

Knowledge and Perception of Cervical Cancer and Screening Programs of Women Seeking care  
at Monduli Hospital in Tanzania and St. Paul Hospital in Addis Ababa, Ethiopia.

BY

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## I. Introduction

When I decided to become a physician, I had my mother, my sister, and other marginalized patients in mind. My goal was simply to become a compassionate physician who cares for those who are most in need. As I progressed in medical school, I realized even those with scant access to care in the US can usually find some form of medical support in this economically advanced country. Alternatively, patients living in under-resourced nations are predisposed to suffer from increased morbidity and mortality since interventions may not be readily available. I decided to focus on the need of medical care for forgotten people here in the US and abroad in order to fulfill my goals. As a senior medical student who spent the past three years trying to carve out the quintessential global health experience, I was determined to actively learn all I could when I went to Tanzania and Ethiopia this summer. I wanted clinical experiences that would empower me, research experiences with results that would generate meaningful results to inform local health care policy makers, and practical experiences to learn how to treat at patients in a limited-resource setting.

Once I expressed my interest in participating in a rotation in East Africa, The Office of Global Health introduced me to executives at Texas Health Resources (THR). In 2011, THR built a clinic in a rural city in Tanzania with plans to return and reevaluate conditions in three years. My path coincidentally matched their return trip, and I later found myself embarking on a month long trip with their team of physicians and health care administrators. I remained in Tanzania to work in a district, or secondary-level care, hospital with local physicians. There, I was able to work alongside midwives to deliver prenatal and postnatal care and physicians on the labor ward and in the operating theater. I surveyed women who presented to the hospital and outlying rural clinics, in addition to nurses working at the hospital on their knowledge and risk factors about cervical cancer.



Figure 1. THR executive with patients waiting at Open Arms Clinic in Monduli, Tanzania



Figure 2. Monduli District Hospital in Tanzania

After my rotation in Tanzania, I went to Ethiopia for an obstetrics and gynecology rotation. Dr. Senait Fisseha from the University of Michigan Medical School established a partnership between a tertiary hospital in Ethiopia and the Department of Ob/Gyn at the University of Michigan. The partnership successfully led to the development of an Ob/Gyn residency-training program at the St Paul Millenium Medical College in Addis Ababa in 2011.

Dr. Fisseha invited me to go to Ethiopia to observe the program and conduct an Ob/Gyn clinical rotation in Ethiopia. There, I also surveyed women presenting to the Ob/Gyn clinic about their knowledge and risk factors for cervical cancer.



Figure 3. St. Paul Millenium Medical College in Addis Ababa, Ethiopia. (Left: Hallway leading to gynecology outpatient; Right: Dr. Fisseha with first group of residents)

## **II. Cervical Cancer burden in the USA**

Cervical cancer is a malignant cancer of the cervix. There are about 12,900 cases annually in the US. In 2014, there were 20,360 new cases of cervical cancer diagnosed, and there were slightly more than 4000 deaths.<sup>1</sup> Today's cervical cancer incidence and mortality is more than 50% decreased from those in the 1950s, when there were 530,232 cases and 254,374 deaths from cervical cancer in the US. The stark decrease of cases and mortality can be attributed to the advent of the Pap Smear screening tests, which finds changes in the cervix referred to as pre-cancers. Screening is especially important in the case of cervical cancer since the symptoms of pain, bleeding, and discharge do not usually present until the cancer has become invasive. If detected early, cervical cancer is one of the most successfully treated cancers.<sup>1</sup>

## **III. Cervical Cancer Burden in Ethiopia and Tanzania**

The burden of cervical cancer is quite different in Ethiopia and Tanzania. It is often advanced when first discovered in patients living in Ethiopia and Tanzania. In fact, the United Republic of Tanzania has the highest prevalence of cervical cancer in East Africa and is the 6th leading country in the world for the prevalence of cervical cancer.<sup>2</sup> The crude incidence of cervical cancer in Ethiopia in 2014 was 16.3%.<sup>3</sup>

By 2030-474,000 women will die every year from cervical cancer-and 95% in lower and middle-income countries (LMIC).<sup>4</sup> If a woman is screened for cervical cancer only once during ages 30-40 years, her lifetime risk is decreased by 25-36%. Screening during middle-aged will also grant women an additional point of access to healthcare during her childbearing years. The need for proper screening measures is widely apparent. In a recent survey, 67.1% of women with cervical dysplasia who presented to Jimma hospital in southwest Ethiopia were infected with the virus that causes cervical cancer.<sup>5</sup>

Because widespread screening with Pap Smears is too resource-intensive, the World Health Organization (WHO) recommends Visual Inspection with Acetic Acid (VIA) in low resource settings. However, even VIA is hardly practical due to the lack of supplies, personnel, infrastructure, and patient education in developing nations. In addition to screening, patient education and widespread HPV vaccination should be initiated and expanded to halt increasing morbidity and financial burden. Up to 90% cases can potentially be avoided with countrywide vaccine. Delivering the vaccine will require government support for developing a new sustainable health care structure that reaches all females in a systematic way.

