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Efforts to Prevent Cervical Cancer in India

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Abstract: *Cervical cancer ranks among the most common cancers among women in India. Women's understanding of primary and secondary prevention techniques, as well as their access to treatment and palliation care, need to be raised in order to prevent and control it. A targeted approach is necessary to meet the World Health Organization's 2030 deadline for eliminating cervical cancer.*
Methods: A review of the current body of research on cervical cancer prevention techniques in India was conducted, covering a range of national programs as well as other government, non-governmental, and professional group activities. It was determined if they applied to the current circumstance.
Results: In addition to auditing performance, national programs should capitalize on the success stories of neighboring countries and states. Synergy between cancer control programs can also be achieved by strengthening cancer registries, improving connections between various healthcare levels by using task-shifting, incorporating digital technology, and supporting initiatives that advance the welfare and health of women. HPV self-sampling can be a great screening technique in the current pandemic age. To enable its deployment in low- and middle-income countries, the development of an accessible, point-of-care HPV test is urgently needed. There is a need to accelerate HPV immunization campaigns.
In conclusion, the new standard of treatment should include expanding HPV vaccine programs and primary HPV testing along with stepping up cervical cancer prevention

Keywords: Cervical cancer, Prevention, Vaccination, Screening, HPV, CIN

I. INTRODUCTION

In India, where it accounts for one-fifth of the worldwide cancer burden, cervical cancer is the second most frequent malignancy among women. Globocan projected 77,348 deaths and 123,907 incident cases in 2020, with a cumulative risk of 2.01% and an age-standardized incidence rate of 18 per 100,000 women. The approximate 4-year relative survival rate of 46% (with a range of 34–60%) is significantly lower than the rates in other Asian nations. This is because over 80% of instances of cervical cancer are identified at an advanced stage, leading to a high death rate.
Despite years of work, neither the government nor nonprofit groups have been able to significantly reduce the incidence of cervical cancer. Previously, the only options available were precancerous lesion screening and therapy; however, human papillomavirus (HPV) vaccine is now an additional option. In India, there are about 272.8 million women and 59.7 million girls who fall within the age range when they can get screened for and immunised against cervical cancer. This article examines the development of India's attempts to prevent cervical cancer, taking into account the indirect effects of social changes on variables influencing the prevalence of this avoidable illness.

Epidemiology of Cervical Cancer

Cervical cancer's natural history is extensively established. Cervical cancer must be caused by persistent infection with high-risk (oncogenic) types of human papillomavirus (hrHPV). Several co-factors, such as early age at coitarche, multiple sexual partners (self or spouse), multiple pregnancies, associated STDs, etc., facilitate the virus's initiation and progression. There are over a hundred different forms of tiny double-stranded DNA viruses, of which HPV is a member. Worldwide, more than 70% of invasive cervical malignancies are caused by HPV 16 and 18. Compared to the global average, nearly 80% of cervical cancer cases and 63% of high-grade lesions in India are associated with HPV 16 and 18 infection. All preventive HPV vaccinations contain one of these two types of vaccines.
The pre-invasive stage of cervical cancer is protracted, lasting ten to fifteen years. This offers a window of opportunity for early cancer identification as well as the detection and treatment of neoplasia in pre-invasive stages using

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straightforward outpatient treatment techniques. This disease's incidence and fatality rate are a direct result of the infrastructure and resources in place in the medical field for screening and treating the entire population.

WHO Demands Cervical Cancer Be Eliminated

The World Health Organization (WHO) declared in May 2018 that widespread HPV vaccination, screening, early detection, and treatment of cervical pre-cancer and malignancy would eliminate cervical cancer as a public health concern. The World Health Assembly (WHA) formally unveiled a global implementation strategy on November 17, 2020. Amidst the COVID-19 outbreak, 194 nations have reaffirmed their backing for this crucial undertaking. By 2030, the elimination program hopes to reach the following milestones: 90% of girls will have received two doses of the HPV vaccine by the age of 15; 70% of women will have undergone high-performance test screening at the ages of 35 and 45; and 90% of women who have been diagnosed with cervical pre-cancer and cancer will receive treatment in order to reduce the number of cases to fewer than four per 100,000 women.

Through prevention and treatment, the UN's Sustainable Development Goals for 2030 seek to cut the premature death rate from non-communicable diseases by one-third. Reaching the elimination targets will contribute to the accomplishment of this objective.

