

Original Research Report

## Evolving a strategic approach to cervical cancer control in Africa

Isaac F. Adewole<sup>a,\*</sup>, J.L. Benedet<sup>c</sup>, Brian T. Crain<sup>b</sup>, Michele Follen<sup>b</sup>

<sup>a</sup>Department of Ob/Gyn, College of Medicine, University of Ibadan, Nigeria

<sup>b</sup>Department of Biomedical Engineering, MD Anderson Cancer Center, Houston, TX 77030, USA

<sup>c</sup>Department of Cancer Imaging, British Columbia Cancer Research Centre, Canada

Available online 3 October 2005

### Abstract

Nigeria is a country in western Africa where the incidence rate of cervical cancer is 25/100,000. There are 32 million women aged 15–64 years old. If we were to conduct a one-time screen over 1 year, 8000 new invasive cervical cancers would be detected. Currently, 80% of cases present in Stage III. While a one-time screen should detect some earlier stages, there could be as many as 6400 Stage III cancers to treat. Strategies to enable a one-time screen are being considered.

© 2005 Elsevier Inc. All rights reserved.

*Keywords:* Cervical cancer; New approach; Africa

### Introduction

Cancer of the cervix is the most common malignant tumor of the female reproductive tract and the leading cause of death from cancers among women in the developing world [1]. This is especially true in Africa [2]. Cervical cancer is both preventable and curable, especially if detected early. Widespread comprehensive cervical cancer control programs have had a profound impact in developed countries where they have successfully reduced incidence and mortality rates by more than half.

Carcinoma of the cervix is a common disease in Sub-Saharan Africa, where it is associated with a high mortality rate [3,4]. Similarly, it is now the leading malignancy in women in developing countries [5] and is estimated to account for up to 80% of all gynecological cancer-related admissions in several African countries [6,7].

A study at the Ahamdu Bello Teaching Hospital (ABUTH) in Zaria found that cancer of the cervix is the most common malignancy of the female genital tract, accounting for 66.2% of all gynecological malignancies [8]. Similarly, Abioye [9] reported incidence of 19.9%

among women seen with malignant tumors in the University College Hospital (UCH) Ibadan, thereby placing it at the top of all female malignancies. Given the population of 32 million women in Nigeria, we would expect to treat approximately 8000 new cases of invasive cervical cancer annually. There are four radiotherapy centers in Nigeria. Since most cervical cancers present in Stage III, there will be a great demand upon the radiotherapy facilities. New approaches to radiotherapy, including high dose radiotherapy would be of interest.

In Nigeria, hospital-based studies have shown early age at presentation of cancer of the cervix. Patients in these studies had age distributions between 24 and 80 years old and an aggregated mean age of 48 [8,10–12]. Similarly, records from the Cancer Registry of University College Hospital, Ibadan showed a range of 20–85 years with one case occurring before the age of 19 years.

The stage at which patients present for treatment differs between developed and developing countries. In developed countries, the majority of patients present with stage I cervical cancers. Conversely, in developing nations, at least 80% of patients present at stage III and an additional 10% at stage IV ([8,10,11,13,14]; see Fig. 1). The current wisdom about cervical cancer control is the critical importance of early detection. But most of the women in developing nations

\* Corresponding author.

E-mail address: [ifadewole@yahoo.co.uk](mailto:ifadewole@yahoo.co.uk) (I.F. Adewole).

