*, 2017; WHO, 2020). In 2018, the World Health

Organisation (WHO) estimated 570,000 new cases corresponding to 6.6% of all female cancers (WHO, 2020).

Approximately 90% of deaths from cervical cancer occur in LMICs (Bray et al., 2018; Lyimo & Beran, 2012; WHO, 2020). This is partly because of lack of screening; knowledge about risk factors, failure to see signs and symptoms (Bayu, Berhe, Mulat, & Alemu, 2016; Ebu, Mupepi, Siakwa, & Sampselle, 2015; Mabelele, Materu, Ng'ida, & Mahande, 2018); availability of quality data; and challenges faced in providing treatment given the weak health care system in these countries (Bray et al., 2018; Cunningham et al., 2015; Small Jr et al., 2017). According to the WHO, almost all cervical cancer deaths could be prevented if screening was made available to women between the ages of 35 and 55 years, and if adolescent girls received human papillomavirus (HPV) immunisation (WHO, 2020). Nearly all cases of cervical cancer result from human papillomavirus infection (Bray et al., 2018; Small Jr et al., 2017). As it is, the HPV subtypes, 16 and 18 are responsible for over 70% of all forms of cervical cancer.

Cervical cancer is a leading cause of cancer-related deaths and a significant public health issue in sub-Saharan Africa (Viviano et al., 2017). East Africa has the highest incident rate in the world, with the age-specific rate of 42.7 per 100,000 women, which contributes to 26.7 deaths per 100,000 women (Ferlay et al., 2015). Specifically, in Malawi, Zambia, and Zimbabwe, there is an estimated age-standardised incident rate of 59.1 per 100,000 women per year (Bruni *et al.,* 2017). In Tanzania, nearly 70,000 women die of cervical cancer every year (Bruni *et al*., 2017; Runge, Bernstein, Lucas, & Tewari, 2019). This problem is highly magnified by lack of resources, manpower, prevailing poverty, sporadic cervical cancer screening, the prevalence of high-risk oncogenic human papillomavirus subtypes, and relatively high rates of human immunodeficiency virus co-infection (Runge *et al.*, 2019).

The cervical cancer screening aims at detecting precancerous changes, which, if not treated, may lead to cancer (WHO, 2020). The ability of cervical cancer screening programmes to find precancerous lesions and early-stage cancer is now well documented in the literature. (Bayu et al., 2016; Bray et al., 2018; Lyimo & Beran, 2012). Yet, most women in most LMICs do not do regular cancer screening, which contributes to late diagnosis of the disease (Bayu *et al*., 2016; Ebu *et al*., 2015). Paradoxically, cervical cancer is one of the most preventable and treatable forms of cancer.

The Pap smear is routinely used in the developed world for cervical cancer screening; however, this screening method is neither feasible nor financially possible in most LMICs, especially in rural areas. (Cunningham *et al*., 2015; Ebu *et al.,* 2015). The WHO has gone on record recommending use of Visual Inspection with Acetic acid (VIA) as a screening tool in LMICs (Bray *et al*., 2018; Bruni *et al*., 2017; Runge *et al*., 2019; WHO, 2020). VIA is a simple, low-technological method that has shown to be sufficiently sensitive and specific. It is an inexpensive tool; it can be used by nurses, clinical officers, and doctors. The tool does not rely on cytologists for interpretation. Results are immediate, within 10 seconds, which means that diagnostic treatment (e.g., colposcopy, cryotherapy) could be performed during the same visit or soon thereafter.

Addressing high rates of cervical cancer in Tanzania, it is a government priority (Runge et al., 2019). However, one significant impediment to implementation of cervical cancer screening in Tanzania is the lack of knowledge and awareness of cervical cancer screening. This situation contributes to low screening rates (Bansal, Pakhare, Kapoor, Mehrotra, & Kokane, 2015; Cunningham et al., 2015; Mabelele *et al.,* 2018). The gaps in cervical cancer knowledge among women in LMICs are substantial (Bansal et al., 2015; Ebu et al., 2015; Mitiku & Tefera, 2016). As such, it is important to ascertain how much women know about the disease as well as their willingness to go for screening. The present study aims at determining knowledge and practices of cervical cancer screening in outpatient clinics in Arusha region, specifically in Meru district in Tanzania. The study also explores factors associated with cervical cancer. Findings from this study will help to design strategies to increase the uptake of cervical cancer screening programmes in the region.

