Published in final edited form as:

Int J Gynaecol Obstet. 2017 July ; 138(1): 53–61. doi:10.1002/ijgo.12174.

Acceptance of peer navigators to reduce barriers to cervical cancer screening and treatment among women with HIV infection in Tanzania

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Abstract

Objective—To identify barriers to cervical cancer screening and treatment, and determine acceptance toward peer navigators (PNs) to reduce barriers.

Methods—A cross-sectional study was conducted among women with HIV infection aged 19 years or older attending HIV clinics in Dar es Salaam, Tanzania, between May and August 2012. Data for sociodemographic characteristics, barriers, knowledge and attitude toward cervical cancer screening and treatment, and PNs were collected by questionnaire.

Results—Among 399 participants, only 36 (9.0%) reported previous cervical cancer screening. A higher percentage of screened than unscreened women reported being told about screening by someone at the clinic (25/36 [69.4%] vs 132/363 [36.4%]; $P=0.002$), knew that screening was free (30/36 [83.3%] vs 161/363 [44.4%]; $P<0.001$), and obtained “good” cervical screening attitude

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Author contributions

AK, SB, and TM were involved in planning the study, design of the questionnaire, data collection, data entry, and revision of the manuscript. AK also conducted data analysis and wrote the results section. PEJ was responsible for study design, development of the protocol, obtaining ethical approval, planning the research, guiding the data analysis, interpreting the data, and writing the manuscript. RM, NFL, EAA, SY, and JDM were responsible for study conception, review of the study protocol and questionnaire, planning and supervising the study in the field, and revision of the manuscript. RM also participated in data collection.

Conflict of interest

The authors have no conflict of interest.

scores (17/36 [47.2%] vs 66/363 [18.2%]; $P=0.001$). Most women (382/399 [95.7%]) did not know about PNs. When told about PNs, 388 (97.5%) of 398 women said they would like assistance with explanation of medical terms, and 352 (88.2%) of 399 said they would like PNs to accompany them for cervical evaluation and/or treatment.

Conclusion—Use of PNs was highly acceptable and represents a novel approach to addressing barriers to cervical cancer screening and treatment.

Synopsis

Women with HIV infection in Dar es Salaam were positive about peer navigators to assist in scheduling and accompany them for cervical screening and treatment.

Keywords

Barriers; Cervical cancer; Peer navigators; Screening; Tanzania

1 INTRODUCTION

In Africa, 40% of all cases of cervical cancer occur in East Africa [1]. Within this region, Tanzania has the highest burden of the disease: the age-standardized incidence and frequency of mortality are, respectively, 54 and 32.4 cases per 100 000 women [2]. When women are diagnosed with cervical cancer that has spread to surrounding tissues or organs and/or the regional lymph nodes, the 5-year survival rate is 57% as opposed to 92% for cervical cancer caught at an early stage [3]. The 5-year survival rate is only 17% for cervical cancer that has already spread to a distant part of the body [3]. In many low-resource countries such as Tanzania, the high mortality from the disease is due to limited access to screening, diagnosis, and treatment [4]. In Tanzania, women with cervical cancer are twice as likely to be infected with HIV than are women without cervical cancer, and women with HIV infection develop cervical cancer 10 years earlier than non-infected women [5]. The prevalence of HIV is 6.2% among women aged 15–49 years in the country [6]; this is associated with a corresponding and substantial burden in cervical cancer.

When precancerous lesions are detected and treated early, cervical cancer is highly preventable. WHO has recommended high screening coverage as a key component of a successful prevention program [7]. However, cervical cancer screening and prevention services are not readily available to most women in Tanzania: cytology-based screening, as used in high-income countries, is currently not feasible because of the high investments in human and technologic resources that are required to sustain such a program.

Visual inspection with acetic acid (VIA), an evidence-based alternative approach to cytology-based screening for cervical cancer in low-resource settings, is the recommended screening method in Tanzania [4]. It requires fewer resources, and its sensitivity for detecting precancerous lesions (77%; range 56%–94%) is similar to, or greater than, that for cervical cytology (60%; range 35%–84%) [8]. Additionally, VIA provides immediate results that enable screening to be linked with treatment. Combined with freezing of precancerous lesions in one visit, VIA is an effective and efficient strategy for prevention of cervical

cancer in low-resource settings, and can be conducted by competent clinicians and nurses [9–11].

