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TECHNOLOGY, ISLAMABAD



**Impact of Knowledge on
Vaccination Fear and Parental
Attitudes toward Human
Papillomavirus among Parents of
Adolescents**

by

Samra Nasir

A thesis submitted in partial fulfillment for the
degree of Master of Science

in the

Faculty of Management & Social Sciences
Department of Psychology

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(Samra Nasir)

Abstract

Human Papillomavirus (HPV) persists as one of the most widespread sexually transmitted viral infections of the reproductive tract. HPV affects most sexually active individuals, with recurrent infections possible. Knowledge gaps and vaccination fear among parents of adolescents have emerged as significant public health concerns, strongly influencing parental attitudes toward HPV vaccination. Since adolescent vaccination depends on parental consent, this study aimed to assess the impact of knowledge on vaccination fear and attitudes toward HPV among parents of adolescents aged 9 to 17 years. A sample of 250 parents of adolescents was recruited through convenience sampling from schools and colleges in Islamabad and Rawalpindi as recruitment points because they provided access to parents of eligible adolescents. Standardized instruments including the HPV Knowledge Questionnaire (HPV-KQ), Vaccination Fear Scale (VFS), and Carolina HPV Immunization Attitudes and Belief Scale (CHIAS) were used. Data were analyzed using SPSS through descriptive statistics, independent-samples t-tests, one-way ANOVA, Pearson's correlation, and simple linear regression. The findings revealed that parents of male adolescents reported higher vaccination fear and more negative attitudes than parents of female adolescents, while joint-family parents reported higher vaccination fear and more negative attitudes than nuclear-family parents. Lastly, lower education was also associated with higher vaccination fear and more negative attitudes, particularly among secondary-educated parents. However, knowledge did not significantly differ according to adolescent gender or family system. These findings highlight the importance of multifaceted awareness-based programs, seminars, and workshops that not only improve HPV knowledge but also address vaccination fears and other factors influencing parental attitudes toward HPV vaccination.

Keywords: HPV knowledge, vaccination fear, parental attitudes, adolescents .

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Abbreviations

CHIAS	Carolina HPV immunization attitudes and beliefs scale
HBM	Health Belief Model
HPV	Human Papillomavirus
IARC	International Agency for Research on Cancer
KQ	Knowledge Questionnaire
STIs	Sexually Transmitted Infections
VFS	Vaccination Fear Scale
WHO	World Health Organization

Chapter 1

Introduction

1.1 Background of the Study

Human Papillomavirus (HPV) is one of the most common Sexually Transmitted Infections (STIs) in the world, affecting both men and women soon after sexual activity ([World Health Organization, 2024](#); [Bruni et al., 2023](#)). While most infections are asymptomatic and self-limiting, high-risk strains of HPV can lead to serious health issues, such as cervical, anogenital and oropharyngeal cancers ([World Health Organization, 2024](#)). There are over 200 known types of HPV; HPV-16 and HPV-18 are most clinically relevant and are responsible for the majority of cervical cancer cases worldwide ([International Agency for Research on Cancer, 2024b](#)). HPV is no longer viewed exclusively as a sexually transmitted infection, but rather as a major global public health concern that requires urgent prevention efforts due to its strong link to cancer development ([Egawa, 2023](#)). The increasing phenomenon has sparked the importance of considering psychosocial and behavioral determinants of vaccine uptake in communities ([World Health Organization, 2025](#)). This is especially concerning when HPV infection is associated with the development of cervical cancer, which is the leading cause of cancer-related mortality among women globally ([World Health Organization, 2024](#)). Cervical cancer is currently the fourth leading cause of cancer in women with some 660,000 new cases and more than 350,000 deaths reported every year worldwide ([World Health Organization, 2025](#)). Cervical cancer is mostly preventable, and disproportionately

affects women in low and middle income countries where health systems, screening and prevention programmes are poor. However, high income countries have made huge strides in lowering rates of cervical cancer through organized screening and the implementation of HPV vaccination ([Simms et al., 2023](#)). However, despite low awareness, diagnosis and provision of HPV prevention, the HPV-related disease is still responsible for ongoing burden in developing countries ([Bruni et al., 2023](#)). These ongoing differences underscore the importance of raising awareness in the community and advocating for preventive health measures as a key public health tool in the battle against HPV-related diseases around the world.

HPV-related diseases are recognized but emerging public health problem in Pakistan. Various information centers estimate that there are 5,000-6,000 new cases of cervical cancer annually in women aged 15-44 ([International Agency for Research on Cancer, 2024a](#)). HPV vaccines are safe and effective and are available globally, but uptake of HPV vaccination in Pakistan is very low, largely because of low HPV vaccine awareness among parents and low engagement in preventive health behaviors among them ([World Health Organization, 2024](#)). The study findings found that only a minority of parents of adolescent (less than one-third) have adequate knowledge of HPV and its vaccine in South Asian contexts. Fear, misinformation, and lack of trustworthy information are key determinants of vaccine uptake ([Bruni et al., 2023](#)).

Parental knowledge plays a crucial role in adolescents' vaccine uptake, as adolescent decisions on immunizations often depend on parents' decisions. Further findings reveal a strong association between levels of HPV vaccine uptake and increased knowledge, as well as positive parental attitudes ([United Nations Children's Fund, 2024](#)). Cultural taboos about sexual and reproductive health are also a barrier on discussions about HPV and can delay or prevent parents from making decisions about HPV vaccines in the Pakistani context ([Ali et al., 2025c](#)). Consequently, limited awareness remains a strong determinant of HPV vaccination uptake in adolescents, leaving them at a higher risk of HPV-related cancers in the future.

Given the increasing impact of HPV-related diseases, HPV vaccination is one of the most powerful preventive health interventions available worldwide ([World Health Organization, 2024](#)). Despite its relative novelty, HPV immunization has been shown to significantly reduce HPV infection, genital warts and precancerous cervical abnormalities from high-risk HPV strains in recent studies ([Drolet et al., 2023](#)). Currently, three vaccines are widely available and provide immunity against the most common HPV strains associated with cervical cancer, namely Cervarix, Gardasil and Gardasil-9 ([Watson et al., 2023](#)). Further research has shown that the HPV vaccines are also safe, well tolerated and capable of generating lifelong immunity to a persistent HPV infection ([Gargano et al., 2024](#)).

In the last decade, HPV vaccination programmes have been launched in more than 80 countries and many of these have established significant reductions in HPV prevalence and cervical abnormalities ([Bruni et al., 2023](#)). However, the coverage of vaccines has not been uniform across communities, meanwhile knowledge and parental attitudes towards vaccines differ ([World Health Organization, 2025](#)). Parents of adolescents are the most important target group for HPV prevention as HPV vaccination is most effectively introduced into the adolescent's immunization schedule, before exposure to HPV has occurred ([World Health Organization, 2024](#)). The HPV vaccine is recommended for routine use in adolescents between the ages of 9 and 14 by leading global health agencies ([Centers for Disease Control and Prevention, 2024](#)). However, parents' attitudes toward HPV vaccination are strongly affected by their prior knowledge toward Human Papillomavirus, which can affect their vaccination fear and parental attitudes toward taking the HPV vaccine ([Gold et al., 2023](#)).

1.1.1 Knowledge

Conceptualization of knowledge is a requirement for understanding HPV vaccination recommendations because it is a fundamental factor underlying vaccination fear and parental attitude. In this study, knowledge is defined as an individual factual understanding and awareness of human papillomavirus (HPV), including its

transmission, associated with health risks, prevention and its vaccination. Greater knowledge facilitates informed decision making and is associated with vaccine acceptance and other preventive health behaviors ([Fiegler-Rudol and Kasperczyk, 2024](#)). This captures the levels to which parents of adolescents know HPV is a sexually transmitted infection that can cause cervical cancer and other health conditions, and to which they know their adolescents are eligible, safe and effective for vaccination. Within this context, knowledge serves as a critical determinant of disease and understanding of vaccine. Such knowledge shapes parental attitudes and intentions towards vaccination. Insufficient knowledge may foster confusion, concerns about vaccine safety and cultural reservations all of which leads towards vaccination fear ([Gilkey et al., 2021](#)). These fears can negatively affect attitudes and lead to vaccination fear as well as vaccine refusal. On the other hand, adequate and accurate information reduces uncertainty and fear, strengthens the perceived benefits of vaccination, and promotes positive parental attitudes towards HPV vaccination ([Patel et al., 2024](#)). Hence, knowledge is an important factor which can exacerbate or mitigate vaccination fear, depending on the accuracy and comprehensiveness of the knowledge.

HPV is a significantly underutilized public health problem in the Pakistani context, particularly for parents, who have the authority right about vaccination of adolescents. There is a growing body of evidence in Pakistan regarding low awareness of HPV infection and its associated HPV vaccine in the general population, including very low awareness of the link between HPV and cervical cancer ([Zaheer et al., 2025](#)). A cross-sectional study in Pakistan however showed that there were significant gaps in the knowledge of the community regarding HPV as a cause of cancer with just moderate number of participants aware of HPV as a cancer-causing virus ([Shamsi et al., 2024a](#)). Similarly, in Pakistan, another study reported low awareness among parents and widespread misconceptions as major factors that led to low vaccination rates and reluctance for routine adolescent's immunization practices ([Ateeq et al., 2022](#)). In Pakistan, these gaps are especially significant in parent knowledge as it directly impacts vaccination fear among parents of adolescents. Despite this, parents have HPV immunization vaccine resistance, which

is caused by a lack of awareness, cultural issues pertaining to sexual health, and misconceptions about HPV being associated with sexual activity ([Khowaja et al., 2022](#)). Therefore, lack of knowledge not only reduces vaccine uptake but also increases vaccination fear and can lead to negative parental attitudes towards HPV vaccines. Therefore, improving parental knowledge in Pakistan is an essential intervention to reduce the fear around vaccination and promote positive attitudes to help facilitate HPV vaccination uptake among adolescents.

1.1.2 Vaccination Fear

Parents' concerns about vaccines are especially prevalent when it comes to Human Papillomavirus (HPV) partly because there is limited knowledge and misinformation about its transmission and the link between cervical cancer and HPV. Vaccination fear refers to parents' psychological response to the vaccine, characterized by worry and apprehension regarding its safety, potential side effects, and perceived effectiveness. It reflects the level of perceived threat of vaccinations ([Gilkey et al., 2021](#)). International research indicates that more knowledgeable parents have more accurate perceptions, a better understanding of vaccine information, and less safety concerns. This misinformation contributes to vaccine inaccurate or refusal to vaccinate their adolescents.

Misinformation and low health literacy are found to be significant contributors to HPV vaccine refusal on a large-scale level in both high-income, low- and middle-income countries ([Larson et al., 2023](#)). The HPV vaccination fear by the parents of adolescents is a prime factor, which is widely influenced by lack of understanding of HPV globally. However, people who do not fully understand the links between HPV and genital warts, or confuse HPV with the reflection of thinking it is of bad sexual behavior often make decisions based on emotion instead of knowledge and facts ([Noreen et al., 2024](#)). These fears are compounded by community myths and misinformation, and by societal norms of the era, including negative attitudes held by parents toward vaccines, distrust of health systems, and decreased enthusiasm for vaccination uptake ([Salleh et al., 2024](#); [World Health Organization,](#)

2025). However, another important finding from international research is that, in some contexts, an increase in exposure to HPV-related information, particularly when presented as a risk without any accompanying information about prevention, may actually lead to a short-term increase in vaccination fear, particularly among parents with low baseline level of trust in vaccines (Walker, 2023). The connection between knowledge and vaccination fear is not as simple as it may seem. Parental knowledge is very low in Pakistan and knowledge is a very important factor that can influence the vaccination fear and acceptance of HPV vaccination. Evidence from within the country has been consistently found to lack understanding of HPV infection, its causal link with cervical cancer and the presence of HPV preventive vaccines (Zaheer et al., 2025). In one instance, cross-sectional study has shown that there is a significant proportion of parents with incorrect information on how HPV is transmitted, which directly affected their vaccination fear, misinformation, and reluctance to vaccinate their adolescents (Shamsi et al., 2024a). Similarly, another study found that parental misconceptions particularly the notion that HPV vaccination might encourage early sexual activity was strongly correlated with vaccination fear and refusal (Ateeq et al., 2022). Such fear, coupled with poor educational facilities, can result in further negative thoughts, stigmatization and avoidance of preventive health services. Parents might not be comfortable talking about HPV-related issues or might opt out of vaccinating their adolescent because of social stigma, which can also reduce HPV vaccine uptake (Khowaja et al., 2022). Accordingly, these findings indicate that knowledge is the best predictor of vaccination fear and Pakistan based data reinforces that lack of knowledge and misinformation greatly enhance vaccination fear and hinder vaccination uptake.

1.1.3 Parental Attitudes

To grasp the meaning of these culturally located attitudes in terms of actual vaccination experiences, it is necessary to analyze the epistemological stance and concerns that govern parental attitude processes in different socio-cultural contexts. Parental attitudes towards HPV vaccines are an important determinant of adolescent immunization. Parental attitudes reflect their beliefs, perceptions,

and feelings about the vaccine and all of these factors affect parents' willingness to immunize adolescents ([Reiter et al., 2023](#)). The results of new studies indicate that the attitudes formed in the context of HPV are strongly influenced by the social and cultural meaning assigned to the disease, especially when it is seen as a sexually transmitted infection ([World Health Organization, 2024](#)). This type of classification can sometimes lead to emotional discomfort, moral concerns and stigma among parents which can decrease attendance for adolescent preventive health services ([Noreen et al., 2024](#)). Beyond biomedical information, emotional reactions and cultural ideas about HPV have an impact on parental attitudes, and can reduce vaccine uptake; this is why parental attitudes should be taken into account. But parents in many communities may be aware of the benefits of HPV prevention yet not ready to do so due to concern about social stigma or fear that HPV vaccines might encourage adolescents to become sexually active at an earlier age ([Machalek et al., 2023](#)). Such beliefs are correlated with subliminal fear of societal rejection and parents' sense of responsibility, which are still significant factors in vaccination fear ([World Health Organization, 2025](#)). However, if the attitudes are emotional and social instead of biomedical, negative attitudes can exist in situations where there is a relative level of awareness. This emphasizes the need to know the significance of cultural and moral values in parental attitudes. These are compounded by cultural taboos and norms around reproductive health in Pakistan and a taboo and social sensitivity around discussion of STIs ([Khan et al., 2025](#)). Many parents may then find the information about HPV uncomfortable, and develop negative attitudes towards its health-related behaviors thus preventing them from making use of the information. In Pakistan studies indicate that social stigma, cultural condemnations, concern of reducing awareness for early sexual awareness both males and females are the reason behind the negative attitude of parents for HPV vaccination ([Luo et al., 2024](#)). This cultural sensitivity can really affect health seeking practices and often vaccine acceptance is entirely denied despite the knowledge of the medical benefits of the vaccine by parents. In general, parental attitudes towards HPV vaccination are influenced by a combination of knowledge, emotional reaction and socio-cultural factors ([Machalek et al., 2023](#)). Although the worldwide evidence has shown the impact of fear judgement

on the acceptance of vaccines, the problem is especially prominent in Pakistan where there is a great cultural restriction on talking about sexual health. Thus, gaining insight into these attitudes from both a global and local perspective is important for the efforts to tackle vaccination fear and increase HPV vaccination coverage for adolescents.