Until the appropriate infrastructure can be designed and instituted, counseling young women about cervical cancer risk factors and prevalence is needed in Ethiopia and Tanzania. Patient education is necessary since most women living in Tanzania and Ethiopia lack awareness of cervical cancer and proper health seeking behaviors due to misconceptions. Educational programs may need to be targeted beyond women as nurses in large hospitals have also demonstrated a lack of knowledge concerning the causes of cervical cancer, transmission of HPV, and effective screening intervals.<sup>6</sup>

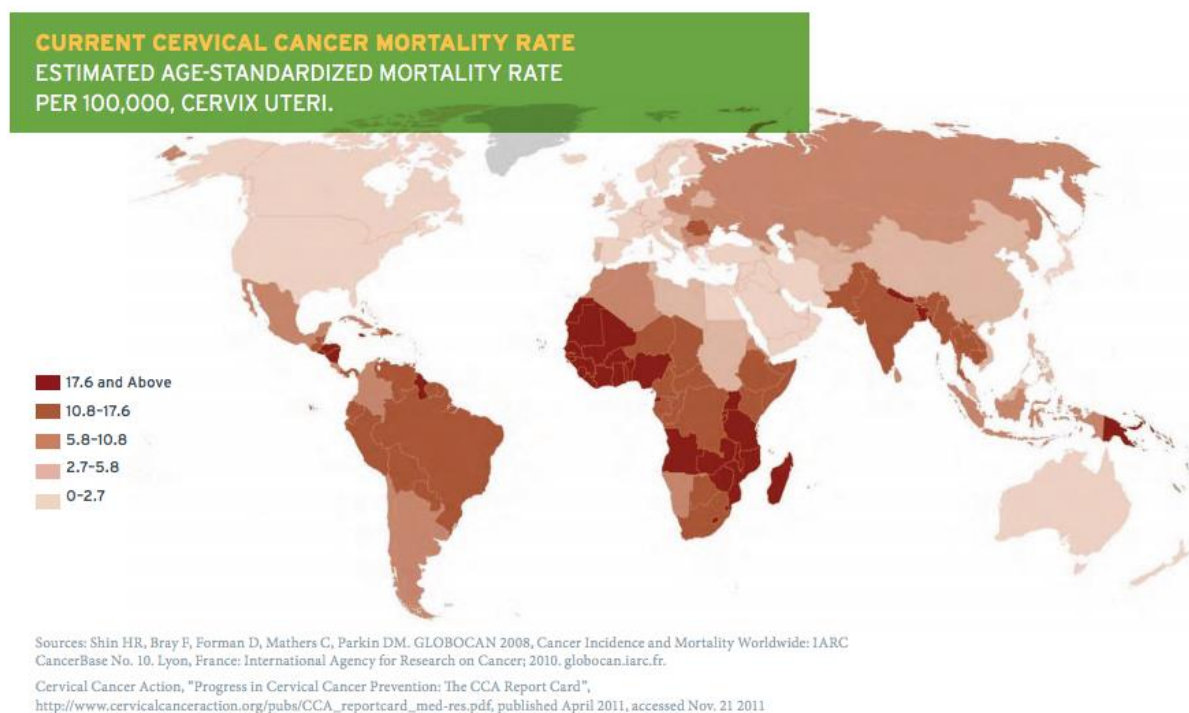


Figure 4. Cervical Cancer Mortality Rate<sup>7</sup>

#### IV. Human Papillomavirus (HPV) and Risk Factors

Cervical cancer is almost always caused by high risk HPV viral infection. Low-risk HPV infections usually clear up without any interventions within a few months or cause vulvar warts. A small proportion of infections caused by 13 high-risk HPV serotypes are more likely to persist and cause cancer. These high-risk HPV serotypes are also linked to cancers of the anus, vulva, vagina, and penis. Despite the development of highly developed

vaccines against HPV 16 and 18, 270,000 women died from cervical cancer in 2012. Not surprisingly, greater than 85% of these deaths occurred in LMIC.<sup>8</sup>

The progression of HPV lesions to cervical cancer usually takes 15 to 20 years before manifesting as symptoms of cervical cancer. It can take only 5 to 10 years in women with weakened immune systems, as in HIV. Because symptoms usually occur late in the disease course, screening protocols in developed nations leverage this lag to diagnose cancer before symptoms appear. Symptoms include irregular periods, vaginal bleeding after sexual intercourse, pelvic pain, fatigue, vaginal discharge, weight loss, and loss of appetite.

