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Vaccine Hesitancy Beyond COVID-19: Lessons for Pakistan's Human Papillomavirus Vaccine Rollout

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The World Health Organization (WHO) in alliance with other Global Health actors such as Global Alliance for Vaccines and Immunisation (GAVI) has a vision to eliminate cervical cancer by 2030 through an active immunisation campaign for Human papillomavirus (HPV) vaccine in 150 countries globally. (1,2)Aligning with this global health initiative, the campaign of HPV vaccine roll-out has successfully achieved completion in many Low-and Middle-Income Countries (LMICs) worldwide and has been approved to roll out in Pakistan since September 2025. (1,2) This nationwide campaign in Pakistan holds immense public health importance as cervical cancer is the second most common cause of cancer among women aged 9-14 years, and the actual burden of disease is generally higher due to underreporting and no official record of cervical cancer cases in Pakistan. (1,3)

However, trust has always remained a powerful determinant for vaccine acceptance, influenced by health beliefs and personal choices, subjective norms and cultural beliefs, religious morality, power dynamics and clarity and transparency of information surrounding it.(4) Historical narrations of vaccine hesitancy establish the concerns of mistrust against western medical interventions due to history of colonization, power dynamics and unethical use of vulnerable population in medical experiments.(2,4) These concerns were reignited in memories during the COVID-19 pandemic; facing similar challenges of vaccine hesitancy as narrated by Mubarak et al. (5,6)One additional barrier that the COVID-19 pandemic brought was the global infodemic of misinformation and conspiracy theories as many people shaped their narratives based on information across social media and confirmation biases ultimately impacting their choices of vaccine uptake. (5,6)

The case of vaccine hesitancy for the HPV vaccine is deeply concerning, as predicted to go even beyond the challenges of historical mistrust and misinformation theories surrounding COVID-19 vaccine hesitancy, encapsulating gendered stigma and sexual health taboo in Pakistan. Dissecting it through the concept of intersectionality in global health where a combination of factors puts an individual in either a privileged or disadvantaged position, the vaccine hesitancy in this case is influenced by multiple factors such as gender, reproductive age, sexual health, religious values and patriatical forces, geographical and health inequalities, and literacy rate. (7)

In Pakistan, where sexual health is a taboo and young girls ability and capacity to make their own decisions in many households is influenced by their parents, vaccine hesitancy becomes a deeply intricate phenomena. (3,8)The cognitive understanding of this vaccine hesitancy behavior resonates with the theory of planned behavior where individuals act according to subjective norms despite being aware of the consequences of their behaviors. (1,3)Hence, in this case cultural and religious morals have the propensity to dominate personal fears of protecting young girls against cervical cancer. Addressing HPV vaccine for women of reproductive age frames a false narrative of vaccine having something to do with sexual activity rather than as a preventive tool against cervical cancer. (1,3)

Persistent myths around the HPV vaccine include lack of proven clinical data, HPV vaccine associated with ovarian cancer and autoimmune diseases, young girls are not sexually active so do need HPV vaccine and sexual inactivity in children. (1,3) These myths relying on misinformation can easily be thwarted through logical and critical thinking such as vaccination provides long term immunity and hence providing those at adolescent would help to better provide immunity at later stages of life than just before the sexual contact. (1,3)In addition, literature has documented enough about the clinical efficacy

and safety data with no adverse effects reported till three decades since the HPV was introduced to the world. (1,3)

The geographical inequities including settlement in urban and rural areas and differences in literacy rate especially for young girls in patriatical households puts an additional pressure on authorities to spread awareness in areas with limited reach. (1,3)Therefore, trust against HPV vaccine should operate through a collective responsibility of spreading awareness by religious and government organisations, healthcare providers, educational institutes and mass media campaigns. Following are the recommendations to structure a corroborative response against the HPV vaccine hesitancy.

1. The healthcare and educational authorities should train the healthcare providers and virology specialists to spread evidence-based and accurate information about the clinical efficacy and expected side effects of HPV vaccine. In addition, a government backed health information database should be developed where parents would be free to report any side-effects from time to time.
2. Health information agencies accompanied with political authorities and religious organisation should join hands to combat misinformation against the HPV vaccine and measures should be taken to put a ban on online posts spreading false narratives. This may reflect on countering the autonomy of an individual however it operates through the principle of beneficence (promoting well-being and preventing harm) as the consequences of harm are more dangerous and severe.
3. The religious organisations have a larger role to play where women faith leaders should counter the false narratives about HPV vaccine. Women faith leaders rebutting false claims of vaccine affecting sexuality would impact young girls more especially in religious households through the cognitive influence of social norm theory (people believing what their peers do). (9)
4. Multilingual health promotion campaigns through digital media representing young girls' with all religions and sects in Pakistan would help to promote diversity, inclusivity and equality in creating awareness. In addition, healthcare providers should be delegated to spread message across rural settlements and slums where digital media is not accessible.
5. All government and private educational institutes in Pakistan should organize seminars for young girls and their parents informing them about the severity of cervical cancer and perks of HPV vaccine as the milestone to protect against it. These seminars should be regularly held, funded by the provincial governments, and parents should be equally allowed to participate and voice their concerns on vaccine hesitancy
6. Lastly, measures taken to reduce vaccine hesitancy in Pakistan should undergo evaluation through the RE-AIM framework encompassing reach, effectiveness, adoption, implementation and maintenance of these recommendations. Qualitative exploration of parents should be carried out through focus group discussions and pilot evaluations of determinants impacting vaccine hesitancy should be included as a key research focus in academia.

In the end, the HPV vaccine hesitancy does not only provides protection against cervical cancer in Pakistan but also puts our society under examination in several ways. The HPV vaccine targeted for girls tests parents' ability to navigate and challenge their deep rooted traditional and stereotypical notions where girls are denied to make decisions about their health and moral and religious values silence their autonomy. The HPV vaccine resumes the everlasting battle between the misinformation on digital media and one's ability to identify the logical fallacies and truth from it. It also questions the role of religious authorities and government officials to keep aside their self-created definitive truths and work in collaboration to protect the daughters of Pakistan against this preventable harm. We are yet to witness whether Pakistan's response towards HPV vaccine can provide an actual breakthrough against cervical cancer.

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