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Knowledge about cervical cancer screening and perception of risk among women attending outpatient clinics in rural Kenya

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Abstract

Objective—To evaluate cervical cancer knowledge, risk perception, and screening intention among women attending outpatient clinics in rural Kenya.

Methods—A cross-sectional oral survey was conducted among non-pregnant women aged 23–64 years who attended one of 11 western Kenyan health facilities for any reason between March 25 and April 26, 2013. Demographic and clinical predictors were identified using bivariate and multivariate regression analyses.

Results—Among 419 participants, 327 (78.0%) had heard of cervical cancer screening. Nevertheless, their specific knowledge was low (mean score 8.6 ± 2.4 [out of 15.0]). Overall, 288 (68.7%) women felt at risk for cervical cancer, and 333 (79.5%) stated that they would undergo screening if offered. Women who intended to undergo screening were less likely to attend a district hospital (adjusted odds ratio [AOR] 0.4; 95% confidence interval [CI] 0.2–0.6) and more likely to have been diagnosed with HIV more than 4 years previously (AOR 0.4; 95% CI 0.2–0.6). Additionally, increased screening acceptance was associated with high knowledge scores (P=0.004).

Conclusion—Educational interventions to increase knowledge about cervical cancer might increase screening uptake in low-income settings. Additionally, improvements in services at local health facilities could have a large effect.

Keywords

Behavior; Cervical cancer screening; Knowledge; Risk perception; Sub-Saharan Africa

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Conflict of interest
The authors have no conflicts of interest.

1. Introduction

Despite the availability of low-cost and effective methods of prevention, cervical cancer kills more than 250 000 women worldwide each year, with at least 85% of all deaths occurring in low-income countries [1]. Cervical cancer is the leading cause of cancer-related death among women in Kenya [2]. Unfortunately, in resource-limited settings such as East Africa, uptake of preventive health measures, including screening for asymptomatic disease, is low [3,4]. In Sub-Saharan Africa, screening rates are estimated at 0.5%–20.0%, with rates in rural areas lower than those in urban areas [5]. In Kenya, 4.0% of women in towns and cities undergo screening, compared with just 2.4% in the countryside [5]. The poor screening rates are attributable to limited access to health care and low uptake of the available services [6].

Previous studies have suggested that poor awareness of cervical cancer and little specific knowledge about risk factors, disease course, and prevention strategies are frequent reasons for low uptake of screening [7,8]. A survey conducted in Nairobi, Kenya [9], found that only half of the 1353 women enrolled had heard of cervical cancer and only one-third had heard of a cervical smear test. Myths about cervical cancer are pervasive in Sub-Saharan Africa, with many individuals believing that family planning or poor hygiene cause cervical cancer and that traditional medicines or vaginal washing can decrease a woman's risk of cervical cancer [10,11]. Qualitative studies have found that a major reason women do not seek early screening is because they feel healthy or not at risk, so do not appreciate the need for screening [8,10]. In the Kenyan survey [9], 69% of the 649 women who had heard of cervical cancer did not consider themselves to be at risk. Improving awareness about timely use of preventive health services and changing attitudes to risk might help to improve screening uptake.

In 2007, the Family AIDS Care and Education Services (FACES) HIV treatment program piloted the Cervical Cancer Screening and Prevention (CCSP) program at an HIV clinic in Kisumu, Kenya [12]. In 2012, FACES expanded the CCSP program to all women residing in two rural districts of western Kenya (Mbita and Suba) irrespective of their HIV test status. The program provided free screening at 11 FACES-supported government health facilities in Mbita and Suba, as well as free cryotherapy treatment at the two district hospitals. The aim of the present study was to obtain baseline information about knowledge, risk perception, and screening intent among women attending these health facilities to aid the future development of an effective educational intervention for cervical cancer in Kenya.

2. Materials and methods

A cross-sectional oral survey was conducted among women who attended one of the 11 health facilities supported by FACES in Mbita and Suba between March 25, 2013, and April 26, 2013. Women who attended the health facilities for any reason (e.g. HIV or mother–child health care) were invited to participate in the present study if they were deemed eligible for cervical cancer screening on the basis of FACES-CCSP guidelines (i.e. they were aged 23–64 years and not pregnant) but had not previously been screened. Ethical approval was obtained from the Kenya Medical Research Institute Ethical Review

Committee and the University of California, San Francisco Committee on Human Research. All participants provided written informed consent.

