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The Need for Societal Investment to Improve Cervical Cancer Outcomes in Nigeria: A commentary

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Abstract

Although cervical cancer is a preventable cancer with a well-known natural history, it remains a huge burden in developing countries of sub-Saharan Africa where organized cervical cancer screening services are lacking. Developed countries that have invested on providing organized screening programs have made substantial progress in reducing both incidence and mortality due to cervical cancer. Implementing evidence-based interventions such as human papillomavirus (HPV) vaccination of young girls, early detection and treatment of premalignant conditions of the cervix through conventional Pap cytology, HPV screening or visual aided inspection with acetic acid could significantly reduce incidence of new cases at population level. Societal investment for such preventive services and provision of effective treatment for those diagnosed at early stages will yield economic benefits in reducing premature deaths of women at the prime of their productive lives. From a societal perspective, this should be a priority area for national investment towards the achievement of sustainable development in Nigeria and similar settings in Africa.

Keywords

Cancer prevention; treatment; society; cervical cancer

INTRODUCTION

With over half a million new cases of cervical cancer every year, it is the fourth most common cancer affecting women worldwide, after breast, colorectal, and lung cancers¹. It is also the fourth most common cause of cancer death in women worldwide, causing 266,000 deaths in 2012¹. These statistics suggests an upsurge compared to an earlier report of approximately 454,000 new cases and 200,000 attributable deaths in 2010². Developed countries offering comprehensive screening programs have recorded a sustained decline in cervical cancer incidence and mortality; however, many developing countries in sub-Saharan Africa are experiencing an upsurge^{2,3}. Indeed, almost 70% of the global burden of cervical cancer¹ falls in areas with lower levels of development. The disparities in cervical cancer

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incidence and mortality between the developed and developing countries are further evident in the recent global cancer statistics which reported that in sub-Saharan Africa, 34.8 new cases of cervical cancer are diagnosed per 100,000 women annually, and 22.5 per 100,000 women die from the disease¹, compared to North America with cervical cancer annual incidence of 6.6 per 100,000 women and mortality of 2.5 per 100,000 women. Undoubtedly, these differences could be attributed to the level to which nations have invested to address this disease from a societal perspective. For instance, the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) is an investment by society to ensure that underinsured, low-income women have unfettered access to breast and cervical cancer screening in all US States and has contributed to significant reduction in premature deaths from these cancers^{4,5,6}.

In Nigeria, approximately 11,500 new cervical cancer cases were reported in 2010 compared to about 6,000 in 1980². Also, approximately 6,000 deaths were attributed to cervical cancer in 2010 compared to about 3,000 deaths in 1980². These statistics suggest an increase in cervical cancer burden as well as mortality in one of Africa's most populous nations. Incidentally, Nigeria ranked the second in the world on the burden of HIV, behind South Africa⁷. The high burden of HIV in Nigeria may be a contributing factor to the growing incidence of cervical cancer, particularly in the younger age group since HTV-mediated immune-suppression has been shown to increase the prevalence of premalignant lesions of the cervix, and the hazard of progression from premalignant to invasive cervical cancer stages is equally higher in an HIV infected population^{3,8,9}.

Although the natural history and the etiologic agents for cervical cancer are well-known¹⁰ and the anatomical structure and location of the cervix lends itself for effective screening, detection and treatment of pre-cancer stages, this entirely preventable cancer continues to inflict pain, suffering and death among women in Nigeria. It shortens the productive lives of women and has enormous economic consequences for the society! According to the Global cancer report¹, "cervical cancer can have devastating effects with a very high human, social and economic cost, affecting women in their prime".

In Nigeria, the sad and devastating situation of cervical cancer is not just the high incidence and prevalence of the disease, but of greater concern is the limited infrastructure for effective treatment for invasive cervical cancer particularly when diagnosed in late stages. A recently published data from a federal tertiary academic medical center in Nigeria¹¹ showed that majority of these cancers are detected at advanced stages with low survival probability. Additionally, there are several related social factors affecting access to treatment of cervical cancer, even in settings where treatment facilities are available within the country. The National Health Insurance Scheme (NHIS) in Nigeria does not provide coverage for cervical cancer prevention or treatment services and most patients incur heavy out-of-pocket payments¹². Leaving individuals to bear the cost for such lifesaving preventive and therapeutic services, implicitly limits the utilization of cervical cancer services which could contribute to the late presentation in advanced stages with dismal survival probability. Even in developed societies where treatment facilities are available, cost related factors, health insurance, low levels of health literacy, lack of social support and transportation barriers have limiting effects on patients receiving care in a timely fashion^{13,4,14,15,16,17}. It is

therefore imperative to look closely at the options for improving cervical cancer health outcomes in Nigeria and similar settings in Africa in the perspective of societal rather than individual investments.