METHOD

Study design and setting

A hospital-based cross-sectional study was conducted in Meru district, one of six districts in Arusha region in northern Tanzania. This district was selected because it had both urban and rural characteristics. The major economic activities include agriculture, business, and tourism. The district has a total of two hospitals, eight health facilities, and 36 dispensaries (Meru District Council, 2017). The Meru District Hospital and the Usa River Health Centres were selected because they are high-volume, public facilities. They provide inpatient and outpatient care to a large proportion of population in the district as compared to other facilities in Meru. Moreover, the research project team liaised with the region and district administrators to introduce the project and to obtain permission for conducting the study.

Study subjects and sampling methodology

The study population was women attended outpatient clinics between March and April 2019. The inclusion criteria included age between 18 and 55 years, understanding of the study objectives, and voluntarily consenting to participate in the study. The sample size was determined using the formula for estimating a single population proportion. It used a standard normal value 1.96 under a 95% confidence interval, a precision of 4%, and it was assumed that screening practice of cervical cancer stood at 50%. The sample size calculated was 384. Having added 20% of assumed non-response rate, the sample size was 461. Convenient sampling technique was used. The researchers interviewed women who attended outpatient clinics, systematically to obtain the required

sample size.

Data collection tools and procedures

The survey questionnaire was pre-tested. Fifteen (15) women were involved in the pretest of the tool. In the pretest, two dispensaries and one health centre were involved. The two health facilities were not part of actual study. The tool, structured questionnaire used to collect in the pretest was adapted from a previous study, conducted in the Lake Zone in Tanzania (Mabelele et al., 2018). The adapted tool was designed to assess knowledge and awareness of cervical cancer. To be specific, the questionnaire encompassed questions on socio-demographic characteristics; knowledge about signs, risk factors, and prevention of cervical cancer; knowledge about HPV vaccine; and how best one can receive cervical cancer information. In the current study, responses from subjects were recorded. The subjects were trained health care staff i.e., nurses and medical doctors. Interviews were conducted in a private and quiet room in the outpatient departments. The Principal Investigator (PI) and/or research staff collected completed questionnaires. The collected filled in questionnaires were stored in an iron-based locker for security reasons. The locker was accessible to the PI and the research coordinator only.

Data Analysis

Variables and measures

Cervical cancer screening practice was the key outcome in this study. To measure it, the respondents were asked questions like: "*Have you ever been screened for cervical cancer*?" with a Yes/No response. Explanatory/independent variables included cervical cancer knowledge of signs, risk factors, and prevention. Knowledge of signs and of risk factors was assessed using eleven items. Prevention was assessed using five items. Each correct response had 1 as a score; an incorrect response had 0 as a score, for example, "do not know" response. A cut-off point of 50% correction rate was used to categorize respondents into two groups: the total score ranging from 6 to 11 or 3 to 5 was defined as a good level of knowledge, and the total score ranging from 0 to 5 or 0 to 2 was defined as a poor level of knowledge about cervical cancer signs/risk factors and prevention. Other explanatory variables were respondent socio-demographic characteristics such as the name of health facility, age in complete years, marital status, education level, occupation, having health insurance or not, and parity.

Statistical analyses

Data analysis was aided with STATA version 14.0. Descriptive statistics were summarized using frequencies and percentages. The prevalence ratio with 95% confidence intervals (CIs) for factors associated with cervical cancer screening practice were estimated using a multivariable log-binomial regressions model. A p-value of less than 5% was considered statistically significant.

Ethical Considerations

Ethical approval number 2069 was obtained from Kilimanjaro Christian Medical University College Research and Ethics Review Committee. Permission to conduct the study was also obtained from Arusha regional administrative authority. Informed verbal consent was obtained from the study participants after explaining potential harms and benefits of study. The participation in the study was voluntary. Unique personal identification numbers were used as names of participants to maintain confidentiality.