Known risk factors for developing cervical cancer in Ethiopia and Tanzania include parity over six, very low income, prostitution, younger age, early onset of sexual activity, early age of marriage, multiple sexual partners, tobacco use, lack of education, and being widowed/separated.<sup>9</sup> Additionally, many studies have associated the prevalence of cervical cancer to be higher among HIV-infected women in Ethiopia. Women infected with HIV would therefore benefit from initiatives endorsing targeting of services and awareness to populations at increased risk for cervical cancer.<sup>10,11</sup>

## **V. Methods of Screening**

### **a. Developed Countries**

Developed countries have resources that allow for effective screening to detect pre-cancerous lesions at early enough stages when they can be treated, thus preventing cervical cancer. In the US, screening is recommended for women aged 21 to 65. The three methods of cervical cancer screening include a Papanicolaou test (pap smear) and liquid-based cytology, Visual Inspection with Acetic acid (VIA), and HPV testing for high-risk HPV types.

The Pap smear was first implemented in the United States in the 1950s. It is a cytological examination of cervical cells used to detect abnormal cells that may harbor cancer or precancerous changes. Abnormal cells are treated aggressively by excision or ablation. This protocol of screening, evaluation, and treatment of precancerous led to successful cancer prevention over decades. Today, we do not screen as frequently since cervical cancer is caused by persistent infection by high-risk HPV subtypes, which are prevalent among sexually active women and resolve spontaneously. Thus, waiting will prevent over treatment, pain, anxiety, increased costs, and possibly increase rate of preterm delivery.

## **b. Developing Countries**

Women living in developing countries have limited access to effective screening measures. Thus, cervical cancer is usually advanced when symptoms develop and the disease is first diagnosed. Unfortunately, many women living in developing countries continue to suffer and die from cervical cancer as nations attempt to establish the capacity to develop screening protocols. Challenges involved with implementing screening include achieving high screening coverage of women in the at-risk age group, poor quality of Pap smear testing, and incomplete diagnosis and treatment of women found to be positive. For example, studies in Peru demonstrated that in one province, the sensitivity of the Pap test was only 27%; and of women with abnormal Pap test results, 75% did not receive appropriate follow-up diagnosis or treatment.<sup>12</sup>

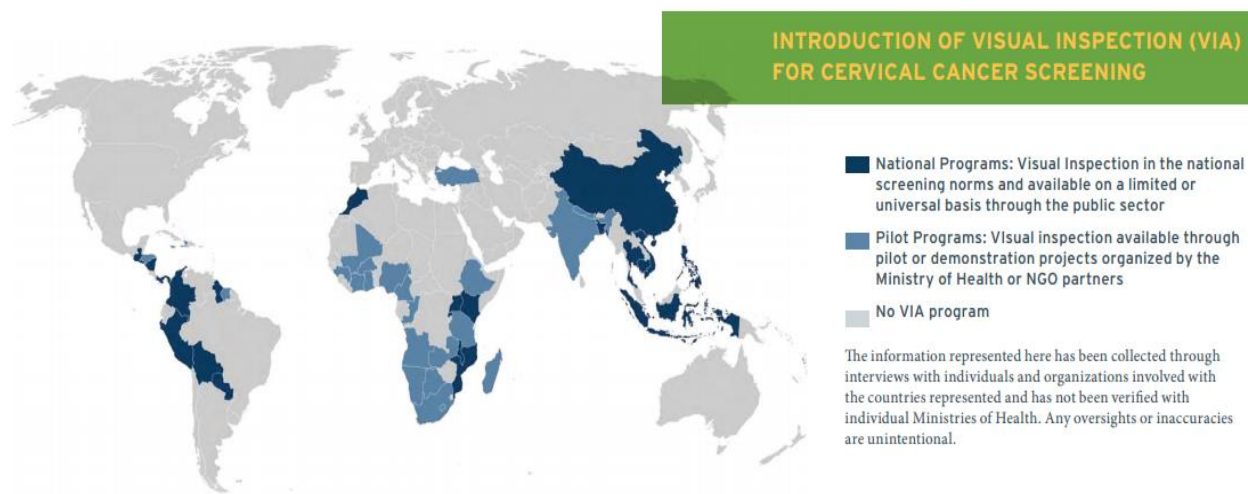
During screening using visual inspection with acetic acid (VIA) or visual inspection with Lugol's iodine (VILI), a solution made with acetic acid is painted on the surface of the cervix. Abnormal cervical tissue turns white when exposed to the acetic acid solution. This "see and treat" technique involves immediate treatment with cryotherapy. Cryotherapy is a procedure in which the visualized abnormal cervical tissue is frozen and consequently abolished. Although cryotherapy is not perfect as it relies on the individualized skills of the provider, it has potential to make significant advancements in preventing invasive cancer. It is especially convenient in an environment where patient follow up is not expected.<sup>13</sup> One pilot study using VIA for screening in Malawi, Uganda, Nigeria, Madagascar, Tanzania, and Zambia demonstrated VIA is an attractive alternative to cytology-based screening in low-resource settings. VIA screening followed immediately by cryotherapy treatment for pre-cancerous lesions is feasible and has demonstrated a 35% reduction in cervical cancer mortality in a seven-year period in a large randomized trial in India.<sup>14</sup>