Trained interviewers administered an oral survey to participants in English, Kiswahili, or Dholuo (the mostly commonly spoken languages in the study region), and entered responses directly into Open Data Kit version 1.4.4 (http://opendatakit.org/) on tablet-style computers. The survey was modeled on cervical cancer screening intake forms used in the study region, previous studies of frequent misconceptions about cervical cancer, and WHO guidelines on education about cervical cancer screening [6,7,12,13].

The demographic section of the survey comprised 23 multiple-choice and "fill-in-the-blank" questions about age, marital status, educational level, occupation, duration and mode of transportation to the clinic, whether participants knew someone with cervical cancer, primary source of health information, reproductive history, use of family planning, and HIV test status. Information about previous screening for sexually transmitted infections (STIs), HIV, or breast cancer (through clinician-performed breast examination or mammography) was combined into a health screening behavior score. Women with a history of at least two previous tests were categorized as having high health-screening behavior. Finally, the level of health facility where the participant was recruited was documented. In all, the present study included two district hospitals (high-level facilities offering inpatient and outpatient medical and surgical procedures), five subdistrict hospitals (middle-level facilities offering outpatient and inpatient services), and four local dispensaries (low-level facilities offering outpatient services).

The awareness section of the survey included five items that assessed whether or not participants had ever heard of cervical cancer, human papillomavirus (HPV), cervical cancer screening, cervical smear tests, or visual inspection with acetic acid.

The knowledge section comprised 15 true-or-false statements that included both facts and common myths about cervical cancer, risk factors, and HPV. A knowledge score was generated from the data collected in this section, with one point given for each correct answer and zero points given for incorrect answers or an answer of "I don't know."

The perception-of-risk section included five items that assessed whether participants thought they were at risk for cervical cancer, STIs, HIV, breast cancer, and malaria. The three possible answers in this section were "yes," "no," and "I don't know."

The screening-intention section asked whether a woman would agree to screening, recommend screening to friends, or accept screening by a male provider. Participants were also asked whether they would they pay for screening, and if so, what the maximum amount they would be willing to pay was.

Data were analyzed using Stata version 12.0 (StataCorp, College Station, TX, USA). Bivariate analyses were performed using χ^2 and *t* tests to assess the relationship between demographic characteristics and awareness of cervical cancer screening, knowledge score, perception of cervical cancer risk, and intention to undergo screening. Multivariate analyses were performed using linear regression for knowledge score and logistic regression for

screening awareness, perception of risk, and screening intent. Backwards elimination models were created using variables with at least borderline significance ($P<0.2$) in the bivariate analysis and controlling for interviewer using hierarchical clustering. Final models were selected on the basis of the best fit as reflected in the R^2 score.

Three subanalyses were conducted to evaluate knowledge, risk perception, and screening intent. Within the knowledge section, the association between a participant's HIV test status and whether they correctly answered two questions about HIV as a cervical cancer risk factor was assessed. In the risk section, regression analyses were conducted to assess the correlation between feeling at risk for cervical cancer and feeling at risk for other diseases. Finally, the outcome measures (knowledge score, screening awareness, and cervical cancer risk perception) were assessed as potential predictors of each other and of screening intention. Bivariate and multivariate logistic regression analyses of these associations were performed as described above. $P<0.05$ was considered statistically significant.

3. Results

A total of 419 women completed the survey. The mean age was 33.4 ± 9.3 years and most relied primarily on the facility for health information (Table 1). Nearly all the women had previously been tested for HIV, and more than half had received positive test results (Table 1).

Although most women had heard of cervical cancer screening, less than one-third reported hearing about specific screening methods or HPV (Table 2). The bivariate analysis indicated that awareness of screening was associated with district hospital attendance, high health screening behavior score, use of family planning, and long duration of HIV diagnosis (Table 3). The multivariate analysis found that screening awareness was associated with age older than 30 years, knowing someone with cervical cancer, district hospital attendance, and a high health screening behavior score (Table 3).