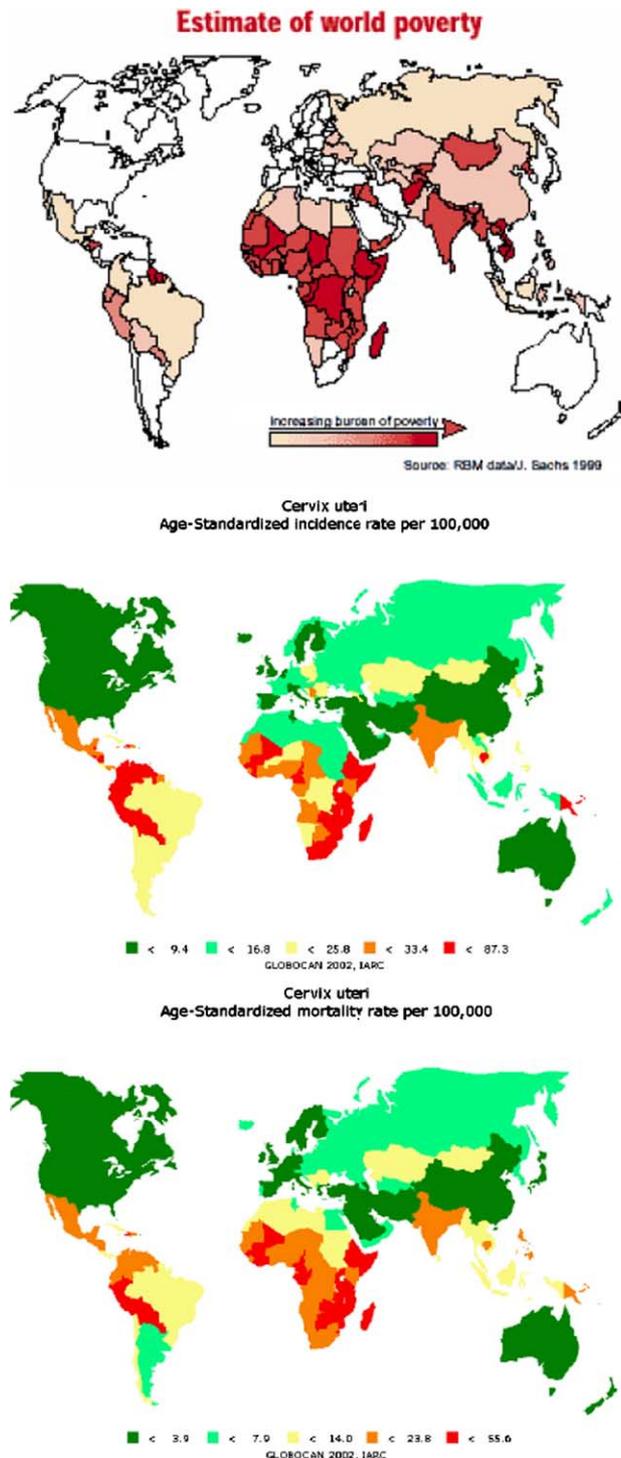


Fig. 1. Incidence and mortality of cervical cancer correlate strongly with poverty levels, leading to worldwide disparities in health.

present with advanced disease when nothing can be done for them. Olukoya [15] noted several reasons for late presentation, namely,

“Ignorance about the symptoms; fatalistic attitude; readiness to attribute neoplastic disease to supernatural causes, thereby resulting in delays in seeking help; fear of

confirmation of suspicion; and of course, the perennial problem of low coverage of the population by health care services especially the rural areas.”

Furthermore, it has been reported that 50–90% of women who develop or die from cervical cancer have never been screened [16]. The American Cancer Society (ACS) reported that due to the application of cytology screening in the United States, the death rate from invasive cervical cancer has been reduced by at least 70% over the last 40 years [17].

There is, however, good news about knowledge regarding the epidemiology of cervical cancer in the developing world. Specifically, invasive cervical cancer has shown that it has prolonged, asymptomatic pre-invasive stages which can be easily detected and treated accordingly. Indications of these pre-invasive stages are readily identified through cancer screening. It takes 10–15 years for pre-invasive stages to progress to invasive cancer. The most common screening method, which involves cervical cytology studies, is the Papanicolaou smear. Cervical cytology as means of detecting pre-invasive stages of cancer of the cervix has proven to be an efficient means of reducing both the incidence and mortality associated with cervical cancer.

Where a screening program is well established and nationwide in scope, its value has been proven beyond doubt [18,19]. Therefore, a mass screening program is being advocated with the most immediate emphasis on areas where the prevalence of cervical cancer is high. In order for this to come about, the availability of a proven method of screening and its advantages must be introduced.

In many African countries, there is currently no program of mass screening for detection of cervical pathology. Services are only available in family planning clinics that are located primarily in the teaching hospitals. Even where they are offered, screening services are not adequately utilized [20]. Konje et al. [21] reported a total of 3171 cervical smears over a period of 44 months in the University College Hospital (UCH), Ibadan from 1986 to 1990. This decreased to 1127 smears in a follow up 4 year period. In Konje’s study, only 44.2% of the subjects were self-referrals who had prior knowledge of the value of cytologic screening. Furthermore, these patients were invariably hospital staff, their relatives, or other well-educated members of society. Once again, the constraints against wider utilization were found to be poverty, ignorance, and system failure [22].

In health care systems of the developing world, resources for AIDS, Malaria, and TB take precedence over funds for cervical cancer screening, pushing it to the background. The few existing services are poorly staffed and funded. The current users are mainly people in the high socio-economic strata whose cytology results are often normal. A successful approach requires that greater sections of the population be targeted and reached.