RESULTS

Socio-demographic characteristics of study participants

Table 1 shows socio-demographic characteristics of study population. A total of 706 women participated in this study. Over fifty percent (53.5%) were from Meru District Hospital; the rest were from the USA River Health Centre. The mean age (SD) of respondents was 30.2 (SD=8.0) years. Three-quarters (74.5%) were married or cohabiting with their partners. Over fifty percent (57%) had a primary education. Moreover, over thirty six percent (36.4%) were self-employed. Twenty percent (20%) only of participants had health insurance. The majority (71%) had 1-3 pregnancies (Table 1).

Table 1: Socio-demographic characteristics of study

Characteristics	n	%
Facility		
Meru DH	378	53.5
USA river HC	328	46.5
Participant age in years		
Mean (SD)	30.2	7.9
≤24	190	26.9
25–34	310	43.9
≥35	206	29.2
Marital status		
Single	134	19.0
Married/cohabiting	526	74.5
Widowed/Divorced/Separated	46	6.5
Education Level		
No formal Education	21	3.0
Primary	403	57.1
Secondary	221	31.3
Higher than secondary	61	8.6
Occupation		
Formal Employment	83	11.8
Self Employed	257	36.4
Peasant	147	20.8
Housewife	186	26.4
Student	33	4.7
Health Insurance		

No	566	80.2
Yes	140	19.8
Parity		
Median (IQR)	2 (1-3)	
None	77	10.9
1-3	498	70.5
More than 4	131	18.7

Participant knowledge about cervical cancer

Table 2 shows the distribution of participant knowledge of cervical cancer. Findings show that the majority (77.2%) of women had poor knowledge about the signs and the risk factors for cervical cancer, while just one-quarter (22.3%) had good knowledge. Two-thirds (62.8%) had poor knowledge of the risk factors associated with cervical cancer. Over half (53.4%) of the participants had good knowledge about cervical cancer preventive strategies.

Table 2: Participant knowledge about cervical cancer

Knowledge of cervical cancer	Yes n (%)	No n (%)
Knowledge on signs		
Vaginal bleeding between periods	307 (43.5)	399 (56.5)
Persistent lower back pain	188 (26.6)	518 (73.4)
Persistent vaginal discharge with an unpleasant smell	458 (64.9)	248 (35.1)
Discomfort or pain during sex	223 (31.6)	483 (68.4)
Menstrual periods that are heavier and longer than usual	308 (43.6)	398 (56.4)
Persistent diarrhoea	25 (3.5)	681 (96.5)
Vaginal bleeding after menopause	229 (32.4)	477 (67.6)
Persistent pelvic pain	186 (26.3)	520 (73.7)
Vaginal bleeding during or after sex	250 (35.4)	456 (64.6)
Blood in the stool or urine	51 (7.2)	655 (92.8)
Unexplained weight loss	155 (22.0)	551 (78.0)
Overall knowledge on signs: Poor 545 (77.2), Good 161 (22.8)		
Knowledge on risk factors		
HPV infection	164(23.2)	542(76.8)
Smoking any cigarettes	265(37.5)	441(62.5)
Weakened immune system	366(51.8)	340(48.2)
Long term use of contraceptive pills	417(59.1)	289(40.9)
Infection with chlamydia	453(64.2)	253(35.8)
Uncircumcised sexual partner	196(27.8)	510(72.2)
Sexual debut at a young age (<17 years)	269(38.1)	437(61.9)
Many sexual partners	394(55.8)	312(44.2)
Many children	101(14.3)	605(85.7)
Sexual partner with many previous partners	222(31.4)	484(68.6)
Not going for regular pap smear/VIA test	375(53.1)	331(46.9)
Overall knowledge on risk factors: Poor 443 (62.8), Good 263 (37.3)		
Knowledge on prevention		
Regular medical check-up/ screening	592(83.9)	114(16.1)
Vaccination for HPV	395(55.9)	311(44.1)
Being faithful to one sexual partner	469(66.4)	237(33.6)
Consistent use of condom	147(20.8)	559(79.2)
Delaying sexual debut	239(33.9)	467(66.1)
Overall knowledge on prevention: Poor 329 (46.6), Good 377 (53.4)		