1.2 Gap Analysis

Existing research in Pakistan has examined both cognitive and behavioral aspects of HPV vaccination. Cognitive aspects have primarily included HPV knowledge, awareness, attitudes, beliefs and perceptions, whereas behavioral aspects have included vaccine acceptability, willingness, uptake and vaccination-related practices ([Atif, 2025](#); [Awais et al., 2026](#)). Recent research among university students found inadequate knowledge alongside attitudes related to vaccination, with recommendations from physicians, parents, and friends influencing vaccination decisions ([Atif, 2025](#); [Awais et al., 2026](#)). Similarly, research among adults has examined HPV awareness and vaccine acceptability, showing that greater awareness was associated with greater vaccine acceptability ([Awais et al., 2026](#)). However, existing studies have generally examined these cognitive and behavioral components separately or across different populations. No previous study in Pakistan has specifically examined the relationship between knowledge, vaccination fear and parental attitudes toward HPV vaccination among parents of adolescents within the same empirical framework. Thus, the present study addresses a gap by examining how a cognitive component (knowledge) relates to emotional and attitudinal components (vaccination fear and parental attitudes) within a parental HPV vaccination context. This reflects an underlying conceptual lack of understanding of the processes by which health information becomes a part of real-life decision-making processes. Most existing research has mainly focused on health professionals, medical trainees, or the general adult population, while largely neglecting parents of adolescents the true decision makers regarding vaccination ([Shukr et al., 2025](#)). This gap is especially concerning because HPV vaccines are recommended to be used mainly for adolescents aged 9-17 years ([World Health Organization, 2024](#)).

Parents play an important role in health and vaccination decisions concerning their children, but the nature and distribution of this decision-making role may vary across families and cultural contexts. In Pakistan, qualitative evidence on HPV vaccination has indicated that fathers may be perceived as having greater authority in final vaccination decisions, while mothers may contribute through discussion, information sharing, and persuasion ([Khan et al., 2025](#)). Evidence involving Pakistani mothers has similarly highlighted the importance of spousal agreement in vaccination-related decisions, particularly when parents hold differing views ([Chen et al., 2024](#)). These findings suggest that parental involvement should not be treated as a uniform construct. In recent years, research in Pakistan has also identified concerns related to HPV vaccine awareness, acceptability, misinformation, cultural beliefs, and vaccine-related concerns as important considerations surrounding HPV vaccination ([Shamsi et al., 2024a](#); [Atif, 2025](#)). Although adolescence is a crucial time for prevention, there is a lack of empirical research on how parents understand HPV information when it comes to their adolescents in Pakistan ([Bruni et al., 2023](#)). This disconnection is problematic in the implementation of global vaccination strategies at the local level, as it fails to account for cultural beliefs and perceived risks embedded in parent's sociocultural context. Lastly, the latest public health reports reveal that these apprehensions of possible side effects, religious beliefs and false information remain significant factors shaping parental attitudes towards HPV vaccines in Pakistan ([World Health Organization, 2025](#); [United Nations Children's Fund, 2025](#)). This means there is a lack of targeted parent-focused research to address this, with a gap in the evidence base for interventions at the household level where vaccination choices are typically made. In addition, the literature does not sufficiently explore a comprehensive and coherent framework that brings together knowledge, vaccination fear and parental attitudes. However, these variables have been evaluated in isolation and the findings have been contradictory and insufficient to capture the interaction of these variables ([Hafeez et al., 2025](#)). Furthermore, the empirical research conducted in recent years suggest that the link between knowledge and parental attitude is either weak, or inconsistent, and other psychological factors like fear and cultural beliefs must be taken into consideration ([Shukr et al., 2025](#)).

Without structural modeling, it is difficult to develop empirically supported interventions which affectively address vaccination fear among parents of adolescents (Sharif-Nia et al., 2024). Therefore, the major research gap is the need for a comprehensive culturally informed view of knowledge's role in causing vaccination fear and thus influencing the parental attitudes towards HPV among parents of adolescents in Pakistan. This is a critical area of need that can be filled to illuminate the cognitive-emotional processes that underlie vaccine decision making. Moreover, it will help to design culturally adapted public health interventions that not only increase knowledge, but also decrease vaccination fear and promote positive parental attitudes towards adolescent vaccination (Bruni et al., 2023). In conclusion, bridging this gap can aid in more effective HPV prevention efforts and help to continue decreasing the burden of cervical cancer.

1.3 Problem Statement

Parental awareness of adolescent vaccination is a key to the development of preventive health decisions, especially when parents are the primary authorities for adolescent health and preventive services. Despite the fact that effective vaccination programs exist in all countries, vaccination-preventable diseases are still a major public health problem (World Health Organization, 2024). Despite progress in Pakistan, the coverage of vaccines among adolescents is still inconsistent and awareness gaps among parents are still a cause for delayed or missed immunizations in Pakistan (Beavis et al., 2022). Adolescents' parents are one of the key groups for vaccination-related research, as they are the first line of influence on whether adolescents get timely preventive health care, particularly within the critical period of adolescence (Sharif-Nia et al., 2024). However, available literature shows that even educated parents, have limited knowledge about vaccines, its benefits, safety and misconceptions are commonly seen (Kumar, 2024). It remains unknown whether this lack of knowledge, or inaccurate knowledge, is linked to vaccination fear and parental attitudes. While low knowledge or incorrect information can be equated with low awareness, incomplete information or incorrect information can also either generate vaccination fear or in some instances, lessen the perceived

risk, which can affect parental attitudes in different ways ([Zhao et al., 2024](#)). Sociocultural beliefs, misinformation, and social influence also play a role in vaccine decisions in the Pakistan, as parents may seek information from non-formal sources instead of medical advice (?). Therefore, concerns about vaccination and parent attitudes about vaccination risks and safety may not just be based on accurate knowledge but also on misinformation, uncertainty, and culturally specific risk and safety beliefs. Moreover, research in the contemporary period mainly investigates individual factors and does not explore the interaction of cognitive, emotional and attitude factors ([Cagnotta et al., 2025](#)). Most of the studies conducted in Pakistan have been limited to assessing knowledge levels and comparatively little work has been done to understand the influence of knowledge on vaccination fear and parental attitudes towards HPV ([Shamsi et al., 2024a](#)). In addition, HPV vaccination studies for adolescents are limited and underrepresented in local research and current studies for adolescents in this regard play a critical role in HPV vaccine decision making ([Khan et al., 2025](#)). Hence, this study hypothesizes that knowledge impact on vaccination fear and parental attitude towards HPV among parents of adolescents and provides evidence for culturally appropriate strategies to tackle both knowledge gaps and emotions that drive vaccine uptake ([Rehman et al., 2023](#); [Ali et al., 2025b](#)).

1.4 Research Objectives

Following are the research objectives of the study; :

- i. Research Objective: To examine the relationship between Knowledge, Vaccination Fear and Parental Attitudes towards Human Papillomavirus (HPV) among parents of adolescents.
- ii. Research Objective: To determine whether Knowledge predicts Vaccination Fear and Parental Attitudes toward Human Papillomavirus (HPV) among parents of adolescents.
- iii. Research Objective: To examine the influence of demographic variables (education level, family system, and gender of adolescents) on knowledge, vaccination

fear and parental attitudes toward Human Papillomavirus (HPV) among parents of adolescents.

1.5 Research Hypotheses

H1. There will be a negative relationship between knowledge and vaccination fear towards Human Papillomavirus (HPV) among parents of adolescents.

H2: There will be a negative relationship between vaccination fear and parental attitudes toward Human Papillomavirus (HPV) among parents of adolescents.

H3. There will be a positive relationship between parental attitudes and knowledge towards Human Papillomavirus (HPV) among parents of adolescents.

H4. Knowledge will predict vaccination fear and parental attitudes toward Human Papillomavirus (HPV) among parents of adolescents.

H5. Demographic characteristics (education level, family system and gender of adolescents) will significantly influence knowledge, vaccination fear, and parental attitude towards Human Papillomavirus (HPV) among parents of adolescents.

Chapter 2

Literature Review

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the world and is a serious public health problem due to its known association with multiple cancers and reproductive illnesses ([Bruni et al., 2023](#)). More than 200 different types of HPV have been identified, about 14 of which are high-risk, cancer-causing strains that can cause malignant changes in epithelial cells ([International Agency for Research on Cancer, 2024b](#)). High-risk strains, particularly HPV-16 and HPV-18, are known to cause long-term infections, which are the primary driver of cervical cancer, as well as cancer of the vulva, vagina, anus, penis, and throat ([Gillison et al., 2024](#)). While there are effective prevention strategies available, HPV is still contributing to the global cancer burden, as hundreds of thousands of new cases of cancer are diagnosed annually, in both men and women ([Drolet et al., 2023](#)). Cervical cancer is the fourth most common cancer among women worldwide, and is most impactful in low middle income countries where women do not have access to screening and vaccination programs ([International Agency for Research on Cancer, 2024a](#)). Epidemiological evidence also indicates that HPV infection is extremely prevalent and often happens shortly after sexual debut, particularly the adolescents and early adulthood years ([Drolet et al., 2023](#)). As a result, adolescence is a very vulnerable age group and parents play an important role as gatekeepers for early preventive health measures such as HPV vaccination. Globally, there are significant differences in the prevalence of HPV-related diseases across regions. In high-income countries, HPV prevalence

has significantly decreased due to efficient vaccination and screening programs, while in resource-limited countries, HPV continues to be transmitted and cervical cancer rates remain high ([Arbyn et al., 2020](#)). The disparities underscore the continuing need for equitable access to prevention, particularly for populations with less frequent organized adolescent health services. The burden of HPV infection in Pakistan is especially striking as there are few screening facilities, and low awareness of the general population and delayed diagnosis. Cervical cancer is one of the most prevalent type of cancer in female population of Pakistan and is one of the most prevalent cancer associated death in Pakistan ([Chughtai et al., 2023](#)). Based on the epidemiological data, there are more than 73 million women at risk of cervical cancer in the country, more than 5 thousand new cases of cervical cancer are diagnosed annually, and more than 3 thousand women die of cervical cancer annually ([Atif, 2025](#)).

In addition, cervical cancer becomes the third most prevalent cancer among women in Pakistan and also a burden of cervical cancer is reported among reproductive age group of women (15-44 years) which needs timely preventive measures ([World Health Organization, 2025](#)). The presence of HPV-16 and HPV-18 is ubiquitous in Pakistan at molecular and epidemiological level and is the most frequent genotypes linked with the development of cervical cancer in Pakistan ([Minhas et al., 2022](#)). The distribution of HPV genotypes is in line with the global distribution patterns. However, there has been a significant variation in the prevalence of HPV in different parts of Pakistan, which indicate inequality in the use of health services, diagnostic and preventive services.

This imbalance highlights the need for improved national monitoring systems, and for more organized cervical cancer prevention activities. Overall, the evidence summarized above is consistent with ongoing global and national public health problem of HPV among adolescents, who are at the highest risk for initial infection or subsequent long-term disease risk. In this context, the role of parents becomes very important in shaping adolescent health-seeking behavior for

prevention especially in countries like Pakistan where adolescent vaccination programmes are still being organized. However, although HPV vaccines are highly effective, their coverage in Pakistan is still low because of lack of knowledge regarding vaccination among parents, safety myths, cultural beliefs, and limited access to health care services (Minhas et al., 2022). These factors contribute to vaccination fear, negative attitudes and ultimately lower vaccine uptake among adolescents. The national HPV vaccination programmes for adolescents in recent times are a significant milestone towards the goal of reducing cervical cancer and achieving elimination goals in Pakistan (Qadri and Faruqui, 2025). However, vaccine uptake rates have not been uniform, and knowledge regarding HPV vaccines as well as parental attitudes toward vaccination remains key factors affecting vaccine uptake among adolescents.

2.1 Knowledge and Vaccination Fear

It is essential to explore the impact of knowledge on vaccination fear and parental attitudes towards HPV vaccination of adolescents, as these are closely linked in determining vaccine acceptance, on the backdrop of these national initiatives. Knowledge is defined as the level of accurate awareness and understanding that parents possess about HPV (the virus that causes cervical cancer) such as how it can be transmitted, how it can be prevented with vaccination, and how it is linked to cervical cancer (Shasti et al., 2025). Knowledge plays a crucial role in adolescent health, as it is linked to parents' decision-making when it comes to preventive health interventions like HPV vaccination, and their knowledge of the vaccine influences vaccine uptake for their adolescent (Ntonifor et al., 2025). Parents with accurate knowledge of HPV infection and vaccination are likely to show greater acceptance and more positive attitudes toward adolescent vaccination and lower vaccine safety concerns and misconceptions (Olubodun et al., 2024). Furthermore, studies have shown that improvements in HPV knowledge are highly associated with the acceptance of HPV vaccines and vaccination fear in various parental groups (Thabit et al., 2025). However, inadequate or inaccurate information leads to increased uncertainty, fears of side effects, and negative parental

attitudes towards vaccination, which results in decreased HPV vaccination uptake among adolescents ([Nassif et al., 2024](#)). Therefore, knowledge is a crucial factor that influences not only the vaccination fear but also parental attitudes towards HPV, and consequently, HPV vaccine uptake in adolescents. Building on this, the level of understanding about Human Papillomavirus vaccination has been shown to be a key component of vaccination fear and acceptance. Studies carried out internationally demonstrate that knowledge is not only information but also a psychological aspect of how parents perceive the safety of vaccination, their fears and their intention to vaccinate adolescents ([World Health Organization, 2024](#)). The results of an extensive study showed that there is a wide variation in HPV knowledge among parents, with very low levels in some regions and almost universal in others. Most importantly, more knowledge is associated with less concern about side effects, which indicated parents' increased confidence towards vaccination ([Noreen et al., 2024](#)). A global study, a meta-analysis of international studies, showed that there was also a significant difference between regions with regard to parental awareness, ranging from very low to near universal. In particular, consistent negative relationship between knowledge and concerns about side effects and vaccination confidence, with higher knowledge being associated with less concerns about side effects and more confidence about vaccination ([Heyde et al., 2024a](#)). Parents who know the most are more likely to report that HPV vaccine is safe and beneficial, decreasing barriers to uptake. This broader setting has resulted in fear of vaccination, especially because of insufficient information, and that the provision of accurate, organized information can significantly diminish fear of vaccination and boost acceptance ([Verger and Peretti-Watel, 2021](#)). Combined, these findings indicate that knowledge is a protective factor in relation to concerns about vaccination. Given this international context, additional insights into the impacts of knowledge on vaccine fear in specific cultural settings can be drawn from region-specific studies. With this global context, region-specific studies further contextualize the understanding of the effect of knowledge on vaccine fear in various cultural contexts. Reported HPV vaccine uptake was significantly associated with knowledge and limited awareness was a determinant of fear which contributed to HPV vaccine refusal in South Asia. Emotional barriers stemmed

from HPV disease are important because of its transmission and misconceptions about infertility and about the safety of the vaccine (Noreen et al., 2024). In addition, another study assessed vaccination fear in immunization contexts and found that lack of knowledge increases perceived risk, which exacerbates vaccination fear (Alanazi et al., 2023). Together these findings suggest that the effects of the knowledge gap are not just to reduce vaccine coverage, but to engender fear and mistrust of vaccine programmes.