Specific knowledge about cervical cancer was low among the women surveyed, with a mean knowledge score of 8.6 ± 2.4 (Table 2) The bivariate analysis found that high knowledge scores were associated with attendance at a district hospital, high level of education, working outside the home, and increased number of lifetime sexual partners (Table 4). The multivariate analysis identified high level of education, long duration of HIV diagnosis, and increased number of lifetime sexual partners as predictors of high knowledge scores (Table 4).

Among 233 women who had had a positive HIV test, 113 (48.5%) indicated an understanding that HIV increases cervical cancer risk, compared with 101 (54.3%) of the 186 women who either had had a negative test or whose HIV test status was unknown. Women with a long duration of HIV diagnosis were no more likely to know that HIV increases cervical cancer risk than were women with a shorter duration of HIV (odds ratio [OR] 1.0 [95% confidence interval (CI) 0.6–1.7], $P=0.881$). Women who tested positive for HIV were significantly more likely to correctly indicate that all women are at risk for cervical cancer irrespective of their HIV status than were women who tested negative for HIV or had never been tested (OR 3.0 [95% CI 1.9–4.8], $P<0.001$; adjusted OR [AOR] 2.8

[95% CI 1.3–5.7], *P*=0.006). Among women who tested positive for HIV, those diagnosed more than 4 years previously were even more likely to answer this question correctly than were other women with HIV (OR 5.8 [95% CI 2.0–17.0], *P*=0.001; AOR 6.0 [95% CI 3.1–11.7], *P*<0.001).

More than two-thirds of all women surveyed felt at risk for cervical cancer (Table 5). In the multivariate analysis, women who reported feeling at risk for cervical cancer were significantly more likely to know someone with cervical cancer, attend a district hospital, live further away from the health facility, or have had their sexual debut when aged at least 18 years (Table 3).

No significant association was found between feeling at risk for breast cancer, STIs, or HIV and reporting previous screening for these diseases (data not shown). In both bivariate and multivariate analyses, women who felt at risk for cervical cancer were more likely than were women who did not feel at risk to report feeling at risk for breast cancer (multivariate AOR 14.2 [95% CI 6.0–33.3], *P*<0.001), other STIs (multivariate AOR 13.6 [95% CI 9.4–19.7], *P*<0.001), malaria (multivariate AOR 6.2 [95% CI 3.8–10.1], *P*<0.001), and HIV (multivariate AOR 25.1 [95% CI 11.1–56.6], *P*<0.001).

Overall, 333 (79.5%) women surveyed said they would accept screening. In the multivariate analysis, women who intended to undergo screening were less likely to attend a district hospital and more likely to have a long duration of HIV diagnosis than were women who were not planning to undergo screening (Table 3). Among the 86 women who declined screening, 24 (27.9%) said they did not have time to wait, 21 (24.4%) were currently menstruating, and 15 (17.4%) wanted to think about their decision first. A total of 400 (95.5%) women said that they would advise their friends to be screened, 328 (78.3%) reported that they would agree to screening by a male provider, and 327 (78.0%) said they would get screened even if they had to pay. The median maximum amount that women said they would pay for screening was 100 Kenyan shillings (approximately US$1.12), although responses ranged from 10–1500 shillings ($0.10–$16.80).

High knowledge scores were associated with awareness of cervical cancer screening (correlation coefficient 1.8 [95% CI 1.3–2.4]; *P*<0.001) and with feeling at risk for cervical cancer (correlation coefficient 1.3 [95% CI 0.8–1.8]; *P*<0.001) in a bivariate analysis. These factors remained significant in a multivariate analysis that adjusted for facility, education, occupation, HIV duration, and lifetime sexual partners: the correlation coefficient was 1.7 (95% CI 0.8–2.5; *P*<0.01) for screening awareness and 1.3 (95% CI, 0.1–2.6; *P*<0.05) for personal risk.

Increased screening acceptance was associated with high knowledge scores in both bivariate analysis (correlation coefficient 0.6 [95% CI −0.004 to 1.1]; *P*=0.050) and in a multivariate analysis that adjusted for facility, education, occupation, HIV duration, and lifetime sexual partners (adjusted correlation coefficient 0.8 [95% CI 0.5–1.1]; *P*=0.004). However, screening acceptance was not associated with screening awareness or feeling at risk.