On the contrary, VIA is not as beneficial for screening post-menopausal women since the older women experience cervical changes. Because the specificity of VIA is 83%, many women will be subjected to false positive results and unnecessary treatments. However, these minimal risks outweigh the benefit of potentially preventing an invasive cancer.



## VI. Cervical Cancer Questionnaire

Although a 2010 survey assessing Tanzanian women's knowledge and attitude towards cervical cancer demonstrated over 75% of respondents correctly identified early marriage and multiparity, other studies demonstrated a lack of knowledge about cervical cancer screening and HPV transmission among patients and nurses. Additionally, many women in Tanzania are not readily represented in such questionnaires. Women who are able to attend clinics with screening programs are generally from higher socioeconomic backgrounds, younger, and more knowledgeable about cervical cancer.<sup>15</sup> 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 stage. Considering both Tanzania and Ethiopia had established VIA programs in 2011 (Figure 5), I developed a questionnaire to assess the knowledge and perception of cervical cancer and cervical cancer screening programs of women in Tanzania and Ethiopia to guide future cervical cancer prevention and screening educational programs in communities.



Source: Cervical Cancer Action, "Progress in Cervical Cancer Prevention: The CCA Report Card", [http://www.cervicalcanceraction.org/pubs/CCA\\_reportcard\\_med-res.pdf](http://www.cervicalcanceraction.org/pubs/CCA_reportcard_med-res.pdf), accessed Nov. 21 2011

Figure 5. Countries which have introduced national and pilot programs for VIA for cervical cancer screening by 2011<sup>14</sup>

### **a. Objectives**

- (1) To assess the knowledge and perception of cervical cancer and cervical cancer screening programs of women in Tanzania and Ethiopia
- (2) To assess risk factors for cervical cancer
- (3) To assess current access to VIA screening
- (4) To guide future cervical cancer prevention and screening educational programs, which may have a positive impact on the early detection of patients at early disease stage

### **b. Location**

Moduli Hospital is located in the Monduli district headquarters. It serves as a referral to all lower health facilities within the district (i.e. dispensaries, clinics and health centers). The hospital has 114 inpatient beds and daily it serves up to 80 patients as outpatients. The outpatient department includes the care and treatment clinics for pregnant, HIV-positive, and diabetic patients. The hospital has a staff of 122. Included in the staff are one gynecologist, one surgeon, four medical doctors and 10 clinical officers. The hospital is about 50 KM from Arusha City.

With a population of 91 million, Ethiopia is the second most populous country in Africa. Whereas the USA had 730,801 physicians and 2.7 million nurses in 2006, there were 1936 physicians and 14,895 nurses in Ethiopia (World Health Report 2006, Ethiopia Atlas of Key Demographic and Health Indicators). The St. Paul's Millennium Medical College was established several years ago as a response to the shortage of physicians in Ethiopia. There are currently 20 departments. The Gynecology and Obstetrics department is one of the strongest, with over 24,380 outpatient visits, 4,200 deliveries, and 3,700 admissions a year.

### **c. Study Design**

A descriptive cross-sectional design was used and the study population consisted of patients presenting for outpatient gynecologic and obstetric clinic appointments.

