Challenges to early detection of cervical cancer at primary healthcare level in Resource limited settings; a descriptive study.

Charles Nkurunziza (✉ nkurunziza86@gmail.com)

University of Global Health Equity <https://orcid.org/0000-0002-5883-6690>

Diomedes Ntsumbumuyange

University of Rwanda College of Medicine and Health Sciences

Lisa Bazzett-Matabele

University of Botswana

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Abstract

Objectives To assess the healthcare system related factors that cause delayed cervical cancer diagnosis at the primary healthcare level.

Methods This was a descriptive study of healthcare providers in outpatient clinics at 10 health centers in Kigali city and the Eastern province of Rwanda. Care providers completed a survey questionnaire.

Results Eighty-seven (87) health care providers participated. Of respondents, 85 (97.7%) were nurses and midwives, 81.6% being nurses. Only 15 (17.2%) reported to have received training on visual inspection with acetic acid (VIA) cervical cancer screening; and were distributed in 6/10 of the health centers surveyed. However, 75.9% of respondents reported that there was at least one person trained in VIA at their health center. Necessary basic equipment for cervical cancer evaluation was reported to be generally available. Overall, 49 (56.3%) participants were found to have adequate basic knowledge on cervical cancer symptoms and appropriate next step in the case of symptoms. We found no association between respondents' knowledge of cervical cancer screening and profession or education level, work experience or reported prior training on VIA ($p = 0.592, 0.384, 0.174$ and 0.404 , respectively).

Conclusion There is a large gap in number of care providers with enough skills to perform cervical cancer VIA screening at health centers in Rwanda. As health centers are patients' first point of contact with the healthcare system, there is a need to empower them in human resources and infrastructure if effective cervical cancer screening and prevention program is to be established.

Introduction

Cervical cancer is the fourth most frequent cancer in women worldwide and represented 7.5% of all women cancer deaths in 2018 (1). It is a preventable disease due to its long pre-invasive phase and ability for early detection (2). However, it is still responsible for approximately 311,400 deaths worldwide as of 2018 estimates (3). About 90% of deaths due to cervical cancer occur in low and middle-income countries and current predictions show that this percentage will go up to 98% by 2030 (2,4). Sub-Saharan Africa is among the regions with high cervical cancer incidence rates and Eastern Africa is one of the most heavily affected areas in the world (5).

In Rwanda, cervical cancer ranks as the number one leading cause of women cancer deaths with estimates of 1304 newly diagnosed cases and associated 921 deaths per year (6). The high mortality rate associated with cervical cancer in Rwanda is, in part, due to late diagnosis of the disease. A study done at Butaro Cancer Center in Rwanda showed that 97% of cervical cancer patients enrolled at the center from July 2012 to June 2015 had stage II disease or above (7). Delay in diagnosis is a major concern in cervical cancer prevention and treatment programs. A study done in Nepal showed that in addition to patient delay, health provider delay is also equally important in delaying cervical cancer diagnosis (8). In Rwanda as well as other developing countries, there is lack of established cervical

cancer screening programs. It is estimated that only 5% of women are appropriately screened for cervical cancer in low and middle income countries (2,9).

The primary healthcare level is the first point of contact between the community and the health care system and is therefore crucial in the establishment of a cervical cancer prevention program. There are patient factors as well as healthcare system factors that contribute to late detection of cervical cancer. The aim of this study is to assess the health system challenges encountered by primary healthcare level providers in Rwanda that contribute to the lack of screening and delayed diagnosis of cervical cancer.

Materials And Methods

This was a descriptive study evaluating healthcare providers involved in outpatient clinics, mainly nurses and midwives. A survey questionnaire was completed by health care providers attending outpatient consultations at the selected health centers (HC). Ten (10) HC were randomly selected, 7 of them located within Kigali city and the other 3 located in the Eastern Province. Health centers from Kigali City included Kabuga, Masaka, Busanza and Nyarugunga in Kicukiro district and Muhima, Gitega and Biryogo, located in Nyarugenge district. The HC from the Eastern province included Muyumbu, Nyagasambu and Musha in Rwamagana District. The study was conducted in 10 HC with an average of 11 staff per each HC rotating in outpatient clinics. Participants were enrolled in the study after signing an informed participation consent form.

The sample size was estimated at 86 respondents, calculated using the online [surveymonkey.com](https://www.surveymonkey.com) sample size calculator with a confidence level of 95% and margin of error of 5%. Data were collected on hard copy questionnaires; electronic data entry was done using Microsoft Excel worksheet. Knowledge score variable was deduced from aggregation of score on 11 basic knowledge questions that were asked. A score above or equal to 70% was considered as adequate knowledge while a score less than 70% was considered inadequate knowledge. After data cleaning, data was imported into IBM SPSS statistics for windows software version 20 for analysis¹⁰. Descriptive statistics were used to summarize demographic characteristics of respondents, distribution pattern of healthcare providers and availability of facilities for cervical cancer screening. Fisher's exact test was used to test the association between knowledge level and different respondent categories.

