ASSESSING FACTORS INFLUENCING VACCINE HESITANCY FOR CERVICAL CANCER AMONG WOMEN IN ISLAMABAD

PROGRAM

(BS- PUBLIC HEALTH)

SUBMITTED BY

AAMNA JAWED

01-152221-026

SUPERVISOR

DR SIDRA SHAHID

BAHRIA UNIVERSITY, ISLAMABAD CAMPUS

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

FALL 2025

Bahria University
Islamabad Campus

Dated: 05/12/2025

Thesis Approval Form

The topic of Research

"Assessing Factors Influencing Vaccine Hesitancy for Cervical Cancer Among Women in Islamabad"

Name of Student: Aamna Jawed

Enrollment no. : 01-152221-026
Program: BS Public Health

Sidra Shahid

Thesis Supervisor
(Dr Sidra Shahid)

Internal Examiner
(Dr Sohima Anzak)

External Examiner
(Dr Hina Shan)

Dr. Irfan Qaisrani
Head of Department
Humanities & Social Sciences

List of Tables

Table 1: Demographics of study participants (N=270) 17
Table 2: Percentages & Frequencies of Hesitancy Scales 21
Table 3: Associations between socio-demographic factors and hesitancy using Chi-square 24
Table 4: Mean & Standard Deviation of vaccine hesitancy score 25
Table 5: Comparison of hesitancy among both the respondent groups 26

List of Figures

Figure 1: Conceptual Framework 6
Figure 2: Vaccine hesitancy model – From 3C's to 5C's (N. MacDonald et al., 2022)..... 12
Figure 3: Percentage of respondents selecting each perceived consequence of HPV infection (multi-response question)..... 19
Figure 4: Percentage of participants reporting each source of vaccine-related information (multi-response question)..... 20
Figure 5: Percentage of participants with high and low HPV vaccine hesitancy 22
Figure 6: Reported barriers to HPV vaccine..... 23

Acknowledgement

"My success is only by Allah" (16:53)

Deeply humbled by the favor of the Almighty, for granting me the ability, patience and resilience to complete this dissertation. This achievement could have only been possible through His guidance and support. I am thankful for the opportunities and support that made this work possible.

I would like to express my appreciation to my supervisor, Dr Sidra Shahid, for her sincere commitment made it possible for me to complete this dissertation. Her support and guidance throughout the research process, as it enabled me to produce the best quality of work. Her valuable insights and timely feedback and professional guidance gave me the strength to work effectively throughout the process. I am grateful for her belief in me and my abilities.

I am grateful to my family and friends for always pushing me to do better, for praying for me and understanding me during this daunting process. It was a motivation and reassurance in itself to overcome the challenges. To my parents, Dr Sadaf Saleem & Dr Muhammad Jawed Iqbal, reaching here wouldn't be possible without your encouragement. Finally, I extend my regard to everyone who has helped me in any way, throughout this process.

Abstract

A grave concern in public health for Human Papilloma Virus exists in the form of vaccine hesitancy. Although, the effectiveness of HPV vaccine in women is widely known and documented, however, the coverage among them remains critically low. The purpose of this study was to investigate the likelihood of HPV vaccine hesitancy in females aged 09 to 26 years in Islamabad, Pakistan. It determined the influencing factors for vaccine acceptability along with facilitators and obstacles. For this purpose, A quantitative cross-sectional study design was adopted. Convenience sampling was done and data was collected from 270 participants. The questionnaire included different measuring tools from validated scales like the WHO SAGE Vaccine Hesitancy Scale. Pilot testing was done, and the reliability test showed a satisfactory internal consistency with Cronbach's alpha of 0.747. IBM SPSS version 26 was used to analyze the data. The descriptive analysis showed a rate of willingness for vaccination at 58.8% indicating favorable attitudes towards vaccination. The challenges that influenced hesitancy included grievances regarding lasting health effects (45.2%), halal compliance (41.9%) and rumors (31.1%). Enablers were information from reliable sources, advice from the healthcare professionals (43.3%), perception of vaccine to work (52.6%) and confidence in governmental campaigns (24.8%). A significant association was observed with education and increased hesitancy at a p-value of 0.04. Other influential factors that were observed included exposure to misinformation, cultural or religious considerations. The findings emphasize the importance of directed public health interventions rather than general educational campaigns, advocacy on digital health literacy and using trusted healthcare sources can help to mitigate fears and misinformation as well as combat stigma and xenophobia. These findings can be used to increase the acceptance and uptake of HPV vaccine in general population.

Keywords: Human Papillomavirus; HPV Vaccine Hesitancy; Vaccine Acceptability; Women's Health; Misinformation; Pakistan

Table of Contents

Chapter I **1**

Introduction **1**

1.1 Problem statement *4*

1.2 Significance of the study *4*

1.3 Research objectives *5*

1.4 Research questions *5*

1.5 Research Gap *5*

1.6 Conceptual Framework *6*

Chapter II **7**

Literature Review & Theoretical Framework **7**

2.1 Literature Review **7**

2.1.2 What is cervical cancer? *7*

2.1.3 Global & National Burden *7*

2.1.4 Pakistan's Perspective *8*

2.1.5 HPV Vaccination – A Global Preventive Tool *9*

2.1.6 Vaccine Hesitancy *10*

2.1.7 Factors Contributing to HPV Vaccine Hesitancy *10*

2.2 Theoretical Framework – The 5C's model for vaccine hesitancy **12**

Chapter III **13**

Research Methodology **13**

8.1 Research Design *13*

8.2 Method of Data collection *13*

8.3 Research Instrument *13*

8.4 Inclusion & Exclusion Criteria *14*

8.5 Population *14*

8.6 Sampling Size and technique *14*

8.7 Data Analysis procedures *16*

Chapter IV **17**

Results & Discussion **17**

4.1 Results **17**
4.2 Discussion **27**
Limitations *31*
Chapter 5 ..... **33**
Conclusion **33**
Recommendations *33*
References **35**
Annexure **42**

Chapter I

Introduction

Behind the staggering statistics of a woman dying every two minutes from cervical cancer, lies a profound human cost. As underscored by the TogetHER for Health's 2023 report, " the unnecessary loss of a woman to cervical cancer isn't just a loss that reverberates through her family and loved ones; rather a woman impacts all the lives she touches – as a mother, as an entrepreneur, as a community leader" (TogetHER for 2022).

Human Papilloma Virus (HPV) is considered a primary causative agent for cervical cancer (Atif et al., 2025). With its 218 types identified to have caused diseases in humans, the two high-risk strains, HPV 16 and 18 are known to cause cervical cancer cases worldwide (Magalhães et al., 2020). Cervical cancer and HPV were first associated together firmly in the early 1980s. The year 2006 brought forth a revolutionary finding as the first vaccine for cervical cancer was officially approved by the FDA ("Pink Book," 2021).

Vaccines have been recognized as one of the most groundbreaking discoveries of medical science. Since their advent, vaccines have made a prominent contribution in radically reducing the global burden of infectious diseases (Kayser & Ramzan, 2021). Use of vaccines has led to the prevention of 4 to 5 million deaths worldwide. This discovery enabled the eradication of smallpox and other diseases like measles, tetanus and polio have changed the global health landscape and improved overall health outcomes (Orenstein & Ahmed, 2017). Similarly, the HPV vaccine offers a vital opportunity to prevent cervical cancer and improve women's health-outcomes, especially in low- and middle-income countries (LMICs), where there are limited facilities (Vu et al., 2018).

This low coverage isn't because of vaccine inaccessibility, it is also greatly influenced by vaccine hesitancy. The World Health Organization's Strategic Advisory Group of Experts (SAGE) on Immunization, describes vaccine hesitancy to be *"the delay in acceptance or refusal of vaccines, despite availability of vaccination services".* Vaccine hesitancy is perceived to be a dynamic and nuanced issue, originating from multiples factors like lack of confidence, complacency and inconvenience (*SAGE on Immunization, 2011*, 2012).

Cervical cancer develops when an abnormal cell growth occurs in the cervix (lower part of uterus connecting to vagina) (Cervical Cancer, 2023). Despite it being one of the treatable and

preventable forms of cancers, with measures like screening and vaccination (in this case) and timely detection, yet it claims lives of approximately 300,000 women every year, globally (WHO, 2022).

Moreover, the vaccine against HPV is widely acknowledged as a significant measure for primary protection against cervical cancer in young women and serves as an essential preventive tool (Shamsi et al., 2024). The effectiveness of the vaccine, regardless of the doses given was in between 83 and 96.1% (Kamolratanakul & Pitisuttithum, 2021). In 2019, cervical cancer was recognized as a significant public health problem by the World Health Organization (WHO) and it urged its signatory countries to take prompt action to work towards its elimination (World Health Organization, 2019).

According to country brief, cervical cancer is a prominent cause of mortality in females and ranks third worldwide in premature deaths (Betsch et al., 2018). Furthermore, in 2022, World Cancer Research Fund reported 662,301 new cases for cervical cancer across the globe, making it one of the prevalent cancers among women (CRUK, 2025). A large number of these cases are attributed to low-and middle-income countries, have limited access to preventive care services, this further worsens the problem. Comparatively in high-income countries, the incidence of cervical cancer cases has reduced considerably due to their organized public health initiatives and widespread vaccination campaigns (Ekwunife et al., 2016). This immense difference has dubbed cervical cancer a “disease of disparity”, prompting the urge to work against this disparity worldwide in the prevention and management of cervical cancer (WHO, 2024).

In Pakistan, cervical cancer stands as the second most common cause of death from cancers in woman. If timely prevention of cervical cancer is not implemented, the number of deaths was estimated to jump to 129,184 by 2070 (CRUK, 2025). Despite this catastrophic situation and surging burden, HPV vaccine is yet to be included in the country’s Expanded Program on Immunization (EPI), making it inaccessible to a vast majority of population. According to the country brief, zero percent girls aged 9 to 14 have been vaccinated! This increases their vulnerability to this preventable disease. The absence of coordinated efforts, school-based vaccinations and effective community outreach has played an integral role in further jeopardizing the situation (CRUK,2025).

Not only is it about the availability or accessibility of the vaccine but includes other factors around the cervical cancer vaccine. Other factors such as cultural myths, misbelief and ignorance contribute to the refusal of vaccination or exacerbates the vaccine hesitancy in communities (T.M. Khan et al., 2016).

The vaccine against HPV is one important tool in preventive public health medicine of cervical cancer by early immunization (Harper & DeMars, 2017). Even though it is effective and safe, it still faces criticism. Furthermore, this resistance may be due to cultural taboos and narratives of misinformation and low health literacy (Altobelli et al., 2019).

Even cities with relatively better access to healthcare and literacy rates in the region are not immune from these challenges. A study conducted in 2020, in Karachi, which was conducted among females and the awareness level for cervical cancer was 51.3%. Of these, only 40.2% had knowledge about the HPV vaccine (Riaz et al., 2020).

Likewise, results of another research conducted on medical university students showed overall only 4.5% were vaccinated against HPV. This indicates a lack of awareness and accessibility even in the educated populations (Shaikh et al., 2019). The most targeted age groups for HPV vaccination worldwide involves girls between 09 to 14 years of age. This is due to the fact that a vaccine is considered to be most effective when given before exposure to HPV (WHO, 2022).

In addition to this, young women up to the age of 26 years old are said to be eligible for the vaccine and continue to represent a significant catch-up group for vaccination (CDC, 2021). Therefore, to prevent cervical cancer, it is imperative that both categories i.e. adolescent girls and young women are considered critical population for understanding vaccine uptake and thus understanding the factors that influence their hesitancy for the vaccine is essential. For the purpose of this study, the term “women” encompasses adolescent girls aged 09 to 17 years (via their caregivers) and young women aged 18 to 26 years, as both fall within the internationally recommended age bracket for HPV vaccination.