Interventions to improve screening and prevention of new cases, improving health seeking behavior of women, and early detection and treatment of invasive cervical cancer are some of the strategies that could change the current scenario of cervical cancer in Nigeria and similar settings in Africa. Understanding what works well in such settings, and the willingness of the society to pay for such interventions are critical elements for achieving sustainable success in improving cervical cancer health outcomes in Nigeria and Africa. This commentary, highlights some of these evidence-based interventions to improve cervical cancer prevention and treatment efforts as a justifiable national investment towards sustainable development in Nigeria.

First, the basic tenets of prevention at primary, secondary and tertiary levels are briefly discussed below:

Prevention of new cervical cancer cases

Perhaps the most cost-effective strategy for reducing cervical cancer incidence and mortality is through primary prevention services. These preventive services include vaccination against the principal causative agents, the high-risk human papillomavirus types (HPV vaccines). Secondary prevention involves investment in cervical cancer screening to detect and treat precancerous cervical abnormalities which if left undetected and untreated could progress to invasive cancer stages. Screening could be done using conventional pap cytology, HPV screening, visual inspection with acetic acid or a combination of screening strategies as recommended by the WHO guidelines depending on availability of resources¹⁸.

Vaccination—Infection with the human papillomavirus (HPV) has been shown to be a necessary component in the causal pathway for the development of cervical cancer¹⁹. Eight of the HPV high-risk genotypes (HPV 16, 18, 45, 31, 33, 52, 58 and 35) account for more than 90% of cervical cancer cases. HPV 16 and 18 are the most common accounting for about 70% of cervical cancer cases worldwide^{10,20}. Two vaccines with proven efficacy in protecting young girls against these cancer-causing viruses are currently available. They are an AS04-adjuvanted HPV-16/18 vaccine and a HPV-6/11/16/18 LI virus-like particle vaccine that protects against two non-oncogenic (HPV 6/11), and two oncogenic types (HPV 16 and 18). These vaccines have been shown through randomized-controlled trials to have efficacy of approximately 98% against HPV 16 and 18^{21,22}. These vaccines are given preferably to young girls at the approved 3-dose schedule over a 6-month period. This approach has been shown to be a cost-effective strategy in preventing cervical cancer in developed and developing countries^{23,20}. These preventive vaccines have been subsidized for use in resource-limited settings, and a recent modeling of optimal cervical cancer prevention strategies in Nigeria estimated a cost of N7,095 (\$45) for the 3 doses of HPV vaccination²⁴. This strategy alone has been shown to reduce cases of cervical cancer from 17.45 per 100,000 women to 6.01 per 100,000 women²⁴. Indeed, a recent commentary in *Lancet Oncology* which states that success of HPV vaccination is now a matter of

coverage²⁵ explicitly shows how these vaccines could prevent this devastating cancer if society is willing to invest in providing vaccines coverage.

Papanicolaou Smear cytology screening—Cytological examination of cervical cells obtained through Papanicolaou (Pap) smear continues to be an effective cervical cancer screening modality and has led to sustained decline in cervical cancer cases in developed countries²⁶. In low-resource settings such as Nigeria, such organized screening programs are not available. Pap smears require specialized staining techniques and interpretation by a trained cytopathologist, who are often in short supply in settings such as Nigeria. However, if made available it will cost approximately N3010 (\$16) to have a one-life time cytology test, which can reduce the incidence of cervical cancer to 12.15 per 100,000 women compared with 17.45 per 100,000 women without prevention²⁴.

HPV DNA screening—Understanding the etiologic role of HPV in cervical carcinogenesis has led to the development of sensitive assays that detect the most common oncogenic types in women 30 years and above as a screening strategy for cervical cancer particularly in developed settings. Several randomized controlled trials have demonstrated the superiority of HPV DNA testing compared to conventional cervical Pap cytology in preventing advanced cervical cancer incidence and deaths^{27,28}. Indeed, recent evidence shows that HPV-based screening provides 60–70% greater protection against cervical carcinomas compared with cytology²⁹ with greater effect seen in women 29 years or older. However, most of the available HPV tests are relatively more expensive compare to Pap test, and appropriate guidelines are needed to help reduce the societal cost of implementing a HPV-screening program in Nigeria. Age-based HPV testing used for triaging equivocal Pap cytology results in younger women and as a primary screening test in older women (>29 years) is expected to be more cost-effective^{30,31}. On the average high-risk HPV (Hr HPV) DNA testing costs approximately N4462 per test according to estimation from a cost-effectiveness analysis study³².