This study received approval from the University of Rwanda College of Medicine and Health Sciences Institutional Review Board (No 083/CMHS IRB/2018). Authorization for data collection was obtained from Muhima, Masaka and Rwamagana district hospitals whose catchment areas include the 10 HC selected for this study.

Results

This study assessed 87 healthcare providers from 10 different HCs, 7 of them located in Kigali city and 3 in the Eastern province of Rwanda. Demographics of respondents are shown in *Table 1*. The majority

(97.7%) of our study participants were nurses and midwives, with 81.6% being nurses. Only one (1.1%) clinical officer participated in the study and 1(1.1%) remaining participant was classified as others. A clinical officer is a legally recognized health professional who is licensed to independently perform general medical duties such as diagnosis and treatment of disease and injury, order and interpret medical tests, perform routine medical and minor surgical procedures(10). Clinical officers are also called medical assistants in some countries(10,11).

Regarding the level of education attained by participants, 58.6% had an A1 education level (advanced diploma) and 34.5% had an A2 education level, also called enrolled nurses (a high school degree offered in the past but no longer exists on the Rwandan academic curriculum since 2007) (12). Only 6.9% of respondents held a bachelor's degree. Respondents with work experience of more than 5 years were 58.6%.

Data regarding the distribution of healthcare providers trained on visual inspection with acetic acid (VIA) cervical cancer screening are shown in *Table 2*. Of 87 respondents, 17.2% reported to have received training on VIA screening and were distributed in 6 out 10 surveyed HC. However, 75.9% of all respondents reported that there was at least one person trained in VIA screening at their respective HC.

The availability of facilities for cervical cancer screening at HC are summarized in *Table 3*. We found that 69.0% of respondents reported that cervical cancer screening was being done at their respective HC. However, despite their clinical judgment for the need to perform a pelvic exam, 65.5% providers reported being unable to perform pelvic exam for cervical cancer evaluation due to lack of time (too many patients waiting) or lack of experience in evaluating for cervical cancer. The basic equipment needed for cervical cancer evaluation were reported to be available. Of the respondents, 94.3% reported to have a table for pelvic examination, 81.6% a source of light for examination and 96.6% reported to have speculums at their HC.

The results of bivariate analysis on the association between respondents' level of basic knowledge on cervical cancer screening and different characteristics are shown in *Table 4*. Of 87 respondents, 56.3% were found to have adequate knowledge, with no significant association between knowledge level and respondent profession, education level, work experience or reported past training on VIA screening ($p = 0.592, 0.384, 0.174$ and 0.404 , respectively).

Discussion

Findings from this study show that nurses and midwives, who made up 97.7% of our respondents, are the main providers of cervical cancer screening and prevention services in Rwandan HCs. Studies done in similar resource limited settings showed variation in professional backgrounds of cervical cancer screening and prevention service providers. Data from Malawi are similar to Rwanda where the majority of providers are of nursing background at 92.7% (13). Contrary to Rwanda and Malawi, in Kenya there are a variety of different professional backgrounds involved in cervical cancer screening and prevention services. A survey done in Kenya on cervical cancer screening and prevention providers found that 28%

were clinicians (nurses or clinical officers), 56% were health educators (community clinical health assistants, community health workers, peer educators, counselors, mentor mothers, and volunteers) and 16% were ancillary staff (pharmacy, laboratory and cleaning staff). Each was involved at different levels of cervical cancer services such as the actual VIA/VILI screening, patient education or filling entry forms (14). Considering the current critical shortage of healthcare professionals in the developing world, this approach in Kenya of training clinicians and non-clinicians in the provision of cervical cancer care services needs to be replicated in other low-resource countries in need of establishing organized and working cervical cancer prevention programs¹⁴. In Rwanda, community health workers have contributed significantly to decreased maternal morbidity and mortality through increased adherence to prenatal care follow up and increased health facility deliveries(15). They could be of importance in increasing the uptake of cervical cancer screening services through community sensitization and follow up.