In 2020, the World Health Organization put into effect its Global Strategy to combat cervical cancer anchored in its 90-70-90 targets, translating into 90% HPV vaccination coverage, 70% screening coverage, and 90% access to treatment (Cervical Cancer Elimination, 2023). These indicator targets were established with the aim of increasing programme coverage, screenings and

treatment in all countries by 2030. But still even the basic vaccination as a first step has yet to be implemented on a large scale in Pakistan (CRUK, 2025). Global studies have measured vaccine hesitancy, but there is limited information on challenges related to HPV vaccine reluctance, specifically in Pakistan's socio-cultural context. Considering this increase in cervical cancer prevalence and the indifference in efforts towards HPV vaccination in public policy, thoroughly examine these barriers and facilitators is imperative.

1.1 Problem statement

Vaccination rates in Pakistan are disproportionately low, however there is robust evidence available that supports the efficacy of HPV vaccine in preventing cervical. It is less known, however, what the setting-specific drivers of HPV vaccine acceptance or hesitancy are among young adolescents and women particularly in urban setting.

However, the contextual determinants of HPV vaccination uptake and acceptance or hesitancy remains largely unclear among young women and adolescent girls in different settings, including urban areas where there is limited local evidence that exists. If the gap is not addressed the public health programs that need attention wouldn't be designed properly. Thus, this would all end up with cervical cancer activities in Pakistan to remain constraint.

To be able to assist public health strategies and to enhance measures for the prevention of cervical cancer, it is important to explore perceptions, barriers and enabling factors associated with HPV vaccine acceptance among young women and adolescent girls.

1.2 Significance of the study

This study is crucial for Pakistan's cervical cancer prevention efforts as it informs the policymakers and public health practitioners about the potential barriers to HPV vaccine uptake. Pakistan is nearing an essential stage in its cervical cancer prevention efforts where with international partners like GAVI, UNICEF and WHO is renewing the HPV vaccination initiative nationwide. This further strengthens the need for understanding the root causes for reluctance towards the vaccine and how efforts could be improved and better placed for the target population as there is no better time than now for it, when the efforts would be directed to the cause.

The research provides actionable insights into vaccine hesitancy among adolescent girls and young women, supporting the WHO's 90-70-90 strategy and global cervical cancer elimination goals,

thus helping in strengthening health strategies, build trust, and reduce Pakistan's cervical cancer burden. Including both groups allows this study to capture present vaccine related decision-making and generate anticipatory insights suitable for future HPV vaccine implementation. Academically, it fills a critical gap by examining caregivers and young women's decision to be vaccinated, which eventually strengthens Pakistan's HPV vaccine hesitancy evidence base.

1.3 Research objectives

The following are the objectives for the study:

i) To assess the level of HPV vaccine hesitancy for cervical cancer among adolescent girls (through caregivers for ages 9–17) and young women (18–26) in Islamabad.

ii) To identify common enablers and barriers influencing HPV vaccine acceptance among adolescent girls and young women based

iii) To examine associations between socio-demographic factors (like age, education, and residence etc.) and HPV vaccine hesitancy among both groups.

1.4 Research questions

a) What is the level of vaccine hesitancy among adolescent girls (through parents 09 to 17 years) and young women (18 to 26 years) in Islamabad?

b) Which factors enable with cervical cancer vaccine hesitancy among adolescent girls and young women?

c) How are socio-demographic factors (such as age, education, residence etc.) associated with HPV vaccine hesitancy among adolescent girls and young women in Islamabad?

1.5 Research Gap

Vaccine hesitancy has emerged as a pressing public health concern around the globe especially for preventable diseases like cervical cancer (Karafillakis et al., 2019). Even though, significant steps and initiatives have been taken globally to reduce the incidence of cervical cancer which has led to the development and recommendation of the Human Papillomavirus (HPV) vaccine, the problem persists due to its low uptake (Dorji et al., 2021).

In low- and middle-income countries like Pakistan, this issue exacerbates due to socio-cultural, economic and informational barriers (Dorji et al., 2021). Although, vaccine hesitancy in relevance to childhood vaccinations and parental concerns is well documented, but there remains paucity in hesitancy surrounding adult vaccinations, particularly among women of reproductive age. There

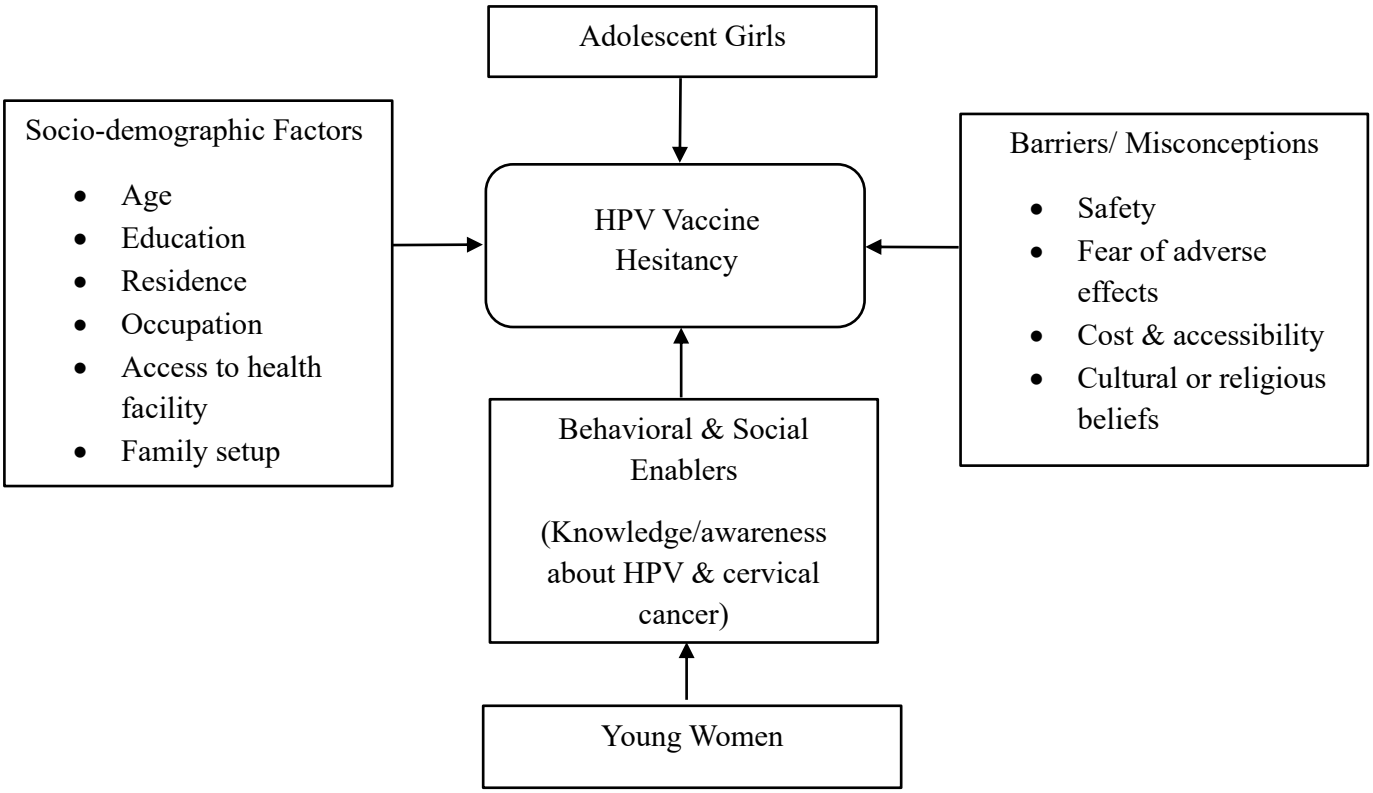
is a clear research gap regarding HPV vaccine hesitancy among women of reproductive age in urban areas like that of Islamabad. This has resulted in a crucial gap in understanding the decision-making processes of adult women.

1.6 Conceptual Framework

The conceptual model used here is grounded in the WHO Behavioral and Social Drivers (BeSD) framework. This framework identifies four key factors that influence vaccination behavior, these include: thinking & feeling, social processes, motivation and practical access to service. These factors shape vaccine acceptance or refusal.

The Carolina HPV Immunization Attitudes and beliefs scale (CHIAS) was also employed to understand the HPV specific attitudes and barriers. Evidence elucidates that misconceptions, safety concerns, and low perceived risk contribute to hesitancy. Whereas accurate knowledge and trust in healthcare providers enable vaccine uptake. Regional research from Pakistan confirms this pattern (Sultana et al., 2022).

Figure 1: Conceptual Framework



Chapter II

Literature Review & Theoretical Framework

2.1 Literature Review

The purpose of this study is to investigate the reasons and factors that impact or add to vaccine hesitancy pertaining to cervical cancer, especially among women aged 09 to 26 years in Islamabad.

2.1.2 What is cervical cancer?

Cervical cancer is a significant public health concern. It is among the top five most common cancer affecting women globally, it stands as the fourth most prominent cancer in women (Vu et al., 2018). It is primarily caused by persistent infection with high-risk (i.e. 16 & 18) strains of Human Papillomavirus (HPV) (Small et al., 2017). It is an increasing global burden for both developing and industrialized nations. It drastically affects the low- and middle-income countries (LMICs) (Villa & Richtmann, 2023).

2.1.3 Global & National Burden

In 2022, globally – 662,044 new cases and 384,709 deaths from cervical cancer were reported, with 90% being in the LMICs. Its high mortality in these regions is associated with limited screening access and preventive services (Vu et al., 2018).

Significant regional disparities in global cervical cancer burden can be observed. A recent study estimates the highest incidence rate in an age-standardized populations were more than 40 per 100,000 women- years in Eastern and Southern Africa (Small et al., 2017). The lowest rates were in western Asia, Australia and New Zealand, approximately 6 per 100,000. In contrast, high-income countries like Switzerland's mortality rates were as low as 1 per 100,000 women-years.

These regional differences highlight the sustained inequities in health depicting the limited access to vaccination, screening and treatment. This urges for specific interventions, catering to hard-hit nations to facilitate their adherence and completion of cervical cancer targets (Singh et al., 2022).

In Pakistan, the cervical cancer burden is experiencing a gradual increase. The country reports an estimated 4,762 new cases and 3,069 deaths annually with an incidence rate of 5.4 per 100,000 women and mortality rate of 3.6 per 100,000 women (CRUK, 2025). It is predicted that without intervention, 129, 184 women in Pakistan will die from 2020 to 2070. This rising burden of disease

underscores the need for preventive strategies effective immediately, especially the implementation of HPV vaccine, which is very efficacious in preventing cervical cancer (*Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem*, 2020).

2.1.4 Pakistan's Perspective

In previous years, Pakistan has struggled to include the HPV vaccine to their national immunization schedule. The vaccine for cervical cancer was introduced in 2019 in Pakistan's Expanded Program on Immunization (EPI). It was initially introduced to cater girls aged 9 to 14 years but later it was dropped. However, at present, there isn't any HPV vaccine or vaccination program in Pakistan (Awan & Khattak, 2022). Though, vaccines like Cervarix and Gardasil are FDA approved and have been available privately but this limits accessibility of common man to it. This was mainly a consequence of low public awareness, sociocultural factors and myths that led to the suboptimal utilization of the vaccine (Mehrizi et al., 2025).

Despite the concerning rates of cervical cancer incidence and global emphasis on HPV vaccination for cervical cancer prevention, research within Pakistan remains scarce. Additionally, even fewer studies have investigated the attitudes and beliefs among women of reproductive age that contribute to the vaccine hesitancy (Shamaun et al., 2022). The literature available mostly caters to university students, adolescents, healthcare workers or the attitudes and perceptions of parents, however no particular work can be seen focusing on women of reproductive age themselves, who are at a larger risk of developing cervical cancer (Shamsi et al., 2024).

Low reporting for cervical cancer in Pakistan could be attributed to the fact that it is considered taboo to talk about anything sexual health related in the society (Zafar & Burney, 2022). Further, the problem also persists because there's no proper knowledge about the screening of cervical cancer or pap smears test in Pakistan (M. Ahmad et al., 2023).

