Acceptability of cervical cancer screening in rural Mozambique

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Abstract

In Zambezia province, Mozambique, cervical cancer (CC) screening was introduced to rural communities in 2010. Our study sought to determine whether women would accept screening via pelvic examination and visual inspection with acetic acid (VIA) at two clinical sites near the onset of a new CC screening program. A cross-sectional descriptive study of 101 women was undertaken in two rural communities in north-central Mozambique. We assessed a woman’s willingness to be screened, knowledge about CC symptoms and treatment, and her recommendations for best methods to deliver information to other women. After the interview, we offered CC screening. Fully 86% of women accepted VIA screening when it was offered, but uptake was 100% at one clinic and only 68% at another. The cause of CC was thought to be associated with promiscuous activity (49%) and curses placed on the woman (42%). All women in one rural Mozambique clinic and two-thirds at a second clinic underwent CC screening. Knowledge about CC screening was significantly associated with uptake, suggesting educational campaigns need to be undertaken. However, educators need to be cautious about linking screening with high-risk behaviors, as women who understood the link trended toward refusing screening.

Introduction

Rural Mozambique is among the world’s most underserved regions for health care and prevention services [1]. This southeastern African nation is comprised of ≈21 million people, of whom 90% live on <US$2 a day [2]. The cervical cancer (CC) crude incidence rate in Mozambique is 32.1 per 100 000 [3], compared with 12.7 in Kenya [4] and 8.1 in the United States [5]. The crude mortality rate in Mozambique is 20.5 per 100 000, compared with 8.6 in Kenya [4] and 2.4 in the United States [5]. Clinical data from the capital city of Maputo suggest CC to be the most common cancer affecting women in the nation’s capital city [6]. High rates of sexually transmitted infections (STIs) and CC dysplasia are common in rural southern Mozambique [7]. Prior to 2009, cervical screening in Mozambique was limited to urban hospitals with gynecological services offering pathology services and screening through Papanicolaou smear or through research studies [7–10]. Providing Papanicolaou smears is expensive however, and rural hospitals have been unable to offer similar services given high laboratory and personnel costs. Instead, rural clinical sites have turned to visual inspection with acetic acid (VIA), a simple, low cost alternative that can be conducted by nurses with no laboratory support [11].
CC screening has been introduced in a number of resource-poor environments with some success in reducing CC mortality [12, 13]. Incidence rates have fallen in parts of Latin America, but mortality rates and low rates of screening have remained high elsewhere, notably in sub-Saharan Africa [14–16]. Interventions aimed at increasing screening coverage have included educational outreach, increased access to screening, financial incentives, improved education of medical professionals and access to translation services [12, 13, 15, 17–20]. Program success in resource-poor environments has been tempered with difficulties related to sustainability, costs, treatment availability and perceived acceptability by patients [12, 13, 15, 21–24]. Strategies to improve screening have revolved around ‘see and treat’ VIA inspection [23], human papillomavirus (HPV) DNA testing [25] and self-swab programs [25, 26].

In late 2009, the Ministry of Health (MoH) began roll-out of a program providing CC screening based in the method of VIA in four provinces (Maputo, Nampula, Sofala and Zambézia). Utilizing funding through the President’s Emergency Plan for acquired immune deficiency syndrome (AIDS) Relief (PEPFAR) and financed through the Centers for Disease Control and Prevention, Friends in Global Health (FGH)—affiliated with the Vanderbilt Institute for Global Health—began providing financial and technical assistance to the local health authorities (Direcção Provincial de Saúde) to set up three new screening facilities in primary clinical sites in Zambeza Province (Fig. 1). One is located in Quelimane (the provincial capital city), with two additional sites in the rural communities of Namacurra and Inhassunge. From February to August 2010, nurses screened 2716 eligible women (average 340 per month). The 2010 MoH protocol recommends screening of women 30–55 years of age; however, all women of reproductive age were offered screening.