In Tanzania, women with HIV infection attending public-sector HIV care and treatment clinics (CTCs) run by Management and Development for Health—a leading non-profit Tanzanian Public Health organization—can be lost to follow-up after initial screening. Women with positive VIA results from across the country are referred to the Ocean Road Cancer Institute (ORCI) in Dar es Salaam for evaluation by colposcopy and biopsy sampling, but there are limited mechanisms in place to help women to navigate potential barriers to attendance for confirmatory diagnosis and treatment. Given the epidemiologic data on cervical cancer and HIV in Tanzania, priority should be given to identifying and mitigating barriers to follow-up care and to providing support to promote the uptake of health services and early detection.

The Patient Navigation Model (PNM) was developed by Freeman et al. [12,13] to help women of low socioeconomic status to adhere to breast cancer screening and treatment guidelines at the Harlem Hospital Center in the USA, and has served as the model for the “Patient Navigator Outreach and Chronic Disease Prevention Act of 2005.” Since the early 1990s, the PNM has been used in the USA as a strategy to support mainly underserved patients as they go through screening, diagnosis, and treatment of cancer [12–15]. Patient navigators act as case managers [14] to assist patients diagnosed with cancer to overcome barriers, and to follow through and adhere to treatment regimens [12–16]. The PNM has also been used to help vulnerable populations access reproductive health services and reduce cancer health disparities in low-resource settings in the southern US states of Alabama and Mississippi [17,18], and in countries in Africa [19,20]. The aim of the present study was to identify barriers to cervical cancer screening, diagnosis, follow-up care, and treatment among women with HIV infection in Dar es Salaam, and to determine the feasibility of integrating peer navigators (PNs) to both reduce barriers to CC screening and enhance the navigation of complex cancer services to ensure follow-up care and treatment.

2 MATERIALS AND METHODS

The present cross-sectional study was conducted among 400 women with HIV infection aged at least 19 years attending 12 Management and Development for Health public-sector HIV CTCs in and around Dar es Salaam, Tanzania, from May 1 to August 31, 2012. Management and Development for Health physicians and nurses informed eligible women about the study and invited them to participate. Women who expressed an interest were introduced to the study staff. A trained research assistant fluent in Kiswahili and English explained the study and the informed consent process. All participants provided informed consent. The institutional review boards of the University of Alabama at Birmingham, USA, and the National Institute for Medical Research in Dar es Salaam, Tanzania, reviewed and approved the study protocol before its implementation.

Consenting eligible women were administered a questionnaire (in English or Kiswahili) that collected information on sociodemographic characteristics, barriers to cervical cancer screening and treatment, knowledge and attitude toward cervical cancer screening, and

perceptions and attitudes toward PNs. The questionnaire was self-administered, with guided assistance from study staff. A trained research assistant or a designated nurse administered the questionnaire to women who could not read.

A score determining knowledge of causes of cervical cancer was calculated by assigning points to answers to six questions assessing knowledge with a maximum of 12 points: knowledge was ranked as poor for scores of 0–5 points, average for 6–8 points, and good for 9–12 points. Similarly, a score determining attitude toward cervical cancer screening was also calculated by assigning points to answers to five questions assessing attitude with a maximum of 5 points: attitude was ranked as poor for scores of 0–1 points, average for 2–3 points, and good for 4–5 points.

The sample size was calculated using an acceptable difference of 0.05, prevalence rate of 50%, an alpha of 0.05, and 80% power. A sample of 385 women was required. An extra 15 women were added to bring the sample to 400 to ensure that a sufficient number of completed questionnaires would be available for analysis. A prevalence of 50% was used because the true proportion of women who would consider peer navigation acceptable was unknown.

Descriptive and statistical analyses were conducted using SAS version 9.3 (SAS Institute, Cary, NC, USA). Data were stratified by history of cervical cancer screening. The Fisher exact test was used to determine significance between groups, and $P < 0.05$ was considered statistically significant.

3 RESULTS

Four hundred women were recruited for the study, but cervical screening status was not available for one woman; therefore, the final sample includes 399 women. Table 1 shows their characteristics. More than half the women were aged 19–39 years, and more than three-quarters had no or only primary education. Over half were Muslims; the remaining women were Christians. Approximately 40% were married or living in a union. Almost half the women had one or two children. More than one-fifth of participants were unemployed. Most women owned a mobile phone, and many received free incoming SMS messages. Only 36 (9.0%) of the women reported previous cervical cancer screening. Among the 399 women, 88 (22.1%) had known about their HIV-positive status for less than 1 year, 214 (53.6%) for 1–5 years, 83 (20.8%) for 6–10 years, and 14 (3.5%) for more than 10 years.