A range of studies in different regions of Pakistan depicted a critical knowledge gap in awareness which has influenced attitudes and beliefs in the educated masses of the country, raising concerns about vaccine literacy amongst the vulnerable population (i.e. female population) (Shamsi et al., 2024). A study among university students in Pakistan found that only 44.8% participants recognized vaccination as a preventive measure against HPV and a large number, i.e. 53% participants were unaware of the vaccine's existence all-together (Khan et al., 2016).

Despite the global advocacy and uproar on cervical cancer, the HPV vaccine coverage remains inconsequential in Pakistan (Sriudomporn et al., 2023). According to the country brief 2025, the vaccination coverage of Pakistan for cervical cancer – as of 2022, is reported to be 0% among girls aged 9 to 14 (CRUK, 2025). In addition to this, the HPV vaccine's exclusion from the country's Expanded Program on Immunization (EPI) restricts its distribution to private channels only. Consequently, its high cost, and constrained availability creates a prominent disparity in its distribution and uptake, underscoring a need for improved access and affordability. While the WHO's recommendation of a single-dose vaccine schedule in 2022, has opened new avenues for a cost – effective immunization campaign, Pakistan is yet to take full advantage of the situation (World Health Organization: WHO, 2022).

The emphasis of the National Health Vision of 2025 is on expanding the preventive practices especially immunization to reduce the burden of disease. However, the vaccination for HPV remains absent from the national EPI, despite its immense role women's health, achieving universal health service and adolescent health (Bossert T, et al., 2016). Integrating this HPV vaccine would help achieve the NHV priorities and will support multiple sustainable developments goals including SDG 1(ending poverty), SDG 3 targets: 3.8 Universal Health Coverage and 3.b Medicines and Vaccines, SDG 5 (gender equity) (CRUK, 2025).

2.1.5 HPV Vaccination – A Global Preventive Tool

(The '90– 70 –90' Cervical Cancer Elimination Strategy by WHO)

The HPV vaccine has been widely recommended as a key intervention in cervical cancer prevention. It has been made to target the HPV strains responsible for 70% of cervical cancers and 90% of genital warts (Harper & DeMars, 2017). Acknowledging the vaccines' prophylactic potential, the World Health Organization (WHO) strongly advocates for the vaccination of 90% of girls, by 15 years of age, to be fully vaccinated against Human Papilloma Virus, as an elimination attempt towards cervical cancer. This strategy is a part of its 90-70-90 targets for eliminating cervical cancer by 2030 (Initiative WHO, 2020). These targets call for 90% HPV vaccinations, 70% screenings for HPV and 90% adequate treatment and care. These targets were set with the aim to eliminate cervical cancer by initially curbing the surge in cervical cancer cases and then eventually reducing its status from public health concern. Studies suggest that if put into effect, these targets could bring the incidence rate to 42% by 2045 and would potentially prevent 62

million deaths by 2120! This particular target will benefit the LMICs, including Pakistan (CRUK, 2025).

Acknowledging the barriers to vaccine coverage and accessibility, WHO's SAGE on Immunization endorsed a single-dose vaccination regimen in 2022. This endorsement was a result of the finding that a single-dose provides better protection as compared to the two-dose regimen. Also, this initiative also ensures that in countries where availability and accessibility is an issue, the logistic problems could be catered for in this way, making it as cost-effective as possible (WHO, 2024).

2.1.6 Vaccine Hesitancy

Vaccine hesitancy is not a new phenomenon that has recently emerged, rather it has held its ground ever since the advent of the first vaccine for smallpox by and now has escalated drastically over the years to an alarming rate (Nuwarda et al., 2022). The World Health Organization (WHO) characterizes vaccine hesitancy as a circumstance where individuals or communities *delay or decline vaccination, despite the availability and accessibility of services* (MacDonald, 2015). In 2019, WHO declared vaccine hesitancy as one of the top ten prominent threat to threats to global health, emphasizing its growing influence on immunization efforts (*Threats to Global Health*, 2019).

To measure vaccine hesitancy levels among population and eventually determine the possible causes leading to hesitancy, various frameworks or hesitancy scales are being used. The widely used are 3C model – Confidence, Complacency and Convenience) (MacDonald, 2015), and the elaborated 5C model which adds Constraints and Collective responsibility to the previous three c's (Betsch et al., 2018). Though these scales are usually applied in context of hesitancy in childhood immunizations, a need to address and explore hesitancy in adult vaccines like HPV, is widely being felt.

2.1.7 Factors Contributing to HPV Vaccine Hesitancy

Multiple factors and an array of inter-connected barriers drive the HPV vaccine hesitancy in Pakistan. These include knowledge gaps, sociocultural beliefs and affordability. Numerous studies from Pakistan and other LMICs consider low awareness about HPV and its vaccine as a prominent factor resulting in hesitancy. A cross-sectional study conducted in Karachi revealed that only 53.3% participants recognized HPV as a causative agent for cervical cancer and hardly 3.1% had

received the vaccine, pointing towards a pronounced information gap even among the educated population (Shamsi et al., 2024).

Another theme evident in literature is socio-cultural point-of-view, especially in a Muslim majority population. Religious and cultural challenges emerge from peoples' misunderstanding of the vaccine as being linked to sexual behaviors. Due to this belief, discussing it in society is seen as a taboo and attributes it to shame or disgust (Kisa & Kisa, 2024).

Themes that have been observed worldwide to influence HPV vaccine hesitancy were brought out by Cochrane qualitative review. These eight themes include limited knowledge, moral beliefs regarding sexuality, societal influences, practical barriers, perception of the vaccine's safety and institutional reliability (Parkinson, 2025). Looking at the global trends for the factors that influence vaccine hesitancy, a study in Europe highlights the most common reasons for vaccine hesitancy to be inadequate information, concerns about long term effects of the vaccine and trust issues with the health authorities (Karafillakis et al., 2019). For European parents, psychological and social factors like parents' belief, educational levels and the perceptions about vaccine's safety and need were prominently observed(Achimaș-Cadariu et al., 2024).

Similarly in the US prominent concerns that led to a refusal or delay in HPV vaccination were safety issues as many were worried about the adverse effects (Chido-Amajuoyi et al., 2021). Also trends from 2010 to 2020 revealed a perception that the vaccine isn't required for a child as they aren't sexually active (Boakye et al., 2023). Additionally, in Africa, factors like ambiguity regarding long term affects, infertility and limited knowledge, transportation access and misinformation playing a major role, emerged to be the leading causes of HPV vaccine hesitancy (Omayo et al., 2023).

Although other elements such as cost of vaccine and lack of a healthcare system also play an essential role, this review is mainly based on summarizing the existing studies to collect and analyze the most common reasons that have been reported so far. Further reasons for hesitancy were examined in more detail after the data collection of the current study which can be found in the discussions section.

2.2 Theoretical Framework – The 5C's model for vaccine hesitancy

The 5C model developed in 2018 helps in grasping fully the intricate nature of vaccine hesitancy. It expands on the WHO SAGE Working Group's 3C framework brought about in 2014, which addresses confidence (trust in vaccines and system), complacency (low perceived risk) and convenience (access-related barriers). Later it was revised into the 5C model adds two more dimensions constraints (encompassing both structural and psychological barriers) and collective responsibility (the willingness to protect others through one's vaccination) to it. This offers a more diverse understanding of various psychological factors that affect the decision making of individuals when it comes to vaccine reluctance (Nurwarda, 2022).

The 5C framework is very useful for adult focused vaccines as decision making in adult is influenced by an array of factors from cultural to perceived risks. By applying this model, this study will organize key factors reported by women of reproductive age in Islamabad and explore the role of psychological barriers impacting the vaccine uptake (Betsch et al, 2018).

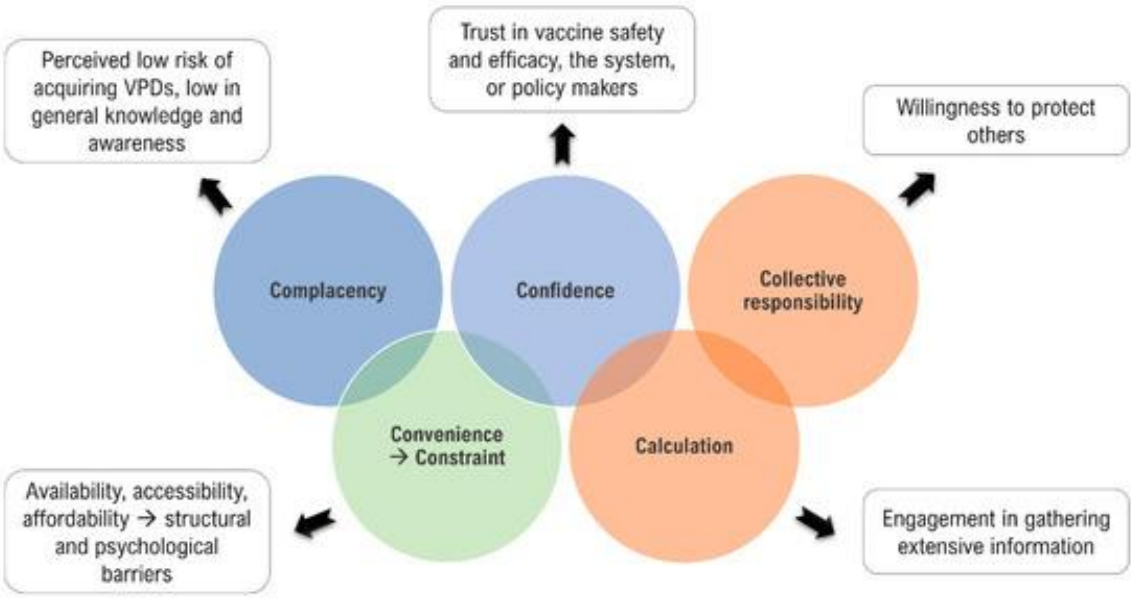


Figure 2: Vaccine hesitancy model – From 3C's to 5C's (N. MacDonald et al., 2022).

Chapter III

Research Methodology

8.1 Research Design

This research leveraged a *cross–sectional quantitative* study design to assess the factors influencing vaccine hesitancy for cervical cancer among women aged 9 to 26 years in Islamabad. This was the most suitable design for this study as it helped in analyzing and assessing the prevalence of hesitancy and its association with the demographic, behavioral and other factors at one point in time.

8.2 Method of Data collection

To cater to the population of 09 to 26 years old, the population was divided into two categories for ethical purposes as those under 18 cannot consent for themselves. So, there were self-responders (between ages 18 to 26 years old) and parents/guardians (filling for their daughters 09 to 17 years).

The tool was administered both in-person using paper–based surveys and online using google forms to collect data from a diverse population. Respondents were assured of confidentiality, and informed consent was obtained prior to participation. Additionally, assistance was provided to the participants with a lower literacy level.

8.3 Research Instrument

Data was collected using a structured, self-administered questionnaire which was adapted from validated tools, including Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) (McRee et al., 2010), the WHO Behavioral and Social Drivers (BeSD) framework (*Behavioural and Social Drivers of Vaccination*, 2022), and the WHO SAGE Vaccine Hesitancy Scale (Shapiro et al., 2017). All these tools were integrated to shape various sections of the questionnaire such as CHIAS for barriers, BeSD for enablers, WHO SAGE VHS for hesitancy. Prior to the data collection, the pilot testing of the tool was carried out to test its cultural relevance and clarity in Islamabad's context. Additionally, reliability testing was carried out, and Cronbach's alpha was calculated to be 0.747, to check for the internal consistency of the questionnaire.

The tool consists of five sections

- ➔ Section A: Socio-Demographic
- ➔ Section B: Knowledge, Beliefs & Perceived Risk

➔ Section C: Social Norms & Influence

➔ Section D: Motivation & Intent

➔ Section E: Practical Barriers

All items were presented on a 5-point Likert scale (from strongly disagree to strongly agree) and took around 4 to 7 minutes to be completed.