### **d. Survey Instruments**

The questionnaire was a 34-item questionnaire adapted from previous assessments was used for data collection. It was designed to identify (1) socioeconomic factors, (2) current access to healthcare and health status, (3) previous screening tests, and (4) knowledge of cervical cancer from women presenting for care in Tanzania and Ethiopia. Other pertinent information gathered included age, language spoken, whether the patient is employed, what access the patient has to medical care, knowledge on risk factors for HPV acquisition, HIV status, and perception on cervical cancer screening. All women who presented to Monduli District Hospital in Tanzania

and the Saint Paul Hospital in Ethiopia were asked to participate in this study and guided with informed consent. The questionnaires and informed consent forms were translated to Swahili, Maasai, and Amharic. Translation services were available at all times.

### e. Results

Table 1 and Figure 6 describe the demographics and socioeconomic backgrounds of the participants. Twenty-three women completed the questionnaire in their native language. About half of the women were in Tanzania and half were in Ethiopia. Ages ranged from 19 to 45. More than half of the participants reported having a job, and 65% reported being married. Thirty-four percent of participants had college educations.

When asked about any barriers to health care, participants cited fear, religious reasons, lack of medical facility, laziness, lack of transportation, lack of money, and interference with jobs. Most participants visit hospitals or clinics when seeking medical care (Figure 7). Although 75% of the participants walk to receive medical care, only 5% described the need to travel further than 3 hours to reach a medical provider (Table 2).

Variables	Frequency	%
<b>Nationality</b>		
Tanzanian	11	48
Ethiopian	12	52
<b>Age</b>		
>30 years old	7	30
<30 years old	10	43
Unknown	6	26
<b>Married</b>	15	65
<b>Highest Level of Education</b>		
Primary	10	43
Secondary	5	22
University	4	17
College	4	17
<b>Employed</b>		
Full time	10	50
Part time	1	5
Unemployed	9	45
<b>Income source</b>		
Regular job	10	56
Farming	4	22
Family Support	2	9

Table 1. Demographics of Women in the Study

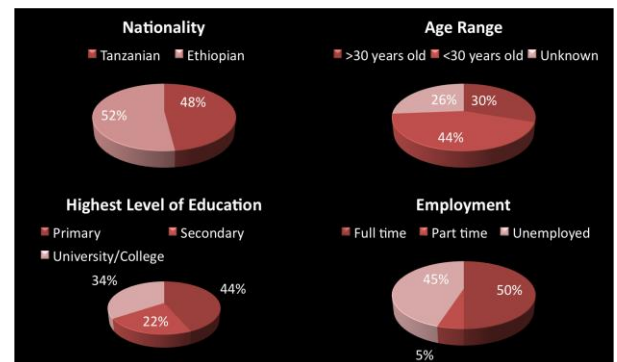


Figure 6. Demographics of Women

<b>Medical Care</b>	<b>%</b>
Traditional Healer/Family	0
Medical Clinic	26
Hospital/doctor	70
Community health worker	4
<b>Nearest Medical Care Provider</b>	
Less than 10 minutes	20
Less than 30 minutes	55
Less than 3 hours	20
More than 3 hours	5
<b>Transportation Method to Provider</b>	
Walk	75
Car	20

Table 2. Access to Medical Care

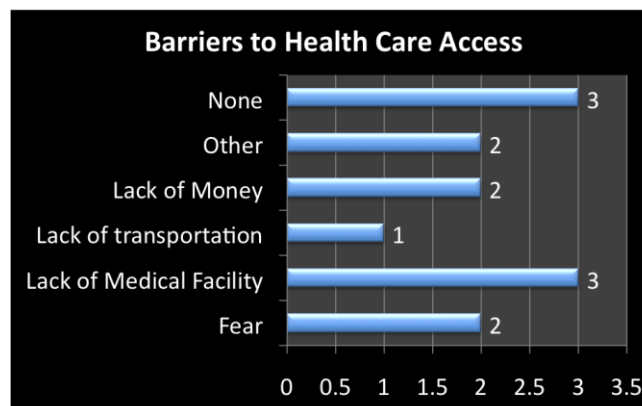
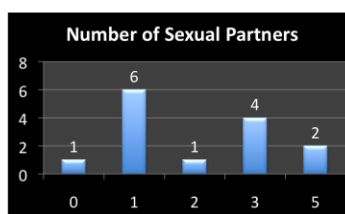
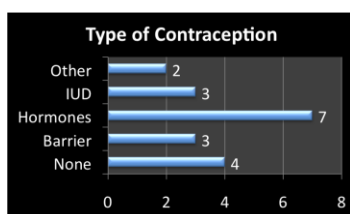


Figure 7. Barriers to Medical Care

Tables 3 and 4 lists the cervical cancer risk factors of the participants. Two women reported having sex before the age of 16. The number of partners documented ranged from 1 to 5 and only 2 women reported having 5 or more sexual partners. Only 16% of participants use condoms for birth control and 20% smoke cigarettes. No one reported a personal history of cancer or HIV.