A significantly higher percentage of screened than unscreened women reported that someone at the CTC had told them about cervical cancer ($P < 0.001$) (Table 2). Although almost 70% of screened women reported that they had heard about cervical cancer screening from a member of the hospital staff (doctor, nurse, or hospital counselor), half the unscreened women reported that they had heard of cervical cancer through the media (television, radio, or newspaper) (Table 2).

Overall, approximately half the women did not know that HIV infection increased the risk of HPV infection, and one-fifth did not know that a woman can have cervical cancer and not know it (Table 2). Almost all women, screened or unscreened, knew that it is important to

follow-up on positive screens for cervical cancer, and approximately 90% knew that early detection and treatment of cervical lesions can prevent development of cervical cancer (Table 2). A large proportion of screened and unscreened women knew that cervical cancer can be treated (Table 2).

A significantly higher percentage of screened versus unscreened women knew that cervical cancer screening was free ($P<0.001$) (Table 2). A significantly higher percentage of unscreened versus screened women did not know that cervical cancer treatment was free ($P<0.001$) (Table 2).

Although higher proportions of unscreened versus screened women had to travel 31–60 minutes and 61–20 minutes to the ORCI, the reverse was true for the longer travel time of more than 120 minutes (Table 2). The most common mode of transportation used by the women was the bus (Table 2). Although most women said they could take time off from work to go to the clinic, approximately 6% said they were unable to (Table 2).

Most unscreened women said that they wanted to be screened for cervical cancer (Table 3). However, two-thirds said that the queue to receive follow-up services for a positive screening result is too long (Table 3). Approximately 19% of participants thought that it was embarrassing to be screened for cervical cancer, and a large proportion of both unscreened and screened women thought that the cervical examination was painful (Table 3). Almost all women said that they would prefer to be examined by a female doctor and that they would feel more comfortable with a female nurse in the room if they were being examined by a male doctor. Most women said that they would be able to attend the clinic for cervical screening on a Saturday. An attitude score compiled from responses to the questions listed in Table 3 showed that a significantly higher percentage of screened women obtained “good” attitude scores versus unscreened women ($P<0.001$).

Most women, screened or unscreened, did not know what a PN does, but agreed that it would be helpful to have someone talk with them about cervical cancer (Table 4). When told about ways in which a PN could help, many agreed that a PN with HIV infection would be more helpful than one without HIV, and others felt that a PN who was a cervical cancer survivor would be more helpful than one who was not (Table 4). Most women said they would like emotional support, assistance with both explanation of medical terms and setting up appointments, and transportation to ORCI during treatment. Many said that they would like the PN to accompany them to the clinic for cervical evaluation, referral, and treatment. Approximately 90% agreed that receiving SMS message reminders of appointments would be helpful, and 92% agreed to phone call reminders.

4 DISCUSSION

The present data showed that a small proportion (9%) of women with HIV infection had been screened for cervical cancer. Whereas most screened women reported that they had heard about cervical cancer screening from a healthcare provider at the CTC, approximately 50% of unscreened women reported that they heard of cervical cancer through the media. Most of the women knew that it is important to follow up on positive screens for cervical

cancer, that early detection and treatment of cervical lesions can prevent the disorder from developing, and that it can be treated. PNs were highly acceptable to most of the study women. Most said that they would like the PN to accompany them to the clinic for cervical evaluation, referral, and treatment, and would especially welcome PNs with HIV infection who had been screened for cervical cancer or who were cervical cancer survivors.

The low rate of screening observed in the study is in keeping with screening rates reported in low-income countries. An analysis of cervical cancer screening in 57 countries by Gakidou et al. [21] reported that, on average, the screening coverage in low-resource countries was 19% as compared with 63% in high-resource countries, ranging from 1% in Bangladesh to 73% in Brazil. It is generally known that most low-income countries are not able to implement comprehensive cervical smear screening programs or to treat precancerous lesions as is done in high-income countries [4].

More than half the study women had known of their HIV-positive status for 1–5 years, and the remainder had known of their status for 6–10 years or longer; however, only 9% had been screened for cervical cancer. Although cervical cancer occurs more frequently among women with HIV infection than among those without [5], 50% of the study women did not know that HIV infection increased the risk of HPV infection, and approximately 19% did not know that a woman can have cervical cancer and not know it. These findings show a lack of both essential knowledge about cervical cancer and the relationship between HIV, HPV, and cervical cancer, and highlight the need for specific educational programs addressing these matters in Tanzania.

More than two-thirds of unscreened women reported that no one at the CTC had told them about cervical cancer. Whereas 69% of screened women reported that they had heard about screening from a doctor, nurse, or hospital counselor, almost 50% of unscreened women said that they heard of cervical cancer via TV, radio, or newspapers. Previous studies [22–24] have reported that physician recommendations seem to be an important predictor of cancer screening. Perhaps an increase in medical recommendations for cervical cancer screening would increase the number of women who get screened in Tanzania.