8.4 Inclusion & Exclusion Criteria

The inclusion criteria for this study determine the participants who will be eligible to participate in the study if the following conditions are met:

- Females aged 9 to 26 years and are residents of Islamabad.
- For adolescent girls aged 9 to 17 years, their parent/caregiver willing to complete questionnaire on behalf of the child.
- For young women aged 18 to 26 years, the woman is able and willing to complete the questionnaire herself.
- Capable of providing informed consent, either independently or with support if needed for those with a lower literacy rate

The following conditions will be applied to determine whether the participants are eligible to be a part of the study or not:

- Participants who were a part of pilot testing phase of the questionnaire
- Females younger than 09 or those older than 26 years.
- Women who are not living in Islamabad or are a part of transient migratory or visiting population
- Those already vaccinated with cervical cancer vaccine

8.5 Population

This study was conducted in Islamabad, focusing on the general female population from the ages 09 to 26 years old, residing in the federal capital of Pakistan as of 2025. As this is the recommended population by WHO.

8.6 Sampling Size and technique

This study employs *convenience sampling.* This sampling technique ensures that participants from multiple demographic groups are included in the study for a comprehensive representation of

different settings. The strata were defined based on the socio-demographic variables. The purpose of this sampling technique was to reflect demographic diversity within Islamabad, ensure that sub-groups important to vaccine hesitancy were included proportionately, support meaningful comparison of hesitancy levels of across these socio-demographic categories and reducing sampling bias.

Age Group

Age was a primary variable for stratification as perceptions of HPV vaccination differ a great deal among caregivers of adolescents and young women. There were two distinct age based categorical divisions, Stratum 1: Caregivers of adolescent girls aged (09 to 17 years), Stratum 2: Young women aged 18 to 26 years.

Educational Level

The purpose of education being a stratification factor was that awareness of cervical cancer, health literacy and vaccine acceptance are very strongly associated with formal education. The respondents were categorized into five categories, i.e. no formal education. Primary – matric, Intermediate, Bachelor's and Master's. This ensured a balanced representation of women with varying levels of health information access and comprehension.

Employment Status

This category was used as a proxy for socio-economic standing, autonomy and access to health information. They were classified as employed, unemployed and students. Including these strata allowed the sample to capture potential differences in exposure to health systems, access to resources and decision-making autonomy.

Residence (Urban/Peri-Urban)

Residence was used as a variable for stratification to account for structural differences in access to healthcare, cultural norms and information availability. They were divided into 3 categories: rural, semi-urban and urban.

Sample size

Sample Size was calculated using *Openepi* to be 273, with a 23.21% (Ghayas et al., 2018) prevalence rate of vaccine hesitancy for HPV in Pakistan, with a 95% confidence interval and a 5% margin of error.

8.7 Data Analysis procedures

Data was analyzed using IBM SPSS (version 26). *Descriptive statistics* (frequencies, percentages, means, and standard deviations) were used to summarize participant characteristics and overall response patterns. Due to the presence of categorical variables (e.g., education, residence, awareness and perceived risks), frequencies and percentages were most apt to measure the distribution patterns

Hesitancy score was computed by summing all related items from the questionnaire to create a continuous variable that reflects the overall hesitancy. This is a standard method as it allows for classification of respondents into low or high hesitancy groups

Comparative analysis between self-responders and parents/caregivers was performed to examine whether the decision-making patterns differed across the two types of respondents. Since the study employed both parents and responders themselves filling the questionnaire, it was imperative to clarify the influence of hesitancy by the responder's role.

To assess the *associations* between sociodemographic factors and hesitancy levels *chi-square* tests were employed. This test allowed the study to determine whether the demographic characteristics served as potential determinants for hesitancy.

Chapter IV

Results & Discussion

4.1 Results

4.1.1 Sociodemographic characteristics (Descriptive Statistics)

In this study data was collected by dividing the population sample into two categories based on their age factor due to ethical reasons. The first constituted of respondents who filled the questionnaire for themselves as they were 18 and above, the second category was of parents or guardians who filled the questionnaire on behalf of their daughters as they were under 18 and couldn't consent for themself.

Most participants were between the ages 18 – 26 years old and responded for themselves, constituting to 73% of the total population (table 1). However, 27% of participants were parents or guardians responding for their daughters in between the ages 9 – 17 years old. Age distribution depicted that a majority of the population belonged to the 22 to 26 years old category (36.6%), followed by a smaller proportion aged 15 to 17 years (1.1%) (table 1).

The educational item reflected that around 66.3% of the respondents held a bachelor's degree while 6% had no formal schooling. In addition to this, more than half of the respondents i.e. 54.8% were students, followed by 36.7% who were employed and 8.5% were housewives (table 1).

Table 1: Demographics of study participants (N=270)

Demographic variable	Category	Frequency (N)	Percentage (%)
Who are you filling this for?	Myself (I am between 18 – 26 years old)	197	73
	My daughter/child (aged 09 to 17 years old)	73	27
Age Group	09 to 11 years	63	23.3
	15 to 17 years	10	3.7
	18 to 21 years	98	36.3

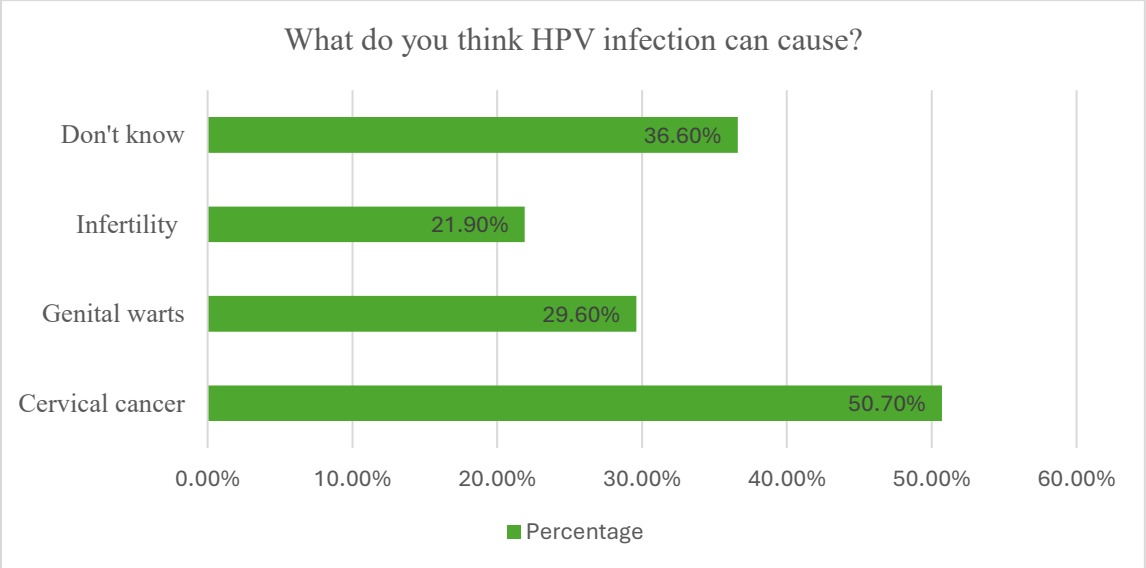
	22 to 26 years	99	36.7
Education Level	No formal education	15	5.6
	Primary – Matric	14	5.2
	Intermediate	40	14.8
	Bachelor's	179	66.3
	Masters	22	8.1
Occupation/Employment	Employed	99	36.7
	Housewife	23	8.5
	Student	148	54.8
Family setup	Nuclear	171	63.3
	Joint family	70	25.9
	Single parent household	29	10.7
Do you have children? (for self-reporting respondents)	Yes	15	5.6
	No	185	68.5
	Not Applicable	70	25.9
Area of residence	Urban	173	64.1
	Peri-Urban	52	19.3
	Rural	45	16.7
Access to healthcare facility	Yes	245	90.7
	No	25	9.3

Child's school enrollment (for parents/guardians)	In school	79	29.3
	Out of school	24	8.9
	Not Applicable	167	38.1
Have you heard of the HPV vaccine before today?	Yes	150	55.6
	No	120	44.4

The living situation for a greater majority of the respondents, 63.3%, was of a nuclear family while the remaining 25.9% were living in a joint (table 1). Amid the adult respondents, 5.6% had children. A number of respondents (64.1%) were living in urban areas, followed by 19.3% in peri-urban and 6.7% in rural areas. Additionally, 90.7% of the respondents had access to healthcare facilities. School enrollment among girls stood at 29.3% (table 1). Regarding the awareness of the HPV vaccine a rough split could be observed with a 55.6% having prior knowledge (table 1).

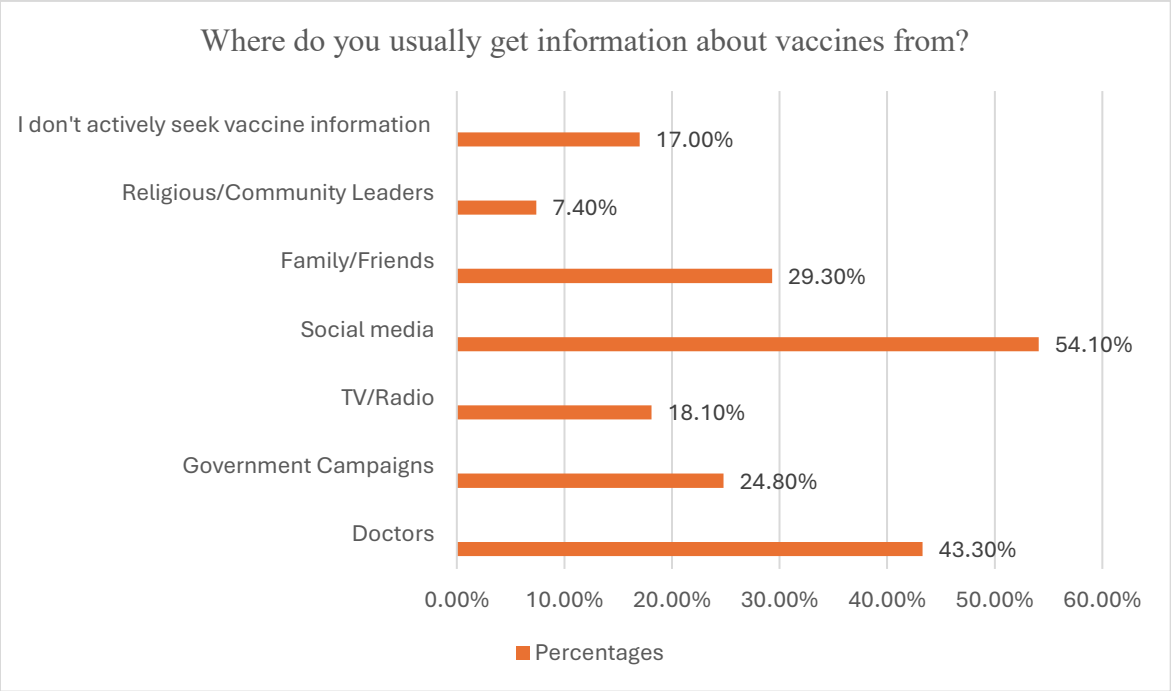
Cervical cancer stood the most commonly recognizable health repercussion for of HPV infection at 50.7% and over one-third of the respondents, around 36.6%, were not sure about the possible outcomes of HPV-related infection (figure 3).

Figure 3: Percentage of respondents selecting each perceived consequence of HPV infection (multi-response question)



The prominent or go – to source for vaccine information was social media for 54.1% of the participants, accompanied by 43.3% relying on doctors and 24.8% on government campaigns (figure 4).

Figure 4: Percentage of participants reporting each source of vaccine-related information (multi-response question)



4.1.2 Hesitancy Items

A variability in vaccine hesitancy items could be observed. Perceived effectiveness of the HPV vaccine had a largely favorable response, with 38.5% agreeing and 14.1% strongly agreeing to it. Around one-third (37.0%) remained neutral (table 2).