Furthermore, evidence also supports this relationship and shows contextual differences. In Ethiopia, parents who had good knowledge of HPV were significantly more likely to accept HPV vaccination than those with less knowledge who were fearful due to safety concerns and misconceptions (Derbie et al., 2023). In Sub-Saharan Africa, higher knowledge regarding cervical cancer prevention was linked with less vaccination fear, and less knowledge was linked to trust and perceived harm (John et al., 2025). Moreover, in India, vaccination acceptance was increased by improving the awareness of parents regarding the myths and moral objections associated with vaccination (Kumar, 2024). As a whole, these studies validate knowledge as an important link between awareness and emotional response. Moreover, in high income countries though, while awareness is typically fairly high, the depth of knowledge is important in determining vaccination fear. The level of knowledge about vaccine efficacy in Europe was correlated with reduced concerns about long-term vaccine side effects, and increased acceptance of adolescent vaccination (Rossi et al., 2024). Likewise, in the USA, parents with higher levels of knowledge have more trust in healthcare providers and less perceived threat to vaccines, and therefore, less vaccination fear (Walker, 2023). However, this is a relative increase in awareness, and gaps still exist in the knowledge which continues to drive emotional and behavioral outcomes in these settings. Even in highly educated communities, knowledge about vaccines is not equal and the level of detail is an important factor in vaccine acceptance.

Moreover, empirical evidence suggests that vaccination fear is one of the major barriers to HPV vaccines uptake by parents. However, recent studies indicate that

vaccination fear is not always a deterrent but depends on the variety and credibility of information available, and parents' understanding. Vaccination fear is significantly influenced by the potential for perceived risks to safety and exposure to inaccurate or misleading information ([Shasti et al., 2025](#); [Khan et al., 2025](#)). A study has shown that concerns about vaccine safety, particularly concerning infertility and long-term adverse effects, and misinformation spread through social media channels, often add to the uncertainty and delay adolescents' HPV vaccination decisions, particularly regarding vaccine acceptance ([Wilson and Korfmacher, 2023](#)). This illustrates that fear is not always a psychological phenomenon, but can also be developed through the social and informational realms.

Similarly, recent empirical research also confirms that the vaccination fear is more related to the level and accuracy of the information parents have about HPV, rather than to whether they have heard about vaccines at all. Even if parents have only partial or incomplete knowledge about the HPV, they often still report higher levels of fear, as a lack of knowledge tends to heighten perceived risks ([Siddiqui and Anwar, 2024](#)).

Furthermore, larger scale studies have shown that parental fear levels are significantly greater when compared to parents who have a clear understanding of HPV transmission and prevention measures ([Hussain et al., 2025](#)). While accessible and accurate information about vaccines tends to alleviate vaccination fear in most cases, in some, inaccurate information can actually lead to the further escalation of vaccination fear ([Smith et al., 2024](#)). Where there is incomplete understanding, the potential for harm may increase as there are no reliable correcting details, which can lead to vaccination fear and an increase in resistance to vaccination among parents ([Smith et al., 2024](#)).

This finding suggests that the influence of information on parental attitudes extends beyond just the information content to the reliability and completeness of the information. This is particularly true in Pakistan where there are high levels of information deficiencies and strong sociocultural influences available. Concern

about adverse effects and false information have been found to be one of the most important factors associated with HPV vaccination fear, due to a lack of awareness about HPV and cervical cancer (Ali et al., 2025c). Similarly, a survey was done which revealed that even if the majority of the parents were aware of HPV vaccination, their understanding of the vaccine was insufficient, with many having queries regarding the long-term consequences and safety issues (Hafeez et al., 2025). Parents' initial vaccination concerns in Karachi were predominantly due to incorrect beliefs regarding infertility and morality, which was reduced after offering information, indicating the importance of information dissemination to shift the parental attitudes (Shamsi et al., 2024b).

Additionally, qualitative research also supports the findings of the dynamic shifts in vaccination fear. Although parents were initially very apprehensive and unwilling, due to a lack of understanding of HPV, their vaccination fear was significantly reduced (Rehman et al., 2023). Likewise, parents who consider themselves reasonably informed about vaccination timings, requirements, and vaccine safety are deterred by a lack of knowledge in those areas, which also causes uncertainties and fear based resistance toward vaccination (Irfan et al., 2026). The observations suggest that vaccination fear is not an emotion alone, but rather a consequence of the quality and comprehensiveness of information provided to them. These results shows that when there are gaps in knowledge, people feel uncertain in their minds, and this uncertainty then makes it easier for them to respond fearfully.

Conversely, studies also demonstrate that giving parents accurate and comprehensive information about HPV and the benefits of vaccination reduces fear and increases vaccine uptake, suggesting that knowledge is a protective factor from vaccination fear (Purvis et al., 2024). This is also supported by a systematic review that assessed parental attitudes towards HPV, which found that worry about vaccine side effects is a common barrier, but when parents are appropriately informed about the risks and the effectiveness of HPV, the motivation to safeguard adolescents from cancer becomes strong (Heyde et al., 2024b). The results show

the power of informed understanding to change perceptions of risk and reduce fear-based opposition.

2.2 Vaccination Fear and Parental Attitudes

Given these contrasting results, it is important to explore knowledge and fear of HPV vaccines in a more complex way among adolescents. Findings from the preceding studies support the finding that an informed understanding protects against vaccination fear, but a different line of evidence indicates that more knowledge does not always reduce vaccine-related fear, and may even increase it, depending on the circumstances ([Wilson and Korfmacher, 2023](#)). This is especially true if the information shared is technically complex and has a strong emphasis on risk or is shared outside of a balanced health education context. Empirical studies show that even though detailed information about potential side effects is scientifically accurate, it can make parents more aware of the risks associated with vaccines and amplify emotional concerns about vaccine safety ([Shasti et al., 2025](#)). In these cases, knowledge can be used to increase awareness of unlikely or unknown adverse events or theoretical risks, potentially increasing anxiety not reducing it. Similarly, studies examining risk perception also show that those who receive more health related information are more likely to develop risk awareness with respect to potential harms, and that this risk awareness is enhanced when there is no statement comparing benefits and risks ([Khan et al., 2025](#)).

A pattern that arises particularly in making parental attitudes is parents may view an extensive biomedical explanation as an expression of uncertainty or risk rather than confidence. Furthermore, research has revealed that even if it implies a gain in information, a partial understanding of HPV could be associated with the escalation of vaccination fear, if it emphasizes the severity of cervical cancer in disproportion to the vaccine's safety and effectiveness ([Siddiqui and Anwar, 2024](#)). Similarly, the connection between knowledge and vaccination fear is not simply linear, however, but is influenced by parents' reception, comprehension, and emotional processing of information. This highlights how knowledge may lead

to either decreased or increased vaccination fear when information is of good quality, is well framed and cognitively interpreted. The evidence from the past few years around the world regarding fear plays a significant role in HPV vaccination fear, with concerns regarding vaccine safety and exposure to misinformation becoming the primary drivers. A large-scale systematic review and meta-analysis, that included more than 203,000 parents from various countries around the world, showed that about 39.6% of the global populations of parents have fear about HPV vaccination, with concerns about adverse effects and safety issues being the most important psychological barrier to vaccination ([Wang and Piraveenan, 2025](#)). Furthermore, this is not a problem exclusively of low-resource countries; a European systematic review reported that concerns about the vaccination fear, especially regarding their possible long-term side effects and infertility, substantially impact parental attitudes, even in high-income countries where vaccines were well established ([Achimaş-Cadariu et al., 2024](#)). Likewise, another cross-national synthesis found that vaccine safety concerns and exposure to misinformation were consistently correlated with higher levels of HPV vaccination fear and HPV vaccine uptake was directly correlated with vaccination fear among parents of adolescents ([Wang and Piraveenan, 2025](#)). The relationship between information exposure and vaccination fear is not always simple, however, and global behavioral studies indicate that exposure to misinformation on social media can have dramatic effects on fear responses, particularly when parents are exposed to unverified information about reproductive health effects that is not timely corrected by credible sources ([Wilson and Korfmacher, 2023](#)). Furthermore, vaccination fear is a long-standing obstacle to high levels of vaccination coverage, and that is especially the case in areas where there is good health system infrastructure ([World Health Organization, 2024](#)). Within the Pakistan, numerous studies have been conducted found high levels of vaccination fear among parents, which is largely driven by misinformation, culturally specific concerns and inadequate knowledge of HPV-associated diseases. A recent systematic review in Pakistan revealed that the concerns of parents regarding the HPV vaccine, including issues of vaccine safety, concerns of infertility, and general mistrust of newly introduced vaccines, are all related to the reduced HPV vaccine acceptability ([Rehman et al., 2023](#)). Likewise, [Shamsi et al.](#)

(2024a) found that parental attitudes are strongly related to misconceptions about possible impacts on reproductive health, which are also shared and reinforced by social networks and misinformation at the community level, ultimately resulting in delayed or complete refusal to vaccinate adolescents. Furthermore, another study conducted within the country highlighted fear even when parents had some basic level of awareness about HPV, as they have gaps or inaccuracies in the information available to them when it comes to vaccine safety and who can receive the vaccine (Ali et al., 2025c). Overall, the results indicate that vaccination fears are prevalent in Pakistan and are significantly shaped by the sociocultural context and the nature of information available to parents.

2.3 Parental Attitudes and Knowledge

Parents who are willing to take other routine vaccines for their adolescents seem to stop when it comes to HPV vaccination, demonstrating a set of psychological and cultural rules for HPV vaccination. The parental attitudes toward HPV vaccination are known to be multidimensional psychological appraisals that can be traced back to their levels of knowledge, perceived risk, cultural beliefs and social influences and are responsible for the acceptance or refusal of vaccination for adolescents (Ames et al., 2025). These attitudes are not fixed; they are continually influenced by the amount and quality of knowledge that parents have about HPV infection, vaccine safety, and vaccine health benefits. Parents are key authority members and their attitudes are a key factor in the uptake of vaccination in adolescent (Gennari et al., 2026). Findings revealed that better knowledge among parents is associated with more favorable parental attitudes toward HPV among adolescents. For instance, a comprehensive study in high-income and middle-income countries identified that greater awareness among parents is associated with greater confidence in the safety and necessity of the HPV vaccine and strong intentions to have their adolescent vaccinated (Babi et al., 2023). Similarly, a systematic review of the effects of knowledge on vaccination decisions by parents found that knowledge can help parents identify the benefits of vaccination, and it

can also reduce their concerns, which can improve their attitudes toward vaccination (Heyde et al., 2024b).

To add to this trend, Juarez et al. (2025) found that parental attitudes also vary by gender son or daughter. Specifically, parents of females were more active and positive towards HPV vaccination partly due to their perception of greater risk for cervical cancer in their daughters. The finding indicates that knowledge alone is insufficient but works in tandem with the perception of the disease risk; the two come together and influence the evaluation of the pros and cons of HPV vaccination by parents. Large-scale studies conducted across countries also show that negative attitudes towards vaccines are undermined by exposure to false information and vaccine safety concerns, even in cases where parents already have a good or moderate awareness of vaccines (Wilson and Korfmacher, 2023). Similarly, a study that analyzed HPV vaccine information from various countries also found that exposure to HPV vaccine misinformation from digital platforms, like social media, results in reduced vaccine confidence and vaccine confidence is associated with attitude that is not favorable or favorable (Khan et al., 2025). A more general analysis of vaccination fear across multiple world regions, which combined findings from various studies, found that almost one in every ten parents worldwide has some of the vaccination fears, with the negative parental attitudes towards being mostly driven by inadequate knowledge and unfounded concerns about vaccine safety (Wang and Piraveenan, 2025). On the other hand, when evaluating the effectiveness of educational programs, HPV vaccine awareness campaigns have demonstrated effectiveness, with significant improvement in the attitudes of parents (Purvis et al., 2024). Study published in the medical journal researchers combined data from various vaccine studies around the world and discovered that nearly 40% of parents in all countries surveyed expressed vaccination fear in their country. Unequal attitudes towards vaccine risks are the primary drivers of vaccination fear (Wang and Piraveenan, 2025). Observational studies of interventions to parental attitudes have found mixed results, though awareness campaigns that improve parental attitudes and tackle misconceptions about vaccine safety and efficacy have been shown to positively influence vaccine uptake (Purvis et al., 2024).

Based on this, there has been growing evidence of the association of health literacy and positive parental attitudes towards HPV, which have been strongly linked to the capacity for risk-benefit assessment in a balanced manner where lower level of health literacy is associated with lower vaccine acceptance by parents ([Siddiqui and Anwar, 2024](#)). Nevertheless, other studies have warned that knowing the facts is not sufficient in and of itself to result in a positive attitude; the level of trust parents have in their health care systems and how vaccination information is framed in terms of cultural norms also play a role ([Shasti et al., 2025](#)). Building on this, systematic reviews also bring to the picture the evidence that parental attitudes are strongly influenced by the perceived safety of the vaccine and the awareness that the vaccine protects against cancer. These two are closely related to the quality of parents' knowledge ([Heyde et al., 2024b](#)). Combined, the evidence from all over the world supports the conclusion that accurate knowledge is linked with positive parental attitudes.

Although cervical cancer is the third most common cancer among women in Pakistan, most of the parents remain reluctant or unwilling to vaccinate adolescents against the virus responsible for cervical cancer ([Rehman et al., 2023](#)). In Pakistan, parents' attitudes towards HPV vaccination are mostly termed as fearful and the reasons behind this are attributed to limited awareness and the prevalence of misconceptions and beliefs. Several studies have shown that there is significant lack of awareness regarding HPV and its association with cervical cancer among parents, which leads them to negative or undecided attitude towards vaccinating their adolescent ([Fontenot et al., 2024](#)).