Notably, although only 9% of the study women had been screened, most knew that it is important to follow up on positive screens for cervical cancer, that early detection and treatment of cervical lesions can prevent the disorder from developing, and that it can be treated. Thus, there seems to be a lack of connection between this general knowledge of cervical cancer and the need or urgency to be screened among these women with HIV infection. Approximately 83% of screened women knew that cervical cancer screening was free as compared with 44% of unscreened women; furthermore, 60% of unscreened women did not know that treatment was free. This lack of knowledge of the availability of free screening and treatment might help to explain why many women had not been screened.

The concept of PNM was highly acceptable to most of the study women, with most agreeing that they would like assistance with the services provided by PNs. Approximately, 90% of the women agreed that receiving SMS message reminders of appointments for cervical cancer screening and treatment would be helpful, and 92% agreed with phone call

reminders. In Zambia, peer educators have been used successfully to guide women with and without HIV infection into cervical cancer screening and treatment [25]; however, peer educators are not as involved in patient care management as PNs [14]. The case management approach of the PNs involves a comprehensive process of follow-up for diagnosis and completion of primary therapy on diagnosis of a pre-cancerous lesion [14]. Assistance from PNs is more likely to be accepted because PNs are often from the same communities as the individuals in need of health services, and share similar socioeconomic characteristics and health conditions.

The present study has limitations that should be considered in interpreting the results. First, the very small number of screened women did not allow us to conduct analyses to identify predictors of cervical cancer screening. Second, the study women were recruited from clinics; thus, the findings might not be generalizable to women with HIV infection who do not access these clinics. Last, the data were self-reported and might be subject to social desirability bias.

Irrespective of these limitations, the present study has identified areas for interventions that can be implemented to increase cervical cancer screening and treatment among women with HIV infection in Dar es Salaam. Currently, there is no program or systematic mechanism to assist women with accessing cervical cancer screening and with attending the clinic for confirmatory diagnosis and treatment of pre-cancerous lesions. The use of PNs would represent a novel approach for addressing barriers to screening and seems to be highly acceptable among this cohort of women.

Acknowledgments

The research was supported by the UAB/CCC/CFAR National Cancer Institute (NCI) Supplement for HIV-related Malignancies, the UAB Cancer Prevention and Control Training Program (grant #CA 47888 from the NCI), and Minority Health International Research Training (grant #T37 MD001448 from the National Institute on Minority Health and Health Disparities, National Institutes of Health, USA). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

References

1. GLOBOCAN. [Accessed March 20, 2017] Cervical Cancer: Estimated Incidence, Mortality and Prevalence Worldwide in 2012. <http://globocan.iarc.fr/old/FactSheets/cancers/cervix-new.asp>. Published 2012
2. Afri-Dev. Incidence & Mortality. Scorecard. Published; 2014. Info, Information & Analysis on Health, Population, Human & Social Development, 2014 Africa Cervical Cancer Multi Indicator. http://www.who.int/pmnch/media/events/2014/africa_cancer_mortality.pdf [Accessed March 20, 2017]
3. Cancer.Net. [Accessed March 20, 2017] Cervical cancer statistics. <http://www.cancer.net/cancer-types/cervical-cancer/statistics>. Published 2016
4. Tanzania Service Delivery Guidelines for Cervical Cancer Prevention and Control. The United Republic of Tanzania Ministry of Health and Social Welfare; Aug. 2010
5. Kahesa C, Mwaiselage J, Wabinga HR, et al. Association between cancer of the cervix and HIV-1 infection in Tanzania: the need for dual screening. *BMC Public Health*. 2008; 8:262. [PubMed: 18664298]
6. AVERT Global Information and advice on HIV and AIDS. [Accessed March 20, 2017] HIV and AIDS in Tanzania. 2015. <http://www.avert.org/professionals/hiv-around-world/sub-saharan-africa/tanzania>

