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CLINICAL ARTICLE

Successes and challenges of establishing a cervical cancer screening and treatment program in western Kenya ☆

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ABSTRACT

Objective: To describe the challenges and successes of integrating a public-sector cervical screening program into a large HIV care system in western Kenya. *Methods:* The present study was a programmatic description and a retrospective chart review of data collected from a cervical screening program based on visual inspection with acetic acid (VIA) between June 2009 and October 2011. *Results:* In total, 6787 women were screened: 1331 (19.6%) were VIA-positive, of whom 949 (71.3%) had HIV. Overall, 206 women underwent cryotherapy, 754 colposcopy, 143 loop electrical excision procedure (LEEP), and 27 hysterectomy. Among the colposcopy-guided biopsies, 27.9% had severe dysplasia and 10.9% had invasive cancer. There were 68 cases of cancer, equating to approximately 414 per 100 000 women per year. Despite aggressive strategies, the overall loss to follow-up was 31.5%: 27.9% were lost after a positive VIA screen, 49.3% between biopsy and LEEP, and 59.6% between biopsy and hysterectomy/chemotherapy. *Conclusion:* The established infrastructure of an HIV treatment program was successfully used to build capacity for cervical screening in a low-resource setting. By using task-shifting and evidence-based, low-cost approaches, population-based cervical screening in a rural African clinical network was found to feasible; however, loss to follow-up and poor pathology infrastructure remain important obstacles.

1. Introduction

Cervical cancer is one of many epidemics that disproportionately affect low-income countries. The WHO estimates that there are 500 000 new cases of, and 275 000 deaths from, cervical cancer each year worldwide. Approximately 90% of cases and 95% of deaths from cervical cancer occur in low-income countries [1,2]. In many such regions, cervical cancer kills more women compared with any other cancer [1]. Given the limited screening and diagnostic capabilities in these countries, most women present with late-stage, fatal disease [1]. With the ongoing population growth of low-income countries, deaths due to cervical cancer are projected to rise by almost 25% in the next 10 years [1]. In Kenya, the crude incidence of cervical cancer is estimated to be at least 16 cases per 100 000 women per year, although this is probably an underestimate [3]. Thus, the need for screening for cervical cancer in Kenya has become an important health priority [4].

Many of the countries with the highest burden of cervical cancer also face an unrelenting HIV epidemic; for example, the prevalence of HIV among women aged 15–49 years in Kenya was 8.0% in 2009 [5]. HIV infection confers a greater risk for developing cervical dysplasia and cancer. The incidence of cervical intra-epithelial neoplasia (CIN) is 4 to 5 times higher among HIV-infected women than among their uninfected counterparts [6,7]. Women with low CD4 cell counts have the highest prevalence of human papillomavirus (HPV) infection and more commonly harbor high-risk oncogenic HPV subtypes that are associated with severe dysplasia and cervical cancer [8–11]. The natural progression of cervical dysplasia is accelerated, because the average interval between diagnosis of CIN and invasive disease may be shortened from 15.7 to 3.2 years [12]. Until recently, access to anti-retroviral therapy was very limited for HIV-infected women in low-income countries. As

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highly active antiretroviral therapy (HAART) has become more accessible, however, HIV-infected women in low-resource regions are living longer and are increasingly vulnerable to death from chronic diseases including cervical cancer. In contrast to other AIDS-defining malignancies, the incidence of cervical cancer in HIV-infected women has not been decreased by the introduction of HAART [13,14].

Screening for cervical cancer in low-income countries has many inherent challenges, including a lack of public awareness, a lack of screening and diagnostic modalities, poor health infrastructure, understaffing, a cultural aversion to discussing sexual function, poor medical records, and high losses to follow-up [1]. The many logistic prerequisites for a successful Pap-smear based program (preparation of high-quality smears, well-trained and experienced cytologists, logistics to transport specimens and results, and substantial health system strengthening to follow patients longitudinally) pose major challenges to implementation in low-income countries [15,16]. In response to this challenge, more cost-effective methods of cervical cancer screening have been developed and tested [15]. The least expensive of these is visual inspection with acetic acid (VIA), which has been shown to decrease incidence and mortality in low-resource settings, and has been validated as a screening method among women infected with HIV [16,17].

VIA has been embraced as an easily implemented, low-tech screening method; however, there remain many barriers to the development of a comprehensive cervical cancer screening and treatment program regardless of the modality of screening test chosen. Most importantly, such programs must be measurable and sustainable in the long term. The 2011 Wakley Prize Essay eloquently argues that short-term, disease-specific interventions, frequently spearheaded by international health organizations, can be a real source of harm to the comprehensive district health system in place in most low-resource countries [18]. Temporary mass screenings for cancers, such as breast and cervical cancer, occur intermittently in Kenya and are a well-intentioned effort; however, reduction in mortality from cervical cancer depends on early detection and early treatment of precancerous and cancerous disease [1]. Thus, in the absence of comprehensive services to treat precancerous and cancerous disease, targeted mass screenings are unlikely to affect cervical cancer morbidity and mortality.