Positive VIA tests were detected in 296 women (11%). Of those who tested positive, 194 received cryotherapy (66% of VIA+), and 3 (1%) were referred for full evaluation at the Provincial Hospital Reference Center in Quelimane (unpublished data, FGH). The introduction of screening services reflects Mozambique’s drive to improve women’s health services. Several health care providers indicated a large number of patients who were refusing screening when offered, but refusal rates and reasons for not screening were not been documented. We were concerned that a lack of awareness of risk factors, education, misunderstanding and suspicion of the screening process could be limiting the health-seeking behavior of women at more remote rural sites. We posed two operational research questions: (i) were Mozambican women in the two Zambézian rural districts of Namacurra and Inhassunge willing to be screened for CC when approached? (ii) if not, what social, educational and/or personal barriers limited willingness to screen for CC? We conducted our study at two centers supported by the non-governmental organization FGH (Fig. 2). Inhassunge is the smallest and most isolated, with an estimated 91,000 inhabitants in 2007. Namacurra, the district located the shortest travel distance from the provincial capital city of Quelimane, had a population of 196,000 in 2007 [27].

**Methodology**

We conducted 101 semi-structured interviews of women eligible for CC screening to ascertain
knowledge, beliefs and willingness to be screened in the districts of Namacurra and Inhassunge, two of the three venues where screening had been offered for four months. Women ages 30–56 years, non-pregnant, and available at one of these two clinics from 10 June to 15 July 2010 were eligible. Women waiting in line for other services or who were visiting hospital patients were recruited by a female research assistant. One hundred and thirty-seven women were approached to participate (83 in Namacurra and 54 in Inhassunge); 101 accepted (57% in Namacurra and 94% in Inhassunge). All interviews were conducted in private rooms by an anthropologist (C.M.A.) with a female translator who spoke Portuguese and Chuabo. The translator was given training by C.M.A. on interviewing techniques, best practices for translating dialog and ethical regulations. The translator wrote down as close to verbatim as possible answers of the participants.

Participants were asked open-ended questions about CC, including what they had heard about it, who had provided them the information and what caused the symptoms of CC. These questions were followed by several closed-ended questions about the correctness (using true or false responses) of particular causes elicited from women during a previous study in the same region [28]. Women were asked which type of provider (traditional birth attendant, traditional healer or clinical worker) would provide the most effective treatment for these symptoms, which provider they would be most likely to see if they had the symptoms and if they would be willing to speak with a male provider (traditional or allopathic) about symptoms associated with CC. Interviews took an average of 20 min. At the end of the interview, the importance of CC screening and VIA screening was explained and women were offered the service; those who consented were accompanied to the nurse conducting the exam. The questions used during this interview were derived from similar questionnaires used with women in Zimbabwe [29] and Kenya [21]. Questionnaires were pilot tested to ensure appropriate cultural and linguistic characteristics through cognitive interviews with 15 women before the study began. All participants were fluent in either Portuguese or Chuabo and interviews were conducted in their language of choice. Ethical approvals were received from the Mozambique National Bioethics Committee and the Vanderbilt Institutional Review Board.

Statistical analysis
The proportion of women who underwent CC screening was measured along with a 95% confidence interval (CI) using the binomial distribution. Descriptive statistics were used to summarize the range of understanding and stigma toward CC screening by those patients who underwent screening and those who did not. Separate logistic regression models were planned to identify whether demographics or understanding/stigma about the disease were associated with willingness to be screened while adjusting for district location and patient education.

Results of patient interviews
Characteristics of patient interviewees
We interviewed 101 women and offered CC screening to all. The women had a median age of 37 years (interquartile range [IQR]: 32–45), had a median of 2 years of formal education (IQR: 0–5) and had a median of five children (IQR: 3–7). Over half were married (56.4%), 81.2% affiliated themselves with Christian churches and 90.1% lived in the communities in which they were born. Fifty women attending the Namacurra clinic and 51 women
attending the Inhassunge clinic were interviewed. Only 33.7% spoke Portuguese in their homes; the remaining participants spoke local languages, primarily Chuabo. There were differences between the two communities: women in Namacurra averaged one grade level higher than women in Inhassunge and were three times more likely to work outside of the home (Table I).