7. World Health Organization. [Accessed March 24, 2017] Comprehensive Cervical Cancer Control: A guide to essential practice. 2006. <http://www.who.int/cancer/publications/9241547006/en/>
8. Alliance for Cervical Cancer Prevention. [Accessed March 20, 2017] Cervical Cancer Prevention FACT SHEET: New evidence on the impact of cervical cancer screening and treatment using HPV DNA tests, visual inspection, or cytology. http://www.rho.org/files/ACCP_screening_factsheet_July09.pdf. Published 2009
9. Alliance for Cervical Cancer Prevention. [Accessed March 20, 2017] Cervical Cancer Prevention FACT SHEET: 10 Key Findings and Recommendations for Effective Cervical Cancer Screening and Treatment Programs. Apr. 2007 http://screening.iarc.fr/doc/ACCP_recs_2007_factsheet_final.pdf
10. Sherris J, Wittet S, Kleine A, Sellors J, Luciani S, Sankaranarayanan R, et al. Evidence-Based, Alternative Cervical Cancer Screening Approaches in Low-Resource Settings. *International Perspectives on Sexual and Reproductive Health*. 2009; 35(3)
11. Ngoma T, Muwonge R, Mwaiselage J, Kawegere J, Bukori P, Sankaranarayanan R. Evaluation of cervical visual inspection screening in Dar es Salaam Tanzania. *Int J Gynecol Obstet*. 2010; 109:100–104.
12. Freeman HP. A model patient navigator program. *Oncology Issues*. 2004; 19:44–46.
13. Freeman HP, Chu KC. Determinants of cancer disparities: Barriers to cancer screening, diagnosis, and treatment. *Surg Oncol Clinical N Am*. 2005; 14:655–669. [PubMed: 16226685]
14. Freund KM, Battaglia TA, Calhoun E, et al. The NCI Patient Navigation Research Program Methods, Protocol and Measures. *Cancer*. 2008; 113(12):L 3391–3399.
15. Freeman HP, Muth BJ, Kerner JF. Expanding access to cancer screening and clinical follow-up among the medically underserved. *Cancer Practice*. 1995; 3:1, 19–30.
16. Fouad M, Wynn T, Martin M, Partridge E. Patient navigation pilot project: Results from the community health advisors in action program (CHAAP). *Ethn Diseases*. 2010; 20:2, 155–161.
17. Lisovicz N, Johnson RE, Higginbotham J, et al. The Deep South Network for cancer control: Building a community infrastructure to reduce cancer health disparities. *Cancer*. 2006; 107:8, 1971–1979.
18. Norma C, Ware JI, Kaaya S, Biraro IA, Wyatt MA, Agbaji O, Chalamilla G, Bangsberg DR. Explaining Adherence Success in Sub-Saharan Africa: An Ethnographic Study. *PLOS*. 2009; 6:1.
19. Mugusi F, Mugusi S, Bakari M, Hejdemann B, Josiah R, Janabi M, Aboud S, Aris E, Swai H, Mhalu F, Biberfeld G, Pallangyo K, Sandstrom E. Enhancing adherence to antiretroviral therapy at the HIV clinic in resource-constrained countries; the Tanzanian experience. *Tropical Medicine International Health*. 2009; 14(10):1226–32. [PubMed: 19732408]
20. Lisovicz N, Wynn T, Fouad M, Partridge EE. Cancer Health Disparities: What we have done. *Am J Med Sci*. 2008; 335(4):254–9. [PubMed: 18461726]
21. Gakidou E, Nordhagen S, Obermeyer Z. Coverage of cervical cancer screening in 57 countries: low average levels and large inequalities. *PLOS Medicine*. 2008; 5(6):e132, 863–868. [PubMed: 18563963]
22. Breen N, Kessler L. Changes in the use of screening mammography: evidence from the 1987 and 1990 National Health Interview Surveys. *Am J Public Health*. 1994; 84(1):62–7. Epub 1994/01/01. [PubMed: 8279613]
23. Rimer BK, Trock B, Engstrom PF, Lerman C, King E. Why do some women get regular mammograms? *Am J Prev Med*. 1991; 7(2):69–74. [PubMed: 1910890]
24. Fox SA, Stein JA. The effect of physician-patient communication on mammography utilization by different ethnic groups. *Med Care*. 1991; 29(11):1065–82. [PubMed: 1943268]
25. Chirwa S, Mwanahamuntu S, Kapambwe S, Mkumba G, Stringer J, Sahasrabudde V, Pfaendler K, Parham G. Myths and misconceptions about cervical cancer among Zambian women: rapid assessment by peer educators. *Glob Health Promot*. 2010; 17(2 Suppl):47–50. [PubMed: 20595342]

Table 1Sociodemographic characteristics, by history of cervical cancer screening.^a