Research by [Khan et al. \(2025\)](#) revealed that the country's attitudes towards vaccines are largely influenced by three factors, including concerns about vaccine safety, misinformation stemming from religious beliefs, and vaccine-related knowledge gaps related to HPV-related diseases. All of this contributes to parents' reluctance to take the vaccine. Similarly, reported, that parental attitudes towards HPV are largely shaped by misinformation and cultural norms, meaning that many parents have a fearful or negative attitude towards vaccination ([Shamsi](#)

et al., 2024a). Lastly, additional research indicates that the knowledge of parents about HPV vaccines can be limited, even among those who are aware of the vaccine, regarding its potential benefits and who may benefit from it. This incompleteness creates a continuous uncertainty over the development of their attitudes (Ali et al., 2025b). To the credit of the parents, there is research on interventions that shows that providing parents with credible and clear information can result in a significant shift in attitudes, leading to greater acceptance of adolescent vaccination. A systematic review that focused specifically on studies conducted in Pakistan revealed that educational interventions to increase what parents know about HPV are effective at shifting parents' perspectives from doubt to actual acceptance. These programs utilize the strengths of HPV vaccines to educate parents on the risks of HPV and the efficacy of vaccines in preventing infection (Rehman et al., 2023; Shamsi et al., 2024a). This indicates that parental attitudes are very sensitive in the Pakistani setting to the amount of knowledge available and its accuracy and comprehensiveness. Taken together, the available evidence suggests that a clear picture emerges of parental attitudes toward HPV is deeply influenced by what parents know. In all countries, more knowledge and more accurate knowledge invariably translates to more positive attitudes toward the HPV. On the other hand, when parents see misinformation with limited knowledge, it makes them fearful and doubtful (Rehman et al., 2023). This link of knowledge and parental attitudes is even stronger in Pakistan due to cultural impediments and due to the lower initial level of awareness of parents.

2.4 Role of Demographics

Alongside cognitive and informational factors, demographic factors have an important role in understanding the impact of knowledge on vaccination fear and parental attitude toward HPV among parents of adolescents. Patterns of adolescent vaccination acceptance in Pakistan are shaped by socio-cultural and structural environment with the major influence of gender of adolescents, family system and parents' education level.

Parental education level is one of the most consistently reported factors in the literature that correlates with positive attitudes toward HPV vaccination. A notable finding in existing literature is that parent's education level doesn't consistently correlate with HPV vaccination. This lack may be explained to differences in health literacy, access to credible health information and capacity to evaluate vaccination evidence (Heyde et al., 2024b). Those parents with higher educational levels are more likely to know more about HPV infection, what can be done to prevent cervical cancer, and its efficacy, which contribute to more positive attitudes toward HPV. A comprehensive systematic review and meta-analysis of the evidence showed that many different populations, increased knowledge and awareness was correlated with increased HPV vaccine acceptance (Heyde et al., 2024a).

Additionally, a broader socioeconomic profile including educational status, which is arguably, the most significant has been found to influence the levels of awareness among parents, and their willingness to accept HPV vaccination. This means that population-based disparities in education help to account for the highly variable parental attitudes and vaccine decision. Less educated parents have been found to express greater uncertainty regarding the safety of the vaccine, and are more likely to be influenced by misleading information. Such uncertainties and vulnerability often lead to increased fear (John et al., 2025). A systematic review in Ethiopia also revealed that parental education was a key determinant of adolescent girls' family's willingness to vaccinate their adolescent girls for HPV (Zewdie et al., 2023). The result highlights the role that access to educational resources plays in the positive attitudes towards vaccination.

In addition to knowledge and parental education, family system has a strong impact on the views of parents about HPV vaccination, as well. Another research suggests that HPV vaccine acceptance and refusal are strongly influenced by the level of support they feel received from people around them and their opinions about the norm or expected choice in their social groups. Parents with higher social support and those who believed there was positive vaccination attitudes within their immediate social circles were more likely to have positive attitudes

towards HPV vaccination ([Khalil et al., 2025](#)). This has been confirmed by qualitative research with parents who had initially been wary of vaccines. Interactions with trusted family members, health professionals, and close social contacts proved to have a significant impact on parents' beliefs about vaccination and their decisions to get their adolescents vaccinated ([Moore et al., 2025](#)). Research conducted among Asian populations further corroborates that. The influence of parental attitude to vaccinate their adolescents against HPV was influenced by the perceived approval of parents by their spouses, elders, or in-laws, as well as by the norms of the society. The pattern indicates a social model of health-related decision making, which is common in many societies ([Zhang et al., 2024](#)). Combining these results, parental attitudes towards HPV vaccination are not solely psychological. They are influenced by the family systems in which mothers and fathers live, work and nurture their adolescents.

Furthermore, a related prediction was whether parents change their attitudes depending on the gender of their child at the time of the recommended vaccine, building upon the previous finding that parents' attitudes toward HPV vaccination differ for males and females. Recent international studies consistently show that parental attitudes regarding HPV continue to be strongly shaped by the gender of their adolescent child, with parents often reporting that they feel females are more deserving of HPV vaccines than males ([World Health Organization, 2024](#)). While this difference has narrowed over time, there are still a significant number of parents who consider it more important for girls than boys to receive it, and this is also reflected in vaccination policies and coverage in the rest of the world ([Centers for Disease Control and Prevention, 2024](#)). The perception of gender is mostly attributed to the early campaign of HPV, which mostly focused on the prevention of cervical cancer. This initial focus remains an influencing factor in parental assessments of risk for HPV and their beliefs about the need to vaccinate sons compared to daughters. Parental attitudes toward HPV is highly associated with factors of perceived susceptibility to HPV-related illness and perceived benefits from its vaccine.

Although there is increasing evidence that HPV also causes cancers in males (oropharyngeal and anal cancer) but are also perceived as having reduced risk of negative health outcomes from HPV (Heyde et al., 2024a). The results of a review that specifically examined HPV vaccination for boys in Asia were similar. It identified significant differences in parental acceptance across various settings, and in areas with low awareness of HPV-related disease in boys, parents had lower intentions to vaccinate boys (Noreen et al., 2024). However, systematic draws the conclusion that parents are more likely to immunize their daughters with HPV vaccines than their sons, as the relationship between HPV and cervical cancer is well understood and widely publicized, whereas knowledge about HPV-related cancers in males is low (Khowaja et al., 2022). These three factors are not independent of each other, but are interrelated, intertwined and sometimes reinforcing.

Lastly, another important demographic consideration is parental gender and vaccination decision-making authority which was not included as demographic variables because the present study focused on knowledge, vaccination fear and parental attitudes rather than on identifying the household's final vaccination decision-maker. This distinction is important because parental attitudes and decision-making authority are not necessarily identical, research has shown that mothers and fathers may have different roles in HPV vaccination decisions, with some studies identifying mothers as important participants in vaccination decisions and others showing variation in whether decisions are made by one parent or jointly (Heyde et al., 2024a).

Similarly, qualitative evidence specifically reported that fathers might have more authority in the final decision of vaccination in Pakistan, whereas mothers might be involved in discussion and persuasion (Khan et al., 2025). Thus, the present study did not assume that either parent was the sole decision-maker; instead, it assessed the participating parent's psychological perceptions, while decision-making authority is recognized as an important factor for future research on actual vaccination decisions and uptake.

2.5 Theoretical Framework

The present study is theorized by the Health Belief Model (HBM), which was initially put forward by [Rosenstock et al. \(1988\)](#) and later developed by Becker and his colleagues. One of the most widely used psychological models used to explore preventive health behaviors and to gain insights into the cognitive processes associated with health-related decision is the HBM. According to the HBM, this willingness to participate in a recommended health behavior is related to various perceptual dimensions that must all align. Individual must first sense a health risk and feel is likely to happen to them or their family members and it would be serious enough to be of concern. Meanwhile, they must acknowledge the size of the benefits they can reap if they take preventive measures, and they must also come across a few or manageable hurdles that would stand in their way. This is not to mention the risk and reward calculations that occur as well, nor the need for activation, whether external (doctor reminders) or internal (awareness of symptoms). Lastly, people need to believe that they can perform the recommended behavior successfully, which was subsequently added to the model and termed self-efficacy. Self-efficacy recognizes that positive health beliefs alone may not lead to action unless individuals also believe that they are capable of performing the recommended behavior despite potential barriers ([Rosenstock et al., 1988](#)). In the context of HPV vaccination, self-efficacy is relevant because parents may understand the benefits of vaccination but may still require confidence in their ability to obtain vaccination for their adolescent. With all of these factors in place, the individual has a greater chance of engaging in the health behavior in question ([Rosenstock et al., 1988](#)). Taking the perspective of vaccination, the HBM model suggests that parental attitudes are strongly influenced by the knowledge and understanding of the parents about HPV and its impact. HPV is recognized to cause a significant proportion of cancers of the cervix, anus, penis, vulva, vagina and oropharynx worldwide ([López et al., 2022](#)). This is because certain factors in parental beliefs about susceptibility to and problems caused by the virus, as well as the effectiveness of the vaccine, play a significant role in influencing their perceptions. With accurate information about HPV, the risk of infection is a very

real concern to the parents of adolescents. Furthermore, they are more informed of the long-term health consequences that may arise from a long term HPV infection. Studies conducted in various communities have consistently demonstrated links between increased knowledge about and vaccine acceptance. In addition, research has shown that those parents who have greater knowledge about the virus are more likely to report higher intentions to vaccinate their adolescents against HPV (Marshall et al., 2022). In addition, this pattern is observed in a variety of cultural and socio-economic environments, thus knowledge is a pivotal factor in the activation of the perceptual pathway of the Health Belief Model. Within the Health Belief Model, knowledge can be considered a modifying factor that may contribute to how individuals perceive susceptibility, severity, benefits, and barriers related to a health behavior (Rosenstock et al., 1988; Zhang et al., 2024).

The HBM suggests that parents who have insufficient knowledge about HPV may be filled with doubt and misconceptions about the safety and efficacy of vaccines. This uncertainty can lead to more concerns about vaccination fear, one of the main psychological factors in this study. The experience of fear is not necessarily the same, and can vary depending on the strength of the fear and the location of the experience (Wilson and Korfmacher, 2023). Concerns about vaccine side effects, misinformation, or perceived vaccine risks, however, could be a strong perceived barrier that may lead to vaccination fear and reduce parental attitudes to vaccinate, as seen as a result of extreme fear (Noreen et al., 2024). Perceived susceptibility and perceived threat, however, could be strengthened by moderate fear of the potential seriousness of HPV infection and its potential for long-term health effects and may further motivate preventive action such as HPV vaccination (Salleh et al., 2024). Fear can either hinder or aid decision making depending on the influence of knowledge and beliefs. Furthermore, public health studies in recent years demonstrate that vaccines' knowledge enhancements that are structured to increase understanding of HPV-related issues greatly reduce uncertainty and increase parental trust in vaccination decisions, thus positively impacting vaccine uptake (Heyde et al., 2024a). In addition to the importance of knowledge and vaccination fear, the HBM also proposes that parental attitudes toward HPV are a

result of weighing the potential benefits and barriers. Favorable attitudes toward HPV vaccination are much more likely to exist among parents who believe that the vaccine is effective in preventing cancer, and that it will benefit their adolescents' future health (Beavis et al., 2022). Whereas, when vaccine safety, social stigma, misinformation, and perceived lack of need are part of a person's concerns, these are likely to lead in a negative attitude and total rejection of the vaccine (Beavis et al., 2022).

Overall, research with parents of adolescents has shown that attitudes toward HPV vaccination are consistently associated with higher levels of knowledge, perceived benefits, and perceived barriers. Furthermore, the studies in the same group demonstrate that fears and misconceptions also contribute to vaccination fear (Smolarczyk et al., 2022). The Health Belief Model is a comprehensive framework that can be used to understand the interactions between knowledge, vaccination fear, and parental attitudes when combined. Together, these three factors help to determine if parents will vaccinate their adolescents for HPV, and thus, the extent to which adolescents are protected from HPV-related diseases and associated cancers.

2.6 Conceptual Framework

The conceptual model of the present study describes a complex interplay between knowledge, vaccination fear and parental attitudes, which influences parents regarding HPV vaccination of adolescents. The conceptual framework of the present study outlines the hypothesized relationships among knowledge, vaccination fear, and parental attitudes toward HPV vaccination among parents of adolescents. Knowledge, positioned as the independent variable, refers to parents' understanding of HPV transmission, associated diseases, cancer risks, and the role of vaccination in prevention. Although prior research suggests that parental knowledge contributes to HPV vaccine perceptions and acceptance, evidence also indicates that knowledge alone does not guarantee favorable vaccination attitudes (Heyde

[et al., 2024a](#)).

However, vaccination fear specifies dependent variable, encompasses parents' concerns and emotional responses regarding HPV vaccination. Within this framework, it is conceptualized through fear of diagnosis and fear of side effects, consistent with findings that safety concerns and adverse effects are key factors influencing parental vaccination decisions ([Al-Shaikh, 2025](#)). Moreover, parental attitudes, the second dependent variable, reflect parents' evaluations of HPV vaccination, including perceived safety, perceived risk, and overall support for vaccination. Studies have shown that attitudes are shaped by perceptions of vaccine benefits, risks, and safety concerns ([Heyde et al., 2024a](#)).

The conceptual model proposes that HPV-related knowledge is associated with both vaccination fear and parental attitudes toward HPV vaccination. As illustrated in the diagram, knowledge is linked to vaccination fear, suggesting that variations in parents' factual understanding of HPV may correspond with differences in their concerns regarding vaccination, particularly fear of diagnosis and fear of side effects. In a similar vein, knowledge is also connected to parental attitudes, indicating that parents' awareness of HPV and its prevention may be associated with their level of support for vaccination, perceptions of vaccine safety, and perceived risk ([Heyde et al., 2024a](#)).

Furthermore, the model examines the relationship between vaccination fear and parental attitudes, as parents' concerns about HPV vaccination may influence how they respond to vaccination. These proposed relationships are empirically tested through study hypotheses and statistical analyses; consequently, the model does not assume that one variable necessarily causes another. This approach is consistent with prior research highlighting the relevance of knowledge, vaccine-related concerns, perceived risk, and safety perceptions in shaping parental responses to HPV vaccination ([Al-Shaikh, 2025](#)).