4. Discussion

Although many of the women surveyed in the present study had heard of cervical cancer screening and felt at risk for the disease, their specific knowledge was generally low. However, a high level of knowledge was a key predictor of screening intent. Other predictors of screening intent included long duration of HIV diagnosis and attendance at a low-level health facility.

Previous studies [6,10,14,15] have suggested that lack of awareness or knowledge is a major barrier to screening acceptance in Sub-Saharan Africa. Two retrospective studies in East Africa [16,17] identified an association between screening awareness or knowledge and previous screening. However, these studies were unable to show whether undergoing screening leads to improved knowledge or vice versa.

The findings of the present study indicated an association between duration of HIV disease and cervical cancer knowledge. A study of an integrated HIV–cervical cancer program in Zambia [11] highlighted a concern that women not infected with HIV might be unwilling to access cervical cancer screening owing to the association of cervical cancer with HIV and possible stigma. In the present study, long duration of HIV infection predicted high screening intention and was associated with high knowledge scores. Women infected with HIV might have increased access to health education than do those who are not infected, which in turn could lead to increased cervical cancer knowledge and screening uptake. The relationship between HIV test status, health knowledge, and stigma in regards to cervical cancer, therefore, deserves further exploration.

The present study also highlighted high screening intent among women attending low-level health facilities (subdistrict hospitals and dispensaries) versus large district hospitals, despite having low levels of awareness, specific knowledge, and personal risk perception. Pilot screening programs, including FACES-CCSP, often start at large central hospitals [9,18]; however, extending services to local facilities is likely to be an important component to attaining increased screening rates. The idea of decentralizing health services has played an important part in expanding HIV services and increases patient retention in HIV programs in Kenya [19]. Further research is required to understand why women might be more likely to accept screening at a low-level health facility than a high-level facility and to determine how best to support screening at such facilities.

No association was detected between screening intent and either general screening awareness or personal perception of risk in the present study, by contrast with previous qualitative studies [8–10]. Social desirability bias—i.e. the inclination to answer questions with what is perceived to be the desired or more appropriate response rather than the true answer—might have affected the results of questions about awareness and risk that required a “yes” or “no” answer, thereby obscuring a true association between these variables. However, interviewers were trained to administer the surveys in a nonjudgmental and confidential manner to minimize this bias. Alternatively, general screening awareness or feeling at risk for cervical cancer might not be primary drivers for screening uptake.

The present study was limited by the fact that it measured screening intent, rather than screening uptake. In reality, women could be less likely to undergo screening than was suggested in the present study. Conversely, menstruation and "needing time to think" were cited as frequent reasons for declining screening. This finding suggests that overall screening acceptability could actually be high but that women just need to be offered repeated screening opportunities before they engage with the program.

Various steps were taken to ensure that the present study population was similar to the general population in rural Kenya. By administering the survey orally in three languages, all clinic attendees who met the screening criteria were able to participate, irrespective of their literacy or educational background. Nevertheless, generalization of the findings to other populations could be limited because only women who attended a clinic supported by FACES-CCSP were included. These women probably had high health-seeking behavior and awareness of prevention interventions than did women who did not attend such clinics. The wider community of people who do not attend clinics regularly could, therefore, have even less exposure to information about cervical cancer screening than did the clinic attendees recruited in this study. Consequently, community-level studies are needed to understand potential fears and misconceptions among women who do not attend clinics and those targeted by direct community-based educational interventions.

In conclusion, lack of knowledge seems to be an important factor for uptake of cervical cancer screening in low-income settings. Programs that aim to prevent cervical cancer must incorporate health education with screening services to address low levels of knowledge. Culturally appropriate, validated cervical cancer educational tools are needed to maximize screening uptake and achieve universal coverage.

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Synopsis

Knowledge about cervical cancer is low among women in rural Kenya. However, a high level of knowledge is associated with intention to undergo screening.