**Knowledge about CC/what causes problems ‘down there’?**

Knowledge about what caused CC was low within the population we surveyed, not unusual in a rural population with no history of screening availability. Only 30.7% of women \((n = 31)\) had ever heard about the illness and not one could adequately describe the cause or treatment options. After symptoms of advanced cancer were described to all participants, women were asked questions about potential causes. Women were asked ‘could CC be caused by a curse?’ In response, 43.6% of women indicated the symptoms described were in line with illnesses that could be ‘cursed’ onto another person via a traditional healer or a spirit. In particular, vaginal discomfort and bleeding were seen to be something often cursed onto a woman by an ex-boyfriend or husband.

To ascertain whether CC may also face the same stigma as STI’s we asked women ‘Do you believe CC can be caused by promiscuity?’ Forty-nine percent said that promiscuity could be the cause of CC, while 12% indicated that they had heard this statement but were unsure if it was true. Of the 39 who did not believe CC was caused by promiscuity, only 38% indicated why they did not agree. All of these women argued that if cancer was caused by promiscuous activity, a great deal more people would have the problem.

**Who was willing to be screened?**

The majority (84%, 95% CI: 77–91%) of women were willing to undergo CC screening. All 51 (100%) women who consented to be interviewed in Inhassunge agreed to be screened. This

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**Table I. Patient characteristics by district location**

<table>
<thead>
<tr>
<th></th>
<th>Inhassunge ((n = 51))</th>
<th>Namacurra ((n = 50))</th>
<th>Combined ((n = 101))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>37 (33–46)</td>
<td>35.5 (32–43.8)</td>
<td>37 (32–45)</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td>2 (0–4)</td>
<td>2 (0–6)</td>
<td>2 (0–5)</td>
</tr>
<tr>
<td><strong>Number of children</strong></td>
<td>5 (3.5–7)</td>
<td>5 (3–7)</td>
<td>5 (3–7)</td>
</tr>
<tr>
<td><strong>Religion, (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>40 (78.4)</td>
<td>42 (84.0)</td>
<td>82 (81.2)</td>
</tr>
<tr>
<td>Muslim</td>
<td>5 (9.8)</td>
<td>8 (16.0)</td>
<td>13 (12.9)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (11.8)</td>
<td>0 (0.0)</td>
<td>6 (5.9)</td>
</tr>
<tr>
<td><strong>Portuguese speaker</strong></td>
<td>15 (29.4)</td>
<td>19 (38.0)</td>
<td>34 (33.7)</td>
</tr>
<tr>
<td><strong>Source of income available (not farming)</strong></td>
<td>3 (5.9)</td>
<td>8 (16.0)</td>
<td>11 (10.9)</td>
</tr>
<tr>
<td><strong>Are symptoms of CC caused by curse?, (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>7 (13.7)</td>
<td>11 (22.0)</td>
<td>18 (17.8)</td>
</tr>
<tr>
<td>No</td>
<td>19 (37.3)</td>
<td>20 (40.0)</td>
<td>39 (38.6)</td>
</tr>
<tr>
<td>Yes</td>
<td>25 (49.0)</td>
<td>19 (38.0)</td>
<td>44 (43.6)</td>
</tr>
<tr>
<td><strong>Are symptoms of CC caused by promiscuity?, (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>6 (11.8)</td>
<td>5 (10.0)</td>
<td>11 (10.9)</td>
</tr>
<tr>
<td>No</td>
<td>16 (31.4)</td>
<td>25 (50.0)</td>
<td>41 (40.6)</td>
</tr>
<tr>
<td>Yes</td>
<td>29 (56.9)</td>
<td>20 (40.0)</td>
<td>49 (48.5)</td>
</tr>
<tr>
<td><strong>Tested for CC (outcome)</strong></td>
<td>51 (100.0)</td>
<td>34 (68.0)</td>
<td>85 (84.2)</td>
</tr>
</tbody>
</table>