Although 27% of Tanzanian women and 58% of Ethiopian women heard of VIA, only 1 women received the VIA screening exam. When the remaining participants who knew of VIA were asked why they did not receive the screening test, they reported “not feeling sick”, being discouraged by their partner, and fear. None of the women knew that the proper age to receive the first screening test is 30 years old. None of the Ethiopian and 9% of Tanzanian participants reported VIA screening intervals to be every 3 years, and 25% of Ethiopian and none of the Tanzanian participants reported intervals of every 5 years. Most women believed the first screening VIA test should occur at the age of 20. None of the participants had previously heard of pap smears, colposcopy, or cryotherapy.



Figures 8 and 9. Participant's Contraception Use and Number of Sexual Partners

Variable	N	(%)
Age of Sexual Onset <16 yrs old	2	15
Number of Sexual Partners		
0	1	7
1	6	43
2	1	7
3	4	29
5	2	14
Type of Contraceptive Used		
None	4	17
Barrier	3	16
Hormones	7	37
IUD	3	16
Other	2	11
Cigarette Use	4	20
HIV/AIDS	0	0

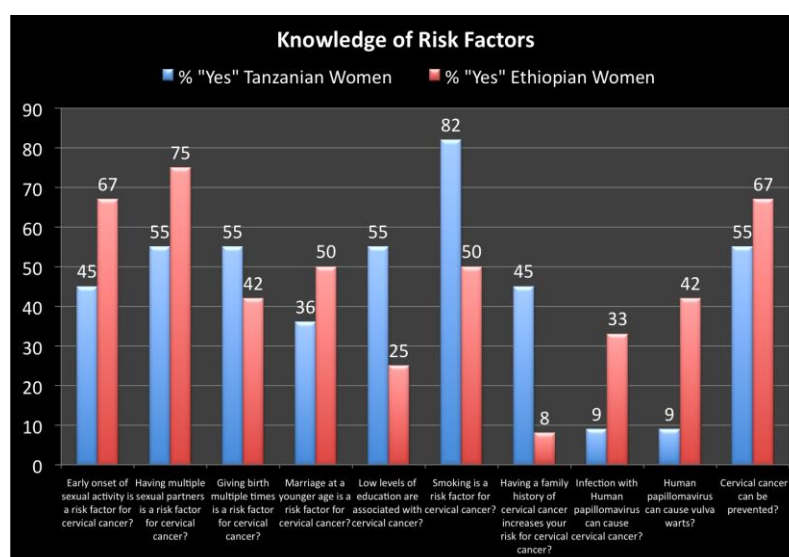
Table 3. Cervical Cancer Risk Factors

Question	% Yes- Tanzania	% Yes- Ethiopia
<b>Have You Heard of Visual Inspection with Acetic Acid (VIA)?</b>	27	58
<b>Have you ever had a VIA?</b>	9	0
<b>If you have not had a VIA before, was there a reason?</b>		
Fear	20	8
Cultural/religion		8
I do not feel sick	33	17
Discouraged by my partner		8
I Don't Know	40	17
<b>Have you been tested for HIV before?</b>	78	100
<b>When Should a Woman Have Her First VIA Test?</b>		
As a child	11	
At the age of 20 years	36	100
At the age of 30 years	0	
After the age of 30 years	9	
<b>How Often Should A Woman Receive a VIA Test?</b>		
Once	22	
Every year	67	75
Every 3 years	9	
Every 5 years		25

Table 4. Cervical Cancer Knowledge

The participants answered 10 questions that assessed knowledge of cervical cancer risk factors (Figure 10). Notably, 45% of Tanzanian women and 67% of Ethiopian women cited early sexual activity as a risk factor. Most Tanzanian and Ethiopian women acknowledged having multiple sexual partners and smoking as risk factors, and that cervical cancer is preventable. Ethiopian women seemed to have a better understanding of HPV and associated diseases than Tanzanian women. Less than half of the participants knew that giving birth multiple times and having a family history of cervical cancer increases the risk for cervical cancer. Eighty-two percent of Tanzanian women correctly identified smoking tobacco as a risk factor.

Figure 10. Cervical Cancer Knowledge



### **f. Conclusions**

Socioeconomic status, determined by highest education level and employment, did not correlate with knowledge of HPV or VIA. Although most participants walk to access medical care, many can reach a provider within 30 minutes. Participants noted few barriers to care, including lack of transportation, money, and facilities.