## The HIV/AIDS scenario

In Africa, HIV sero-prevalence ranges from very low and stable in places like Senegal to very high in Botswana (UNAIDS 2004). The establishment of the Global Fund for HIV/AIDS, TB, and Malaria, as well as the President's Emergency Plan for AIDS Relief (PEPFAR) and other funding mechanisms like the Bill and Melinda Gates Foundation are expected to show positive health results in the targeted disease areas. However, the largest and most visible funding mechanisms have failed to address the poor reproductive health situation in Africa. The funds for maternal mortality prevention, cervical cancer prevention, and family planning programs have simply disappeared. This has created a distortion within health care systems: ready availability of funds for the treatment and prevention of certain diseases, with almost or near total neglect of other health related problems. Thus, designing and implementing comprehensive health care programs in the context of this "HIV/AIDS Scenario" present unique challenges. However, the presence of health care funding in the region may herald better prospects for the future.

## A strategic approach

Lack of funding for cervical cancer related programs should not be seen as a problem but a window of opportunity since the relevant funds for HIV/AIDS come into the same health care systems. About 60% of the HIV-infected population in Africa is composed of women. Thus, we have the potential to reach women through HIV-related services. These services have trained staff, particularly counselors and other outreach personnel who could be educated to incorporate cervical cancer screening into their programs. Men being treated within these programs could also be reached with information: many studies have emphasized the need to involve men in cervical health in Africa, as they are key decision makers in many African family and civic settings.

The HIV/AIDS pandemic is expected to lead to upsurge in cases of pre-invasive and invasive cervical cancer. Consequently, this highly unfortunate effect could create a scientific basis for the necessity of integrating cervical cancer screening and treatment into HIV/AIDS Programs.

Typically, HIV/AIDS programs have Voluntary Counseling and Testing (VCT) services. These may be provided as stand-alone programs, integrated into Prevention of Mother to Child Transmission (PMTCT) of HIV, or part of more comprehensive HIV Treatment and Care Programs. These VCT programs have fairly organized testing models with built-in pre- and post-test counseling. Testing algorithms either use rapid tests that give results within 15 min or enzyme assays that involve women coming back to pick their results.

## The integrated model

We propose that all women and men accessing public health services should be counseled on cervical cancer screening. Women can then be offered cervical screening by the conventional Pap read by the CytoSavant. Additional testing, such as by visual inspection with acetic acid (VIA) washing, HPV testing, and spectroscopy could be added. These tests could be done while the women are waiting for the results of HIV testing. Women with lesions could then be offered treatment with cryotherapy or the loop electro-surgical excision procedure (LEEP). The LEEP specimen could be diagnosed as pre-cancerous or cancerous using a desktop confocal microscope. Using the CytoSavant to read the Pap smear will take two hours. Spectroscopy can make a diagnosis in real time. The confocal microscope can also make a full analysis on a tissue specimen in real time because it is able to detect the nuclei and these images can be segmented, analyzed, and diagnosed.

Patients with invasive cancer need to be assessed in 1 day and begin treatment immediately. The management of invasive cervical cancer is standard. Specifically, it involves surgery for early stage disease and radiotherapy for all stages. Chemotherapy is useful for selected cases. Because numerous studies have demonstrated shortages of trained personnel required to manage pre-cancerous and cancerous stages of the disease, a phased approach is necessary in a country without the vital infrastructure and resources to address the problem. We are confident that 8000 cases of cervical cancer can be treated within 1 year with the resources available in Nigeria.

The benefit of this approach is the potential for reaching a large number of women with little additional financial cost as no new infrastructure or additional staff would be required. The success of Cervical Cancer Screening will depend on the program being acceptable to women themselves. Methods and activities have to respect the dignity, privacy, and autonomy of women. This is more likely if women's rights and women's health advocates are involved in the development of the program. The greatest burden of cervical disease occurs in poor countries with economies in transition. Thus, minimal requirements are proposed as a priority goal toward reducing the number of women dying from cervical cancer internationally.

The primary operational aim of the program must focus on achieving the highest possible coverage rate. The secondary aim must be to treat every case that is diagnosed. In low-resource settings, it is reasonable to screen once in a patient's lifetime. We believe that screening all 32 million women in Nigeria once in their lifetime is a noble and achievable goal.

A well-managed comprehensive demonstration program is advocated as a starting point for a more general introduction of mass screening. Such a pilot project could not only inform and guide future efforts, but also provide

concrete results in a critical locality. This will facilitate lobbying for national implementation and enable organizers to design and implement programs that are tailored to the needs of the communities they are intended to serve.