Characteristic	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
Age, y				0.044
19–39	231/394 (58.6)	13/34 (38.2)	218/360 (60.6)	
40–49	122/394 (31.0)	16/34 (47.1)	106/360 (29.4)	
50	41/394 (10.4)	5/34 (14.7)	36/360 (10.0)	
Educational level				0.784
None	49/398 (12.3)	6/36 (16.7)	43/362 (11.9)	
Some/all primary	293/398 (73.6)	24/36 (66.7)	269/362 (74.3)	
Some/all secondary	49/398 (12.3)	5/36 (13.9)	44/362 (12.2)	
Tertiary	7/398 (1.8)	1/36 (2.8)	6/362 (1.7)	
Religion				0.669
None	2/399 (0.5)	0/36	2/363 (0.6)	
Christian	174/399 (43.6)	14/36 (38.9)	160/363 (44.1)	
Muslim	223/399 (55.9)	22/36 (61.1)	201/363 (55.4)	
Marital status				0.551
Single or with a visiting partner	115/399 (28.8)	9/36 (25.0)	106/363 (29.2)	
Divorced/widowed	122/399 (30.6)	13/36 (36.1)	109/363 (30.0)	
Married/living with partner	162/399 (40.6)	14/36 (38.9)	148/363 (40.8)	
No. of children				0.086
0	48/398 (12.1)	1/36 (2.8)	47/362 (13.0)	
1–2	188/398 (47.2)	14/36 (38.9)	174/362 (48.1)	
3–4	120/398 (30.2)	16/36 (44.4)	104/362 (28.7)	
5	42/398 (10.6)	5/36 (13.9)	37/362 (10.2)	
Employment				0.370
Unemployed	92/399 (23.1)	12/36 (33.3)	80/363 (22.0)	
Informal income-generating activity	223/399 (55.9)	17/36 (47.2)	206/363 (56.7)	
Unskilled laborer ^b	50/399 (12.5)	4/36 (11.1)	46/363 (12.7)	
Skilled laborer	11/399 (2.8)	2/36 (5.6)	9/363 (2.5)	
Professional, business, or office worker	23/399 (5.8)	1/36 (2.8)	22/363 (6.1)	
No. in household				0.120
1–2	48/399 (12.0)	3/36 (8.3)	45/363 (12.4)	
3–4	150/399 (37.6)	9/36 (25.0)	141/363 (38.8)	
5–6	121/399 (30.3)	17/36 (47.2)	104/363 (28.7)	
7	80/399 (20.1)	7/36 (19.4)	73/363 (20.1)	
Daily expenses for household, Tanzanian shillings				0.560
0–5000	138/399 (34.6)	14/36 (38.9)	124/363 (34.2)	

Characteristic	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
5001–10,000	174/399 (43.6)	13/36 (36.1)	161/363 (44.4)	
10,001	87/399 (21.8)	9/36 (25.0)	78/363 (21.5)	
Own a mobile phone				0.816
No	65/396 (16.4)	5/36 (13.9)	60/360 (16.7)	
Yes	331/396 (83.6)	31/36 (86.1)	300/360 (83.3)	
Receive free incoming SMS messages				>0.99
No	81/399 (20.3)	8/36 (22.2)	73/363 (20.1)	
Yes	318/399 (79.7)	28/36 (77.8)	290/363 (79.9)	

^aValues are given as number/total number of responses (percentage) unless indicated otherwise.

^bJobs such as cook, cleaner, or laborer.

Knowledge of cervical cancer and of availability and accessibility to cervical cancer screening, by history of cervical cancer screening.^a

Table 2

Knowledge	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
Someone at the care and treatment clinic has talked to me about cervical cancer				<0.001
No/don't know	262/399 (65.7)	12/36 (33.3)	250/363 (68.9)	
Yes	137/399 (34.3)	24/36 (66.7)	113/363 (31.1)	
I heard about cervical cancer screening primarily from:				0.002
Hospital staff	157/399 (39.3)	25/36 (69.4)	132/363 (36.4)	
My family/friends	19/399 (4.8)	2/36 (5.6)	17/363 (4.7)	
Media (television, radio, newspaper, etc.)	189/399 (47.4)	8/36 (22.2)	181/363 (49.9)	
Not applicable	34/399 (8.5)	1/36 (2.8)	33/363 (9.1)	
Knowledge of causes of cervical cancer				0.563
Poor	58/399 (14.5)	3/36 (8.3)	55/363 (15.2)	
Average	280/399 (70.2)	27/36 (75.0)	253/363 (69.7)	
Good	61/399 (15.3)	6/36 (16.7)	55/363 (15.2)	
HIV makes me more likely to be infected with the virus that causes cervical cancer				0.601
No/don't know	201/399 (50.4)	20/36 (55.6)	181/363 (49.9)	
Yes	198/399 (49.6)	16/36 (44.4)	182/363 (50.1)	
A woman can have cervical cancer and not know it				0.268
No/don't know	75/398 (18.8)	4/36 (11.1)	71/362 (19.6)	
Yes	323/398 (81.2)	32/36 (88.9)	291/362 (80.4)	
It is important to follow up on positive screens for cervical cancer				>0.99
No/don't know	4/399 (1.0)	0/36	4/363 (1.1)	
Yes	395/399 (99.0)	36/36 (100.0)	359/363 (98.9)	
Early detection and treatment of cervical cancer lesions can prevent it from developing				>0.99
No/don't know	38/399 (9.5)	3/36 (8.3)	35/363 (9.6)	
Yes	361/399 (90.5)	33/36 (91.7)	328/363 (90.4)	
Cervical cancer can be treated				0.682