National Programmes for Cancer Control

When the two components of cervical cancer prevention—HPV vaccine and screening combined with pre-cancer treatment—are put into practice, incidence and death of the disease can be significantly reduced to the point where it is no longer a public health concern. It's also necessary to address issues including lack of resources and infrastructure, low socioeconomic level, lack of awareness, cultural obstacles, and limited access to healthcare.

1976 saw the launch of the National Cancer Control Programme (NCCP). The main goal was to prevent cancer by health education; the secondary goals were to reinforce the current cancer treatment facilities, screen for cervical, oral, and breast cancers, and provide palliative care to patients who were nearing the end of their lives. The National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases, and Stroke (NPDCS) and NCCP were combined in 2010. Between 2010 and 2012, the program was implemented in 100 districts spread across 21 states. The program's bottlenecks were found through an evaluation of the first phase, and the program was subsequently reorganized and expanded. Under the auspices of the National Health Mission (NHM), states get financial support for initiatives up to the district level. District and Community Health Centers (CHC) now have non-communicable disease (NCD) clinics for the early detection, management, and follow-up care of common NCDs. The initiative includes provisions for providing free diagnostic services and medications to patients who visit these NCD clinics. The goal of the Tertiary Care Cancer Centers (TCCCs) program, which operates outside of district boundaries, is to establish and enhance State Cancer Institutes (SCI) and TCCCs as comprehensive cancer care providers. The following is the program strategy that is being used at different levels:

(i) Primary level

• Door to door information, education and communication (IEC) by Accredited Social Health Activists (ASHA) and provision of IEC material
• Monthly visits by medical officer (MO) to subcentre to monitor ASHA’s work and record keeping
• Periodic training of health workers in screening
• Mass recruiting campaign and periodical screening camps by MO/health staff of each subcentre
• Utilization of laboratory technician and health workers for screening with cytology/HPV at primary health centres (PHCs)

(ii) Secondary level

• Provision of
• A gynaecologist trained in colposcopy at commu- nity health centre (CHC) level
• Colposcopy equipment (1–3 per district) and a thermal/cryoablation unit
• A pathologist

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• Chemotherapy and palliative care services
• District level periodic monitoring and data keeping

(iii) Tertiary level
• Improving training in Regional Cancer Centers (RCC) and training institutes (emphasis on surgical skills)
• Infrastructure for radiation and imaging techniques.

Cancer Registries
The Indian Council of Medical Research (ICMR) launched the National Cancer Registry Programme (NRCP) in 1982 to offer an overview of the prevalence and trends of cancer. The cancer registries supply the ICMR with data on a regular basis and might be hospital- or population-based. In Barshi, Maharashtra, the first rural cancer registry was started in 1987. This program not only raised the villagers' awareness of cancer, but it also enhanced the frequency of early detection and markedly reduced the number of cervical cancer-related deaths. It was later expanded to include additional Gujarati and Maharashtran areas. Under the NRCP, there are currently 236 hospital-based and 36 population-based cancer registries.

Cervical Cancer Screening Efforts in India
Even one screening round is more beneficial than none at all in lowering the incidence and mortality from cervical cancer. The majority of women in rural areas, who are socioeconomically disadvantaged, lack formal education, and are unaware of the risk factors linked to the disease's development, have a higher incidence of the condition. Surveys on knowledge, attitude, and practice (KAP) among rural women have revealed that younger, literate women have more awareness and knowledge than older, illiterate women.
Various screening techniques have been employed to lower the illness incidence, particularly in rural areas.

Camps for Screening
For many years, this strategy of setting up outreach clinics was used, and when women were informed about cervical cancer, they willingly came to the camp to be screened. For the ladies who actively engaged in the screening programs, it was helpful. However, it did not result in proactive community involvement. Poor acceptance and participation in the screening test are caused by the fear of going through an interior examination. Multiple dropouts at different stages are also a result of the initial cytology-based screening strategy. A study conducted between 1982 and 1987 in the rural Barshi Tehsil of Maharashtra by Nene et al. revealed that just holding camps was insufficient to encourage women to be screened. Yet, a different study by Sharma et al. among people in Delhi produced positive outcomes for a camp-based strategy and stressed the significance of routine cervical cancer screening using this strategy across the nation.

