



Identification of high-risk factors, preventive practices, and awareness of cervical cancer screening among nursing students

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Abstract

Cervical cancer remains a significant public health concern worldwide, particularly in low- and middle-income countries such as India, where incidence and mortality rates remain high despite the availability of effective preventive and screening strategies. Persistent infection with high-risk human papillomavirus (HPV) is the principal etiological factor; additional risk factors include early onset of sexual activity, multiple sexual partners, smoking, immunosuppression, and hormonal contraceptive use. Early and regular screening with methods such as Papanicolaou (Pap) smear and high-risk HPV testing can detect precancerous lesions and significantly reduce mortality. However, low awareness, cultural barriers, and limited access continue to hinder screening uptake and preventive practices. This article synthesizes evidence on high-risk factors, preventive practices including HPV vaccination and screening modalities, and awareness levels among women, with a focus on India, and discusses opportunities for improved public health interventions.

Keywords: Cervical cancer, Human papillomavirus (HPV), high-risk hpv, risk factors, screening, Pap smear, hpv testing, hpv vaccination, awareness, prevention

Introduction

Cervical cancer, a malignancy of the uterine cervix, is one of the most preventable forms of cancer when appropriate preventive measures and screening practices are applied. According to the World Health Organization (WHO), it is the fourth most common cancer among women worldwide, with an estimated 660,000 new cases and 350,000 deaths in 2022, disproportionately affecting low- and middle-income countries where screening and vaccination coverage are inadequate.

Despite global advances, cervical cancer remains a leading cause of morbidity and mortality in India, where many women are diagnosed at advanced stages due to low awareness and poor screening uptake. Risk identification and preventive strategies are essential components of public health efforts aimed at reducing the burden of the disease.

High-Risk Factors for Cervical Cancer

Human Papillomavirus (HPV) Infection

Persistent infection with high-risk HPV types (e.g., HPV 16 and 18) is the principal cause of cervical cancer. These oncogenic HPV strains can lead to the development of precancerous lesions that may progress to invasive cancer if undetected.

Demographic and Behavioral Risk Factors

Several behavioral and demographic factors elevate risk. Early age at first sexual activity and multiple sexual partners increase lifetime exposure to HPV. Immunosuppression, including HIV infection, reduces the body's ability to clear HPV, heightening risk. Smoking has also been linked to cervical carcinogenesis by weakening local immune responses in the cervical epithelium. Long-term use of hormonal contraceptives and multiple pregnancies (high parity) have been associated with increased risk in some studies.

Socioeconomic and Access Barriers

Low educational status, rural residence, and low household income are associated with reduced knowledge of cervical cancer and lower screening uptake, contributing to later stage at diagnosis and poorer outcomes.

Preventive Practices

HPV Vaccination

HPV vaccination is one of the most effective preventive practices against cervical cancer, ideally administered before the onset of sexual activity to generate immunity against high-risk HPV strains. While uptake remains limited in many populations due to cost and awareness barriers, vaccination has been shown to significantly reduce HPV prevalence and cervical cancer rates where coverage is high.

Screening Methods

Regular cervical cancer screening enables early detection of precancerous cells. Commonly used methods include the Pap smear test and HPV DNA testing. Pap smears are simple, cost-effective tests that detect abnormal cervical epithelial cells, while HPV testing identifies high-risk HPV infections that may progress to cancer.

In India, national guidelines recommend regular screening in women aged 30–65 years; however, implementation remains inconsistent across regions, with screening coverage higher in urban areas and among women with higher education and socioeconomic status.

Awareness of Cervical Cancer and Screening

Knowledge among Women

Multiple studies conducted in India reveal low levels of cervical cancer awareness among women. For example, a study in New Delhi found that among 400 women, only 103 were aware of cervical cancer and its screening, and just 10 underwent regular screening; awareness was higher among

healthcare workers and educated women but overall screening adherence remained low.

Similarly, research across central India indicates good knowledge among medical students regarding risk factors and preventive measures, yet actual uptake of HPV vaccination and screening was low, highlighting gaps between awareness and practice.

Population-based studies also demonstrate marked urban-rural disparities, with women in rural areas often having limited information on HPV, screening methods, and vaccination compared to their urban counterparts.

Barriers to Screening Uptake

Common barriers include lack of information, misconceptions about screening procedures, social stigma, fear of pain or discomfort during pelvic examination, and belief of not being at risk. Cultural factors and low priority of preventive health behaviors further impede participation.

Discussion

Interpreting Awareness and Risk Recognition

The evidence indicates that while awareness of cervical cancer risk factors, including HPV infection, is moderate among some groups, there is a substantial disconnect between knowledge and action. Even when women understand the importance of screening, barriers such as fear, socio-cultural norms, and limited access to services reduce uptake.

Strategies for Improvement

To improve preventive practices and screening uptake, multifaceted interventions are needed:

- **Health Education Campaigns:** Community-based awareness initiatives delivered in local languages can promote understanding of cervical cancer, HPV vaccination, and screening benefits.
- **Mobile and Community Screening:** Outreach programs using mobile clinics and community health workers can increase access, particularly in rural areas.
- **Policy Support:** Integration of cervical cancer screening into routine primary health care and subsidized HPV vaccination can reduce financial barriers.
- **Men's Involvement:** Inclusion of men in educational efforts can foster supportive environments for women to seek preventive care.

Conclusion

Cervical cancer remains a largely preventable disease, yet high-risk factors continue to contribute to considerable mortality due to low uptake of preventive practices and limited awareness of screening. Targeted public health efforts addressing socio-behavioral barriers, expanding HPV vaccination, and strengthening organized screening programs are essential for reducing the burden of cervical cancer, particularly in low-resource settings like many regions in India.

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