As discussed, the shortage of healthcare staff is still critical in Rwanda as well as other developing countries (16). The findings of this study also demonstrate the scarcity of staff trained in VIA cervical cancer screening at HC in Rwanda. Cervical cancer screening with VIA is the method recommended by WHO to be the most feasible and cost-effective in resource limited settings (2,17,18). We found that only 17.2% of the respondents reported to have received training on VIA screening and were distributed in 6 out of 10 HC included in the study. Although 75.9% of providers reported having at least one staff trained in VIA screening at their respective HC, 2 or fewer respondents at 9 out of the 10 HC studied reported to have received training on VIA cervical cancer screening. These findings are similar to other limited-resource countries where shortages of staff, specifically those trained in cervical cancer screening, are reported. The survey done in Kenya evaluating providers' perceptions on barriers to cervical cancer screening found that 62% reported inadequate staffing as the primary barrier to cervical cancer service delivery and 60% reported the limited number of trained staff as the primary barrier (14). Similarly, findings in Malawi showed lack of readily available staff to offer cervical cancer screening and prevention services (13). There is a need to train more staff on VIA cervical cancer screening in order to establish a functional cervical cancer screening program.

Despite the necessity to perform a pelvic examination for cervical cancer screening or to evaluate symptoms suspicious for cervical cancer, 38.4% of respondents were not performing pelvic exam because they lacked experience and 27.9% because of lack of time. These findings are concerning considering that a speculum and or pelvic exam is the first evaluation necessary to detect cervical lesions or raise the suspicion of cervical cancer cases to be referred to the trained staff within the same HC or to a higher-level health facility for appropriate evaluation. These findings are supported by data from a study performed at Kigali University Teaching Hospital in Rwanda with patients who attended cervical cancer screening services, where they found that 95% of the patients were referred from a low-level health facility and 33% of them had no prior speculum evaluation despite their symptoms suspicious for cervical cancer(19). For addressing the lack of appropriate pelvic evaluation for patients in need, each HC should be equipped with a cervical cancer screening unit separate from other outpatient services with

trained staff assigned to perform routine screening and evaluate those referred from fellow care providers.

The majority of respondents (69%) reported that cervical cancer screening is being offered at their HC. They reported that the basic equipment for screening service, including examination table, light source and speculums, were available (94.3%, 81.6% and 97.7%, respectively). Contrary to these findings, inadequate infrastructures and insufficient basic equipment and supplies are repeatedly reported to be among the challenges to cervical cancer screening in resource limited settings (13,14). Our study was limited in its design as it was based on participants' responses and not able to assess the type and quality of cervical cancer screening services that are offered at the HCs. Specifically, we did not assess the quality, quantity and functional status of the facilities that were reported as sufficient. We believe an important next step would be to physically assess the quality and quantity of the equipment available for cervical cancer screening programs. There is need to avail enough equipment since lack of material for service provision is demotivating for women who would have presented for screening, and would have a negative effect on uptake of screening services even in sensitized community.

All of the respondents agreed that cervical cancer is a public health problem in Rwanda. Similar to other countries with limited resources such as Nigeria, health care providers in Rwanda also show awareness of cervical cancer as a public health issue, an important step in establishing cervical cancer screening and prevention services(20). However, their knowledge, skills and confidence level on offering cervical cancer prevention and detection services still need improvement. The present study found that 56.3% of participants had an adequate level ($\geq 70\%$) of basic knowledge on cervical cancer presentation and the appropriate next step in evaluating for it. It would be expected that knowledge level of cervical cancer screening and prevention would be associated with professional background, education level, work experience or prior training in VIA cervical cancer screening. However, our study failed to find an association between these variables. These findings could be attributed to an overall lack of training of health care workers about cervical cancer or the lack of routine practice on cervical screening for the small number of providers who have received training on cervical cancer screening in the past. These findings reflect an almost non-existing cervical cancer screening program, putting almost all staff at the same level of knowledge, because even those who were trained or those who have many years of work experience have not been providing cervical cancer screening services.

This study highlights the existing gap in the number of healthcare providers with adequate knowledge and skills to provide cervical cancer screening and prevention services at health centers in Rwanda. As health centers are the first point of contact of the patients with the healthcare system, there is a need to empower them with both human resources and infrastructure if an effective cervical cancer prevention program is to be established. As providers are often overburdened with providing acute care, there is also a need to have a separate unit for cervical cancer screening at each health center to facilitate the provision of routine cervical cancer screening and evaluation of patients with symptoms suspicious for cervical cancer.

Cervical cancer is preventable and treatable with early detection and appropriate management(21). For its elimination, coordinated effort is needed to integrate a functional cervical cancer screening program into our health system and ensure that every woman over 30 years of age is screened and eventually treated for cervical precancerous lesions as we are called to by the WHO(21).