Utilizing Village Health Nurses (VHNs) for Screening
VHNs participated in a screening program for non-communicable diseases (NCDs) after receiving training from the Tamil Nadu Health Services Project for cervical cancer screening. The initiative demonstrated the viability and efficacy of using qualified healthcare professionals for screening. This program's lessons served as the foundation for the NPCDCS approach.

Methods for Screening for Cervical Cancer
Depending on compliance and resource availability, a number of screening techniques, including cytology, primary HPV testing, co-testing (HPV + cytology), and visual inspection with acetic acid, are used in different situations. Good clinical practice recommendations (GCPR) have been released by the Federation of Obstetricians and Gynecologists of India (FOGSI) for the screening and treatment of women who test positive for pregnancy in various resource settings.

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Pap smears in cytology

It is currently the most often utilized modality in Indian cities. In wealthy nations, it has been reported to lower the incidence of cervical cancer by almost 80%. But because of its low sensitivity, it needs a lot of infrastructure, money, and testing iterations.

Acetic acid visual inspection (VIA)

Given the dearth of cytology facilities in rural regions, VIA has been used with sensitivity similar to that of cytology. Research on VIA's effectiveness has demonstrated that it lowers cervical cancer-related mortality. Over the course of a seven-year follow-up period, a cluster randomized research carried out in the Dindigul district of Tamil Nadu, India, revealed a 25% and 35% decrease in incidence and mortality, respectively. In screening programs, VIA is the preferred test according to the 2016 NPCDCS guidelines. Women between the ages of 30 and 65 should undergo screening every five years, in addition to screening for oral and breast cancer. Additionally, FOGSI suggests VIA as the preferred test in environments with restricted resources.

HPV Examination

It is well acknowledged that HPV testing is the most effective screening test because to its high sensitivity and negative predictive value. Gravitt et al. conducted a population-based investigation in a periurban neighborhood of Andhra Pradesh and discovered that the HPV test had a greater sensitivity and specificity than the Pap and VIA tests. In developing nations, an affordable point-of-care HPV test is still the best choice for one or two rounds of screening. Systems for CBNAAT-based testing created during the COVID epidemic might also be helpful for HPV testing.

Research has indicated that when it comes to the identification of cervical neoplasia, HPV self-sampling results are on par with provider-collected samples. The quick advancement of newer technology, such as battery-operated portable colposcopes, battery-operated thermal ablators, and artificial intelligence-driven software programs for pre-cancerous lesion detection and triage, will aid in the widespread use of screening.

It is important to maintain the momentum created by VIA until HPV testing become accessible. With differing degrees of programming organization and efficacy, VIA-based screening programs were established in high-morbidity, low-resource nations like Bangladesh and India. The creation of a multilevel coordination within the healthcare system was facilitated by the affordability and ease of use of the VIA test, which also assisted in educating a large number of healthcare staff for screening.

The assurance of service quality is also crucial for the success of a screening program. Studies from Bangladesh and India have shown that selecting an appropriate screening test is not enough to ensure the effectiveness of a screening program; proper component organization and careful attention to quality are essential. The highest-risk women must find the chosen screening method to be workable, easy to use, safe, accurate, and convenient. However, if follow-up for screen-positive women is inadequate, screening on its alone is insufficient. A study by Vidhubala et al. evaluated a community-based screening program in rural Tamilnadu's Tuticorin and Thirunelveli districts. Data from 2192 women's case files who had VIA and a traditional Pap smear were assessed. Only 74 out of the 807 women who were referred—or 9.2%—visited the referral center, according to their findings. They came to the conclusion that inadequate follow-up following screening is caused by fragmentation in the care continuum, which is necessary for the screening program to be successful.

Vaccination against HPV

The WHO position document on HPV vaccination states that immunizing females who have never had an HPV infection is particularly important in environments with limited resources and is also reasonably priced. Since 2008, HPV vaccinations for females between the ages of 9 and 45 have been licensed in India, and their usage has been approved by the National Technical Advisory Group on Immunization (NTAGI). Starting at age nine, the Indian Academy of Paediatrics Committee on Immunization (IAPCOI) advises all females to receive vaccinations. The FOGSI recommends that vaccinations be administered between the ages of 9 and 14 years. Older age cohorts should also be considered for vaccination, but it should be noted that vaccinations administered to sexually active females may not be

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as effective because they may already be infected, but they may still offer some protection against strains to which they have not previously been exposed.