Knowledge	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
No/don't know	92/399 (23.1)	7/36 (19.4)	85/363 (23.4)	
Yes	307/399 (76.9)	29/36 (80.6)	278/363 (76.6)	
Cervical cancer screening is free				<0.001
No/don't know	208/399 (52.1)	6/36 (16.7)	202/363 (55.6)	
Yes	191/399 (47.9)	30/36 (83.3)	161/363 (44.4)	
Cervical cancer treatment is free				<0.001
No/don't know	228/398 (57.3)	8/36 (22.2)	220/362 (60.8)	
Yes	170/398 (42.7)	28/36 (77.8)	142/362 (39.2)	
Time to travel to ORCI, min				0.049
30	36/398 (9.0)	3/36 (8.3)	33/362 (9.1)	
31–60	177/398 (44.5)	13/36 (36.1)	164/362 (45.3)	
61–120	110/398 (27.6)	7/36 (19.4)	103/362 (28.5)	
120	75/398 (18.8)	13/36 (36.1)	62/362 (17.1)	
Mode of transport to ORCI				0.271
Walk	15/399 (3.8)	1/36 (2.8)	14/363 (3.9)	
Personal car	12/399 (3.0)	1/36 (2.8)	11/363 (3.0)	
Taxi	23/399 (5.8)	5/36 (13.9)	18/363 (5.0)	
Bus	337/399 (84.5)	28/36 (77.8)	309/363 (85.1)	
Auto rickshaw/motorcycle, taxi, or ferry	12/399 (3.0)	1/36 (2.8)	11/363 (3.0)	
Availability of childcare when at clinic				
No	114/399 (28.6)	10/36 (27.8)	104/363 (28.7)	0.849
Yes	244/399 (61.2)	23/36 (63.9)	221/363 (60.9)	
Not applicable	41/399 (10.3)	3/36 (8.3)	38/363 (10.5)	
Able to take time off from work				0.495
No	24/399 (6.0)	1/36 (2.8)	23/363 (6.3)	
Yes	284/399 (71.2)	27/36 (75.0)	257/363 (70.8)	
Not applicable	91/399 (22.8)	8/36 (22.2)	83/363 (22.9)	

Abbreviation: ORCI, Ocean Road Cancer Institute in Dar es Salaam, Tanzania.

Values are given as number/total number of responses (percentage) unless indicated otherwise.

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Table 3Attitudes toward cervical cancer screening, by history of cervical cancer screening.^a

Characteristic	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
I want to be screened for cervical cancer				>0.99
Disagree/neither agree nor disagree	15/399 (3.8)	1/36 (2.8)	14/363 (3.9)	
Agree	384/399 (96.2)	35/36 (97.2)	349/363 (96.1)	
The queue for follow-up services for a positive cervical cancer screen is too long				0.854
Disagree/neither agree nor disagree	135/399 (33.8)	13/36 (36.1)	122/363 (33.6)	
Agree	264/399 (66.2)	23/36 (63.9)	241/363 (66.4)	
It is embarrassing to be screened for cervical cancer				0.514
Disagree/neither agree nor disagree	322/396 (81.3)	30/35 (85.7)	292/361 (80.9)	
Agree	74/396 (18.7)	5/35 (14.3)	69/361 (19.1)	
Cervical examination is painful				0.077
Disagree/neither agree nor disagree	288/399 (72.2)	21/36 (58.3)	267/363 (73.6)	
Agree	111/399 (27.8)	15/36 (41.7)	96/363 (26.4)	
I would prefer a woman to examine me for cervical cancer				0.71
Disagree/neither agree nor disagree	20/399 (5.0)	1/36 (2.8)	19/363 (5.2)	
Agree	379/399 (95.0)	35/36 (97.2)	344/363 (94.8)	
I would feel more comfortable with a female nurse in the room if a male doctor is examining my cervix				0.243
Disagree/neither agree nor disagree	22/399 (5.5)	0/36	22/363 (6.1)	
Agree	377/399 (94.5)	36/36 (100.0)	341/363 (93.9)	
I would be able to attend the clinic for cervical cancer screening on a Saturday				0.094
Disagree/neither agree nor disagree	30/399 (7.5)	0/36	30/363 (8.3)	
Agree	369/399 (92.5)	36/36 (100.0)	333/363 (91.7)	
Attitude score				0.001
Poor	10/399 (2.5)	1/36 (2.8)	9/363 (2.5)	
Average	306/399 (76.7)	18/36 (50.0)	288/363 (79.3)	
Good	83/399 (20.8)	17/36 (47.2)	66/363 (18.2)	

