



A comprehensive assessment of breast and cervical cancer control infrastructure in Zambia



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ABSTRACT

Introduction: By 2030 cancer will kill one million Africans each year. Women will bear the heaviest burden, as cancers of the breast and cervix are the most common malignancies and causes of cancer-related death in the African region. National-level data that map the status of women's cancer control services are needed to inform strategies for implementing platforms for the early detection and treatment of these "priority" cancers.

Methods: Using mixed-methods, we assessed available services for breast and cervical cancer detection and treatment at all provincial hospitals, the national referral hospital, and the national cancer treatment center in Zambia.

Results: A system for cervical cancer prevention using visual inspection with acetic acid (VIA) and ablation/excision of precancerous lesions has been established at the provincial level. The potential for mammography, clinical breast examination, diagnostic ultrasound and biopsy exist at the provincial level, albeit on a much smaller scale. Breast wedge resections and mastectomy can be performed in provinces where general surgeons are located; however, breast conserving and reconstructive surgery are not available. Invasive cancers are generally referred to University Teaching Hospital in Lusaka, where services for radiation, chemotherapy and hormonal therapy are available but overburdened. Pathology services nationwide are woefully inadequate.

Discussion: The assessment revealed a critical need for centrally coordinated, but decentralized, public service platforms for women's cancer control. Efforts are underway, through multiple stakeholders, to implement recommendations related to training healthcare workers who can provide advanced diagnostic and therapeutic services, improving pathology services, and innovative financing for these initiatives.

1. Introduction

The growing global cancer burden is increasingly falling on low- and middle-income countries (LMICs), where nearly 80% of disability adjusted life-years-lost to cancer occurs [1–4]. In Africa the need for action is profound as it is predicted that by 2030 cancer will kill one million Africans each year [2]. Women will bear the heaviest burden, as cancers of the breast and cervix are the most common malignancies and causes of cancer-related death in the African region.

2. Background

Breast cancer incidence rates in developing nations, although rising,

are much lower than those in developed nations. Mortality rates, however, are just as high. System level barriers to breast cancer control in LMICs are centered around the lack of screening, early detection, diagnostic, and treatment facilities [5]. Although scarce, Zambia-specific data indicates that breast cancer incidence has been rising.

Cervical cancer is a major cause of cancer deaths among women in LMICs. One in five cases reported globally occurs in sub-Saharan Africa [6,7]. System level barriers are similar to those for breast cancer. HIV infected women are at increased risk of developing cervical precancer and cancer. [8–10]. Zambia has disproportionately high cervical cancer incidence and mortality rates [4,11], as well as a generalized HIV/AIDS epidemic [12].

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3. Preliminary activities

In 2005 the Zambian Ministry of Health facilitated the initiation of the Cervical Cancer Prevention Program in Zambia (CCPPZ). Since inception the CCPPZ has implemented nurse-led public cervical cancer prevention service platforms where screening is performed by visual inspection with acetic acid (VIA), followed by ablation with cryotherapy or thermal coagulation, excision with loop electrical excision procedure (LEEP) or referral for biopsy [13]. To date CCPPZ has screened over 500,000 women [14–16]. Supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the Centers for Disease Control and Prevention (CDC), as well as a prominent public-private partnership – Pink Ribbon Red Ribbon – the CCPPZ was able to build a highly efficient management and quality assurance infrastructure. [14–16]

More recently, the Zambian government has accelerated its efforts to expand breast cancer early detection and treatment capacity through the initiation of a partner-sponsored effort with the Susan G. Komen Breast Cancer Foundation. The model consists of breast cancer public awareness campaigns, clinical breast examination (CBE) by nurses, ultrasound-guided biopsy of palpable breast masses by high-level healthcare providers and referral for treatment. However, limited funding and the lack of an efficient delivery and management system preclude the availability of these services, except on a very small scale.

Despite these initiatives, there are no national-level data that map women's cancer control services in the country.

4. Methods

The overall aim of this project was to quantify existing service delivery capacity and to identify gaps, challenges, and priority areas of focus for building setting-appropriate and sustainable breast and cervical cancer control service platforms throughout Zambia.

The project provides an overview of services currently available for breast and cervical cancer screening, early detection, diagnosis and treatment in Zambia, obtained through a nationwide survey. The survey was accomplished by conducting health facility assessments (HFAs) at all 9 provincial hospitals in Zambia, as well as at the University Teaching Hospital (UTH) and Cancer Diseases Hospital (CDH) in the Lusaka Province. Provincial and tertiary facilities were the focus of the assessment because they have been identified by the Zambian National Cancer Control Strategic Plan as the highest priority facilities for expansion of cancer screening, early detection, and treatment services.

