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Evidence for the Need of Educational Programs for Cervical Screening in Rural Tanzania

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Abstract

The Ocean Road Cancer Institute (ORCI) in Tanzania sees about 3,000 new cancer patients annually, 47% of whom have advanced cervical cancer. We interviewed 98 women from the screening clinic and 49 women from the new cancer treatment clinic about their education, income, occupation, residence, medical history, and knowledge about cancer. Women in the screening clinic had higher socioeconomic levels, as shown by more education and employment than women in the new-patient clinic. Patients from the screening clinic were also younger, lived in near ORCI, and had better knowledge of cancer than women from the new-patient treatment clinic. Educational programs focused on the importance of cervical screening in rural remote areas of Tanzania may have a positive impact on the early detection and identification of patients at early disease stages.

Keywords

Educational programs; Cervical screening; Cervical cancer; Early detection; Tanzania; Africa

Introduction

Cervical cancer was responsible for over 250,000 deaths in 2005 [1]. Over 80% of the cases occurred in developing countries [1]. The burden is highest in East Africa where the cervical cancer mortality rate is 34 deaths per 100,000 women per year compared to only nine deaths per 100,000 women per year worldwide [2]. The global disparity is due in part to the widespread use of the Papanicolaou (Pap) smear in developed countries for the early detection of cervical cancer. When precancerous changes are detected by Pap smears,

cervical cancer is almost 100% treatable [3]. Pap smears have been shown to be up to 80% effective in detecting such changes [1]. Therefore, by implementing it as a regularly practiced diagnostic procedure in developed countries, the worldwide incidence rate of cervical cancer dropped from 13.4 cases per 100,000 women in 1990 to 7.3 cases per 100,000 women in 2001, representing a 56% decrease in cervical cancer mortality [3].

Although the dramatic decrease in cervical cancer mortality has been a major accomplishment for cervical cancer prevention, the benefits are seen almost exclusively in developed countries [4]. The Pap smear, while highly effective, is not a practical solution for resource-poor settings. It not only requires highly trained professionals to carry out the cytology-based procedure, but it also utilizes expensive technology rarely available in developing countries [5]. In an effort to reduce mortality rates around the world, alternate screening techniques are being investigated. Visual inspection using acetic acid (VIA) has recently been shown to be an effective alternative when resources are limited [6].

In response to the growing burden of cancer and the need for cancer treatment and cancer education programs in Tanzania, the Ocean Road Cancer Institute (ORCI) was established in Dar es Salaam in 1996. As the only hospital dedicated exclusively to cancer treatment and prevention in East Africa, about 3,000 new patients are seen at the hospital each year. ORCI is primarily a treatment center, administering radiation and chemotherapy for patients with confirmed cancer diagnoses. Biopsies and other diagnostic procedures are performed at various hospitals throughout the country which then refer patients to ORCI for treatment, when necessary. In an effort to decrease the number of patients presenting at late stages and to improve the prognosis of those requiring radiation treatment, ORCI established a cervical cancer screening clinic in 2003. The screening clinic provides a variety of services including daily educational sessions regarding the biology and risk factors of cervical cancer, importance and methods of screening, VIA, colposcopy, biopsy, and referral services for abnormal tests. Furthermore, ORCI introduced an outreach program that travels to satellite clinics throughout Tanzania for cervical screening and educating local nurses and women about VIA and cervical cancer prevention.

As the screening clinic became more established, it was observed that women utilizing screening services appeared to have different demographic backgrounds than patients with cervical cancer in the new-patient clinic. As ORCI prepares to scale up its local and outreach screening and educational services, it was necessary to assess how the patient demographics of the screening and treatment groups of patients differ. If stark variations are observed, outreach programs targeting women similar to those presenting at the new-patient clinic should be considered. As a result, this study was conducted to compare the patient populations in the screening clinic and new-patient clinic with respect to background demographics, socioeconomic status, and medical conditions.

Methods

Background of the Research Site

ORCI consists of five separate clinics: a new-patient clinic, follow-up clinic, radiation treatment clinic, chemotherapy treatment clinic, and in-patient wards. The new-patient clinic sees patients with all types of cancer that have confirmed biopsies and have been referred to ORCI for treatment. This is the patient's first appointment with a physician to discuss diagnosis and treatment options. The follow-up clinic is for patients that have either completed their treatment regimen and are consulting with oncologists for follow-up of treatment protocols, side effects, or recurrence. The radiation and chemotherapy treatment clinics are for the administration of treatment only. The in-patient wards are for patients

undergoing treatment that are either too sick to commute to the hospital or for patients who receive outpatient services but who reside outside of Dar es Salaam.