Concerns regarding the vaccine's serious or long-term side effects were seen as 37.8 agreed and 7.4% strongly agreed to it (table 2). Additionally perceived risk of cervical cancer for personal or daughters' health had a predominant neutral response of 44.1% while 32.6% disagreed to some extent. Around 40% of the respondents agreed to the fact that the HPV vaccination is important. Trust in doctors' recommendations and government health program was high as 49.3% agreed and 18.9% strongly agreed with their recommendations (table 2).

Table 2: Percentages & Frequencies of Hesitancy Scales

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The HPV vaccine is effective in preventing cervical cancer	8 (3.0%)	20 (7.4%)	100 (37.0%)	104 (38.5%)	38 (14.1%)
I am concerned about serious or long-term side effects of the HPV vaccine	19 (7.0%)	38 (14.1%)	91 (33.7%)	102 (37.8%)	20 (7.4%)
I believe there is a chance that I/my daughter is at a risk of getting cervical cancer	30 (11.1%)	58 (21.5%)	119 (44.1%)	55 (20.4%)	8 (3.0%)
The HPV vaccine is important for my/my daughter's health.	14 (5.2%)	25 (9.3%)	87 (32.2%)	108 (40.0%)	36 (13.3%)
I usually trust recommendations from doctors and government health programs about vaccines.	10 (3.7%)	19 (7.0%)	57 (21.1%)	133 (49.3%)	51 (18.9%)
Some people in my community believe that HPV vaccine is unnecessary for unmarried girls.	15 (5.6%)	57 (21.1%)	90 (33.3%)	75 (27.8%)	33 (12.2%)
Some people in my community are concerned about the vaccine’s halal status.	10 (3.7%)	44 (16.3%)	103 (38.1%)	78 (28.9%)	35 (13.0%)
Rumors I have heard in my community about the HPV vaccine make me doubt its safety or need	20 (7.4%)	65 (24.1%)	101 (37.4%)	64 (23.7%)	20 (7.4%)
Religious leaders in my community would support girls/women getting the HPV vaccine.	21 (7.8%)	66 (24.4%)	120 (44.4%)	49 (18.1%)	14 (5.2%)
Community leaders (school heads, local elders) would support girls/women getting the HPV vaccine.	14 (5.2%)	30 (11.1%)	100 (37.0%)	101 (37.4%)	25 (9.3%)
I have come across information on social media or in the news	17 (6.3%)	54 (20.0%)	96 (35.6%)	81 (30.0%)	22 (8.1%)

that made me doubt vaccines or reconsider my decision to vaccinate					
If the HPV vaccine were available to me/my daughter, I would get vaccinated.	11 (4.1%)	27 (10.0%)	73 (27.0%)	121 (44.8%)	38 (14.1%)
I am hesitant to get the HPV vaccine for myself/my daughter, even if it is available.	22 (8.1%)	97 (35.9%)	75 (27.8%)	59 (21.9%)	17 (6.3%)

Community views were mixed as 40.0% believed that the vaccine is unnecessary for unmarried girls, while 26.7% disagreed. A significant number of respondents i.e. 41.9%, had their reservations regarding the halal status of the vaccine (table 3).

Figure 5: Percentage of participants with high and low HPV vaccine hesitancy

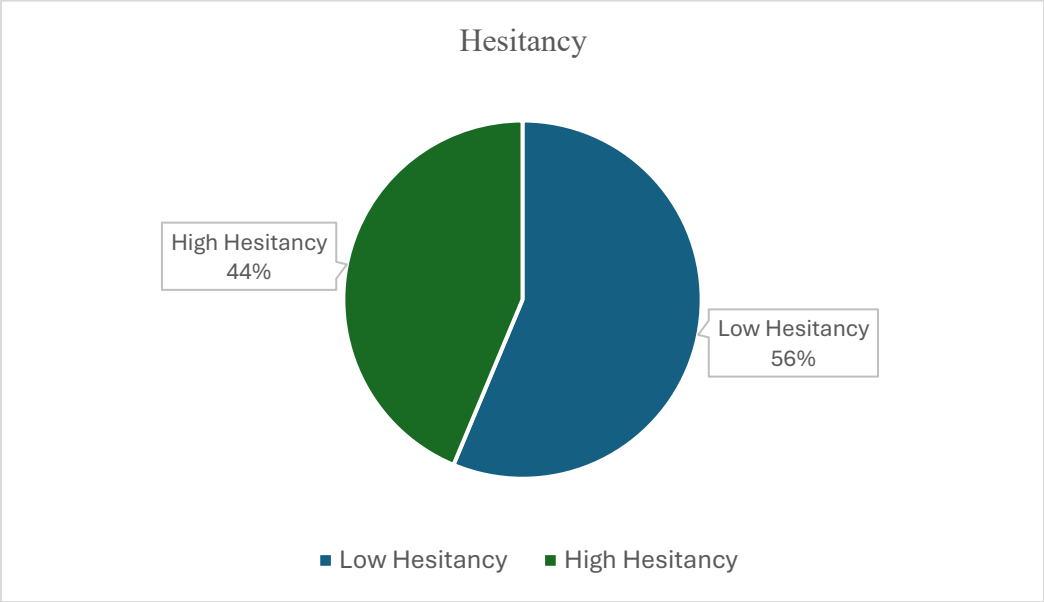


Figure 5 illustrates the overall composite score for hesitancy among participants ranging from high to low. According to it, 44% of participants showed a higher hesitancy rate while the overall hesitancy in the population was observed to be 56%.

4.1.3 Enablers

Around 31.1% (both agree and strongly agree combined) agreed that rumors in the community regarding vaccines contributed to their hesitancy. Responses catering to support from religious leaders were predominantly neutral accounting to 44.4%, on the contrary support from community leader for the vaccine had 37.0% participants being neutral and 46.7% agreeing (agree & strongly agree components) (table 2).

Consequently, 38.1% labelled exposure to social media or news content influencing vaccine decisions, while 35.6% reported it as neutral. Overall, willingness to vaccinate was high at 58.9% with only 14.1% expressing unwillingness. When assessing "hesitancy to get the HPV vaccine regardless of its availability", most respondents reported low hesitancy at 44.0%. (35.9% disagree, 8.1% strongly disagree) (table 2).

4.1.4 Barriers to HPV vaccination

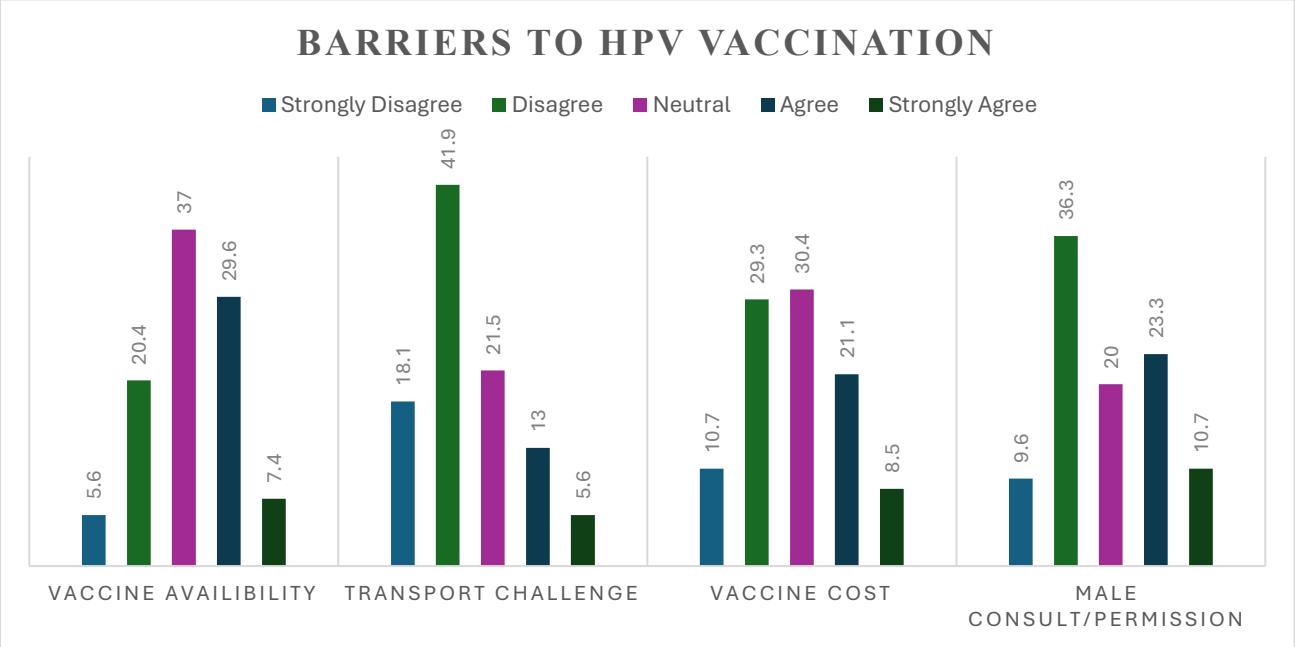


Figure 6: Reported barriers to HPV vaccine

Among barriers, 36.6% of respondents believed vaccine availability to be a barrier to HPV vaccination (figure 5). As for transport as a barrier, 60.0% (combined) disagreement was observed. Concerns towards the cost of the vaccine was mixed as 40.0% disagreed to it being a barrier while

30.4% had a neutral perspective on it (figure 5). Regarding the need for male permission to get vaccinated 45.9% disagreed on needing permission while, 34.0% agreed that they would need permission (figure 5).

4.1.5 Analytical Statistics

Association between demographics and hesitancy

Associations between key demographic factors and hesitancy were examined using Chi-square. For association between *age & vaccine hesitancy*, no significant association was observed (p=0.536) with low hesitancy most common among 18 to 21 years old at 70.5%, whereas adolescents aged 15 to 17 years old had higher hesitancy at (66.6%) (table 3).

However, for an association between *education & vaccine hesitancy* a significant association was found at p=0.04. A low hesitancy rate was observed for participants with no formal education at 66.7% (table 4).

Table 3: Associations between socio-demographic factors and hesitancy using Chi-square

Item	Category	Low	High	pValue
Who are you filling this for?	Myself (I am between 18 – 26 years old)	56.3%	43.65%	0.979
	My daughter/child (aged 9 – 17 years old)	56.16%	43.84%	
Age	09 to 11 years	55.3 %	44.6%	0.536
	15 to 17 years	33.33%	66.6%	
	18 to 21 years	70.5%	29.4%	
	22 to 26 years	58.8%	41%	
Education	No formal education	66.67%	33.33%	**0.04**
	Primary – Matric	50%	50%	(significant)
	Intermediate	50%	50%	
	Bachelors	54.75%	45.25%	
	Masters	59.09%	40.91%	
Occupation/Employment	Employed	56.57%	43.43%	0.687
	Housewife	47.83%	52.17%	
	Student	57.43%	42.57%	

Family setup	Nuclear	54.97%	45.03%	0.847
	Joint family	58.57%	41.43%	
	Single parent household	58.62%	41.38%	
Do you have children? (for self – reporting respondents only)	Yes	53.3%	56.67%	0.829
	No	56.22%	43.78%	
Area of residence	Urban	56.65%	43.35%	0.916
	Peri-Urban	53.85%	46.15%	
	Rural	57.78%	42.22%	
Access to healthcare facilities	Yes	55.51%	44.49%	0.415
	No	64.0%	36.0%	
Child's school enrollment (for parents/guardians only)	In school	54.43%	45.57%	0.736
	Out of school	58.33%	41.67%	
Have you heard of the HPV vaccine before today?	Yes	53.33%	46.66%	0.272
	No	60%	40%	

Additionally, it can be inferred from table 3 that other factors like prior awareness, occupation, family set up, parenthood status, residence or access to healthcare facilities etc., there was no significant association with hesitancy i.e. p values >0.05.

Comparative Analysis

Table 4: Mean & Standard Deviation of vaccine hesitancy score

	Mean	Std. Deviation
Vaccine hesitancy items	31.0407	4.90601

The hesitancy score was calculated by summing all 13 items (combining both hesitancy and enablers) and was analyzed for all respondents. A mean score of 31.04 with a 4.91 standard

deviation was recorded (table 4). Based on the total score, respondents were categorized into "*low hesitancy"* and *"high hesitancy"* groups.