Factors associated with cervical cancer screening

One-third of 706 women only happened to screen for cervical cancer. Factors that were significantly associated with cervical cancer screening in the crude log-binomial regression model include participant age groups (years), marital status, parity, having health insurance, and good knowledge of the signs, risk factors, and prevention of cervical cancer (Table 3). Significantly higher prevalence of cervical cancer screening was among respondents aged ≥35 years (PR=4.49, 95% CI: 3.00-6.72) and (PR=2.59, 95% CI: 1.70-3.92) compared to those aged ≤24 years. Compared to those who were single, women who were married/cohabiting (PR=2.10, 95% CI: 1.43-3.11) and widowed/ Divorced/ Separated (PR=2.41, 95% CI: 1.45-3.99) had a higher prevalence of cervical cancer screening. To add, the prevalence of screening went higher with increased parity. It was the highest among women who reported more than four pregnancies (PR=3.53, 95% CI: 1.99-6.25) compared to those who had none. Respondents with health insurance had 54% higher odds of being screened for cervical cancer (PR=1.54, 95% CI: 1.24-1.92) compared to those who did not have. Lower prevalence of cervical cancer screening was among respondents in informal employment (all occupational categories) as compared to those with formal employment. Participants with good knowledge on cervical cancer signs (PR=1.75, 95% CI: 1.42-2.15), risk factors (PR=1.28, 95% CI: 1.03-1.58), and prevention (PR=1.69, 95% CI: 1.35-2.12) were more likely to have been screened (Table 3).

In the adjusted analysis, women aged 25-34 years and those aged ≥ 35 years showed higher prevalence of cervical cancer screening as compared to those who were

aged ≤ 24 years [(PR=2.11, 95% CI: 1.37-3.25) vs (PR=3.62, 95% CI 2.36-5.56), respectively]. Furthermore, having health insurance (PR=1.28, 95% CI: 1.09-1.50), good knowledge of cervical cancer signs (PR=1.50, 95%CI 1.25-1.80), and prevention (PR=1.30, 95%CI 1.05-1.60) were associated with higher odds of cervical cancer screening. Women with good knowledge about risk factors for cervical cancer were less likely to be screened (PR=0.97, 95% CI: 0.96-0.98) (Table 3).

DISCUSSION

In this study, only one-third of the participants reported to have had screened for cervical cancer. Yet, this rate is higher than that reported in other parts of Tanzania (i.e., the Kilimanjaro and Mwanza regions in Tanzania), (Cunningham *et al.*, 2015; Lyimo & Beran, 2012; Mabelele *et al*., 2018; Runge *et al.*, 2019) and in other LMICs (Bansal, Pakhare, Kapoor, Mehrotra, & Kokane, 2015; Bayu *et al*., 2016; Ebu *et al*., 2015; Ncube, Bey, Knight, Bessler, & Jolly, 2015). We found that cervical cancer screening was associated with participant's age; having health insurance; and a good knowledge of the signs, risk factors as well as prevention. These findings are similar to those reported in a systematic review in Tanzania as well as other studies, which found that older women, having some form of health insurance and having prior knowledge about cervical cancer were associated with increased women's likelihood of being screened for cervical cancer (Bansal *et al.*, 2015; Bayu *et al.*, 2016; Bruni *et al*., 2017; Cunningham et al., 2015; Ncube *et al.*, 2015; Runge *et al.*, 2019).

Women who consider themselves to be at risk for cervical cancer or who seek care after recognising symptoms were more likely to be screened (Bayu *et al*., 2016). Having health insurance may imply easier access to health care services, which is an essential gateway to implementation of cervical cancer interventions in the country. However, knowledge on the benefits of cervical cancer screening as well as the risk factors for the disease was generally poor. This suggests that there is need for education on symptoms, risk factors, and prevention of cervical cancer among women and the public. The education may include creating awareness on the importance of the cancer screening.