Values are given as number/total number of responses (percentage) unless indicated otherwise

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Table 4Attitudes toward PNs, by history of cervical cancer screening.^a

Characteristic	All women (n=399)	History of cervical cancer screening		P value
		Yes (n=36)	No (n=363)	
I know what a PN/supporter does				0.250
No	382/399 (95.7)	36/36 (100.0)	346/363 (95.3)	
Yes	17/399 (4.3)	0/36	17/363 (4.7)	
It would be helpful for someone to talk to me about cervical cancer				0.380
Disagree/neither agree nor disagree	15/398 (3.8)	0/36	15/362 (4.1)	
Agree	383/398 (96.2)	36/36 (100.0)	347/362 (95.9)	
A PN with HIV would be more helpful than a PN without HIV				>0.99
Disagree/neither agree nor disagree	51/399 (12.8)	5/36 (13.9)	46/363 (12.7)	
Agree	348/399 (87.2)	31/36 (86.1)	317/363 (87.3)	
A PN who is a survivor of cervical cancer would be more helpful than a PN who is not				0.273
Disagree/neither agree nor disagree	80/399 (20.1)	10/36 (2.8)	70/363 (19.3)	
Agree	319/399 (79.9)	26/36 (72.2)	293/363 (80.7)	
Assistance with explaining medical terms procedures				>0.99
No	10/398 (2.5)	1/36 (2.8)	9/362 (2.5)	
Yes	388/398 (97.5)	35/36 (97.2)	353/362 (97.5)	
Assistance with emotional support during treatment				0.096
No	6/396 (1.5)	2/36 (5.6)	4/360 (1.1)	
Yes	390/396 (98.5)	34/36 (94.4)	356/360 (98.9)	
Assistance with setting up an appointment				0.318
No	4/396 (1.0)	1/36 (2.8)	3/360 (0.8)	
Yes	392/396 (99.0)	35/36 (97.2)	357/360 (99.2)	
Assistance with transportation to ORCI				>0.99
No	11/397 (2.8)	1/36 (2.8)	10/361 (2.8)	
Yes	386/397 (97.2)	35/36 (97.2)	351/361 (97.2)	
I would like the PN to accompany me to the clinic for cervical evaluation/referral for treatment				0.288

Characteristic	All women (n=399)	History of cervical cancer screening		
		Yes (n=36)	No (n=363)	P value
Disagree/neither agree nor disagree	47/399 (11.8)	2/36 (5.6)	45/363 (12.4)	
Agree	352/399 (88.2)	34/36 (94.4)	318/363 (87.6)	
It would be helpful to receive SMS message reminders of appointments for cervical cancer screening or treatment				0.420
Disagree	8/399 (2.0)	0/36	8/363 (2.2)	
Neither agree nor disagree	5/399 (1.3)	0/36	5/363 (1.4)	
Agree	358/399 (89.7)	35/36 (97.2)	323/363 (89.0)	
Not applicable	28/399 (7.0)	1/36 (2.8)	27/363 (7.4)	
It would be helpful to receive phone call reminders of appointments for cervical cancer screening or treatment				0.432
Disagree/neither agree or disagree	7/399 (1.8)	0/36	7/363 (1.9)	
Agree	366/399 (91.7)	35/36 (97.2)	331/363 (91.2)	
Not applicable	26/399 (6.5)	1/36 (2.8)	25/363 (6.9)	
I would be willing to educate other women about cervical cancer once I have learned more about the topic				0.626
Disagree/neither agree or disagree	14/399 (3.5)	2/36 (5.6)	12/363 (3.3)	
Agree	385/399 (96.5)	34/36 (94.4)	351/363 (96.7)	

Abbreviations: PN, peer navigator; ORCI, Ocean Road Cancer Institute in Dar es Salaam, Tanzania.

^aValues are given as number/total number of responses (percentage) unless indicated otherwise.