A comparative analysis between self-responders and parents showed a similar pattern, with each having a low hesitancy at 56.3% and 56.2% respectively (table 5).

Table 5: Comparison of hesitancy among both the respondent groups

Item	Low	High
Myself (I am between 18 – 26 years old)	111 (56.3%)	86 (43.65%)
My daughter/child (aged 9 – 17 years old)	41 (56.16%)	32 (43.84%)

4.2 Discussion

This study delved deeper into the reasons why vaccine hesitancy persists among women in Islamabad. It revealed trends that have been observed with other LMICs. A wealth of literature evidence from around the globe supports the potency of the vaccine in terms of protection from cervical cancer (Harper & DeMars, 2017; Kamolratanakul & Pitisuttithum, 2021), but there still are reservations of women that show up as hesitancy. This makes reluctance to be vaccinated a formidable challenge that is aggravated by the lack of awareness and is fueled further by misinformation. The World Health Organization presses to the elimination of cervical cancer via widespread or mass vaccination campaigns. This stresses upon the need to address these barriers (WHO,2024 ; Singh et al., 2022).

In Pakistan, HPV vaccine acceptance is often influenced by knowledge gaps, safety anxiety and cultural concerns, reflecting global trends (Khan et al., Atif et al., 2025, MacDonald, 2015). Pakistan's slow vaccine rollout is attributed to these factors further coupled with low perceived risks and religious concerns, acting as major drivers for hesitancy (Awan & Khattak, 2022).

This study investigated factors that influence HPV vaccine hesitancy among women and parents in Islamabad, exhibiting moderate hesitancy prompted by misinformation, cultural norms, low perceived risk and safety concerns. These findings are directly in line with multiple studies conducted at global and regional level, supporting the WHO's Behavioral and Social Drivers (BeSD) model and existing literature on HPV vaccine acceptance.

The findings of this study pointed out that majority of the respondents generally viewed the HPV vaccine to be effective in protecting against cervical cancer, as most of the responses were between agree and strongly agree. However, items that measures safety concerns, perceived risk and necessity for the vaccine reflected a mixed or neutral responses hinting towards moderate levels of uncertainty rather than out-right opposition towards the vaccine. This suggests that the hesitancy in the present sample holds its grounds due to incomplete information, social media ambiguity or limited credible guidance

These results align with the WHO SAGE Working Group's model (2014), which views vaccine hesitancy as a continuum than a binary construct, that is influenced by an array of factors like contextual, individual and vaccine-specific factors. In this study, the high level of agreement with

vaccine effectiveness depicts a modifiable form of hesitancy, where perception towards the acceptance of vaccines can be improved by awareness and reassurance.

The participants acknowledged the overall preventive role of vaccine, which is consistent with the findings from a study conducted in Malaysia, where awareness of benefits remained high despite limited HPV knowledge. However, the neutral responses for the long-term safety of the vaccine raises concerns regarding trust in the governmental efforts. This is further backed by studies conducted in LMICs from Nigeria *(*Adewumi et al., 2022) and India (Basu et al., 2021), where misinformation and lack of professional counseling contributed to concerns regarding side effects. This indicates that even when people perceive the vaccines work, fear of harm can influence the decision to get the vaccine. This highlights the need for clearer communication about the vaccine's global safety records.

This study observed a prominent role of social media i.e. conflicting information, ambiguous narratives etc. and rumors in the community in shaping respondent's perception regarding vaccine related decisions. This echoes global evidence that social media adds to uncertainty, multiplying safety concerns, and widening knowledge gaps due to overflow of information online, for issues as sensitive as vaccinations (Wilson & Wiysonge, 2020). In Pakistan, misinformation on issues as stigmatized as reproductive health tend to gain more momentum due to limited appropriate resources (Ali et al., 2021)

An additional behavioral dimension also came forth as neutral responses revealed a perceived low personal risk, resonating with a sociological phenomenon of "optimum bias" where susceptibility to health threats is often downplayed by individuals. A similar trend could be seen in studies conducted in Turkey and Thailand, where young adults undermined the risk of HPV, labeling cervical cancer as "rare" or "irrelevant" (Oz et al., 2020; Chawla et al., 2022). This trickles down to poor motivation for preventive action. The findings suggest that hesitancy roots in misinformation, distancing from the issue by dismissing it and inconsistent risk appraisal, underscoring the need for community-focused communication.

Cultural narratives dominate the respondent's perception regarding vaccination, especially regarding the vaccine's appropriateness for unmarried girls. This mirrors the social beliefs dominant in Pakistan where sexually transmitted infections (STI's) or reproductive health are treated as morally charged topics (Shamaun et al., 2022).

The perception of HPV vaccine being useless before marriage, finds its roots in South Asian literature, where vaccination concerns are centered more on modesty or assumed sexual behaviors and fears of social judgement (Noreen et al., 2024).

Ideologies grounded in culture have the power to override scientific messaging especially in communities like that of Pakistan, where sexual health discussions are a rare occurrence (Baig et al., 2022). Hesitancy emerges from cultural and social concerns, which require strategies like those employed in Malaysia, Indonesia and Bangladesh. These focused on engaging reliable figures in the community and normalize the vaccine, while addressing its moral acceptability (Musa et al., 2020).

Respondents found the healthcare providers and the healthcare system to be reliable, despite moderate hesitancy rates. This corroborates findings in the literature that healthcare professionals strongly influence HPV vaccine related decisions (Saleem et al., 2023, Holman et al., 2014). Additionally, viewing safety and necessity of the vaccine with a neutral lens for a great majority directly translates the fact that having trust does not mean direct uptake of the vaccine. Such trends could also be noticed in countries like India and Kenya, where individuals trusted the healthcare professionals, but did not have sufficient counseling regarding vaccination (Basu et al., 2021).

This study highlighted that willingness to vaccinate was fairly high, with a considerable number of respondents expressing readiness to vaccinate as soon as the HPV vaccine was made available. This compliments previous studies where individuals with moderate hesitancy are very likely to shift their perspective when they are guided appropriately or have access to a structured vaccination program (Betsch et al., 2018)

Additionally, this study also revealed that majority of the participants (around 56%) had a lower hesitancy towards the HPV vaccine. This indicates a positive attitude in the population towards vaccination. This compliments previous studies as prompt awareness, access to reliable information and trust in healthcare providers act as promoters of vaccines (Kehbila et al., 2025)

The neutral responses regarding religious and community support depicts the fact that individuals wait for social cues to make decisions, especially vaccine centered. Like the situations in Indonesia and Nigeria, minimal community or religious endorsement can boost HPV vaccine acceptance (Adewumi et al., 2022; Kartasamita et al., 2021) . Targeted interventions, however, could

drastically improve vaccine uptake to a greater extent as enablers reflect a populations ability to be easily persuaded when the right areas are catered for.

Even though access to healthcare was high, structural barriers did emerge. For at least one-third population, vaccine availability was a significant concern. This finding is in accordance with Pakistan's current struggle in integrating the HPV vaccine into the routine immunization. This struggle is a result of major affordability issue, funding gaps, delays in rollout of the vaccine to regional counterparts (Awan & Khattak, 2022)

Many respondents highlighted that transportation wasn't a major concern, which confirms with the findings of other LMIC's where cost and supply are major issues (Nguyen et al., 2020). Concerns regarding the costs were mixed portraying uncertainty about pricing and affordability, which are common themes observed in HPV research (Gallagher et al., 2018).

The need for male permission to get vaccinated had a mixed response, depicting a persistent gendered decision-making norm in Pakistan. Pakistani and Bangladeshi women often need a male-approval for decisions centered around reproductive health (Naeem et al., 2021). This shows the impact of the interaction of social constraints and structural barriers in shaping vaccination behavior.

Thus, it can be inferred that the HPV vaccine hesitancy is mainly attributed to attitudinal, cultural, informational factors rather than cost or availability issues although a small segment of the population did report a limited access.

A significant association was observed between education level and hesitancy. It was a counterintuitive finding where individuals with no formal education had a lower hesitancy rate than those with higher education. Such trends have been documented in vaccination research worldwide, which reveals that a higher educational background, increases the susceptibility of being exposed to misinformation online, and thus results in more extensive questioning of the institutional messaging (Jennings et al., 2021). Further, research conducted in China brought forth that, students with a university degree showed increased tendency to encounter and believe vaccine-related misinformation online, contributing to nuanced but increased hesitancy (He et al., 2024). Another study in Europe and Middle East stated that higher education groups are more

likely to demonstrate hesitancy towards vaccination as it is fueled by interest, heightened scrutiny and caution (de Figueirdo et al., 2020).

As far as this study is concerned, the participants with no formal education rely more on the physician's advice or the community outreach programs than digital information, thus gaining protection from information overload and misinformation. This is also confirmed by findings from studies in Turkey and Jordan, where less educated women trusted healthcare providers more and encountered less information online (Oz et al., 2020).

Thus, the unexpected association reflects the pattern in contemporary vaccine literature i.e. *more education does not always mean there would be a reduced hesitancy* when digital ecosystems are this prominent.

Finally, the purpose of adopting a dual-level assessment in this study was to capture both parent/guardian perspectives and self-responses from young women. These offer important insights for future cervical cancer vaccination efforts. While parental responses reflect the current attitudes and decision-making behaviors influencing vaccine uptake, self-responders' findings provide and anticipatory assessment of potential HPV vaccine acceptance. This evidence can support policymakers and public health planners in designing preparedness strategies, targeted communication, and early interventions ahead of wider HPV vaccine availability for women aged 18 to 26 years.

Limitations

The study has several limitations which may hinder its generalizability. The nature of the study was cross-sectional thus it could only identify the correlations (like education and hesitancy) but couldn't establish causality because to do so, would require a longitudinal study. Since the study was based in Islamabad, it is a possibility that the study may not apply to rural Pakistan, where the basic barriers are access and health literacy.

Time constraint could've also influenced this study. Additionally, data on sensitive topics that are reported by self-responders on taboo topics like reproductive health or sexual health, has a probability of experiencing a social desirability bias.

Lastly, the proportion of parent data is comparatively less as compared to self-responders. During the data collection phase, many parents declined participation due to cultural sensitivities

surrounding the discussions of reproductive health in young women. The fact that in a Pakistani society, addressing or talking about reproductive health or sexual health issues directly warrants as advocating for moral vices of the society and exposing young girls to it, thus many parents refused to fill out the questionnaire as they didn't want to indulge their daughters in such vices.

Chapter 5

Conclusion

This study adequately pointed out the key determinants of vaccine hesitancy among women in Islamabad with the findings painting an interesting picture. It also generated crucial evidence for cervical cancer prevention strategies. While 56% of the respondents acknowledged the vaccine's preventive role, as they were less hesitant, many still were not sure due to safety concerns, long term side effects and cultural beliefs that influenced their vaccine related decisions. An interesting aspect from the finding of the study is the paradoxical consortium between high educational level and an increased vaccine hesitancy, which observed a significant association ($p=0.04$). This suggested that online misinformation influenced digitally engaged groups. Cultural factors like needing permissions from a male member of the family (34%) emerged as barriers. Similarly, strong recommendations from healthcare providers and accurate information were clear enablers of the acceptance of vaccine hesitancy.

Overall, the findings reiterate the fact that to eliminate cervical cancer in Islamabad, public health interventions should thus be focused on improving digital health literacy and reinforcing targeted apprehension which goes beyond basic awareness campaigns by truly addressing the concerns at grass root level. Closing these gaps is essential to advance cervical cancer prevention in Islamabad.

Recommendations

To mitigate vaccine hesitancy for cervical cancer, the recommendations discussed below, considering the study and review of literature could be considered.

Firstly, given how misinformation tends to escalate too rapidly due to the diverse digital ecosystems nowadays, regulatory policies like that of China are an important need of the hour. This regulatory policy implies that people who speak on sensitive issues like health should have a valid medical license or qualification for it. Similarly, for Pakistan's context, platforms should monitor health influencers and verify them first.