For each facility surveyed we assessed human resources (health care providers with specialized training in breast and cervical cancer screening, early detection and treatment) and facility infrastructure (capacity, equipment, and supplies) to provide breast and cervical cancer screening, early detection and treatment services, as well as HPV vaccination services. Relevant referral systems were also assessed. Concurrent with facility assessments, we conducted a structured interview with each Provincial Health Officer, which included questions on service provision, utilization, and costs to a patient for receiving breast or cervical cancer screening, early detection, diagnosis, and treatment in each district of the particular province. The availability of supplies and equipment was also evaluated at the district level but was not substantiated through visual inspection. All fieldwork was completed between August 2014 and January 2015.

5. Results

5.1. Population

Zambia is divided into 10 provinces, comprised of 102 districts, with a total population of 14,891,010. The target population for the assessment was women aged 25–59 years ($n = 2,208,870$), who comprise ~15% of Zambia's population. Provincial Health Offices reported

1937 health facilities within the country, corresponding to a national rate of 1.3 health facilities per 10,000. Although there are no established benchmarks for the ideal number of health facilities, hospitals, or hospital beds per 10,000 population, the World Health Organization reports an average of 0.8 hospitals per 10,000 for the African region [17].

5.2. Human resources

The paucity of human resources for health has previously been noted as a limitation in patients' access to breast and cervical cancer care in Zambia. The Provincial Health Offices reported a total of 11,746 healthcare workers, including nurses ($n = 9609$), clinical officers ($n = 1179$), general medical officers ($n = 665$), specialists ($n = 104$), technologists ($n = 109$), and pharmacists or pharmacy technicians ($n = 80$). Of these healthcare workers, 2955 (26%) are employed in the provincial, tertiary, and specialty hospitals (2587 nurses, 249 general medical officers, and 119 clinical officers). The provincial and tertiary hospitals surveyed reported an additional 104 specialists (40 general surgeons, 28 gynecologists, 6 clinical oncologists, 14 anesthesiologists, 7 radiologists, 9 pathologists), and 109 technologists (36 anesthetists, 42 radiographers, 27 histology technologists, and 4 cytology technicians) (Fig. 1). The largest cadre of healthcare workers in the public sector is nurses, who account for 82% of the total healthcare workers, while specialists and technologists make up only 2%.

5.3. Service distribution

In most provinces, the provincial hospital is located in the provincial capital and also serves as the district hospital for that district. In this analysis, all services provided at the provincial hospital are counted toward services provided in that district.

Breast cancer screening (mammography), early detection (CBE) and diagnostic (ultrasound, biopsy, pathology) services are not universally available. Six out of 10 provinces have the potential capacity to offer CBE and either mammography or ultrasound; neither Muchinga nor Luapula Provinces report offering of any of these services. (Fig. 2).

All provincial hospitals provide cervical cancer “screen and treat” services or refer to a nearby clinic; as a result, all provinces have at least one district providing cervical cancer prevention. All provinces also have at least one district outside the capital that provides cervical cancer prevention services, with the exception of Muchinga Province. Fig. 5 shows the provinces providing cervical cancer prevention in at least one facility.

5.4. Breast cancer services

With respect to early detection and screening services, healthcare workers trained to perform either CBE, ultrasound or mammography are present in 8 of 11 hospitals. Two of the hospitals surveyed do not have the capacity for CBE, ultrasound, or mammography (Fig. 2).

Three hospitals have dedicated breast specialty clinics, each of which offers CBE, mammography, ultrasound and ultrasound-guided breast biopsy (fine needle aspiration and core needle biopsy). These clinics operate in Kabwe General Hospital (Central Province) one day per week, University Teaching Hospital (Lusaka Province) every weekday, and Cancer Diseases Hospital (Lusaka Province) three days per week. Only 5 of the 11 hospitals were able to report numbers of women assessed for breast cancer in the 12-month period preceding the survey. The total number reported was 1414; of these, 839 (~60%) were screened at the Cancer Diseases Hospital in Lusaka.

The most common forms of breast cancer evaluation and treatment are incisional or excisional wedge biopsy and mastectomy, both of which are performed at 8 hospitals. One hospital charges for these services. Radiation therapy is offered only at the Cancer Diseases Hospital. Chemotherapy is offered at 4 hospitals, but mainly provided

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