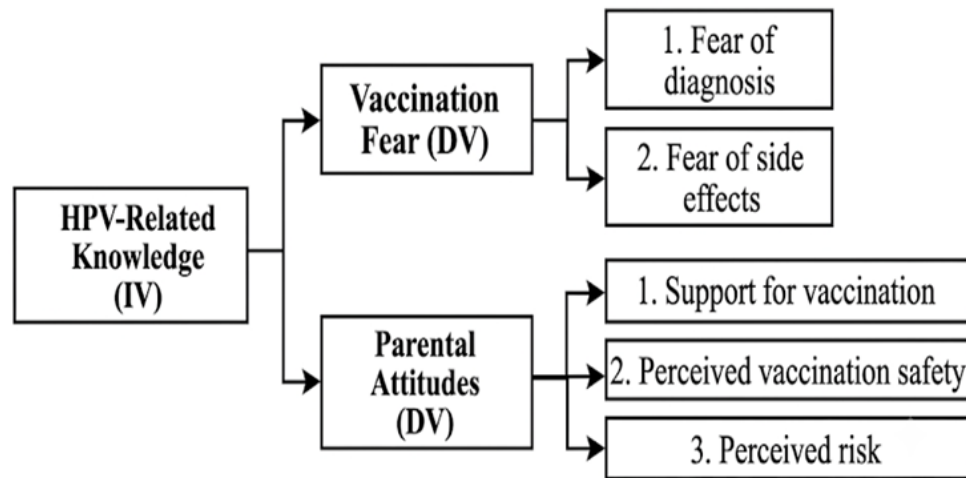


FIGURE 2.1: Conceptual Model of the Study

2.7 Rationale

Although HPV vaccination is well established as an effective method for preventing HPV-related diseases, its introduction and uptake in Pakistan have historically remained limited ([World Health Organization, 2024](#)). High-risk human papillomavirus (HPV) infection is responsible for approximately 5% of all human cancers worldwide, with cervical cancer accounting for the vast majority of HPV-attributable cancers. Globally, approximately 660,000 new cases of cervical cancer and 350,000 deaths were estimated in 2022 ([International Agency for Research on Cancer, 2024b](#)). On the other hand, HPV vaccination uptake is still poor in many lower middle income countries, with coverage among adolescents estimated at low levels often in the single figures in Pakistan, due to poor access, lack of knowledge and continuing social and cultural barriers. Parental attitudes about adolescent vaccination are often based on cultural beliefs, myths and doubts about vaccine safety rather than on scientific information ([World Health Organization, 2024](#)). In Pakistan, discussions on sexual health and reproductive health services are generally taboo, limiting young people and adolescents' visibility and educational efforts on HPV prevention from parents. This consistent public health knowledge gap is evident from national and regional research with many studies showing a significant proportion of parents are unaware of its link with cervical cancer and other anogenital diseases ([Ali et al., 2025c](#)). As the cervical cancer is one of the

top cancers among women in Pakistan and late diagnosis and limited screening compound the situation, it is alarming that there is lack of awareness about it.

Consequently, misconceptions, fear, and lack of knowledge persist and perpetuate vaccination fear and negative parental attitudes towards HPV vaccination particularly regarding safety, cultural concerns and vaccine myths associated with promiscuity (Khalil et al., 2025). Parental awareness and perceptions are the most important factors influencing adolescents' vaccine acceptance, given that adolescents rely on parents for all preventive health decisions. Lack of awareness not only affects comprehension of the severity of HPV and the various ways to prevent it but also increases fear, uncertainty and misinformation and decreases the chances of timely vaccination (Noreen et al., 2024). Behavioral research indicates that parental knowledge, vaccination fear and parental attitudes towards HPV are closely linked psychological factors that sequentially impact the process of vaccination decision making. Data indicates that a lack of or misinformation on vaccination contributes to the perception of risk and uncertainty, thus fostering greater vaccination fear (Heyde et al., 2024b). On the other hand, good and adequate knowledge helps to decrease uncertainty, increase perceived benefits and lead to better attitudes toward vaccines (Salleh et al., 2024). More recent studies also attest to the fact that vaccination choices are not solely rational but are influenced by emotional reactions, social pressure, and beliefs which are deeply integrated into the family decision process and work at the same time (Drolet et al., 2023). The Health Belief Model-based determinants of parents' emotional reactions, including fear, impact attitudes on vaccination (World Health Organization, 2025). However, these psychological and cultural factors gain even more significance when vaccine acceptance is determined in a collectivist society such as Pakistan, where the role of family authority is significant regarding health-related behaviors (Ali et al., 2025c). Therefore, the purpose of this study is to investigate the impact of knowledge on vaccination fear and parental attitudes towards HPV among parents of adolescents. The findings are anticipated to provide support for intervention design for culturally responsive initiatives, which can decrease fear, correct misconceptions, and enhance positive attitudes of parents. Finally, it can

help enhance school-based and community-based health education programs to increase uptake of HPV vaccines and decrease the health burden of cervical cancer in future generations ([United Nations Children's Fund, 2025](#)).

Chapter 3

Research Methodology

3.1 Research Design

This study used a quantitative correlational design to examine the impact of knowledge on vaccination fear and parental attitudes toward HPV among parents of adolescents. In particular, the study evaluated the impact of knowledge on fear-based responses, as well as positively and negatively influencing parental attitudes.

3.2 Sampling Method

In this study, parents of adolescents were recruited by a convenient sampling method. The method enabled data collection from the accessible population to be done in an efficient manner.

3.3 Sample Size

A total of 250 parents of adolescents (aged 9-17) were selected for the study ([Saxena et al., 2025](#)). The participants were selected from various localities of Islamabad and Rawalpindi, from private, government, and semi-government schools and colleges. These locations were used to obtain a wide representation of the parent population in the twin cities through data collection.

3.4 Data Collection Procedure

The data collection of this study was approved by the Institutional Review Board (IRB) of Capital University of Science and Technology. Approval was also granted from the appropriate educational institutions to recruit participants. The participants were given information about the study and were assured that their data will not be used for anything other than research and that it will be kept confidential. A convenient sample of parents of adolescents aged 9-17 years. Participant recruitment and questionnaire administration were conducted online. The researcher shared an online questionnaire developed through Google Forms with eligible parents through relevant online communication forums and groups facilitated by the institutional coordinators and principals. Before completing the questionnaire, participants were provided with information about the study and informed consent. They were informed that participation was voluntary that they could withdraw at any time without consequences, and that their responses would remain anonymous and confidential and would be used only for research purposes. Prior to main data collection, a pilot study was carried out to test the cultural appropriateness, clarity and comprehensiveness of the study instruments with 50 subjects before the main data collection. The results of the pilot study allowed researchers to be certain that the questionnaires were understood and applicable to the target population. Participants filled out a survey, which contained the Human Papillomavirus Knowledge Questionnaire (HPV-KQ), the Vaccination Fear Scale (VFS), and the Carolina HPV Immunization Attitude Scale (CHIAS). The data were collected anonymously, and participants were assured that their responses would remain confidential.. In addition, the data was analyzed in IBM SPSS Statistics Version 21 to explore the relationships between knowledge, vaccination fear, and parental attitudes towards HPV.

3.5 Documentation Method

Eligible parents of adolescents were asked to complete a self-administered questionnaire. The questionnaire was distributed electronically to eligible parents via

online communication platforms and groups facilitated by the institutions. After giving informed consent, participants filled out the questionnaire on their own. All responses were systematically documented securely to safeguard confidentiality, maintain accuracy and facilitate subsequent data analysis.

3.6 Eligible Characteristics of Participants

The characteristic of participants who were eligible for the study are following;

3.6.1 Inclusion Criteria

- i. Parents of adolescents aged 9 to 17 years.
- ii. Parents required a minimum of secondary education to ensure accurate completion of the questionnaires.

3.6.2 Exclusion Criteria

- i. Parents who have no legal guardianship of the adolescent do not have authority to make vaccination decisions.

3.7 Measuring Instruments

The present study examined its variables with original English language versions of psychological tools.

3.7.1 HPV Knowledge Questionnaire

The HPV Knowledge Questionnaire was first developed by [Fisher et al. \(2024\)](#) to assess subject's knowledge regarding Human Papillomavirus (HPV) and its vaccination. The scale assesses knowledge of HPV transmission, symptoms, prevention and vaccination to differentiate between incorrect knowledge and genuine uncertainty.

The scale consists of 13 items assessing general knowledge about HPV, gender differences in HPV infection and recommendation regarding HPV vaccination. Participants are asked to reply with True, False or 'Don't know'. All items are used to add up for a total score. The instrument has been shown to have good reliability with Cronbach's alpha of 0.83 which means that the instrument is able to measure in a consistent and reliable manner.

3.7.2 Vaccination Fear Scale

The Vaccination Fear Scale was designed by [Machalek et al. \(2023\)](#) to measure fear related to vaccinations. The instrument has 6 items which measure both cognitive and somatic symptoms and aims to measure the intensity of fear. The participants answer on a 5 point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting higher fear. The scale has demonstrated good reliability, with a Cronbach's alpha of 0.80, reflecting consistent measurement and there is no reverse scoring.

3.7.3 Carolina HPV Immunization Attitudes and Belief Scale

The Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) is a self-report tool developed by ([McRee et al., 2011](#)), designed to assess parental attitudes and beliefs regarding HPV vaccination. The original version of the scale consists of 16 items measuring multiple domains of vaccine-related perceptions, including perceived vaccine effectiveness, barriers to vaccination, anticipated regret, and social influences, with the purpose of evaluating how attitudes may impact vaccination decisions for adolescents.

Each item is rated on a 4-point scale (1=Strongly Disagree, and 4=strongly Agree). Items (5, 12, 13 and 16) are reverse scored before being analyzed. The scale has shown acceptable reliability of Cronbach's alpha in the range between 0.75 and 0.89, ensuring reliable measurement.

3.8 Ethical Considerations

Since HPV is a sensitive sexually transmitted infection, ethical considerations were strictly adhered to all throughout the study. Ethical clearance from the IRB of Capital University of Science and Technology, and official clearance from the relevant educational institutions were obtained before collecting the data. All participants have been provided with informed consent, describing the aim, procedures, voluntary participation, and ability to withdraw at any time without repercussions of the study. No personal identifiable information, such as names, phone numbers, e-mail addresses or IP addresses was gathered. All responses recorded were remained confidential, only accessible to the researcher. The link to the survey was sent via trusted channels, and respondents were informed that their responses would only be used for academic research purpose only. It was also explained to the participants that their involvement or non-involvement in the event would not impact on their relationship with any education institution. To maintain the dignity, privacy and psychological integrity of the participants, all data was handled, stored and reported securely, in an aggregate form.

Chapter 4

Results

The current research aimed to assess how knowledge influenced HPV vaccination fear and parental attitudes towards HPV vaccination among parents of adolescents. The results of the current study are presented in this chapter using both descriptive and inferential statistical analyses. The analyses are carried out on demographic characteristics of the participants, descriptive statistics, and Cronbach's alpha coefficients to determine the reliability of the study instruments. Pearson's correlation analysis was used to analyze the relationships between the study variables. Simple linear regression analyses were also performed to find predictive relationship between study variables. Furthermore, Independent-samples t-tests were used to compare differences between gender of adolescents and family system however, one-way analysis of variance (ANOVA) was used to compare differences between education levels of parents.

4.1 Missing Value Analysis

It is important to understand that missing data are a significant component of quantitative research, as these can introduce bias, affect the statistical power of the research, and influence the validity of results. Data was pre-screened for missing values before being used in the main statistical analyses. The percentage of missing data was determined for each variable; all of the variables in the study were determined to have zero (0%) missing data. This complete data set did not

require imputation or case dropping, which resulted in the use of the full sample ($N = 250$) for all analyses. There were no missing values, which further strengthened the robustness and credibility of the findings of the study.

4.2 Reliability Analysis (Pilot Study; $N= 50$)

TABLE 4.1: Reliability Analysis of pilot study instruments ($N=50$)

Scales	Items	α
KQ	10	0.92
VFS	6	0.89
CHIAS	16	0.91

Note. KQ = Knowledge Questionnaire; VFS = Vaccination Fear Scale; CHIAS = Carolina HPV Immunization Attitude Scale; α = Cronbach's alpha; $N = 50$.

The reliability of the instruments is shown in Table 4.1. A pilot study was carried out with 50 respondents to test the internal consistency of the instruments of the study before primary data collection. The reliability analysis showed good internal consistency of the three scales. The Cronbach's alpha for the Knowledge Questionnaire (KQ) was .92, the Cronbach's alpha for the Vaccination Fear Scale (VFS) was .89 and the Cronbach's alpha for the Carolina HPV Immunization Attitude Scale (CHIAS) was .91. Cronbach's alpha values of .70 and higher are acceptable (above .80 is well to excellent internal consistency) based on established standards. Therefore, the results showed that all of the instruments had good reliability in collecting data for this research. Based on these good reliability results from the pilot study, the same instruments were used for the main study.

4.3 Correlation Analysis (Pilot Study; $N=50$)

To explore the relationship knowledge, vaccination fear, and parental attitudes toward HPV, a pilot study was conducted on a sample of 50 parents of adolescents. This preliminary analysis is summarized in Table 4.2 that displays Pearson's correlation matrix.

TABLE 4.2: : Pearson Correlation between knowledge, vaccination fear and parental attitudes (N=50)

S. No.	Variables	KQ	VFS	CHIAS
1.	KQ	—		
2.	VFS	.59**	—	
3.	CHIAS	.66**	.78**	—

Note. KQ = Knowledge Questionnaire; VFS = Vaccination Fear Scale; CHIAS = Carolina HPV Immunization Attitude Scale, *Correlation is significant at the 0.01 level (1-tailed).

There was a strong positive correlation between HPV knowledge and HPV vaccination fear ($r = .59$, $p < .01$), meaning that the greater the HPV knowledge, the higher the level of HPV vaccination fear. The ties between knowledge and concerns with vaccine safety and side effects imply that higher awareness of HPV health risks is associated with higher concerns about vaccine safety and side effects.

At the same time, knowledge showed a significant positive correlation with parental attitudes ($r = .66$, $p < .01$) indicating that parents with high levels of knowledge have positive attitudes toward HPV vaccination. These findings confirm the importance of knowledge to facilitate vaccine acceptance.

This trend continued with vaccination fear, which had the greatest correlation with parental attitudes ($r = .78^{**}$, $p < .01$), which indicated that increased vaccination fear was associated with more negative attitudes towards vaccination. This connection is important to note that emotional concerns play an important role in shaping parental attitudes those who are more concerned

4.4 Frequencies and Percentages of Demographic Variables

Demographic characteristics of the 250 parent participants are shown in Table 4.3. The parents' age started with those aged 25 to 30 years ($n = 104$, 41.6%), followed

by those aged 31–40 years ($n = 85$, 34.0%) and the oldest (above 40 years) ($n = 61$, 24.4%). In terms of marital status, most participants were married ($n = 183$, 73.2%), with smaller numbers of divorced ($n = 25$, 10.0%), separated ($n = 24$, 9.6%), and widowed ($n = 18$, 7.2%) participants. At educational level, over one-fifth of participants has a Bachelor's degree ($n = 102$, 40.8%), a greater number of participants has a Master's degree or higher ($n = 82$, 32.8%) and the least number of participants has secondary education as their highest level of education ($n = 66$, 26.4%).

Regarding the employment status, housewives ($n = 67$, 26.8%) were the next largest group, followed closely by full-time employed parents ($n = 84$, 33.6%), part-time employed parents ($n = 54$, 21.6%) and self-employed ($n = 45$, 18.0%). With respect to family income, the distribution was relatively even parents earning between 50,000–100,000 PKR accounted for 29.6% ($n = 74$), those earning 100,000–200,000 PKR represented 29.2% ($n = 73$), followed by those earning less than 50,000 PKR at 22.4% ($n = 56$), and finally those with income above 200,000 PKR at 18.8% ($n = 47$). Concerning the number of children, the most common groups were those with 2 children (47.2%), 3 or more children (30.4%) and the least common were those with one child (22.4%). Turning to adolescent characteristics, the age distribution was remarkably balanced across the three categories: 9–11 years ($n = 83$, 33.3%), 12–14 years ($n = 83$, 33.2%), and 15–17 years ($n = 84$, 33.6%).