A new screening clinic, separate from the main cancer hospital and the above-mentioned clinics, was established in 2003. Three trained nurses carry out daily educational sessions, perform VIA and colposcopy, and if necessary, take biopsies from women who come for screening or present with gynecological symptoms. If women are negative for cancer or dysplastic lesions, they are given an appointment card to return to the clinic a year later for another VIA screening test. If infection or other abnormalities are seen, antibiotics or specialist referrals are also provided. If cervical cancer is suspected, a biopsy is taken and women with positive results are referred to the new-patient clinic for treatment. Although the aim of the clinic was screening and education, 62% of the women present with some kind of medical complaint. Due to the limited resources available in the clinic, if infection is suspected, broad spectrum antibiotics are provided based on the visual inspection alone. Because of the accessibility and relatively small travel cost for women living in Dar es Salaam, these women utilize the screening facility and also come with complaints of mild symptoms.

Study Subjects and Data Collection

We conducted a cross-sectional study at the ORCI from May through August 2007. We recruited 98 women from the screening clinic and 49 patients from the new-patient clinic. The new-patient clinic was the main source of all confirmed cancer patients before they started their treatment. All patients who came to the two clinics during the period of the study were recruited without any refusals. Upon completion of the patient clinic appointment, women were asked to participate in the research study. Verbal consent was obtained for all participants followed by an interviewer-administered questionnaire delivered in Swahili by one of the coauthors (LMP).

The questionnaire was designed to inquire about the following demographic variables: current residence, residence at birth, tribe, age, cost and time to travel to ORCI, marital status, educational level (for both the woman and husband, if applicable), religion, and occupation. Economic status was assessed through questions on income, monthly budget, home ownership, presence of aluminum roof on the house, and ownership of a farm, cows, radio, television, bicycle, motorcycle, or car. Health information was obtained by inquiring about primary complaints, duration of symptoms, and results of the examination on the day of the interview. Women were also asked who accompanied them to the appointment and their knowledge of the definition of cancer. The questions about knowledge or definition of cervical cancer and its risk factors were not included in the study questionnaire after a pilot testing showed that women in the treatment clinic did not understand the meaning of a virus and, when they were told about the human papillomavirus, they thought it was the same thing as human immunodeficiency virus (HIV). When asked if they knew that cervical cancer was associated with a virus, they misinterpreted it as being told they were HIV-positive. Because most women in the screening clinic were more educated and were not dealing with a cancer diagnosis, they were interested in discussing the facts of cervical cancer. Upon completion of the questionnaire, about 15 min was spent answering questions and explaining the mechanism of cancer and prevention methods. The women in the new-patient clinic, however, were distressed by their diagnosis and upcoming treatment. Many were in severe pain and not interested in discussing the biology of the disease. Based on this information, it was decided to exclude questions about knowledge and perception from the women in the new-patient treatment clinic. By excluding the information, many comparisons of knowledge, beliefs, and perceptions could not be carried out, but the decision was made for the best interest of the patients. The study was approved by the

Institutional Review Boards at the University of Michigan and ORCI and verbal consent was obtained prior to all interviews.

Statistical analysis was carried out using SAS Version 9.0. Chi-square and *t* test analysis were done where appropriate to compare characteristics of women interviewed from the screening and the new-patient clinics.

Results

We found several significant differences in demographic characteristics between the screening clinic women and those in the new-patient clinic (Table 1). Of the women presenting for screening, 90.7% had at least some education compared to only 43.1% of women presenting for treatment. Marital status also differed between the groups with 78.4% of the screening patients being married compared to only 44.9% of the treatment patients. The majority of the screening clinic women (74.2%) lived in Dar es Salaam compared to only 8.2% of the treatment patients. Age also varied significantly with 75.3% of screening patients being 47 years of age or younger, while in treatment, 73.5% were over the age of 47 years. Occupation was significantly different with 18.6% of the screening clinic patients being farmers, while 81.6% of the treatment clinic patients were farmers. Additionally, of the women presenting for screening, 43.6% came alone, whereas in treatment, only 16.3% came alone. In the screening group, 12.8% were accompanied by at least one male relative, while in treatment, 44.9% were accompanied by a male. Men were also more likely to be involved in seeking treatment rather than screening. There was no significant difference in religion between the two groups (Table 1).