Table 1

Demographic characteristics.[a]

Characteristics	Participants (n=419)
Age, y	33.4 ± 9.3
Relationship status	
Married	282 (67.3)
Single, widowed, or divorced	137 (32.7)
Highest educational level	
Primary school or less	308 (73.5)
Beyond primary school	111 (26.5)
Occupation	
Works outside the home	249 (59.4)
Housewife (including family subsistence work such as farming or fishing activities)	170 (40.6)
Facility type	
District hospital	108 (25.8)
Subdistrict hospital	189 (45.1)
Dispensary	122 (29.1)
Transportation to clinic	
Walking	244 (58.2)
Motorcycle	163 (38.9)
Other	12 (2.9)
Travel time to clinic, min	47.5 ± 40.2
Primary source of health information	
Health facility or healthcare worker	356 (85.0)
Other [b]	63 (15.0)
Knows someone with cervical cancer	121 (29.0)
Previous health-seeking behavior	
STI testing	81 (19.4)
Clinician breast examination	25 (6.0)
Mammogram	17 (4.1)
HIV testing	390 (93.1)
Reproductive history	
Gravidity	3.4 ± 2.4
Age of sexual debut, y	16.5 ± 2.6
Current sexual partners	0.9 ± 0.5
Lifetime sexual partners	2.2 ± 1.3
Use of family planning	
None	229 (54.7)
Depot or injectable contraceptives	94 (22.4)
IUCD or contraceptive implant	44 (10.5)
Condom	21 (5.0)
Tubal ligation	15 (3.6)

Characteristics	Participants (n=419)
Other	16 (3.8)
HIV test status	
Positive	233 (55.6)
Negative	114 (27.2)
Unknown [c]	72 (17.2)
Time since first positive test result, y	3.3 ± 2.8

Abbreviations: STI, sexually transmitted infection; IUCD, intrauterine contraceptive device.

[a] Values given as mean ± SD or number (percentage).

[b] Radio, church, school, etc.

[c] Never screened or no negative test result received in the past year.

Table 2

Awareness and knowledge of cervical screening.[a]

Characteristic	Participants (n=419)
Awareness	
Cervical cancer	348 (83.1)
Cervical cancer screening	327 (78.0)
Cervical smear test	122 (29.1)
VIA	107 (25.5)
HPV	131 (31.3)
Knowledge	
Screening tests look for changes on your cervix that indicate you are at risk for cancer	275 (65.6)
Women should get screened for cervical cancer only if they have symptoms	278 (66.4)
If a woman has abnormal vaginal bleeding, discharge, or pain, she should see a medical provider to get screened for cervical cancer	381 (90.9)
Cervical cancer can be prevented	348 (83.1)
Screening tests can help prevent cervical cancer	361 (86.2)
There is no treatment for cervical cancer	209 (49.9)
Knowledge of risk factors	
Family planning increases risk	116 (27.7)
HIV increases risk	214 (51.1)
Only women who test positive for HIV are at risk	312 (74.5)
Washing inside the vagina decreases risk	182 (43.4)
Screening decreases risk	344 (82.1)
Nothing can prevent cervical cancer because it is fate or the will of God	265 (63.3)
Knowledge of HPV	
HPV is an infection that can cause cervical cancer	138 (32.9)
HPV is spread during close contact like during sexual intercourse	139 (33.2)
HPV infection is always symptomatic	34 (8.1)
Knowledge score [b]	8.6 ± 2.4

Abbreviations: VIA, visual inspection with acetic acid; HPV, human papillomavirus.

[a] Values given as number (percentage) or mean ± SD.

[b] Number of correct responses out of 15.

Table 3

Predictors of awareness, risk, and acceptance of cervical screening.