The immunogenicity of two versus three doses of qHPV vaccine was found to be non-inferior in a large multicenter cohort study conducted in India. Even receivers of a single dose had a strong and long-lasting immunological response; however, it was not as strong as that following two or three treatments, and the antibody levels remained constant over a four-year period. Trials are being conducted right now to investigate the potential for a single shot vaccination.

HPV vaccination program implementation in India

In 2016, Delhi became the first state in India to vaccinate schoolgirls, ages 11 to 13, against opportunistic HPV infections. The program had a fairly narrow scope, but no serious adverse effects were noted. Following this, the Punjabi government created operational guidelines with technical assistance from UNICEF, WHO, and ICMR to deliver HPV immunization through health facilities. The two districts with the highest load, Bathinda (incidence 17.5 per 100,000) and Mansa (17.3 per 100,000), were chosen for a campaign method. When Phase 1 began in November 2016, there was an outstanding rate of vaccination coverage; at government and government-aided schools, 98% (9672/9922) of the target population received all two doses. 94% (15,140/16,106) of the eligible girls received the first dosage after phase 2 ended in November 2017, and 99% (14,988/15,140) received the second dose. This opened the door for legislators in other states to think about HPV vaccination.

In 2018, Sikkim became the first state to vaccinate all 9–14-year-old girls in the state. Targeting 25,284 girls in 1166 schools, 97% of the girls received their first dosage in class or at a health center (for those who do not attend school), while the other girls received their second dose six months later. Minor side effects that were transient and soon went away were headache, nausea, dizziness, and injection site soreness. Subsequently, vaccination of females at the age of nine was included to the regular immunization regimen. The State Coordinated Advisory Committee, UNICEF, WHO, and Jhpiego offered technical support for the initiative.

Changing Cervical Cancer Risk Factors and Demographics

The Child Marriage Restriction Act, 1929 forbade child marriage in India, where the legal marriage age is eighteen. Currently, 2.6% of women marry younger than the legal age, with a mean age of 21.2 years. Encouraging girls to complete their education, improving their nutritional status, and advising women to marry only after obtaining a job and education have all contributed to significant changes in the sociodemographic pattern. Government initiatives such as the Rajiv Gandhi scheme for the empowerment of adolescent girls (SABLA) and the Kishori Shakti Yojna aim to improve the health and education of women. Over the last three decades, there has been a sharp rise in the proportion of literate women; the national female literacy rate is currently 70.3%, while the male rate is 84.7%. Family planning incentives drive the norms of small families. Reproductive Maternal Neonatal Childhood Health + Adolescent (RMNCH + A) is a strategy of NHM that involves the provision of contraceptives by ASHA workers at home, postponing marriage at a younger age, encouraging menstrual hygiene through the Menstrual Hygiene Scheme, raising awareness of sexual hygiene, and treating and preventing reproductive tract infections in "Suraksha clinics." Women who are working to create small-scale industries and self-employment are providing opportunities for women to pursue their professional and career-related goals.

Professional associations and non-governmental organizations' (NGOs') contribution

Professional groups such as FOGSI, the Asia-Oceania Research Organization in Genital Infection and Neoplasia (AOGIN-India), the Indian Society of Colposcopy and Cervical Pathology (ISCCP), the Association of Gynaecologic Oncologists of India (AGOI), and others have developed screening guidelines, run screening outreach programs, hold awareness campaigns across the nation, use cutting-edge tactics like the Lifeline Express to reach remote areas, and partner with corporate and paramedical organizations to support cervical cancer prevention strategies.

Upcoming prospects

As part of their social responsibility commitments, corporations like FOGSI, ISCCP, and AOGIN-India, as well as international organizations like WHO, should collaborate with public-private partnerships to support India's efforts to

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control cervical cancer. The World Health Organization advises two rounds of HPV testing by the ages of 35 and 45. In the current pandemic era, where prevention efforts have had a setback, HPV self-sampling can be an ideal method, avoiding crowding of health facilities and minimizing contact with health personnel.

II. CONCLUSION

Introduction of non-cytological screening by HPV test and VIA has brought a paradigm shift in the cervical cancer screening. Over the last decade, HPV vaccination has multiplied the efforts. In spite of all advancements, screening for cervical cancer will still be required as millions of women have already been exposed to the virus. Inclusion of widespread vaccination and HPV test as a point-of-care test should be the new standard of care in cervical cancer prevention.

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