The impetus to start a comprehensive cervical cancer program in Kenya arose in response to the high morbidity and mortality from cervical cancer observed in HIV clinics and referral hospitals supported by The Academic Model Providing Access to Healthcare (AMPATH) in western Kenya. AMPATH is a collaboration among 9 North American universities and medical centers that is led by the Indiana University School of Medicine, Moi University School of Medicine (MUSOM), Moi Teaching and Referral Hospital (MTRH), and Kenyan Ministries of Health (MOH) [19]. AMPATH started in 1990 as an HIV/AIDS prevention and treatment program. Collaboratively, AMPATH and MUSOM established HIV treatment clinics at existing MOH district clinics and have subsequently enrolled approximately 150 000 individuals infected with HIV at 65 rural sites in western Kenya. AMPATH has since evolved and expanded its focus to include primary care and chronic disease management, with programs addressing tuberculosis, hypertension, diabetes, oncology, maternal mortality, family planning, food insecurity, orphans and vulnerable children, and income generation.

In 2009, a pilot study funded by the Fogarty International Center (NIH) was conducted to evaluate the test characteristics of VIA and the feasibility and acceptability of cervical cancer screening among women infected with HIV in western Kenya [16]. The study validated VIA as an acceptable method of screening for HIV-infected Kenyan women, and confirmed the high prevalence of abnormal screens in that cohort. In addition, the pilot facilitated the development of a functional clinic model and a core of well-trained MOH nurses and doctors who could provide clinical care and serve as regional trainers and specialists.

After successful completion of the pilot study, the cervical cancer screening program was extended. Utilizing the clinical and human resources developed from the pilot study [16], in addition to the organizational infrastructure and supply chain of AMPATH, the program was expanded to 4 regional health facilities over the course of 2 years, serving an estimated catchment population of approximately 1 million. In this context, the aim of the present study was to explore the challenges and successes of a public sector cervical cancer screening program in western Kenya.

2. Materials and methods

In the present retrospective, descriptive study, data were analyzed from women who underwent cervical cancer screening by VIA between June 1, 2009, and October 31, 2011. The cervical cancer screening program was rolled out as a clinical program and hence ethical approval was required for retrospective analysis of de-identified data. Ethical approval was obtained from the Institutional Research and Ethics Committee at MUSOM, Eldoret, Kenya, and Indiana University's Institutional Review Board in Indianapolis, IN, USA.

After the pilot study [16], the screening program was expanded to 4 regional health facilities. To increase screening uptake in these communities, an Information–Education Campaign was implemented by means of health talks, T-shirts, and print media to raise awareness about the availability and necessity of screening. For equity reasons, screening was offered regardless of HIV status. Patients were actively recruited for screening from both AMPATH-supported HIV clinics and maternal–child health clinics at the 4 facilities. The target age range for screening was 21–65 years; however, HIV-infected patients of any age were accepted for screening owing to their increased risk of cervical dysplasia and progression to cancer.

To staff these 4 facilities adequately, significant training, mentorship, and capacity building was required. The program used a training curriculum adapted from the WHO's International Agency for Research on Cancer (IARC), and key nurses underwent additional training in cryotherapy and cervicography in Lusaka, at the Centre for Infectious Disease Research in Zambia [20–22]. These key nurses then trained (using IARC-based materials) and mentored other local MOH nurses who staffed the cervical cancer screening services in their clinics. A core group of local gynecologists from MUSOM underwent specialized training and continuous mentorship from visiting North American gynecologists to become skilled at colposcopy, biopsy, and loop electrical excision procedure (LEEP).

The AMPATH–MUSOM collaboration provided the regional logistic support, supply chain management, and screening rooms. Most screening supplies were procured domestically in accordance with MOH procurement policies; however, some specialized supplies could not be sourced nationally and required importation.

Box 1
Cryotherapy eligibility criteria.

1. Lesion is associated with the squamocolumnar junction.
2. Lesion covers 75% or less of the squamocolumnar junction.
3. Lesion is seen in its entirety and does not disappear into endocervical canal.
4. There are no abnormal blood vessels.
5. There is no cervical lesion (polyp) or anatomic defect (scarring or fibrosis) that prevents flush contact between cervix and cryoprobe.
6. There is no clinical evidence of cancer (ulcerations, heaped edges, excessive bleeding from friable tissue).
7. Patient is not pregnant.