Participants did not report many sexual risk factors for HPV/Cervical cancer. No one reported a personal history of HIV. However, only 16% use condoms for birth control. Ethiopian women more knowledgeable about sexual risk factors than Tanzanian women (early sexual activity, multiple partners, marriage at a young age, HPV). 67% Ethiopian women and 55% Tanzanian women responded cervical cancer can be prevented. However, VIA is not yet readily accessible. Although the WHO recommends VIA screening for women starting at the age of 30 with intervals of 3-5 years, most women believed the first screening VIA test should occur at the age of 20 and VIA should be repeated every year. None of the participants had previously heard of pap smears, colposcopy, or cryotherapy.

### **g. Study Limitations**

The study was conducted in a district (secondary) hospital in Tanzania and a tertiary hospital in Ethiopia. The sample size was small and limited to the women who had time to participate before their clinic appointments. The findings may not be representative of the entire state, especially the health care deserts of the country. Women who can attend clinics with screening programs are generally from higher socioeconomic backgrounds, younger, more knowledgeable about cervical cancer, and live closer in location to medical facilities. Furthermore, given that the participants were asked to fill out questionnaires, the responses are subject to reporting bias.

## **VII. Next Steps**

Cervical cancer can be prevented in developing nations if efforts are organized and prioritized. Screening with VIA should be available to all women starting at 30 years of age. With the implementation of screening programs comes a need for proper counseling, since providers will need to develop rapport by easing the fears and concerns of patients, who will hopefully return for additional screenings in the future. Providers will also need training on immediate treatment of pre-cancerous lesions by cryotherapy. Effective screening can be

maximized if more midlevels and nurses are trained to perform the “screen and treat” method. Nations will need to be careful to avoid screening pitfalls that could potentially drain resources, including screening women at low risk, focusing on treating advanced cases.

Part of the approach to establish widespread screening also includes educational programs regarding minimizing risk factors, counseling, condom use, and access to screening. The difference of responses among Tanzanian and Ethiopian communities highlights the need for curriculum specific to each community.

Each developing country will need to conduct a situational analysis of women affected by HPV, strengthen information systems and cancer registries, and establish information and surveillance systems for ongoing monitoring of cervical cancer program performance. Cervical cancer registries will allow nations to measure effectiveness and impact of programs. These systems should include follow-up diagnoses and test results, in addition to the capacity for treatment of pre-cancerous lesions by cryotherapy and treatment for invasive cancer with surgery, radiation, and chemotherapy.

### **VIII. Additional Options for Screening**

In addition to pap smears and VIA, HPV DNA tests have been developed for cervical cancer screening and are currently used in developed nations. Although HPV testing has proven to be more sensitive than Pap Smear testing and VIA in detecting pre-cancerous lesions, it is relatively expensive and requires extensive time to obtain a result. The current recommendations for the use of VIA are supported by The World Health Organization's 2013 guidelines for preventing cervical cancer, which state that “a screening test with the highest diagnostic accuracy is not necessarily the test of choice in clinical practice”.<sup>15</sup>

There is a promising new HPV test that potentially suits the particular needs of low-resource environments. Qiagen’s CareHPV is an HPV molecular-based test that generates results within 3 hours. The test kit is portable, compact, battery-operated, and conducted with minimal training. Remarkably, initial data in China indicate three- time use of CareHPV over a woman’s life coupled with effective treatment has the potential to reduce the incidence of cervical cancer by 56%! The test is currently undergoing approval and will hopefully be provided in developing countries at a low cost soon.

## **IX. HPV Vaccination**

The WHO recommends vaccination for girls aged 9-13 years as the primary prevention method in a comprehensive multidisciplinary approach to cervical cancer. The WHO works with countries and partners to develop and implement these comprehensive programs. In 2006, 51 countries had national HPV vaccination public health sector programs and 26 countries had pilot HPV vaccination programs largely due to the efforts of the WHO and various partners.<sup>7</sup>

Obstacles preventing the widespread implementation of the HPV vaccine include cost, underdeveloped infrastructure, the lack of cost effectiveness analysis, and cultural sensitivity training. The WHO and the PAHO Epi Revolving fund supports vaccination programs in middle income countries, such as countries in Latin America and Caribbean. The WHO and Global Alliance for Vaccinations and Immunizations (GAVI) support lower income countries. GAVI negotiated a single dose of HPV vaccine to \$5 for lower income countries. GAVI also recently teamed with the pharmaceutical company Merck. Together, they pledged HPV vaccines for 2 million girls in 9 countries by 2015. This has already resulted in more than 133,000 girls receiving vaccines in Rwanda.<sup>16</sup>

