

# Interventions in India to Prevent Cervical Cancer

Asmita Tanba Raipure<sup>1</sup> and Dr. Tulshi<sup>2</sup>

<sup>1</sup>Department of Nursing, Shri Jagdishprasad Jhabarmal Tibrewala University, Jhunjhunu Rajasthan, India

<sup>2</sup>Department of Nursing, Shri Jagdishprasad Jhabarmal Tibrewala University, Jhunjhunu Rajasthan, India

**Abstract:** *Purpose Among the most common malignancies in Indian women, cervical cancer ranks high. Raising women's knowledge of primary and secondary prevention techniques, as well as their access to treatment and palliative care, is crucial to its control and prevention. To achieve the World Health Organization's (WHO) goals of cervical cancer eradication by 2030, a targeted approach is necessary. Methods A comprehensive literature analysis was conducted on cervical cancer preventive techniques in India. This included a range of national projects and other endeavours spearheaded by government agencies, NGOs, and professional groups. We evaluated how well they fit the current context. Final Product It is important for national programmes to learn from the experiences of other states and adjacent nations, and to regularly assess their progress. Incorporating task-shifting, adding digital technologies, and supporting activities that enhance women's welfare and health, as well as strengthening cancer registries and improving linkages across different healthcare levels, would also contribute to cancer control efforts. In this age of pandemics, HPV self-sampling may be the best way to check for the virus. To make its introduction possible in low- and middle-income nations, a cheap point-of-care HPV test must be developed immediately. Efforts to vaccinate against HPV should be expedited. In summary the current gold standard for cervical cancer prevention should be to increase the scope of HPV vaccination and primary HPV testing..*

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

## 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

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 Call for Elimination of Cervical Cancer**

The World Health Organisation (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 eradication programme hopes to accomplish the following targets:

90% girls fully vaccinated by 15 years of age with two doses of HPV vaccine;

70% women screened with a high-performance test at 35 and 45 years of age; and,

90% of women with cervical pre-cancer and cancer receive treatment to achieve a goal of less than four cases per 100,000 women.

The United Nations' Sustainable Development Goals for 2030 aim to reduce the premature mortality from non-communicable diseases by one-third through prevention and treatment. Achieving the elimination targets will help to achieve this goal as well.

#### **National Programmes for Cancer Control**

When both of the arms of cervical cancer prevention are put into practice—HPV vaccine and screening combined with pre-cancer treatment—incidence and death can be significantly reduced to the point that the disease is no longer considered 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 programme was administered in 100 districts spread across 21 states. The program's bottlenecks were found through an evaluation of the first phase, and the initiative was subsequently reorganised 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 Centres (CHC) now have non-communicable disease (NCD) clinics for the early detection, management, and follow-up care of common NCDs. The project includes provisions for providing free diagnostic services and medications to patients who visit these NCD clinics. The goal of the Tertiary Care Cancer Centres (TCCCs) programme, 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 programme strategy that is being used at different levels:

##### **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)

##### **Secondary level**

Provision of

A gynaecologist trained in colposcopy at community 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

### **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 (NRCPP) 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 programme 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 Maharashtrian areas. Under the NRCPP, 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.

### **Screening Camps**

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 activities, 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.

#### **Screening Through Village Health Nurses (VHNs)**

VHNs participated in a screening initiative 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.

### **Cervical Cancer Screening Modalities**

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

### **Cytology (Pap Smear)**

It is currently the most often utilised 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.

### Visual Inspection with Acetic Acid (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 randomised research carried out in the Dindigul district of Tamil Nadu, India, revealed a 25% and 35% decrease in incidence and mortality, respectively. In screening programmes, 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 Testing

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 peri-urban community 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 ablaters, and artificial intelligence-driven software programmes 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 programmatic organisation and efficacy, VIA-based screening programmes 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 programme. Studies from Bangladesh and India have shown that selecting an appropriate screening test is not enough to ensure the effectiveness of a screening programme; proper component organisation 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. But if women who test positive are not adequately followed up with, screening on its own is insufficient. A study by Vidhubala et al. evaluated a community-based screening initiative 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 centre, 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 programme to be successful.

### HPV Vaccination

The WHO position document on HPV vaccination states that immunising 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 licenced in India, and their usage has been approved by the National Technical Advisory Group on Immunisation (NTAGI). For all girls beginning at age nine, the Indian Academy of Paediatrics Committee on Immunisation (IAPCOI) advises vaccination. The FOGSI recommends that vaccinations be administered between the ages of 9 and 14 years. Older age cohorts should be taken into consideration, but it should be noted that vaccinations administered to sexually active females may be less effective because they may already be infected, though they may still offer some protection against strains to which they have not previously been exposed.

The immunogenicity of two versus three doses of the 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.

### **Implementation of HPV Vaccination Programme in India**

In 2016, Delhi became the first state in India to vaccinate schoolgirls, ages 11 to 13, against opportunistic HPV infections. The programme had a fairly narrow scope, but no serious adverse events were noted. Following this, the Punjabi government created operational guidelines with technical assistance from UNICEF, WHO, and ICMR to deliver HPV immunisation 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 centre (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 immunisation schedule. The State Coordinated Advisory Committee, UNICEF, WHO, and Jhpiego provide technical support for the initiative.

### **Changing Demography and Risk Factors for Cervical Cancer**

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 project 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 at 70.3%, whereas the male rate is 84.7%. Family planning incentives drive the norms of small families. Reproductive Maternal Neonatal Childhood Health? Adolescent (RMNCH? A) strategy of NHM comprises the following: ASHA workers delivering contraceptives at home, postponing marriage 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 ambitions.

### **Contribution of Professional Organizations and Non-governmental Organizations (NGOs)**

Professional groups such as FOGSI, the Asia-Oceania Research Organisation 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 programmes, hold awareness campaigns across the nation, use cutting-edge tactics like the Lifeline Express to reach remote areas, and partner with corporate and paramedical organisations to support cervical cancer prevention strategies.

### **Future Prospects**

Public-private partnerships involving international organisations like WHO and professional associations like FOGSI, ISCCP, and AOGIN-India, in conjunction with corporations as part of their social responsibility commitments, should be leveraged by India in its attempts to eliminate cervical cancer. The World Health Organisation advises two rounds of HPV testing by the ages of 35 and 45. HPV self-sampling can be a perfect approach in the current pandemic era, when preventative efforts have suffered setbacks, as it minimises contact with medical workers and prevents overcrowding in healthcare facilities.

## **II. CONCLUSION**

The paradigm for cervical cancer screening has changed with the introduction of non-cytological screening with the VIA and HPV test. The HPV vaccine campaign has increased efforts during the past ten years. Millions of women have already



been exposed to the virus, therefore screening for cervical cancer will still be necessary despite all of the breakthroughs. The new standard of treatment for preventing cervical cancer should include both a point-of-care HPV test and broad immunisation.

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