Gender-wise, there were more female adolescents (144, 57.6%) than male adolescents (106, 42.4%). Concerning HPV awareness, a large proportion of parents had heard about HPV ($n = 177$, 70.8%) and the HPV vaccine ($n = 174$, 69.6%). In addition, when asked if their adolescent had been vaccinated with HPV, 85 (34.0%) responded "yes," while 148 (59.2%) responded "no," and 17 (6.8%) responded "do not know." Finally, concerning the family system, nuclear families ($n = 129$, 51.6%) slightly outnumbered joint families ($n = 121$, 48.4%), indicating a nearly equal distribution between the two household structures of joint and nuclear systems.

TABLE 4.3: Frequencies and Percentage of Demographic variables (N=250)

Variable	Category	n	%
Age of Parent	25–30 years	104	41.6
	31–40 years	85	34.0
	Above 40 years	61	24.4
Marital Status	Married	183	73.2
	Divorced	25	10.0
	Widowed	18	7.2
	Separated	24	9.6
Education Level	Secondary Education	66	26.4
	Bachelor's degree	102	40.8
	Master's degree or above	82	32.8
Employment Status	Housewife	67	26.8
	Employed (Full-time)	84	33.6
	Employed (Part-time)	54	21.6
	Self-employed	45	18.0
Family Income	Less than 50,000 PKR	56	22.4
	50,000–100,000 PKR	74	29.6
	100,000–200,000 PKR	73	29.2
	Above 200,000 PKR	47	18.8
Number of Children	1	56	22.4
	2	118	47.2
	3 or above	76	30.4
Age of Adolescents	9–11 years	83	33.3
	12–14 years	83	33.2
	15–17 years	84	33.6
Gender of Adolescents	Male	106	42.4
	Female	144	57.6
Heard Regarding HPV	Yes	177	70.8
	No	73	29.2
Heard Regarding HPV Vaccine	Yes	174	69.6
	No	76	30.4
Adolescent Received HPV Vaccine	Yes	85	34.0
	No	148	59.2
	Don't Know	17	6.8
Family System	Joint	121	48.4
	Nuclear	129	51.6

4.5 Descriptive and Reliability Analysis of Main Study

TABLE 4.4: Descriptive, Reliability, and Psychometric Properties of the Study Scales ($N = 250$)

Scales	I	M	SD	α	Range		Skew	Kur	KS	p
					Actual	Potential				
KQ	10	1.67	.63	.94	1–3	10–30	.85	-.42	.14	.00
VFS	6	3.46	1.08	.92	1–5	6–30	-.29	-.91	.11	.00
CHIAS	16	2.78	.59	.92	1–4	16–64	-.03	-.54	.08	.00

Note. KQ = Knowledge Questionnaire; VFS = Vaccination Fear Scale; CHIAS = Carolina HPV Immunization Attitude Scale; M = Mean; SD = Standard Deviation; α = Cronbach's alpha; KS = Kolmogorov-Smirnov test for normality.

Table 4.4 presents the descriptive statistics, reliability coefficients, and psychometric properties of the three study scales. The Knowledge Questionnaire (KQ) demonstrated excellent internal consistency ($\alpha = 0.94$), with a mean score of 1.67 ($SD = 0.63$). Skewness (0.85) and kurtosis (-0.42) values were within acceptable limits; however, the Kolmogorov-Smirnov test was significant ($KS = 0.14$, $p < .001$), indicating non-normality. The mean score of the Vaccination Fear Scale (VFS) was 3.46 ($SD = 1.08$) and the scale was reliable ($\alpha = 0.92$). Skewness (-0.29) and kurtosis (-0.91) suggested mild deviation, and the KS test was significant ($KS = 0.11$, $p < .001$). The Carolina HPV Immunization Attitude Scale (CHIAS) also had high internal consistency ($\alpha = 0.92$) and a mean score of 2.78 ($SD = 0.59$). Skewness (-0.03) and kurtosis (-0.54) were near-normal, yet the KS test was significant ($KS = 0.08$, $p < .001$).

All three scales showed good internal consistency, ranging from Cronbach's alpha of 0.92 to 0.94, which meant that the instruments were highly reliable for the purpose of assessing HPV-related knowledge, HPV vaccination fear, and attitudes of parents. The mean scores indicated that the participants had low to moderate levels of knowledge about HPV, moderate levels of fear of vaccination, and

mostly positive attitudes towards HPV vaccination. While skewness and kurtosis values remained within acceptable limits for normality, the Kolmogorov-Smirnov test yielded significant results for all scales ($p < .001$).

Although the normality tests revealed statistically significant departures, the assumption of normality was deemed acceptable based on the overall distributional characteristics of the data and the relatively large sample size ($N = 250$). With larger samples, normality tests such as the Kolmogorov-Smirnov (K-S) test tend to identify practically insignificant deviations from normality.

Parametric methods are generally robust to moderate violations of normality when the sample size is sufficiently large, particularly when the data do not exhibit extreme skewness or outliers. Accordingly, parametric tests were employed for the subsequent analyses. The adequate psychometric properties of the study instruments further supported their appropriateness for the planned statistical analyses.

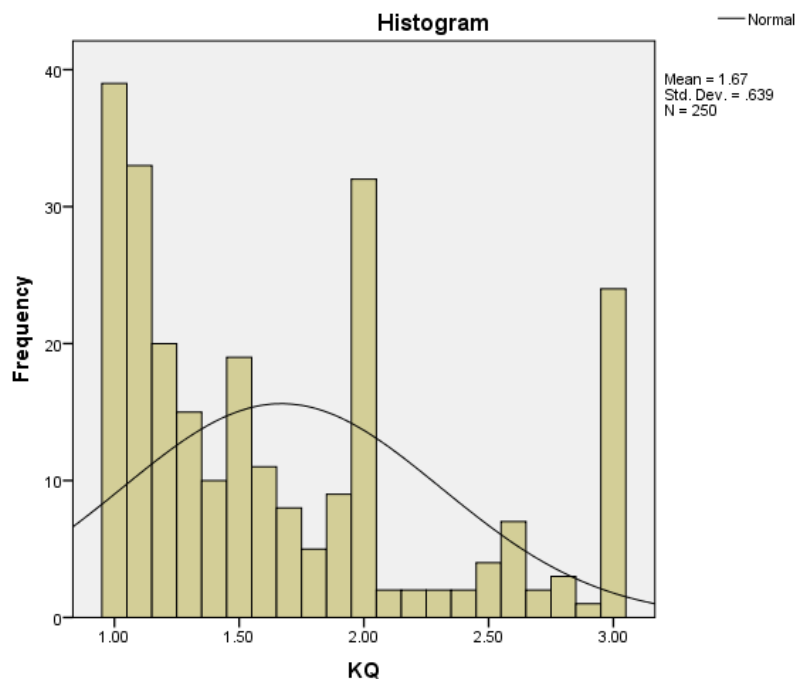


FIGURE 4.1: Visual inspection of the histogram for Knowledge Questionnaire scores revealed a distribution that approximated normality, with a slight positive skew ($N=250$)

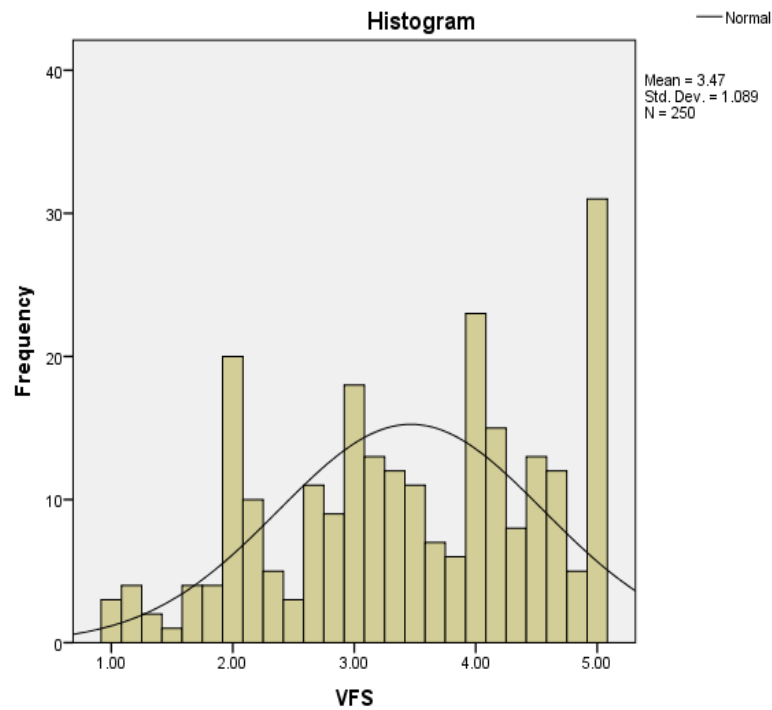


FIGURE 4.2: Visual inspection of the histogram for Vaccination Fear Scale revealed a distribution that approximated normality, with a slight positive skew.

(N=250)

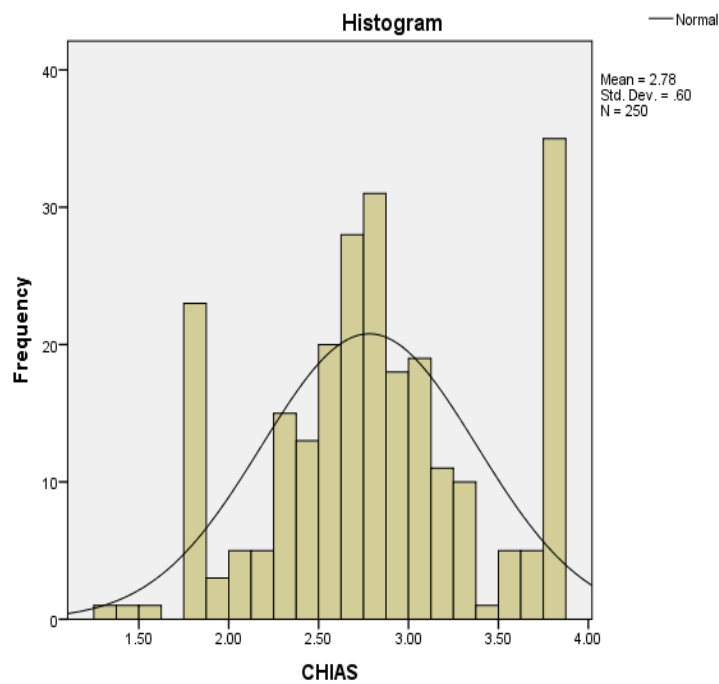


FIGURE 4.3: Histogram for CHIAS scores showed a distribution that was approximately normal, with a slight positive skew (N=250)

4.6 Pearson Correlation between Knowledge, Vaccination Fear and Parental Attitudes

Table 4.5 explains the Pearson correlation conducted to examine the relationship between Knowledge Questionnaire (KQ), Vaccination Fear Scale (VFS) and Carolina HPV Immunization Attitude Scale (CHIAS) in a sample of 250 participants.

TABLE 4.5: Correlation Among Study Variables

S. No.	Variables	KQ	VFS	CHIAS
1.	KQ	—		
2.	VFS	.06	—	
3.	CHIAS	-.07	.71**	—

Note. KQ = Knowledge Questionnaire; VFS = Vaccination Fear Scale; CHIAS = Carolina HPV Immunization Attitude Scale, *Correlation is significant at the 0.01 level (1-tailed).

Table 4.5 demonstrates the Pearson correlation analysis was conducted to examine the relationships among Knowledge (KQ), Vaccination Fear (VFS), and parental attitudes toward HPV immunization (CHIAS) in the main study sample ($N = 250$). The findings revealed that the correlation between Knowledge (KQ) and Vaccination Fear (VFS) was not statistically significant ($r = .06$), indicating that knowledge was not significantly associated with vaccination fear among parents of adolescents. Similarly, the relationship between Knowledge (KQ) and parental attitudes (CHIAS) did not reach statistical significance ($r = 0.07$), suggesting that knowledge was not meaningfully related to parental attitudes toward HPV immunization. Similarly, the relationship between Knowledge (KQ) and parental attitudes (CHIAS) was weak and negative ($r = -.07$) and did not reach statistical significance ($p > .05$), suggesting that knowledge was not meaningfully related to parental attitudes toward HPV immunization. Similarly, Vaccination Fear (VFS) and HPV immunization attitudes (CHIAS) demonstrated a strong, positive, and statistically significant correlation ($r = .71$, $p < .01$), indicating that higher levels of vaccination-related fear are strongly associated with more intensified scores on the CHIAS scale.

4.7 Simple Linear Regressions of KQ predicting VFS

TABLE 4.6: Simple Linear Regression Analysis of KQ Predicting VFS (N = 250)

Predictor	B	SE	β	t	p	95% CILL	95% CIUL
(Constant)	3.29	.19	–	17.06	.00	2.91	3.67
KQ	.10	.10	.06	.94	.34	-.11	.31
$R^2 = .004$							

Note. Dependent Variable: VFS (Vaccination Fear Scale); KQ = Knowledge Questionnaire; B = un-standardized coefficient; SE = standard error; β = standardized coefficient, p = significance level; CI = confidence interval; LL = lower limit; UL = upper limit.

To examine whether knowledge about HPV serves as a significant predictor of vaccination fear among parents, a simple linear regression analysis was conducted. The findings of this analysis are presented in Table 4.6 and 4.7. Table 4.6 presents the results of a simple linear regression analysis conducted to examine whether knowledge about HPV (KQ) predicts vaccination fear (VFS) among parents of adolescents. The regression model was not significant, $p = .347$, indicating that knowledge does not significantly predict vaccination fear. The model accounted for only 0.4% of the variance in vaccination fear ($R^2 = .004$), suggesting a very weak relationship between the two variables.

The unstandardized coefficient for KQ was $B = .102$ ($SE = .108$, $\beta = .060$, $t = .942$, $p = .347$), with a 95% confidence interval ranging from -0.111 to 0.315, which crosses zero, further confirming the non-significant nature of this relationship. The direction of the relationship shows positive, with higher levels of vaccination fear linked to slightly higher levels of knowledge, but this effect was not statistically significant. Based on the present findings, it is clear that knowledge does not meaningfully influence vaccination fear among parents, which means that other psychological cultural and social factors could be more important in exerting influence on vaccination fear.

4.8 Simple Linear Regression Analysis of KQ Predicting CHIAS

TABLE 4.7: Simple Linear Regression Analysis of KQ Predicting CHIAS (N = 250)

Predictor	B	SE	β	t	p	95% CILL	95% CIUL
(Constant)	2.90	.10	–	27.29	.00	2.69	3.11
KQ	-.07	.05	-.07	-1.19	.23	-.18	.04
$R^2 = .001$							

Note. Note: Dependent Variable: VFS (Vaccination Fear Scale); KQ = Knowledge Questionnaire; B = un-standardized coefficient; SE = standard error; β = standardized coefficient, p = significance level; CI = confidence interval; LL = lower limit; UL = upper limit.

