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EDITORIAL

Cervical cancer prevention in the era of HPV vaccination: The road ahead

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Cervical cancer remains one of the most prevalent malignancies affecting women globally, with an estimated 570,000 new cases diagnosed annually [1]. The burden of this disease is disproportionately higher in low- and middle-income nations. The incidence rate varies widely, with high-risk regions reporting up to 75 cases per 100,000 women, whereas low-risk areas report fewer than 10 cases per 100,000. Alarmingly, about 90% of the 311,000 deaths attributed to cervical cancer each year occur in resource-limited settings. Predictions indicate that by 2030, global cases could rise to 700,000, with mortality reaching approximately 400,000, predominantly in economically disadvantaged regions [1].

Persistent infection with high-risk strains of the Human Papillomavirus (HPV) is the primary cause of cervical cancer [2]. HPV comprises over 100 types, of which at least 14 are classified as high-risk. Notably, HPV types 16 and 18 account for nearly 70% of cervical cancer cases worldwide. This virus spreads primarily through sexual contact, making it one of the most common sexually transmitted infections globally. The higher mortality rates observed in low- and middle-income countries are largely due to inadequate access to quality cervical cancer screening and treatment rather than higher HPV exposure [2].

The most effective long-term preventive measure against cervical cancer is HPV vaccination [2]. Immunizing adolescent girls against HPV significantly decreases the likelihood of developing cervical cancer in later years. Additionally, high vaccination rates contribute to herd immunity, offering indirect protection to unvaccinated individuals. The World Health Organization (WHO) recommends administering two doses of the HPV vaccine to girls aged 9 to 14 years for optimal protection [1]. However, vaccine coverage remains inconsistent, largely influenced by a country's economic status. Higher-income countries report greater vaccination rates, whereas financial constraints and vaccine supply limitations hinder widespread adoption in lower-income nations. Furthermore, misinformation and vaccine hesitancy pose significant barriers to achieving optimal coverage [3].

To improve vaccine acceptance and sustainability, robust awareness campaigns are essential. These initiatives should focus on dispelling myths, addressing safety concerns, and promoting the efficacy of HPV vaccines. Public health strategies must also integrate comprehensive sexual and reproductive health education, advocate for safe sexual practices, and discourage tobacco use to further mitigate cervical cancer risks [3].

Since the introduction of the first HPV vaccine in 2006, over 100 million adolescent girls worldwide have received at least one dose, with most recipients residing in high-income nations [2]. By 2019, more than 65% of HPV-vaccinated girls globally were from low- and middle-income countries. However, as of 2020, only 25% of low-income countries and less than 30% of lower-middle-

income nations had incorporated the HPV vaccine into their national immunization programs, in contrast to over 85% of high-income countries [1]. In response to these disparities, WHO launched the Cervical Cancer Elimination Initiative in 2020, setting ambitious targets for 2030. These include ensuring that 90% of girls receive the HPV vaccine by age 15, 70% of women undergo cervical screening at least twice in their lifetime, and 90% of women diagnosed with cervical pre-cancer or cancer receive appropriate treatment [1]. Given that India accounts for nearly 20% of the global cervical cancer burden, HPV vaccination is a critical public health priority [4]. The WHO's 90% vaccination goal presents an opportunity to reduce the disease burden significantly. Despite the availability of quadrivalent and bivalent HPV vaccines, national uptake remains suboptimal. Recognizing the need for cost-effective interventions, India introduced Cervavac, its first indigenous HPV vaccine, in 2023 [4]. However, challenges such as limited awareness, cultural stigma, and the absence of a national immunization mandate hinder its widespread adoption. Additionally, the financial burden of vaccine procurement further restricts accessibility, especially in rural areas [4].

To achieve WHO's vaccination targets, India must integrate HPV vaccination into its Universal Immunization Programme and explore single-dose regimens to enhance coverage [1]. Strengthening public-private partnerships, implementing school-based vaccination drives, and deploying mobile immunization units can further improve accessibility. Additionally, culturally sensitive awareness campaigns are essential in addressing vaccine hesitancy and misinformation [3]. Alongside vaccination, bolstering cervical cancer screening and treatment infrastructure will be crucial in meeting WHO's 2030 objectives. A combination of policy-driven strategies, research-backed interventions, and community engagement is essential for the eventual elimination of cervical cancer [1].

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