Visual Inspection with Acetic Acid (VIA) and treatment with Cryotherapy—This is one of the most effective cervical cancer prevention strategies recommended by the World Health Organization¹⁸ to resource limited settings like Nigeria and can easily be implemented, even in rural outreach programs in the country. It can be used as a primary cervical screening and prevention strategy or used to evaluate need for cryotherapy and other forms of treatment in women who have positive HPV test or abnormal Pap cytology test³³. A recent economic analysis estimated that \$3.0-\$7.31 and \$38 to \$71 is required per woman to conduct VIA and to treat those who will need either cryotherapy or loop electro-surgical excision procedure (LEEP), respectively³⁴. An earlier study done in a neighboring West African country with similar demographics estimated a national annual program³⁵ cost of between 0.6 and 4.0 million US dollars with coverage being the major variable that determines cost. On an individual level, they estimated a cost of \$4.93-\$ 14.75 and \$47.26-\$84.48 per woman for VIA and treatment respectively³⁵. The findings in Ghana suggests that a similar national program is feasible and could even be more cost-effective looking at the huge population of women in Nigeria who could benefit from this preventive strategy. It is therefore pertinent for government and society to invest on saving the lives of women

from this preventable cancer as a cost-saving intervention compared to the future cost of treating invasive cervical cancer, premature mortality, and associated disabilities.

Looking at the targeted interventions for the primary prevention of cervical cancer discussed above, it seems that investing in HPV vaccination and increasing coverage for the WHO VIA “screen-and-treat” strategy will go a long way in stopping the potential cervical cancer epidemic in Nigeria. Optimization modeling²⁴ done in Nigeria equally suggested that within the budget constraint, vaccination and cervical cancer screening are cost-effective strategies for cervical cancer prevention in Nigeria.

Although, primary prevention will help in preventing new cases of cervical cancer, early detection and optimal treatment of new cancer cases improves survival probability.

Early detection and effective treatment of invasive cervical cancer

Early detection of cervical cancer cases offers much better treatment opportunities aimed at cure and improving overall cancer survival. To achieve this, health literacy through education of women on the disease is required. Other requirements include training of health personnel on early diagnosis of cervical cancer cases and improving the skills and proficiency of doctors on surgical treatment modality for early cervical cancer stages as well as ability to administer chemo radiation.

Education of women on the disease to improve their health seeking behavior

—Health seeking behavior is critical both for achieving preventive and curative objectives of any health intervention program. Deliberate and well-directed efforts at raising cervical cancer awareness for young girls and mothers to seek primary prevention services are key interventions for sustainable success in cervical cancer prevention and treatment efforts. This will also help to increase the health literacy on cervical cancer risk factors, symptoms and how to access relevant services in the community. Studies have supported the value of health literacy in improving the ability of women with cervical cancer to seek and receive treatment in a timely fashion¹⁶. Investing and partnering with communities for mass media campaigns on radio, television and newspaper publications, design and production of Information, Education and Communication materials on risk factors, symptoms and treatment of cervical cancer will help in realizing this objective.

Training of doctors on early diagnosis of cervical cancer—Detection of cervical cancer at early stages offers tremendous opportunities for curative treatment that have been shown to improve overall survival probability at a much lower cost to society compared to treatment at advanced cancer stages of the disease. Data from Jos, Nigeria revealed significant survival probability for early cervical cancer stages compared to advanced stages even after controlling for other factors¹¹.

Provision of evidence-based treatment for early cervical cancer cases such as early surgical intervention (Hysterectomy), adjuvant chemo radiation—

Treatment of early cervical cancer cases with surgical hysterectomy and adjuvant chemo radiation therapy where indicated have been shown to improve cervical cancer survival and quality of life^{36,37} of patients suffering this disease.

CONCLUSION AND POLICY RECOMMENDATION

In conclusion cervical cancer is entirely a preventable disease and society should see the economic benefit of investing its resources on preventive services such as HPV vaccination, effective screening services for early detection and treatment of precancerous conditions, and to offer effective treatment for those diagnosed at early stages to optimize survival and overall quality of life of women. Developing regional centers of excellence in cervical cancer prevention, early detection and treatment in Nigeria will be a worthwhile investment and will greatly reduce the huge economic losses due to premature mortality from cervical cancer. From a societal perspective, this should be a priority area for national investment towards the achievement of sustainable development in Nigeria and similar settings in Africa.

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