*aContinuous variables are reported as medians (IQR).  
*bFishers exact test \(P = 0.001\).
contrasted sharply with only 34 (68%) women accepting in Namacurra (Fisher’s exact test, \( P = 0.001 \) comparing clinics). In Inhassunge, women primarily indicated that they would accept the screening because ‘it is for my health’. Reaction to the same offer was met with more suspicion and distrust in Namacurra. Women in Namacurra often asked if the test was required and eyed interviewers with wariness. In Namacurra, patients indicated five reasons for non-acceptance (open-answer responses to the question ‘why will you not get screened today?’). Four women indicated that they had no symptoms and therefore felt no reason to be screened, three had heard that women who receive screening leak water from their vagina’s and did not want this, two were afraid of undergoing the exam (they were worried it would be painful), two said that they did not have time and five simply said that they ‘did not want to’. All women who accepted screening asked if they would accept a man, woman or either to do the test. Fifty-nine percent said that they would only accept a woman to perform the exam, while the remaining women were willing to have a clinician of either gender.

Because all women accepted screening in Inhassunge, we were underpowered to conduct exhaustive multivariable statistical analyses to determine characteristics of non-screeners. Adjusted odds ratios (ORs) were estimated to determine whether specific beliefs influenced a woman’s willingness to be screened independent of district and education. Only having heard about CC screening (OR: 6.82, 95% CI: 1.26–36.9, \( P = 0.03 \)) and knowing the screening was available (OR: 9.98, 95% CI: 1.96–50.8, \( P = 0.006 \)) were significantly associated with willingness to be screened. Women with more children were less likely to accept screening (OR 0.80, 95% CI: 0.63–1.01, \( P = 0.056 \)). Believing that traditional healers can successfully cure CC (OR: 0.41, 95% CI: 0.11–1.51) and believing that CC was caused by a curse/witchcraft (OR 0.49, 95% CI: 0.12–2.07) reduced the odds that a woman would agree to screening by about 50%, but observations were of limited statistical power.

There was a statistically significant difference in screening acceptance between the two communities we surveyed. In trying to recruit participants, C.M.A. noted hostile attitudes toward study personnel and health care workers were pervasive in Namacurra but not in Inhassunge. The data collected did not produce any explanations for this difference, although anecdotal evidence suggested perceived coercive relationships with clinical personnel existed in Namacurra but not in Inhassunge. Similar services are offered at both hospitals, including prenatal care, maternal services, human immunodeficiency virus (HIV) care and treatment, tuberculosis medication as well as emergency care and inpatient services. However, the Namacurra facility is slightly larger than the site in Inhassunge, and the community itself is three times larger, potentially indicating greater acceptability in highly rural areas. Ten women who were interviewed in Namacurra asked us if the exam was compulsory, indicating that they would only receive the exam if it was forced upon them. Further studies geared toward uncovering these site-specific differences are essential. A side note to our project was the reaction of women who completed the screening: some were very keen to educate their fellow community members. Several impromptu seminars by patients were conducted to women still waiting at the clinic toward the end of the day (we did not interview women who heard the lectures) explaining that the screening procedure was not painful and that they experienced no negative effects. Women appeared to respond positively to hearing this message from a peer, suggesting this may be a way forward.

**Discussion**

CC accounts for up to 25% of all cancers in women, with an average of 40 cases per 100 000 women in developing countries [30] and 38.2 per 100 000 in Southern Africa [31]. Studies in developing countries have reported lack of health facility coverage, screening and treatment resources and trained personnel for undertaking widespread CC screening [17, 29, 32, 33]. Despite increasing availability of screening in Mozambique, we found knowledge about CC and the causes of the disease
to be extremely low within the population we surveyed. This was not unexpected given the short time screening had been available. The name itself (‘cáncer de colo uterino’, in Portuguese and ‘chaga’ in Chuabo) yielded an array of local understanding, but few of the symptoms were associated with an allopathic understanding of the disease. This contrasts with knowledge rates documented in rural Kenya [21] and Zimbabwe [29], where women had greater understanding about the causes, methods of prevention and treatment of CC. Fifty women (49%) we interviewed had heard about the clinic offering a new test, but few understood why the test was available or how it was done. There was concern among both clinicians and community educators that describing specifics about CC would result in the population ‘blaming’ foreigners for bringing a new disease to their communities (as has been the case with HIV) [34]; as a result, we are doing additional observations to judge whether clinicians were being deliberately vague.