This study acknowledges a number of limitations. As it is, the study relied on self-reported data on cervical cancer screening, and on knowledge, which could culminate in biased responses from some of participants. Moreover, the participation in the study was achieved through volunteering. As such, those who were not ready to participate in the study might have had different responses. This study was hospital-based and included participants in outpatient clinics, which may make it difficult generalising the findings to the general population.

CONCLUSION

Our findings provide a snapshot of knowledge, attitudes, and practices in a population-based sample of women seeking care in two health centres in Arusha region in Tanzania. In this study, one-third of women only have reported to have screened for cervical cancer. The overall knowledge on cervical cancer, and on its risk factors is generally poor. On a positive note, several factors are associated with cervical cancer screening practice. These factors include age, having health insurance and good knowledge on signs, risk factors, and prevention of cervical cancer. Based on the findings, it is imperative providing education to local population about benefits of cervical cancer screening. Providing education as an intervention increases chances for the uptake of cervical screening to eligible women. The intervention will result in saving women lives from early detection, and prevention measures of the disease.

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AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

MJM & OO: designed the study and reviewed the manuscript, IBM & CA: participated in data collection, performed the statistical analysis, and drafted the manuscript. MF, CS, and MP: contributed to review of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Table 1: Factors associated with cervical cancer screening (N=706)

Characteristics		CPR* (95% CI)	p-value	APR† (95% CI)	p-value
Participant age					
≤24	23 (12.1)	1.00		1.00	
25-34	97 (31.3)	2.59 (1.70-3.92)	<0.001	2.11 (1.37-3.25)	0.001
≥35	112 (54.4)	4.49 (3.00-6.72)	<0.001	3.62 (2.36-5.56)	<0.001
Marital status					
Single	23 (17.2)	1.00		1.00	
Married/cohabiting	190 (36.1)	2.10 (1.43-3.11)	<0.001	1.33 (0.90-1.96)	0.147
Widowed/ Divorced/ Separated	19 (41.3)	2.41 (1.45-3.99)	0.001	1.17 (0.71-1.93)	0.533
Parity					
None	11 (14.3)	1.00		1.00	
1-3	155 (31.1)	2.18 (1.24-3.82)	0.007	1.15 (0.65-2.06)	0.626
More than 4	66 (50.4)	3.53 (1.99-6.25)	<0.001	0.92 (0.50-1.69)	0.789
Education Level					
No formal Education	8 (38.1)	1.00		-	
Primary	128 (31.8)	0.83 (0.47-1.46)	0.527		
Secondary	76 (34.4)	0.90 (0.51-1.60)	0.727		
Higher than secondary	20 (32.8)	0.86 (0.45-1.65)	0.652		
Occupation					
Formal Employment	38 (45.8)	1.00		1.00	
Self Employed	89 (34.6)	0.76 (0.57-1.01)	0.058	0.94 (0.74-1.19)	0.590
Peasant	46 (31.3)	0.68 (0.49-0.96)	0.026	0.75 (0.56-1.02)	0.063
Housewife	56 (30.1)	0.66 (0.48-0.91)	0.010	0.91 (0.69-1.20)	0.484
Student	3 (9.1)	0.20 (0.07-0.60)	0.004	0.58 (0.19-1.76)	0.339
Health Insurance					
No	168 (29.68)	1.00		1.00	
Yes	64 (45.71)	1.54 (1.24-1.92)	<0.001	1.28 (1.09-1.50)	0.003
Knowledge on cervical cancer signs					
Poor	153 (28.07)	1.00		1.00	
Good	79 (49.07)	1.75 (1.42-2.15)	<0.001	1.50 (1.25-1.80)	<0.001
Knowledge on risk factors for cervical cancer					
Poor	132 (29.80)	1.00		1.00	
Good	100 (38.02)	1.28 (1.03-1.58)	0.023	0.97 (0.96-0.98)	<0.001
Knowledge on cervical cancer prevention					
Poor	79 (24.01)	1.00		1.00	
Good	153 (40.58)	1.69 (1.35-2.12)	<0.001	1.30 (1.05-1.60)	0.015

*Crude Prevalence Ratio; †Adjusted Prevalence Ratio