Table 4.7 presents the results of a simple linear regression analysis conducted to examine whether knowledge about HPV (KQ) predicts attitudes toward HPV immunization (CHIAS) among parents of adolescents. The regression model was not significant, $p = .23$, indicating that knowledge does not significantly predict immunization attitudes. The model accounted for only 0.6% of the variance in parental attitudes ($R^2 = .001$), suggesting a very weak relationship between the two variables. However, the negative Beta value ($\beta = -.076$) indicates an inverse relationship, suggesting that higher knowledge about HPV is associated with slightly more positive attitudes toward immunization (as lower CHIAS scores reflect more favorable attitudes). However, this effect was not significant (table 4.7). The present study finding suggested that although knowledge about HPV does not have a meaningful effect on HPV immunization attitudes of the parents, there might be other psychological, cultural, or social factors that may explain the attitude formation. All the regression assumptions were deemed to be met. To conclude, regression analyses showed that HPV-related knowledge (KQ) was not significantly predictive of the vaccination fear (VFS) and HPV attitudes (CHIAS) of parents of adolescents. The regression analyses for both outcomes were non-significant, indicating no meaningful predictive relationship ($R^2 = .004$ and $.001$, respectively). These results indicate that knowledge is not enough to explain vaccination-related perceptions, meaning that additional psychological, cultural,

and social factors need to be taken into account in order to grasp the fear and attitudes of parents towards HPV vaccination.

4.9 Independent T-Test Analysis for Gender Difference of Adolescents

Table 4.8 explains the independent samples t-test conducted to compare parents' Knowledge, Vaccination Fear and Parental Attitudes based on the gender of their adolescent (male vs. female) in a sample of 250 parents. Independent samples t-

TABLE 4.8: Independent Samples t-test Examining Differences among Gender Difference in Adolescents

Vari	Male		Female		t	p	95% CI		Cohen d
	M	SD	M	SD			LL	UL	
KQ	1.67	.62	1.67	.65	.07	.93	-.15	.16	0.01
VFS	3.66	1.03	3.33	1.12	2.37	.01	.05	.60	0.30
CHIAS	2.91	.57	2.69	.60	2.83	.00	.06	.36	0.36

Note. Knowledge Questionnaire; VFS= Vaccination Fear Scale; CHIAS= Carolina HPV Immunization Attitude Scale, M= mean, SD= standard deviation, t= independent sample t-test, CI= confidence interval, p= significance, Cohen's d= effect size

tests were performed to determine if there were differences in HPV-related knowledge, fear of HPV vaccination, and/or HPV vaccination attitudes between parents of male adolescents and parents of female adolescents and the results are presented in Table 4.8. In comparison, there was no difference in knowledge between the two groups. There was virtually no difference in the scores for parents of male (M = 1.67, SD = 0.62) and female (M = 1.67, SD = 0.65) adolescents, and the mean difference was very small. There was no effect size (Cohen's d = 0.01) for adolescent gender, indicating that the gender of the adolescent was not a significant factor in explaining differences in parental knowledge. For male adolescents parents reported higher fears of vaccination (M=3.66, SD=1.03) than parents of female adolescents (M=3.33, SD=1.12), a difference of 0.33 points on the mean.

This difference was statistically significant and there was a small effect size (Cohen's $d = 0.30$), so there was more vaccination fear by parents of males than by parents of females about HPV vaccination. Similarly, parents of male adolescents ($M = 2.91$, $SD = 0.57$) had more negative attitudes towards HPV immunization than the parents of female adolescents ($M = 2.69$, $SD = 0.60$) with a mean difference of 0.22 points. This difference was also statistically significant, with a small-to-moderate effect size (Cohen's $d = 0.36$), suggesting that parents of sons maintained less favorable views toward HPV vaccination compared to parents of daughters. Overall, these findings suggest that while HPV-related knowledge does not differ by adolescent gender, significant differences exist in vaccination fear and attitudes. Parents of male adolescents demonstrate greater vaccination fear and more negative attitudes toward HPV immunization compared to parents of female adolescents, highlighting the influence of gender-based perceptions on parental vaccination decisions.

4.10 Independent T-Test Analysis for Family System

TABLE 4.9: Independent Samples t-test Examining Differences among Family System

Var	Joint		Nuclear		t	p	95% CI		Cohen <i>d</i>
	M	SD	M	SD			LL	UL	
KQ	1.67	.69	1.67	.59	.06	.94	-.15	.16	0.01
VFS	3.75	.98	3.20	1.13	4.09	.00	.28	.81	0.52
CHIAS	2.96	.54	2.62	.61	4.62	.00	.19	.48	0.59

Note. KQ= Knowledge Questionnaire; VFS= Vaccination Fear Scale; CHIAS= Carolina HPV Immunization Attitude Scale, M= mean, SD= standard deviation, t= independent sample t-test, CI= confidence interval, p= significance, Cohen's d = effect size

Table 4.9 explains the independent samples t-test conducted to compare parents' Knowledge, Vaccination Fear and Parental Attitudes based on family system (nuclear vs. joint family system) in a sample of 250 parents. An independent samples

t-test was carried out to in table 4.6 explore whether parents from joint and nuclear family systems differed in their HPV-related knowledge, vaccination fear, and attitudes toward HPV immunization. Looking first at knowledge, no notable difference emerged between the two groups. Parents from joint families had a mean score of 1.67 (SD = .69), while those from nuclear families scored similarly, with a mean of 1.67 (SD = .59). The t-test yielded a value of 0.06 with 248 degrees of freedom and a p-value of .94. The confidence interval ranged from -0.15 to 0.16, and the effect size was negligible at 0.01. The findings indicate that family structure is not seen to influence parents' HPV related knowledge. However, there was a clear contrast with regard to fear of vaccination. The mean score of fear was higher in the parents of joint families ($M = 3.75$, $SD = .98$) than in those of nuclear families ($M = 3.20$, $SD = 1.13$). There was a statistically significant difference, $t(248) = 4.0$, $p < .001$. The confidence interval ranged from 0.28 to 0.81 and the effect size was moderate ($d = 0.52$), indicating a significant contribution of the family system to the vaccination fear. The same applied to parental attitudes. Similarly, parental attitudes toward HPV varied among the two groups. The attitude scale scores of the parents in the joint families were higher ($M = 2.96$, $SD = .54$) than the attitude scale scores of the parents in the nuclear families ($M = 2.62$, $SD = .61$). This difference was statistically significant, $t(248) = 4.62$, $p < .001$. The confidence interval ranged from 0.19 to 0.48, and the effect size was moderate to large ($d = 0.59$); indicating that family system has a substantial impact on parental attitudes toward HPV. This difference was statistically significant, $t(248) = 4.62$, $p < .001$. The confidence interval spanned from 0.19 to 0.48, and the effect size was moderate to large ($d = 0.59$), suggesting that family system has a considerable influence on parental attitudes toward HPV vaccination. The sample comprised 121 participants from the joint family system and 129 from the nuclear family system, representing an approximately 0.94:1 ratio.

Taken together, these findings indicate that while family system does not relate to knowledge about HPV, it does appear to influence both vaccination fear and attitudes. Parents from joint families reported greater fear and held more pronounced attitudes toward HPV immunization compared to those from nuclear families.

4.11 ANOVA Comparison of Study Variables across Parental Education Levels (Secondary, Bachelor's, Master's)

TABLE 4.10: Differences in Study Variables by Educational Level

Var	SE (1)		BS (2)		MS (3)		$F(2, 247) p$		Post Hoc
	M	SD	M	SD	M	SD			
KQ	1.57	.68	1.79	.68	1.60	.53	3.03*	.05	ns
VFS	4.12	.96	3.38	1.08	3.04	.96	21.65***	.00	1 > 2; 1 > 3
CHIAS	3.11	.55	2.78	.62	2.52	.48	20.62***	.00	1 > 2 > 3

Note. Secondary Education, 2 = Bachelor's Degree, 3 = Master's Degree. VFS = Vaccination Fear Scale; CHIAS = Carolina HPV Immunization Attitude Scale; , ** $p < .001$.

The mean scores and standard deviations of knowledge, vaccination fear and attitudes toward HPV vaccination by three levels of parental education are shown in Table 4.10. There were no significant differences notable in knowledge scores between parents with a bachelor's degree ($M = 1.79$, $SD = 0.68$) and those with a master's degree ($M = 1.60$, $SD = 0.53$) or secondary education ($M = 1.57$, $SD = 0.68$). However, a significant difference was found for vaccinations fear. Parents who obtained secondary education reported the highest level of vaccination fear ($M = 4.12$, $SD = 0.96$), followed by parents with a bachelor's degree ($M = 3.38$, $SD = 1.08$), and the lowest level of fear was reported for parents with a master's degree ($M = 3.04$, $SD = 0.96$). Likewise, significant differences were observed for parental attitudes. Parents with a secondary education had the most negative attitudes ($M = 3.11$, $SD = 0.55$), followed by those with a bachelor's degree ($M = 2.78$, $SD = 0.62$), and those with a master's degree had the most positive attitudes ($M = 2.52$, $SD = 0.48$). To conclude, these results suggest that parents' education has a significant impact on vaccination fear and parental attitudes.

Chapter 5

Discussion and Conclusion

This chapter discusses the empirical findings of this study with respect to the study objectives and hypotheses; which were derived from the analyses conducted in this study. Moreover, this chapter emphasizes the contribution of the current study to the existing body of knowledge and points out areas for future studies. Results are discussed within the framework of the existing literature and theory.

This study aimed to measure the impact of knowledge on vaccination fear and parental attitude towards HPV among parents of adolescents quantitatively. The main goal was to gauge the degree to which knowledge impacts the vaccination fear and in turn impacts parental attitudes towards HPV among parents of adolescents. Furthermore, the study explored the association between knowledge and vaccination fear and parental attitudes, which indicated whether knowledge was a protective or risk factor for parental attitudes regarding vaccination among parents. Moreover, this study examined the knowledge differences and vaccination fear among adolescents, as well as the parental attitudes toward HPV among their parents, with respect to their gender, family system and education levels. Additionally, the study explored differences in knowledge, vaccination fear among adolescents and parental attitudes toward vaccination among parents, by gender, family system, and level of parental education. These were explored to understand the factors that may affect knowledge and parent attitudes towards HPV. By identifying these relationships, the study contributes to a growing body of research on

HPV vaccine uptake in Pakistan, particularly the psychological and educational factors influencing parental attitudes toward adolescent vaccination. A quantitative research design was used to examine the impact of knowledge, on vaccination fear, and parental attitudes. The total number of parents picked up was 250 who were parents of adolescents from different schools and colleges of Rawalpindi and Islamabad. The participants were selected from both the Government and Private educational institutions with an aim of getting a cross section of various socio-economic and educational backgrounds. A convenience sampling technique was used in recruiting the participants who were appropriate to the research purposes. The data-collection was achieved with the help of the standardized quantitative instruments with the original English version. Knowledge of HPV-related issues was assessed by the Knowledge Questionnaire (KQ) and fear related to vaccination with the Vaccination Fear Scale (VFS) while parental attitudes toward HPV immunization were measured with the Carolina HPV Immunization Attitude Scale (CHIAS). For analysis of the data the Statistical Package for the Social Sciences (SPSS) version 21 was used. Recruitment of participants added to the sample diversity, and provided a more complete analysis of the potential influences of different educational, socio-economic, and cultural backgrounds on knowledge, vaccination fear, and parental attitudes toward HPV immunization for their adolescent. This sampling strategy therefore increased the representativeness of findings from the study to other demographic groups of parents.

5.1 H1: Association between Knowledge and Vaccination Fear

The present study hypothesized that knowledge would be negatively correlated with HPV vaccination fear among parents of adolescents. Contrary to the initial hypothesis, there was a positive association between knowledge and vaccination fear ($r = .060$, $p = .347$), which indicates that this variable does not significantly contribute to vaccination fear in this sample. The results do not support the hypothesis H1, since it was not found that there is a significant negative correlation

between the two variables. This non-significant relationship between knowledge and vaccination fear can be understood in the wider social, cultural and emotional context of Pakistan and other similar contexts where the social, emotional and trust related factors may have a more significant influence on fear surrounding vaccines than the knowledge. Despite high awareness among parents, misconceptions about HPV are prevalent in Pakistan, such as a lack of understanding of the link between HPV vaccination and fertility, stigma about sexual health, and low trust in vaccination campaigns (Shamsi et al., 2024a; Baloch et al., 2023; Hakim et al., 2025). In addition, empirical evidence from the past few years in Punjab suggests that vaccination fear among parents is more influenced by risk perceptions and social norms than by actual knowledge (Tahira and Anjum, 2026). This is similar to the international evidence recent systematic review of COVID-19 vaccination fear identified that emotions and lack of trust were more likely to drive vaccination fear than knowledge and another international study showed that misinformation and exposure to social media were more likely to drive vaccination fear even among well-informed populations (Schwartz et al., 2023). Consequently, in culturally sensitive contexts such as Pakistan, vaccination fear appears to operate independently of knowledge, which may explain why the proposed hypothesis was not supported.

5.2 H2: Association between Vaccination Fear and Parental Attitudes

This study hypothesized that there would be a significant positive correlation between parental attitudes towards Human Papillomavirus (HPV) and vaccination fear among parents of adolescents. Results found showed a strong, positive and statistically significant relationship between vaccination fear and parental attitude towards HPV vaccination ($r = .710$, $p < .001$), which indicated that increased vaccination fear is correlated with less favorable vaccination attitudes of parents towards HPV vaccination. These results support H2 as there was a significant association between the two, with a large magnitude, meaning that there is strong

evidence that there is an association. This indicates that the fear of HPV vaccination is a key factor in parental perceptions and reactions to HPV vaccines, and can lead to greater vaccination fear and negative attitudes. The high level of positive association between vaccine fear and parental attitudes, however, can be explained in terms of culturally embedded belief systems prevalent in Pakistan where vaccine-related fear is closely intertwined with negative attitudes, which are rooted in misinformation, religious concerns and widespread mistrust in healthcare systems (Baloch et al., 2023).

This negative attitude can be manifested as rejection of HPV vaccination, lack of willingness to approach health care to seek information on HPV vaccination, perception of vaccine as a potential threat or unnecessary treatment, or the preference for alternative or traditional treatment methods over a health care professional's recommendations. Research from Pakistan consistently shows that parental fears about infertility, side effects, and vaccine safety have a significant impact on attitudes towards HPV vaccination, often leading to resistance and vaccination fear (Shamsi et al., 2024a; Baloch et al., 2023; Hakim et al., 2025). A study done in Punjab also found that negative perceptions and fear-based beliefs have a greater impact on vaccination attitudes than knowledge and education (Tahira and Anjum, 2026).