Secondly, fear or injections is not a new phenomenon rather it affects 20 to 50% of the adolescents and 20 to 30% of young adults and this fear accounts for increased vaccine hesitancy. Interventions should include needle free or alternative delivery methods, and reassurance or awareness about safety to counter these fears.

Additionally, there is an eminent need to counter cognitive biases and misinformation about vaccine safety. Communication strategies must be effective enough to cater to concerns like overestimating adverse events, which result in heightened hesitancy. For example, research shows that most reported vaccine adversities are mild but due to a greater sense of perceived risk, hesitancy is fueled ten folds. To combat this, tailored messages should be sent out, discussing the side effects, using reliable means.

Further, another way to tackle vaccine hesitancy could include contrasting between cosmetic procedures and preventive vaccines. People willingly undergo aesthetic procedures like Botox and fillers without expressing the same concern and hesitation that they voice out for therapeutic vaccines. This contraindication should be leveraged in such issues involving the health of the community as a whole. It could be used in public health messaging to reinforce that individuals tend to trust cosmetic injections without giving it much thought yet hesitate with vaccines, despite their proven and documented evidence for benefits.

Lastly, leveraging healthcare providers to normalize vaccination and providing tailored counseling to dispel fears could be a good incentive as well. Interventions need to go beyond generic awareness campaigns and address the underlying concerns.

References

Ahmad, M., Narayan, E., Ahmed, I., & Bule, M. H. (2023). Inadequate cervical cancer testing facilities in Pakistan: A major public health concern. *International Journal of Surgery Global Health, 6*(5). https://doi.org/10.1097/gh9.0000000000000336

Ahmad, S., Safdar, M. R., & Ahmed, M. N. Q. (2025). A cross-sectional study of the predictors of COVID-19 vaccine hesitancy in Pakistan. *Human Vaccines & Immunotherapeutics, 21*(1), 2549164. https://doi.org/10.1080/21645515.2025.2549164

Atif, N., Hashmi, F. K., Malik, U. R., Ghauri, M. A., Gillani, A. H., Kadirhaz, M., Jiang, M., Chang, J., & Fang, Y. (2025). From awareness to acceptance: Understanding HPV and vaccine knowledge, attitudes and beliefs among university students in Punjab, Pakistan. *Journal of Pharmaceutical Policy and Practice, 18*(1). https://doi.org/10.1080/20523211.2025.2473023

Awan, U. A., & Khattak, A. A. (2022). Has Pakistan failed to roll back HPV? *The Lancet Oncology, 23*(5), e204. https://doi.org/10.1016/s1470-2045(22)00141-3

Behavioural and social drivers of vaccination: Tools and practical guidance for achieving high uptake. (2022). *World Health Organization.*

Betsch, C., Böhm, R., & Chapman, G. B. (2015). Using behavioral insights to increase vaccination policy effectiveness. *Policy Insights From the Behavioral and Brain Sciences, 2*(1), 61–73. https://doi.org/10.1177/2372732215600716

Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., & Böhm, R. (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLoS ONE, 13*(12), e0208601. https://doi.org/10.1371/journal.pone.0208601

Boakye, E. A., Nair, M., Abouelella, D. K., Joseph, C. L., Gerend, M. A., Subramaniam, D. S., & Osazuwa-Peters, N. (2023). Trends in reasons for human papillomavirus vaccine hesitancy: 2010–2020. *PEDIATRICS, 151*(6). https://doi.org/10.1542/peds.2022-060410

Bossert, T., Ali, N., Khan, M. S., United Nations, Ministry of Planning, Development & Reform, National Institute of Population Studies & Macro International, Ministry of Finance, World Health Organization, UNICEF, Polio Global Eradication Initiative, Qureshi, H., Bile, K. M., Jooma, R., Alam, S. E., Afridi, H. U., Global Fund, & UNAIDS. (2016). *National Health Vision Pakistan*

2016–2025. https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/pakistan/national_health_vision_2016-25_30-08-2016.pdf

Carcinoma.gov. (2023, June 15). *Cervical cancer.* https://www.cancer.gov/types/cervical#:~:text=Cervical%20cancer%20is%20cancer%20that,usually%20develops%20slowly%20over%20time

Cervical Cancer Elimination Progress Report. (2025, November 19). https://report.cervicalcancercontrol.org.au/

Cheng, L., Wang, Y., & Du, J. (2020). Human papillomavirus vaccines: An updated review. *Vaccines, 8*(3), 391. https://doi.org/10.3390/vaccines8030391

Chido-Amajuoyi, O. G., Talluri, R., Shete, S. S., & Shete, S. (2021). Safety concerns or adverse effects as the main reason for human papillomavirus vaccine refusal. *JAMA Pediatrics, 175*(10), 1074. https://doi.org/10.1001/jamapediatrics.2021.1585

De Figueiredo, A., Simas, C., Karafillakis, E., Paterson, P., & Larson, H. J. (2020). Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: A large-scale retrospective temporal modelling study. *The Lancet, 396*(10255), 898–908. https://doi.org/10.1016/s0140-6736(20)31558-0

Dorji, T., Nopsopon, T., Tamang, S. T., & Pongpirul, K. (2021). Human papillomavirus vaccination uptake in low-and middle-income countries: A meta-analysis. *EClinicalMedicine, 34*, 100836. https://doi.org/10.1016/j.eclinm.2021.100836

Ekwunife, O. I., O'Mahony, J. F., Grote, A. G., Mosch, C., Paeck, T., & Lhachimi, S. K. (2016). Challenges in cost-effectiveness analysis modelling of HPV vaccines in low- and middle-income countries: A systematic review and practice recommendations. *PharmacoEconomics, 35*(1), 65–82. https://doi.org/10.1007/s40273-016-0451-7

ELIMINATION PLANNING TOOL: ADVANCING TOWARDS CERVICAL CANCER ELIMINATION. (2025). In *Country_brief_0.4* (pp. 1–2). https://gco.iarc.fr/media/covid/factsheets/586-PAK-pakistan.pdf

Forman, R., Anderson, M., Jit, M., & Mossialos, E. (2020). Ensuring access and affordability through COVID-19 vaccine research and development investments: A proposal for the options market for vaccines. *Vaccine, 38*(39), 6075–6077. https://doi.org/10.1016/j.vaccine.2020.07.068

Gallagher, K., LaMontagne, D., & Watson-Jones, D. (2018). Status of HPV vaccine introduction and barriers to country uptake. *Vaccine, 36*(32), 4761–4767. https://doi.org/10.1016/j.vaccine.2018.02.003

Global strategy to accelerate the elimination of cervical cancer as a public health problem. (2020). *Google Books*. https://books.google.com.pk/books?id=hsNqEAAAQBAJ

Hakim, M., Ali, F., Zala, N., Pervaiz, A., Afaq, S., & Haq, Z. U. (2025). Prevalence and associated factors of parental refusal rates for routine immunisation: A cross-sectional study in Peshawar, Khyber Pakhtunkhwa, Pakistan-2024. *BMC Public Health, 25*(1), 369. https://doi.org/10.1186/s12889-025-21388-1

Harper, D. M., & DeMars, L. R. (2017). HPV vaccines – A review of the first decade. *Gynecologic Oncology, 146*(1), 196–204. https://doi.org/10.1016/j.ygyno.2017.04.004

He, Y., Zhang, X., Li, J., Chen, Y., Zhang, L., & Wei, Y. (2024). Factors influencing HPV vaccine hesitancy among university students in China: A cross-sectional survey utilizing the 3Cs model. *Human Vaccines & Immunotherapeutics, 20*(1). https://doi.org/10.1080/21645515.2024.2400750

Holman, D. M., Benard, V., Roland, K. B., Watson, M., Liddon, N., & Stokley, S. (2013). Barriers to human papillomavirus vaccination among US adolescents. *JAMA Pediatrics, 168*(1), 76. https://doi.org/10.1001/jamapediatrics.2013.2752

Initiative, C. C. E. (2020, November 17). Global strategy to accelerate the elimination of cervical cancer as a public health problem. https://www.who.int/publications/i/item/9789240014107

Jennings, W., Stoker, G., Bunting, H., Valgarðsson, V. O., Gaskell, J., Devine, D., McKay, L., & Mills, M. C. (2021). Lack of trust, conspiracy beliefs, and social media use predict COVID-19 vaccine hesitancy. *Vaccines, 9*(6), 593. https://doi.org/10.3390/vaccines9060593

Kamolratanakul, S., & Pitisuttithum, P. (2021). Human papillomavirus vaccine efficacy and effectiveness against cancer. *Vaccines, 9*(12), 1413. https://doi.org/10.3390/vaccines9121413

Karafillakis, E., Simas, C., Jarrett, C., Verger, P., Peretti-Watel, P., Dib, F., De Angelis, S., Takacs, J., Ali, K. A., Celentano, L. P., & Larson, H. (2019). HPV vaccination in a context of public mistrust and uncertainty: A systematic literature review of determinants of HPV vaccine hesitancy in Europe. *Human Vaccines & Immunotherapeutics, 15*(7–8), 1615–1627. https://doi.org/10.1080/21645515.2018.1564436

Kayser, V., & Ramzan, I. (2021). Vaccines and vaccination: History and emerging issues. *Human Vaccines & Immunotherapeutics, 17*(12), 5255–5268. https://doi.org/10.1080/21645515.2021.1977057

Kehbila, J., Mbinta, J. F., Ekabe, C. J., & Joselyne, M. N. (2025). Prevalence and determinants of HPV vaccine hesitancy among parents in Efoulan Health District Yaoundé.

Khan, M., Zafar, A., Muneer, R., Siddiqui, A., Abdul, S., Khan, K., Zafar, A., & Zafar, A. (2021). Knowledge, attitude and practices regarding cervical cancer and human papilloma virus (HPV) vaccination. *Pakistan Journal of Medicine and Dentistry.* https://doi.org/10.36283/pjmd10-2/016

Khan, T. M., Buksh, M. A., Rehman, I. U., & Saleem, A. (2016). Knowledge, attitudes, and perception towards human papillomavirus among university students in Pakistan. *Papillomavirus Research, 2*, 122–127. https://doi.org/10.1016/j.pvr.2016.06.001

Koç, Z. (2014). University students' knowledge and attitudes regarding cervical cancer, human papillomavirus, and human papillomavirus vaccines in Turkey. *Journal of American College Health, 63*(1), 13–22. https://doi.org/10.1080/07448481.2014.963107

Kisa, S., & Kisa, A. (2024). Religious beliefs and practices toward HPV vaccine acceptance in Islamic countries: A scoping review. *PLoS ONE, 19*(8), e0309597. https://doi.org/10.1371/journal.pone.0309597

MacDonald, N. E. (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine, 33*(34), 4161–4164. https://doi.org/10.1016/j.vaccine.2015.04.036

MacDonald, N., Dube, E., & Comeau, J. (2022). Have vaccine hesitancy models oversimplified a complex problem to our detriment? The adapted Royal Society of Canada vaccine uptake framework. *Vaccine, 40*(29), 3927–3930.