Table 2 illustrates the difference in travel time and cost for the screening and treatment groups. Women spent a median of 1.5 h to reach ORCI, whereas women in the treatment group spent a median time of 11.0 h traveling to the hospital. The travel costs were also significantly different between the two groups with women from the screening clinic spending significantly less to get to ORCI, with an average travel cost of 400 Tsh (~\$0.50) compared to the treatment patients whose average travel cost was 11,500 Tsh (~\$12.00). There was no significant difference between the two groups with respect to the time since the onset of symptoms.

The health indicators of the two groups also varied between groups. A significantly higher proportion of the screening patients presented to ORCI with some type of pain or symptoms (61%), while 29.9% came strictly for screening with no complaints and 8.3% came as the result of physician referrals. Of the women who were screened, 27.8% had a negative VIA test, 63.9% had a negative VIA but had some other type of irregularity or infection, and 8.3% had a positive VIA test indicating possible cervical intraepithelial neoplasia or cervical cancer. For the women in the new-patient treatment clinic, 16.4% had early stage cancer (IB–IIA) and 83.7% had advanced stage cancer (IIB–IVA). Approximately, 50% of women in the screening clinic had some idea of the definition of cancer, which was significantly higher than those in the treatment clinic (12%). The medical complaints were also significantly different in the two groups of women. In the screening clinic, 65.6% complained of pain, 17.2% had bleeding, and 20.3% had discharge. In the new-patient clinic, 46.9% complained of pain, 71.4% had bleeding, and 49% had discharge.

Table 2 summarizes the economic status indicators of women in screening compared to treatment clinics. Screening clinic women were more likely to own a TV, radio, and car compared to the women in the treatment group. Screening patients were also more likely to live in rental homes compared to owning their own and have an aluminum roof compared to

women in treatment. Women in screening were less likely to own a farm than treatment patients.

Discussion

This study highlighted several important differences between women who utilize the cervical screening services compared to cervical cancer patients who utilize the new-patient treatment clinic at the major cancer center in Tanzania. First, women in the treatment clinic were more likely to have less education, live outside Dar es Salaam and have farming as their primary source of income, compared to the screening clinic. This is important because 63% of Tanzanian adults' primary economic activity is farming, 80% live in rural areas, and only 71% are literate [7]. The vast majority of women who utilize the screening facility at ORCI are educated nonfarmer women who live in Dar es Salaam. The majority of women in Tanzania who are left out of screening activities live in rural farming communities outside the capital city of Tanzania.

Second, women in the treatment clinic traveled significantly further at a much greater cost than women in the screening clinic. This is most likely attributable to cost, convenience, and severity of disease. The average household expenditure in Tanzania is about \$8/month; however, the average travel cost of women in the treatment clinic was about \$18, with some individuals spending over \$80 [7]. For rural farmers, the benefit of spending more than 2 months to a year's worth of income for a screening test is impractical and infeasible. Therefore, the screening facility is mainly utilized by local women from Dar es Salaam who can afford the relatively small travel costs and time for the service. Rural farmers are only making the long journey to the city when cervical cancer has already been diagnosed and radiation therapy is required. This again is evidence for the need of education and screening services in the rural areas.

Additionally, the health indicator variables provided important information on the two groups of women. Eighty-four percent of women in the treatment clinic had advanced stage disease (IIB–IVA). Taken with the demographic variables, this is very significant because rural, poor farm women are developing cervical cancer and not seeking treatment until the very late stages. This can be attributed to the cost of travel and the time required reaching ORCI. Of the 97 women screened in this study, only eight were VIA-positive and required a biopsy be taken. Thirty percent of the women presented for screening only, with no clinical complaints at all. When asked if the women knew what cervical cancer was, 51% in screening said yes and only 12% in treatment said yes. These findings are significant because women in the new-patient treatment clinic had severe symptoms without knowing the reasons for the pain or the disease nature. Also, women in the screening clinic presented because they had mild symptoms which they knew could be a sign of a more serious disease. However, all of the women regardless of which hospital services are required need to know more about screening and why it is performed.