Predictors	Awareness of screening		Perception of risk		Acceptance of screening	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (>30 y)	1.6 (1.0–2.5)	1.5 (1.0–2.2) [a]	0.9 (0.6–1.4)	–	1.6 (1.0–2.5)	–
Education (beyond primary school)	1.9 (0.7–5.0)	–	0.9 (0.6–1.4)	–	0.7 (0.4–1.2)	–
Occupation (works outside the home)	1.4 (0.9–2.2)	–	1.0 (0.7–1.5)	–	0.7 (0.5–1.2)	–
Site (recruited at district hospital)	2.0 (1.1–3.7) [a]	2.2 (1.5–3.2) [b]	1.2 (0.7–1.9)	1.2 (1.1–1.3) [b]	0.4 (0.2–0.6) [b]	0.4 (0.2–0.6) [b]
Transportation to clinic (>30 min)	0.7 (0.4–1.1)	–	1.7 (1.1–2.6) [a]	1.9 (1.5–2.3) [b]	1.0 (0.6–1.6)	–
Knows someone with cervical cancer	1.5 (0.9–2.5)	1.5 (1.0–2.2) [a]	1.4 (0.9–2.2)	1.5 (1.1–1.9) [c]	1.2 (0.7–2.1)	–
Health screening behavior score	2.0 (1.0–3.8) [a]	1.9 (1.5–2.4) [b]	0.6 (0.4–1.1)	–	0.8 (0.4–1.3)	–
Age at sexual debut (≥ 18 y)	1.1 (0.7–1.8)	–	1.4 (0.9–2.1)	1.4 (1.0–1.9) [a]	1.0 (0.6–1.6)	–
Lifetime sexual partners (>3)	1.0 (0.6–1.7)	–	0.7 (0.5–1.1)	–	0.8 (0.5–1.3)	–
Uses family planning	1.6 (1.0–2.6) [a]	1.5 (0.7–3.0)	0.9 (0.6–1.3)	–	1.2 (0.8–2.0)	–
HIV test status (positive)	1.2 (0.8–1.9)	–	0.9 (0.6–1.4)	–	0.9 (0.6–1.5)	–
Duration since first positive HIV test result (>4 y)	2.1 (1.1–4.1) [a]	1.9 (0.9–3.9)	0.9 (0.6–1.6)	–	1.7 (0.9–3.2)	0.4 (0.2–0.6) [b]

Abbreviations: OR, odds ratio; CI, confidence interval.

[a] $P \leq 0.05$.

[b] $P \leq 0.001$.

[c] $P \leq 0.01$.

Table 4

Predictors of high knowledge score.[a]

Predictors	Unadjusted model	Adjusted model
Age (>30 y)	−0.2 (−0.6 to 0.3)	–
Education (beyond primary school)	0.9 (0.4–1.4) [b]	0.8 (0.0–1.6) [c]
Occupation (works outside the home)	0.8 (0.3–1.2) [b]	0.7 (−0.5 to 1.8)
Site (recruited at district hospital)	0.5 (0.0–1.1) [c]	0.4 (−0.3 to 1.1)
Transportation to clinic (>30 min)	−0.4 (−0.9 to 0.1)	–
Knows someone with cervical cancer	−0.3 (−0.8 to 0.2)	–
Health screening behavior score	0.4 (−0.1 to 1.0)	–
Age at sexual debut (≥18 y)	0.0 (−0.4 to 0.5)	–
Lifetime sexual partners (>3)	0.6 (0.1–1.1) [c]	0.5 (0.1–0.9) [c]
Uses family planning	0.1 (−0.4 to 0.6)	–
HIV test status (positive vs negative or unknown)	0.2 (−0.3 to 0.6)	–
Duration since first positive HIV test result (>4 y)	0.5 (−0.1 to 1.1)	0.6 (0.0–1.2) [c]

[a] Values are given as correlation coefficient (95% confidence interval).

[b] $P \leq 0.001$.

[c] $P \leq 0.05$.

Table 5

Perception of personal risk of cancer and other conditions among 419 participants.[a,b]

Condition	Response		
	Yes	No	Does not know
Cervical cancer	288 (68.7)	71 (17.0)	60 (14.3)
Sexually transmitted infections	233 (55.6)	147 (35.1)	39 (9.3)
Breast cancer	265 (63.3)	105 (25.1)	49 (11.7)
HIV [c]	135 (72.6)	46 (24.7)	5 (2.7)
Malaria	366 (87.4)	46 (11.0)	7 (1.7)

[a] Values given as number (percentage).

[b] Participants were asked whether they felt at personal risk for each condition.

[c] Among respondents with negative HIV test results or unknown HIV test status (n=186).