Magalhães, G. M., Vieira, É. C., Garcia, L. C., De Lourdes Ribeiro De Carvalho-Leite, M., Guedes, A. C. M., & Araújo, M. G. (2020). Update on human papilloma virus - part I: Epidemiology, pathogenesis, and clinical spectrum. *Anais Brasileiros De Dermatologia, 96*(1), 1–16. https://doi.org/10.1016/j.abd.2020.11.003

McRee, A., Brewer, N. T., Reiter, P. L., Gottlieb, S. L., & Smith, J. S. (2010). The Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS): Scale development and associations with intentions to vaccinate. *Sexually Transmitted Diseases, 37*(4), 234–239. https://doi.org/10.1097/olq.0b013e3181c37e15

Mehrizi, T. Z., Ataei-Pirkooh, A., Eshrati, B., & Shahmabadi, H. E. (2025). Investigating factors affecting the effectiveness of Gardasil 4, Cervarix, and Gardasil 9 vaccines considering the WHO regions in females: A systematic review. *Cancer Epidemiology, 95*, 102759. https://doi.org/10.1016/j.canep.2025.102759

Murewanhema, G. (2021, April 7). Vaccination hesitancy among women of reproductive age in resource-challenged settings: A cause for public health concern. https://www.ajol.info/index.php/pamj/article/view/239047

Nuwarda, R. F., Ramzan, I., Weekes, L., & Kayser, V. (2022). Vaccine hesitancy: Contemporary issues and historical background. *Vaccines, 10*(10), 1595. https://doi.org/10.3390/vaccines10101595

Olatunji, E. A., Ogunsola, A. S., Khodakarami, N., & Callaghan, T. (2021). Who receives influenza vaccinations at the pharmacy? An analysis of the Texas Behavioral Risk Factor Surveillance System. *Vaccine, 39*(21), 2857–2866. https://doi.org/10.1016/j.vaccine.2021.04.016

Orenstein, W. A., & Ahmed, R. (2017). Simply put: Vaccination saves lives. *Proceedings of the National Academy of Sciences, 114*(16), 4031–4033. https://doi.org/10.1073/pnas.1704507114

Parkinson, M. (2025, November 17). Global evidence highlights social roots of HPV vaccine hesitancy | Cochrane. https://www.cochrane.org/about-us/news/global-evidence-highlights-social-roots-hpv-vaccine-hesitancy?

Pink book. (2021). In *Epidemiology and Prevention of Vaccine-Preventable Diseases* (14th ed.). https://www.cdc.gov/pinkbook/hcp/table-of-contents/chapter-11-human-papillomavirus.html

Plotkin, S. (2014). History of vaccination. *Proceedings of the National Academy of Sciences, 111*(34), 12283–12287. https://doi.org/10.1073/pnas.1400472111

Riaz, L., Manazir, S., Jawed, F., Ali, S. A., & Riaz, R. (2020). Knowledge, perception, and prevention practices related to human papillomavirus-based cervical cancer and its socioeconomic correlates among women in Karachi, Pakistan. *Cureus.* https://doi.org/10.7759/cureus.7183

SAGE on Immunization, 2011. (2012, January 6). *PubMed.* https://pubmed.ncbi.nlm.nih.gov/22242233/

SDG3. (2025). https://sdg3.nhsrc.pk/provincial_at_glance/7

Sanaullah, M., Bashir, S., Bhatti, J. A., Pardhan, A., & Kataria, A. (2012). Promotion of HPV vaccination: Potential gaps between knowledge and practices of Pakistani female family practitioners. *Journal of Family Planning and Reproductive Health Care, 38*(3), 208.2–209. https://doi.org/10.1136/jfprhc-2012-100364

Senarath, U., & Gunawardena, N. N. S. (2009). Women's autonomy in decision making for health care in South Asia. *Asia Pacific Journal of Public Health, 21*(2), 137–143. https://doi.org/10.1177/1010539509331590

Shamaun, S., Jaleel, R., Gull, Y., Shahid, A., Iqbal, M., & Qazi, T. N. (2022). Knowledge and attitude of cervical cancer screening and vaccination in patients attending gynecology outpatient clinic at a tertiary care hospital in Pakistan. *South Asian Journal of Cancer, 12*(01), 017–022. https://doi.org/10.1055/s-0042-1751093

Shamsi, U., Zahid, F., Jabbar, A. B. A., Musharraf, M., Gauhar, F., Akbar, I., Sherwani, M., Bhatti, W., Chaudhary, E., Sadiq, S., Shaikh, A., & Shaikh, F. (2024). Human papillomavirus vaccine awareness and acceptability for primary prevention

Shamsi, U., Zahid, F., Jabbar, A. B. A., Musharraf, M., Gauhar, F., Akbar, I., Sherwani, M., Bhatti, W., Chaudhary, E., Sadiq, S., Shaikh, A., & Shaikh, F. (2024). Human papillomavirus vaccine awareness and acceptability for primary prevention of cervical cancer among women attending gynecology outpatient departments in Pakistan. *Human Vaccines & Immunotherapeutics, 20*(2), 423–432. https://doi.org/10.1080/21645515.2024.2312345

Stokley, S., Jeyarajah, J., Cano, M., Fitter, D., Curtis, C., McCormick, L., & Chamberlain, A. (2014). Human papillomavirus vaccination coverage among adolescents, 2007–2013, and postlicensure vaccine safety monitoring, 2006–2014—United States. *Morbidity and Mortality Weekly Report, 63*(29), 620–624. https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6329a2.htm

World Health Organization. (2014). *Report of the SAGE working group on vaccine hesitancy*. https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf

World Health Organization. (2019). *Behavioral considerations for acceptance and uptake of HPV vaccines: A manual for program managers*. https://apps.who.int/iris/handle/10665/329438

World Health Organization. (2020). *Cervical cancer elimination strategy*. https://www.who.int/publications/i/item/9789240014107

World Health Organization. (2022). *Behavioural and social drivers of vaccination: Tools and practical guidance for achieving high uptake*. https://www.who.int/publications/i/item/9789240055127

World Health Organization. (2023). *WHO SAGE Vaccine Hesitancy Scale (VHS) Manual*. https://www.who.int/tools/strategic-advisory-group-of-experts-on-immunization

World Health Organization & UNICEF. (2022). *Global immunization data*. https://www.who.int/news-room/fact-sheets/detail/immunization-coverage

Zhang, S., Wang, H., & Zhang, H. (2023). Factors influencing HPV vaccine hesitancy and uptake among adolescent girls in China: A cross-sectional study. *Human Vaccines & Immunotherapeutics, 19*(1), 234–243. https://doi.org/10.1080/21645515.2023.2167155

Annexure

Questionnaire

Informed Consent Form

Study Title: *Assessing Factors Influencing Vaccine Hesitancy For Cervical Cancer Among Women in Islamabad*
Researcher: Aamna Jawed, BS Public Health, Bahria University Islamabad
Email: aamnaajawed15@gmail.com

Purpose of the Study
This study aims to understand the reasons behind vaccine hesitancy among women in Islamabad.

Participation
You will be asked to complete a short questionnaire. Participation is entirely voluntary, and you may choose to withdraw at any time without any consequences.

Confidentiality
Your responses will remain completely anonymous and confidential. No identifying information will be recorded.

Risks and Benefits
There are no anticipated risks to participation. Your input will help improve vaccine-related public health strategies in the future.

Consent Statement
I have read and understood the information above. I voluntarily agree to participate in this study.

Participant's Name: (optional) _____

Signature: _____

Date: _____

Researcher's Signature: _____

Please read carefully before answering:

Section A – Demographics & Awareness

➔ Who are you filling this survey for? (please tick one)

a) Myself (I am between 18 – 26 years old)
b) My daughter/child (aged 9 – 17 years old)

(If parent/guardian, "you/your daughter" wording applies.)

1) Age group of respondent/daughter:

09 to 11 years 12 to 14 years 15 to 17 years 18 to 21 years 22 to 26 years

2) Education level:

No formal education Primary – Matric Intermediate Bachelor's Master's or higher

3) Occupation/Employment:

Employed Unemployed Housewife Student

4) Family Setup:

Nuclear family Joint family Single parent household

5) Do you have children? *(For self-reporting respondents only)*

Yes *No*

6) Area of residence:

Urban Peri-Urban Rural

7) Access to a healthcare facility nearby?

Yes No

8) Child's school enrollment *(for parents/guardians only)*

In school Out of school

9) **Awareness:** Have you heard of the HPV vaccine before today?

Yes No

10) **Awareness:** What do you think HPV infection can cause? (select all that apply)

Cervical cancer Genital warts Infertility Don't know

11) Where do you usually get information about vaccines? (select all that apply)

Doctors Government Campaigns TV/Radio Social Media Family/Friends

Religious/Community Leaders I do not actively seek vaccine information

---

Section B – Knowledge, Beliefs & Perceived Risk

1) The HPV vaccine is effective in preventing cervical cancer.

   strongly disagree Disagree Neutral Agree *strongly agree*

2) I am concerned about serious or long-term side effects of the HPV vaccine.

   strongly disagree Disagree Neutral Agree *strongly agree*

3) I believe there is a chance that I/my daughter is at risk of getting cervical cancer.

   strongly disagree disagree Neutral Agree *strongly agree*

4) The HPV vaccine is important for my/my daughter's health.

   strongly disagree disagree Neutral Agree *strongly agree*

5) I usually trust recommendations from doctors and government health programs about vaccines.

   strongly disagree disagree Neutral Agree *strongly agree*

6) Some people in my community are concerned about the vaccine's halal status.

   strongly disagree disagree Neutral Agree *strongly agree*

7) Some people in my community believe that HPV vaccine is unnecessary for unmarried girls.

   Strongly disagree disagree Neutral Agree *strongly agree*

Section C – Social Norms & Influence

1) Rumors I have heard in my community about the HPV vaccine make me doubt its safety or need
   strongly disagree disagree Neutral Agree *strongly agree*

2) Religious leaders in my community would support girls/women getting the HPV vaccine.

   strongly disagree Disagree Neutral Agree *strongly agree*

3) Community leaders (school heads, local elders) would support girls/women getting the HPV vaccine.

strongly disagree Disagree Neutral Agree *strongly agree*

4) I have come across information on social media or in the news that made me doubt vaccines or reconsider my decision to vaccinate.

strongly disagree Disagree Neutral Agree *strongly agree*

Section D – Motivation & Intent

1) If the HPV vaccine were available to me/my daughter, I would get vaccinated.

strongly disagree disagree Neutral Agree *strongly agree*

2) I am hesitant to get the HPV vaccine for myself/my daughter, even if it is available.

strongly disagree disagree Neutral Agree *strongly agree*

Section E – Practical Barriers

1) It would be difficult to find a clinic that has the HPV vaccine available.

strongly disagree disagree Neutral Agree *strongly agree*

2) Transportation to a vaccination clinic would be a challenge for me.

strongly disagree disagree Neutral Agree *strongly agree*

3) It would be difficult to afford the HPV vaccine if not free.

strongly disagree disagree Neutral Agree *strongly agree*

4) In my household, I may need to consult or get permission from a male family member before receiving the HPV vaccine.

strongly disagree disagree Neutral Agree *strongly agree*

Plagiarism Certificate

This is to certify that the thesis entitled *"Assessing Factors Influencing Vaccine Hesitancy for Cervical Cancer Among Women in Islamabad"* submitted *by* Aamna Jawed (01-152221-026), in partial fulfillment of the requirements for the degree of Bachelor of Science in Public Health, is an original work carried out by the student under the supervision of Dr. Sidra Shahid.

This is to declare that this research has not been submitted previously to any other university or institution for the award of any degree or diploma. All sources of information used in this research have been duly acknowledged and referenced. The similarity index of this research work is within the acceptable limits as per university policies.

Sidra Shahid

Aamna Jawed thesis Plagirism check file

Amna1

Document Details

Submission ID
trn:oid:::3618:122529690

Submission Date
Nov 23, 2025, 9:19 AM PST

Download Date
Nov 23, 2025, 9:26 AM PST

File Name
Aamna Jawed thesis Plagirism check file.docx

File Size
44.7 KB

26 Pages

8,445 Words

48,098 Characters

10% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text

Match Groups

50 Not Cited or Quoted 6%
Matches with neither in-text citation nor quotation marks

39 Missing Quotations 4%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

6% Internet sources
6% Publications
5% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

*% detected as AI

AI detection includes the possibility of false positives. Although some text in this submission is likely AI generated, scores below the 20% threshold are not surfaced because they have a higher likelihood of false positives.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

Disclaimer

Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (i.e., our AI models may produce either false positive results or false negative results), so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Frequently Asked Questions

How should I interpret Turnitin's AI writing percentage and false positives?

The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI paraphrase tool or word spinner.

False positives (incorrectly flagging human-written text as AI-generated) are a possibility in AI models.

AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

What does 'qualifying text' mean?

Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.