In order to assist countries in planning vaccine costs and rollout, the WHO developed the Cervical Cancer Prevention and Control Costing (C4P) tool. The C4P tool afforded Tanzania the ability to establish a pilot HPV vaccination over 5 years and construct an economic cost-effective analysis (Figure 11). In summary, HPV vaccination would be highly cost-effective. The estimated cost of establishing the program and delivering 3 doses of vaccine to school girls is \$31.5 million USD, assuming the GAVI-negotiated price of US\$5 per dose.<sup>17</sup> This is equivalent to a financial cost of \$5.77 USD per fully immunized girl, excluding the vaccine cost. The most expensive pre-introduction activities were procurement; service delivery; and information, education, and communication (IEC).<sup>17</sup> Introductory programs in other nations within Latin American and the Caribbean region have already resulted in cost-savings. The coverage for girls age 10 is 85%, 77% and 65% in the 1st, 2nd and 3rd round respectively in the Tanzania pilot studies.



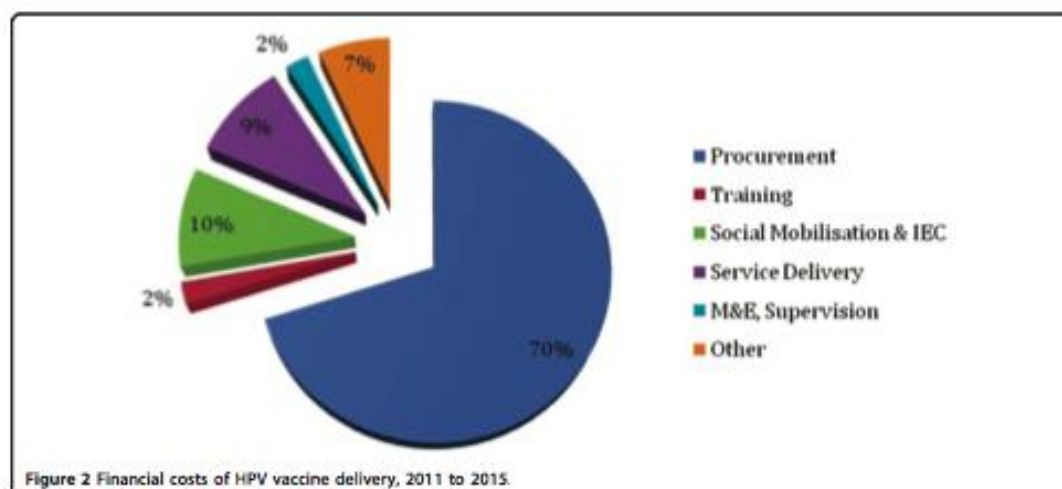


Figure 11. Division of Costs for implementing the HPV Vaccine

In order to implement the vaccine, campaigning strategies must be carefully tailored to the culture where they are delivered, and health officials must be prepared to discuss and defend the vaccine as appropriate in each culture. When HPV vaccines first became available, there was concern that because HPV is sexually transmitted, parents might be worried that by vaccinating their children they would be sending a message that pre-marital sex was acceptable. In a previous study, parents and schoolteachers in Tanzania showed poor knowledge of the disease and its distinction from uterine cancer, yet when parents learned that there are vaccines to help prevent the cancer, they enthusiastically brought their girls for immunization. The studies also found that parents had unexpected questions about the effect of vaccination on future fertility (along with, as anticipated, questions about vaccine safety, effectiveness, and accessibility). Once these questions were addressed through education and community mobilization, HPV vaccine coverage rates typically were above 80%, and often much higher.

Educational messages and notification, approval, or consent of patients or parents should be tailored to local cultural contexts and the information needs of various audiences. Once introduced, arrangements should be in place to monitor safety.

Vaccination alone, compared to the status quo, could lead to a 40% reduction in mortality over the lifetime of the vaccinated cohort. If vaccination is coupled with at least three screening tests over the woman's lifetime, lifetime risk of cervical cancer could be reduced by 60%. Advocacy at global and local levels is needed more than ever before. Governments, universities,

non-governmental organizations, professional associations of OB/GYNs, the cancer control community, and community groups must demand that cervical cancer control be given a higher priority by the WHO, UN agencies, and donors. The biggest obstacle to getting resources and is cost. However, there is a high cost of inaction in developing nations.

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