The large number of women who associated the disease with promiscuity or curses was similar to what has been demonstrated in other studies [18, 21, 29, 33, 35]. Women who believed this illness could be the result of a curse trended toward refusing screening. From a previous study on traditional medicine [28], we learned that 85% of traditional healers in the province believed that they could cure CC, a disconcerting statistic given that 84% of the population will seek care from a them at some point [28]. Like the treatment of HIV, many traditional healers may be unwilling to refer patients for screening as this can impact their financial and/or social standing within the community [36–38]. The relationship of CC with sexual activity will be more complicated to address than the belief in traditional curses, given the nature of HPV infection. About 50% of women linked sexual activity to problems related to genital health. Women’s understanding of disease causation in Mozambique is only occasionally associated with the germ theory of disease and often closely associated with committing social transgressions or supernatural causes [39, 40]. This represents an important avenue for future educational campaigns. Because of the impossibility of disassociating sex and CC, educators face a dilemma. Linking the illness to knowledge of transmission source may not result in the behavior change toward which physicians are aiming [33]. In fact, our data suggested women who understood the association trended toward refusing screening. Instead of focusing education on topics of disease causation, it is likely more beneficial to stress the benefits to women (decreased mortality, less pain, protection against cancer in general) and not stress its sexual source. This has also been supported by a study in South Africa [41]. This method for educating women may also be beneficial to those who have already had children. Interviews suggested that these women believed their bodies were functioning normally (thus no need for screening); however, there also may be pressure for them to leave the clinics as quickly as possible given the responsibilities of their families. Education about symptoms and outcomes of cancer, without a focus on cause, may be more useful in increasing screening uptake.

The use of VIA screening in our populations likely improved patient uptake of services. When patients had the procedure explained to them, acceptability was high. The low cost of this intervention, coupled with the ‘one-stop shop’ model ensures that those who accept screening can receive treatment for dysplasia during that one appointment (with referrals for a diagnosis of cancer). Given problems with lost to follow rates for HIV treatment within these clinical sites [42], we hypothesize that using a procedure that required multiple appointments would have similar problems with follow-up as have been seen in other countries [15, 20, 43, 44]. This high rate of uptake bodes well for future scale-up: with additional education and promotion of the screening we believe uptake rates would be extremely high.

Strengths of our study include the mixed qualitative and quantitative methods, the systematic survey methodology, the care to interview in the local language and the linking of attitudes with screening behavior. No such study has been reported from Zambezí Province, the second most populous province in the nation. Limitations
include the number of women who accepted screening: despite anecdotal reports of high refusal rates, we experienced much higher rates of acceptance than we anticipated. The sample of women who participated in this study was not random: it was a convenience sample. While we tried approached every woman who appeared to be over 30 years of age, thus potentially reducing the bias, we cannot state that this sample is representative of the communities as a whole. With a small sample of women rejecting our offer for CC screening, it was not possible to conduct exhaustive multivariable statistical analyses. We also did not anticipate the large disparity in acceptance by clinic and did not have the appropriate questions to assess why this difference existed.

Conclusions

Research in rural Zambézia has shown women indicated a significant difference in willingness to accept CC screening. This acceptance rate was higher than researchers expected. Women who knew CC could be detected and those who had heard about the screening program at their local clinics were significantly more willing to undergo screening than those with no information. This suggests a path forward for future educational initiatives designed to encourage more women to visit the clinic for screening. Educational initiatives should focus on symptoms and impact of disease, not on disease causation. We believe that most women in rural Mozambique will engage in expanded CC screening and that this acceptance will increase as community education and word-of-mouth is disseminated.

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Conflict of interest statement

None declared.

References