List Of Abbreviations

HC: Health Center

VIA: Visual Inspection with Acetic acid

VILI: Visual Inspection with Lugol's Iodine

WHO: World Health Organization

Declarations

Ethics approval and consent to participate

This study received ethical approval from the University of Rwanda College of Medicine and Health Sciences Institutional Review Board (No 083/CMHS IRB/2018). Authorization for data collection was obtained from Muhima, Masaka and Rwamagana district hospitals whose catchment areas include the 10 HC selected for this study. Participants were enrolled in the study upon signing a consent form for participation.

Consent for publication

Not applicable

Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

This work is the result of collaboration between authors.

Study conception: CN and LBM. Data acquisition: CN. Data analysis and interpretation: CN and LBM. Drafting the manuscript: CN, LBM, DN. All authors have read and approved the final manuscript

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Table 1: Demographics of respondents

		Frequency	Percentage
n		87	100
Profession	Nurse	71	81.6
	Midwife	14	16.1
	Clinical officer	1	1.1
	Other	1	1.1
Education level	A2	30	34.5
	A1	51	58.6
	Bachelor (A0)	6	6.9
Work experience	0-2 years	17	19.5
	3-5 years	19	21.8
	6-10 years	17	19.5
	More than 10 years	34	39.1

Table 2: VIA cervical cancer screening at Health Centers

Health Center	Does your health center have a staff trained in VIA cervical cancer screening?			Are you trained in VIA cervical cancer screening?	
	No	Yes	Don't know	No	Yes
A (n=9)	0 (0.0%)	9 (100.0%)	0 (0.0%)	7 (77.8%)	2 (22.2%)
B (n=10)	6 (60.0%)	1 (10.0%)	3 (30.0%)	10 (100.0%)	0 (0.0%)
C (n=11)	2 (18.2%)	8 (72.7%)	1 (9.1%)	11 (100.0%)	0 (0.0%)
D (n=11)	0 (0.0%)	11 (100.0%)	0 (0.0%)	10 (90.9%)	1 (9.1%)
E (n=12)	0 (0.0%)	12 (100.0%)	0 (0.0%)	10 (83.3%)	2 (16.7%)
F (n=8)	0 (0.0%)	7 (87.5%)	1 (12.5%)	7 (87.5%)	1 (12.5%)
G (n=8)	0 (0.0%)	7 (87.5%)	1 (12.5%)	6 (75.0%)	2 (25.0%)
H (n=7)	0 (0.0%)	7 (100.0%)	0 (0.0%)	0 (0.0%)	7 (100.0%)
I (n=5)	0 (0.0%)	3 (60.0%)	2 (40.0%)	5 (100.0%)	0 (0.0%)
J (n=6)	3 (50.0%)	1 (16.7%)	2 (33.3%)	6 (100.0%)	0 (0.0%)
Total (n=87)	11 (12.6%)	66 (75.9%)	10 (11.5%)	72 (82.8%)	15 (17.2%)

Table 3: Availability of facilities for cervical cancer screening

		Frequency	Percentage
n		87	100
Is VIA cervical cancer screening done at your health center?	No	23	26.4
	Yes	60	69.0
	Don't know	4	4.6
In outpatient consultation, do you have time to perform pelvic examination?	No	15	17.2
	Yes	72	82.8
Do you ever want to perform pelvic exam for cervical cancer evaluation and do not do it because?	No time (many patients waiting)	24	27.6
	No appropriate material	16	18.4
	Not trained to do it	13	14.9
	Not experienced at doing it	33	37.9
	Missing	1	1.1
Do you have a table for pelvic examination	No	5	5.7
	Yes	82	94.3
Do you have a source of light for pelvic examination?	No	14	16.1
	Yes	71	81.6
	Don't know	2	2.3
Do you have speculums at your health center?	No	2	2.3
	Yes	84	96.6
	Missing	1	1.1

Table 4: Bivariate analysis: Respondents' characteristics and basic knowledge level

Category		Inadequate knowledge	Adequate knowledge	P value
		n (%)	n (%)	
Total (n=87)		38(43.7%)	49(56.3%)	-
Respondent profession	Nurse	32(45.1%)	39(54.9)	0.592
	Midwife	5(35.7%)	9(64.3%)	
	Clinical officer	0(0.0%)	1(100.0%)	
	Other	1(100.0%)	0(0.0%)	
Education level	A2	11(36.7%)	19(63.3%)	0.384
	A1	23(45.1%)	28(54.9%)	
	Bachelor (A0)	4(66.7%)	2(33.3%)	
Work experience	0-2 years	11(64.7%)	6(35.3%)	0.174
	3-5 years	9(47.4%)	10(52.6%)	
	6-10 years	7(41.2%)	10(58.8%)	
	>10 years	11(32.4%)	23(67.6%)	
Received training on cervical cancer screening	No	30(41.7%)	42(58.3%)	0.407
	Yes	8(53.3%)	7(46.7%)	