The economic status indicators of the study populations were consistent with the occupation and residence information. Women in the screening clinic had more possessions such as TV, radio, and car. They were also more likely to live in a structure with an aluminum roof and were more likely to rent a home. This is because most of them are from Dar es Salaam where renting is a sign of a higher status compared to rural women who live on farms in their own traditional homes.

ORCI has already begun to address the need for education and screening in rural areas. In 2001, ORCI created a mobile screening clinic to travels to various satellite clinics throughout the country. The mobile unit provides screening services as well as training for

the local health care providers enabling them to continue the screening services upon completion of the outreach program. About 1,500 women are screened during each 2-week outreach session, thus providing thousands of women access to previously unavailable care. However, the staff from ORCI is primarily responsible for the program, thus limiting the number of trips and the accessible geographic areas to those communities close to Dar es Salaam. Mobile units such as the one at ORCI have been shown to be cost-effective and successful in reaching rural populations and should, therefore, be utilized in screening program planning. Cervical cancer is 100% preventable when precancerous lesions are detected through screening [8]. In the United States, cervical cancer mortality rates dropped by 74% between the years 1955 and 1992, which was largely attributable to the 79% participation rate of Pap tests annually [5, 9]. However, in 2006, the World Health Organization reported that 95% of women in developing countries had never been screened, thus accounting for the overwhelming disproportional burden of cervical cancer cases in the developing world [9]. A study done at Muhimbili National Hospital in Dar es Salaam, Tanzania showed that, of 89 cervical cancer patients studied, 90% of the women had advanced stage disease (stage IIB–IV) of whom 47.3% had never had a gynecological examination nor did they feel that one was necessary [10]. In order to see improvements in mortality rates in Tanzania and similar low-income developing countries with high rates of cervical cancer, the number of screening programs and participation in such programs must increase.

In Thailand, the percentage of women having ever been screened for cervical cancer increased from 19.9% in 1990 to 70.1% in 1997 upon implementation of mobile screening [11]. It has been estimated that, by being VIA screened even once, the lifetime risk of cervical cancer decreases by 25% [12]. VIA costs an estimated \$1.60 per test which is entirely feasible for implementation in low-resource countries like Tanzania [1].

In an effort to reach more women, screening programs and subsequent mobile screening units should be organized in each of the 26 regions of Tanzania. There is a government hospital in each region where nurses and doctors could be trained to create a program similar to that of ORCI. The nurses and doctors at ORCI are currently doing informal training sessions for interested health care providers from throughout the country, but on an individual request basis. If a screening team was trained from each region, they could further train staff at the smaller hospitals and dispensaries locally. It would take some of the burden off of the ORCI staff who are currently running the screening clinic, mobile unit, and training programs all at the same time. In Dar es Salaam, there are many maternal and child health clinics and local dispensaries that could also be trained in screening techniques. This would allow more women access to the service and bring greater awareness to the general population of the procedure itself.

Tanzania is also currently implementing a nationwide cancer registry. By initiating screening programs in each region of the country, infrastructure development and a direct reporting strategy back to ORCI of all cases could be established. Once the reporting methods were designed, additional cancer types could be reported, thus providing the foundation for a population-based cancer registry program. ORCI could maintain its role as the national leader in cancer treatment by housing the central database for all data collection.

This study has strengths. The large number of women and their variable clinical stages and socioeconomic as well as demographic backgrounds enabled us to investigate the differences between profiles of patients from screening and treatment clinics. The reputation of the cancer center draws patients from different parts of Tanzania, especially with the high rate of cervical cancer in the country. The newly established screening clinic allowed us to

observe that patients utilize screening facilities for treatment where limited treatment resources were available for seeking medical care.

There were also limitations to this study. Exclusion of the cancer knowledge questions from the new-patient treatment clinic limited the potential comparisons and possible conclusions. We felt that it would have been unethical to add additional stress to the cervical cancer patients who were diagnosed at advanced disease stages to ask them to discuss a disease they did not fully understand.