## References

- [1] Richart RM. Screening techniques for cervical neoplasia. *Clin Obstet Gynaecol* 1979;22(3):70–712.
- [2] Solanke TF. Cancer in Africa. In: Aoki K, Toninaga S, Hirayana T, Hirota Y, editors. *Cancer prevention in developing countries. Proceedings of the 1st UICC conference on cancer prevention in developing countries*. Nagoya: The University of Nagoya Press; 1982. p. 187–203.
- [3] Mati AK, Mbugua S, Ndayi N. Control of cancer of the cervix: feasibility of screening for pre-malignant lesions in an African environment. *IARC Sci Publ* 1984;63:451–63.
- [4] Sawyer JA, Earp J, Fletcher RH, Daye FF, Wynn TM. Pap tests of rural black women. *J Gen Intern Med* 1990 (March–April);5(2):115–9.
- [5] Waterhouse I, Muir CS, Shanmugaratnam K, Power J, editors. *Cancer incidence in five continents*. International Agency for Research on Cancer (IARC) Scientific Publications, vol. 42. Lyon: International Agency for Research on Cancer; 1982.
- [6] Mgaya HN, Massawe SN. The pattern of cervical cytology among gynaecologic and family planning clinic attenders in Dar-es-Salaam. *J Obstet Gynaecol East Cent Afr* 1984;3:73.
- [7] Mmiro EA. Gynaecologic oncology in Africa. Guest lecture delivered at the 12th Annual Scientific Conference of the Kenya Obstetrical and Gynaecological Society, Nairobi; 1987.
- [8] Emembolu JO, Ekwempu CC. Carcinoma of the cervix uteri in Zaria: etiological factors. *Int J Gynaecol Obstet* 1988;26:265–9.
- [9] Abioye AA. The Ibadan Cancer Registry 1960–1980. In: Olatunbosun DA, editor. *Cancer in Africa. Proceedings of a workshop of the west African College of Physicians*. Monrovia, Liberia: Ibadan University Press; 1981. p. 205–15.
- [10] Nnatsu SN, Durosinmi-Etti FA. The problems with the management of carcinoma of the cervix in Nigeria—Lagos experience. *East Afr Med J* 1985;62(5):347–54.
- [11] Ekanem E, Abioye R. Some epidemiologic and clinical features of cervical cancer in Lagos, Nigeria. *Public Health* 1987;101:123–8.
- [12] Edozien LC, Adewole IF. Carcinoma of the uterine cervix in Nigeria—A need for early detection. *Afr J Med Med Sci* 1993;22:87–92.
- [13] Adelusi B. Clinical correlates of cervix uteri in Ibadan, Nigeria. *West Afr J Surg* 1997;2:45–56.
- [14] Agboola OO. Public education about cancer in Nigeria. In: Solanke TF, et al., editor. *Cancer in Nigeria. Proceedings of Nigeria Cancer Society conference Ibadan*. University of Ibadan Press; 1979. p. 203–8.
- [15] Olukoya AA. Cancer of the breast and cervix in Nigerian women and the role of primary health care. *Niger Med Pract* 1989;18(2):26–30.
- [16] Anonymous. Cervical screening (editorial). *Br J Fam Plann* 1984 (April);10(1):1–2.
- [17] Fink DJ. Change in American cancer society checkup guidelines for detection of cervical cancer. *CA Cancer J Clin* 1988 (March/April);38(2):127–8.
- [18] Anderson GH, Boyes DA, Benedet JC, Le-Riche JC, Matistic JP, Suen KC, et al. Organisation and results of the cervical cytology screening program in British Columbia 1955–1985. *Br Med J (Clin Res)* 1988 (April 2);296(6627):975–8.
- [19] Macgregor JE, Fraser ME, Mann EMF. Improved prognosis for cervical carcinomas due to comprehensive screening. *Acta Cytol* 1972;16:14–5.
- [20] Adesina OA, Babarinsa IA, Fawole OA, Oladokun A, Adeniji AR, Adewole IF. Cervical cytology service in Nigeria: providers perspectives. *J Obstet Gynecol* 2003;23:416–8.
- [21] Konje JC, Ogunniyi JO, Otolorin EO, Odusoga OL, Ogunlusi MO, Obisesan KA, et al. Cervical cancer screening at Ibadan: forty four months experience and proposal for screening and management of abnormal smears. *Eur J Gynaecol Oncol* 1991;12(1):5–61.
- [22] Ajayi IO, Adewole IF. Knowledge and attitude of general outpatients in Nigeria to cervical cancer. *Cent Afr J Med* 1998;44:41–3.