ORCI is the only treatment center for cancer in Tanzania. However, with limited resources for diagnosis and the presence of only 12 pathologists in the country, the future for combating cervical cancer is prevention. Future studies focusing on factors associated with the utilization of the screening clinic at ORCI, even for women in Dar es Salam, are important for future promotion of cervical screening. Outreach programs for cervical screening and training of local health professional in remote rural areas should be carefully constructed to add to early detection of cases and reduction of the need for diagnosis and treatment of advanced cases [13]. Educational programs that consider the educational level of the community [14] and focus on the importance of cervical screening in rural remote areas of Tanzania may also have a positive impact on the early detection and identification of patients at early disease stages.

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Table 1

Comparison of women in the new-patient clinic and the screening/diagnostic unit at ORCI, Dar es Salaam, Tanzania

Variables by level	Screening/diagnostic unit		New-patient clinic		p value
	No.	%	No.	%	
Education (97, 49)					<0.001
None	9	9.3	27	55.1	
Primary	63	65.0	21	42.9	
High school (ordinary level)	20	20.6	1	2.0	
High school (advanced level)	0	0.0	0	0.0	
High school plus some advanced education	5	5.2	0	0.0	
Marital status (97, 49)					<0.001
Single	9	9.8	0	0	
Married	76	78.4	22	44.9	
Widowed	7	7.2	13	26.5	
Divorced	5	5.2	14	28.6	
Dar resident (97, 49)	72	74.2	4	8.2	
Age (97, 49)					<0.001
18–32	26	26.8	1	2.0	
33–47	47	48.5	12	24.5	
48–62	21	21.7	27	55.1	
63–77	2	2.1	4	8.2	
78–92	1	1.0	5	10.2	
Religion (97, 48)					0.95
Muslim	51	52.6	25	52.1	
Christian	46	47.4	23	47.9	
Occupation (97, 49)					<0.001
Housewife	35	36.1	4	8.2	
Farmer	18	18.6	40	81.6	
Small Business	11	11.3	3	6.1	
Professional	33	34.0	2	4.1	
Accompanied to appointment by (94, 49)					<0.001
Female relative	31	33.0	18	36.7	

Variables by level	Screening/diagnostic unit		New-patient clinic		p value
	No.	%	No.	%	
Male relative	11	11.7	16	32.7	
Group of relatives	1	1.1	6	12.2	
Friend	10	10.6	1	2.0	
Alone	41	43.6	8	16.3	

Health indicators and economic variables comparing women in the new-patient clinic and the screening/diagnostic clinic at ORCI, Dar es Salaam, Tanzania

Table 2

Variables by level	Screening/diagnostic clinic		New-patient clinic		p value
	No.	%	No.	%	
Health indicators					<0.001
Previous knowledge of cervical cancer (97, 49)	49	50.5	6	12.2	
Primary complaints					
Pain (64, 49)	42	65.6	23	46.9	<0.001
Bleeding (64, 49)	11	17.2	35	71.4	<0.001
Discharge (64, 49)	13	20.3	24	49.0	0.0013
Economic indicators					
Housing status (97, 49)					<0.001
Own home	43	44.3	42	84.7	
Rent	42	43.3	2	4.1	
Live with family	12	12.4	5	10.2	
Aluminum roof (97, 49)	96	99.0	31	63.3	<0.001
Own farm (97, 49)	41	42.3	39	79.6	<0.001
Own cows (97, 49)	9	9.3	7	4.8	0.36
Own TV (97, 49)	48	49.5	5	10.2	<0.001
Own radio (97, 49)	82	84.5	30	61.2	0.002
Own bicycle (97, 49)	31	32.0	13	26.5	0.50
Own car (97, 49)	12	12.4	1	2.0	0.04
Access indicators					
Travel time (h)					0.003
Mean ± SD	4.81±10.19		15.79±18.46		
Median (range)	1.5 (0.33, 72)		11 (1, 96)		
Travel cost (Tsh)					<0.001
Mean ± SD	5,796±14,937		18,408±17,620		
Median (range)	400 (100, 10,500)		11,500 (250, 100,000)		
Time since onset of symptoms (years)					0.105
Mean ± SD	2.93±4.46		1.80±10		

Variables by level	Screening/diagnostic clinic		New-patient clinic		p value
	No.	%	No.	%	
Median (range)	1.0 (0.08, 20)		0.92 (1.08, 10)		