5.3 H3: Association between Knowledge and Parental Attitudes

In the present study, the hypothesis of significant positive association between parental knowledge about Human Papillomavirus (HPV) and their attitudes towards HPV vaccination among parents of adolescents was hypothesized. The correlational results indicated, however, that there was an inverse relationship between knowledge and parental attitudes ($r = -.076$, $p = .233$) and thus knowledge does not meaningfully influence parental attitudes in this sample. The results showed that the knowledge and parental attitudes were not supported by the

empirical data because there was no statistically significant correlation between knowledge and parental attitudes. The non-significant correlation between knowledge and parental attitudes highlights the significant part played by socio-cultural and emotional factors in Pakistan, where HPV vaccination is still considered to be a sensitive and taboo health issue. However, according to the Pakistani study, while there is some awareness among parents, this awareness is often not enough to overcome the negative attitudes, which are often rooted in cultural taboos, misinformation, and lingering concerns about vaccine safety ([Shamsi et al., 2024a](#); [Baloch et al., 2023](#); [Hakim et al., 2025](#)). Such negative attitudes sometimes are expressed as the refusal to consult health workers on vaccination, the idea that it is unnecessary or that perhaps it is harmful, and a belief for the use of traditional medicine rather than biomedical treatment. Likewise, findings in Punjab reveal that the perceived barriers and mistrust in health systems have a greater impact on attitudes than merely being factually aware of these barriers, suggesting that factual awareness does not necessarily lead to positive attitudes in the presence of emotional and systemic barriers ([Tahira and Anjum, 2026](#)). This trend is supported by international data of a systematic review found that providing knowledge alone did not significantly predict attitudes towards vaccination unless combined with trust and positive health beliefs, suggesting that simply providing facts is inadequate to change entrenched attitudes.

In another global study, [Schwartz et al. \(2023\)](#) found that learners' informational awareness is important, learners' emotional response and cultural context tended to be more salient in influencing parental attitudes when the decision concerned their health. In addition, qualitative research demonstrates that stigma and misinformation reduce the effect of knowledge on decision-making processes, especially in situations where reproductive health issues are culturally sensitive ([Nguyen et al., 2024](#)). The stigma surrounding HPV due to its sexual transmission in Pakistan also affects the connection between knowledge and parental attitudes, as parents may be reluctant to access information that conflicts with their beliefs or social norms. Together these results indicate that emotional and cultural factors influence parents' attitudes more strongly in the Pakistani context as well as in

the context of other countries across the world.

5.4 H4: HPV Knowledge as a Predictor of Vaccination Fear

In the current study, knowledge did not significantly predict vaccination fear among the parents. Although knowledge is an important component of informed health decision-making, the present findings suggest that factual knowledge alone may not be sufficient to reduce fear or concerns regarding HPV vaccination. Previous literature indicates that vaccination decisions are influenced by multiple factors beyond knowledge, including perceived vaccine safety, trust in healthcare providers, misinformation, perceived barriers, social influences and individual beliefs (Vincent et al., 2024). Therefore, parents may possess adequate factual information about HPV while still experiencing concerns about vaccine safety, possible side effects, or misinformation encountered through social media and interpersonal networks (Cheema et al., 2024).

The non-significant predictive impact of knowledge in the present study may therefore indicate that having information does not necessarily translate into reduced vaccination fear. Knowledge may be acquired through different sources, such as healthcare providers, educational institutions, social media, family members and other information channels (Vincent et al., 2024). However, the present study assessed the level of knowledge rather than the specific sources through which participants obtained this information. Consequently, it cannot be determined from the present findings whether the information received by parents was derived from reliable or unreliable sources. Moreover, the content and accuracy of information may differ across sources, meaning that a parent can have factual knowledge about HPV while simultaneously being exposed to messages that generate fear or uncertainty about vaccination (Tobaiqy and MacLure, 2024; Pelissier et al., 2025). This interpretation is consistent with evidence suggesting that psychological and perceptual factors may play an important role in HPV vaccination

decisions. Similarly, study reported that perceived benefits, perceived barriers, and perceived susceptibility were stronger determinants of HPV vaccination intention than knowledge, highlighting the importance of factors identified within the Health Belief Model (Wu et al., 2025). Additionally, another study outcome revealed that knowledge was found to be associated with HPV awareness, but, decision for vaccination was mainly influenced by attitudes, risk perception, and confidence in vaccine safety (Cheema et al., 2024). Furthermore, higher HPV knowledge was not necessarily associated with higher HPV vaccine intention, suggesting that vaccine confidence-building interventions and addressing misconceptions would be more effective than HPV vaccine information interventions (Pelissier et al., 2025). Taken together, these findings highlight the need for comprehensive approaches to decrease vaccination fear, which involve increasing vaccine confidence, addressing vaccine-related misinformation, and building trust in health providers in addition to increasing HPV-related knowledge.

5.4.1 Knowledge as a Predictor of Parental Attitudes toward HPV

The present study showed that knowledge did not significantly predict parental attitudes toward HPV vaccination among the parents. Although parents with greater knowledge may have a better understanding of HPV infection and its health consequences, factual awareness alone may not be sufficient to develop positive attitudes toward vaccination. Parental attitudes are influenced not only by what parents know, but also by how they perceive the risk of HPV, the safety and effectiveness of the vaccine, and the social context in which vaccination decisions are made (Chen et al., 2024). Within Pakistan, cultural values and social expectations may play a notable role, given that HPV is linked to a sexually transmitted infection, which can make conversations about HPV and vaccination uncomfortable for parents. A recent systematic review indicated that parental choices regarding HPV vaccination were shaped by norms and values, particularly concerns related to sexuality, moral beliefs, external pressures, and vaccine-specific issues (Salleh et al., 2024). Likewise, a recent study conducted revealed that HPV

vaccination decisions may be affected by culturally rooted elements, such as social approval, family involvement, religious and community influences, and reproductive health considerations.

Consequently, parents may have sufficient knowledge about HPV but still display hesitant or less favorable attitudes when their social or cultural context reinforces doubts about vaccination (Noreen et al., 2024). Moreover, the predictive role of knowledge observed in this study aligns with earlier work suggesting that HPV vaccination attitudes and intentions are shaped not only by knowledge but also by perceived benefits, barriers, vaccine confidence, and risk perception (Chen et al., 2024; Song et al., 2025).

In line with this, interventions that target beliefs, risk appraisal, and motivational factors have been found to be more effective in encouraging vaccination than those focused solely on providing information (Rafeie et al., 2024). These observations indicate that while knowledge serves as a necessary basis for informed choices, it does not automatically result in positive attitudes toward HPV vaccination.

Furthermore, concerns about vaccine safety and accessibility can remain prevalent even among those with considerable HPV-related knowledge, reinforcing the idea that knowledge alone is insufficient for vaccine acceptance (Chauhan et al., 2025). In light of these considerations, the current findings imply that efforts to improve parental attitudes toward HPV vaccination should extend beyond simple information delivery (Heyde et al., 2024b). Future vaccination initiatives ought to integrate accurate HPV education with targeted strategies addressing safety worries, misunderstandings, access-related obstacles, perceived susceptibility, and trust in health recommendations. Adopting such multifaceted approaches may prove more effective in turning knowledge into favorable parental attitudes toward HPV vaccination (Alqethami and Alhalal, 2025).

5.5 H5: Demographics

The present study investigated gender differences in knowledge, vaccination fear, and parental attitudes toward HPV among parents of adolescents. No significant difference was found between the knowledge among the parents of male and female adolescents. Both adolescents' parents are equally knowledgeable and aware of HPV infection and prevention. This may be associated with the growing access to health information, such as in schools, via digital platforms and public health campaigns, which have helped to close traditional gender based knowledge gaps (Luo et al., 2024). The evidence further suggests that education has an even bigger impact on knowledge than gender. In a cross-sectional study of HPV among Chinese adolescents and young adults, knowledge was found to be significant predictors of intention to vaccinate, whereas there was no significant difference in levels of knowledge by gender after adjusting for other factors (Luo et al., 2024). The results of the present study have also been found in a study conducted among French adolescents, which showed that HPV knowledge is similar for both boys and girls after HPV-based school-based education interventions (Pelissier et al., 2025). Parents of male adolescents, however, reported significantly lower vaccination concerns and less favorable attitudes toward HPV vaccination compared with parents of female adolescents. This finding may reflect the historical emphasis of HPV vaccination programmes on cervical cancer prevention, which may have contributed to greater familiarity with HPV vaccination as a health measure for females. Consequently, some parents of male adolescents may perceive HPV vaccination as less relevant to their sons or may have less awareness of the benefits of vaccination for males. Similarly evidence indicates that parents are generally more likely to accept HPV vaccination for their daughters than for their sons, partly because of limited awareness of the benefits of HPV vaccination for male adolescents and the perception of HPV vaccination as primarily a cervical cancer prevention strategy (Heyde et al., 2024a). Overall, these findings align with recent literature indicating that parents of adolescent males more likely to delay vaccinations due to safety concerns and lack of perceived benefits, and positive parental attitudes shown to be highly correlated with perceived susceptibility, perceived benefits,

and exposure to accurate health information ([Luo et al., 2024](#)). Together, these results indicate that a gender-sensitive approach to HPV acceptance incorporates gender-inclusive educational strategies with messaging that vaccines are important for both males and females should be the target of future health promotion programs to decrease vaccination fear, increase parental attitudes, and vaccine uptake among adolescent males and females.

Moreover, the current study also investigated the influence of family structure on parents' HPV-related perceptions of adolescents. The results indicated that there was no significant difference between the HPV knowledge of adolescents from the joint family and nuclear families, indicating that family structure does not seem to have a significant effect on HPV knowledge. This suggests that knowledge about health information via schools, health care providers, electronic media and social media distribution platforms is fairly consistent across family systems, which reduces knowledge gaps. This is supported by recent evidence showing that educational exposure and socioeconomic status and information accessibility are more important in determining HPV knowledge than household composition ([López et al., 2022](#)). This finding is supported by recent evidence showing that educational level, socioeconomic status, and access to health-related information are important factors associated with differences in HPV knowledge. Similarly, study reported that knowledge varied according to educational characteristics, with higher knowledge observed among female students, health-science students, and those living in urban areas ([Atif, 2025](#)). These findings suggest that differences in educational exposure, socioeconomic circumstances, and access to health information may contribute to variations in HPV knowledge. But there was a significant difference in the fear of vaccination between the adolescents belonging to joint families and nuclear families. This could be due to various opinions from the extended family members, such as grandparents and relatives, who may have misconceptions about vaccine safety and can contribute to adolescent uncertainty and fear. Elders have significant influence over health-related decisions in collectivistic cultural contexts; and conflicting messages may exacerbate vaccination concerns ([Heyde et al., 2024a](#)). This is supported by a systematic review which

concluded that family beliefs and social influences significantly influence HPV vaccine uptake (Heyde et al., 2024b). Another study also found that misinformation and negative perceptions within the family are important impediments to HPV vaccination, especially in cultures with a high degree of collective decision-making norms (Ali et al., 2025a). Additionally, family structure can play a meaningful role in shaping beliefs and choices about vaccination, since health-related decisions are often guided by family norms, communication patterns, and shared views. Findings from South Asia suggest that family composition and family-based influences may be linked to vaccine hesitancy, though this association can differ in direction depending on the context (Stuetzle et al., 2025).

Studies on HPV vaccination indicate that decisions about vaccination may involve both parents, with family support and spousal views shaping parental choices (Wong, 2011). In Pakistan, relatives especially fathers and elder family members have been found to exert considerable influence over HPV vaccination decisions (Khan et al., 2025). Accordingly, the greater fear of vaccination and more unfavorable parental attitudes seen among participants from joint families in this study could stem from increased exposure to shared family perspectives and group-based decision-making. All together, these results highlight the importance of family structure as a socio-cultural factor affecting the fear and attitude towards HPV, and its weak effect on the acquisition of knowledge. Furthermore, the present study showed no significant differences in knowledge between the various education groups of parents. The lack of a significant finding could be attributed to the fact that health information is readily available from health care providers, electronic media, and public health promotional initiatives (Ntonifor et al., 2025). In recent years, HPV and its vaccine information has been increasingly accessible to everyone regardless of level of education and parents with different educational attainment can learn the same factual information. But, prior studies show that knowledge is not enough to predict vaccination uptake as parents' confidence in vaccines, trust in healthcare professionals, and perceptions of vaccine safety also play a role in their decision making (Klassen et al., 2024). Moving towards, parental education had a significant impact on vaccination fear. Parents

with secondary education showed the highest vaccination fear, while those with master's degrees showed the lowest vaccination fear. This significant finding may be attributed to the role of higher education in improving health literacy, critical thinking, and the ability to evaluate scientific information, making individuals less susceptible to misinformation circulating through social media and informal sources (Purvis et al., 2024). Furthermore, parents with greater education levels are more likely to consult trusted health experts and evidence-based sources, minimizing confusion and anxiety about vaccine safety (Chen et al., 2024).

Similarly, the same pattern was found for parental attitudes, as the present study also found significant differences between the parental attitudes with varying levels of education regarding HPV. Parents who had a master's degree had the most positive attitudes and parents with secondary education had the least positive attitudes. Higher education can enhance trust in health care providers, critical evaluation of health information and preventive health behaviors.

These results align with a national survey revealed that parents with higher education levels had significantly higher intentions toward vaccination compared with those with lower education, and had more positive attitudes toward vaccination than those with lower education (Kornides et al., 2024). Similarly, a recent study found that parents with lower levels of education reported higher vaccination fear for all childhood vaccines, including HPV, suggesting that education is a key factor in parental vaccine attitudes (Santibanez et al., 2024).

To conclude, results indicate that education has a more significant impact on vaccination fear and parental attitudes than knowledge. The results highlight the need for the development of educational programs and interventions that not only raise awareness about HPV and its vaccination but also address misconceptions, enhance health literacy, and boost confidence in vaccine safety, especially among parents with low levels of education.

5.6 Conclusion

This study's primary goal was to evaluate the impact of knowledge on vaccination fear and parental attitudes towards HPV among adolescent parents. To summarize, the results of this research provide partial support for the hypotheses for this study. There was not enough evidence to support the hypothesized negative relationship between HPV-related knowledge and vaccination-related fear, meaning that knowledge does not effectively reduce vaccination-related fear among parents. Similarly, there was no evidence that being aware of HPV had a meaningful impact on parental attitudes, as was suggested by the proposed negative relationship between knowledge and attitudes. The hypothesis that there would be a positive association between increased vaccination fear and negative vaccination attitudes was, however, highly supported, with increased fear found to be related to increased negative attitudes towards HPV vaccination. In conclusion, these findings suggest that parental attitudes toward HPV are not driven solely by knowledge, also the emotional and cultural factors play an important role in their willingness to vaccinate their adolescents or not.

5.7 Limitations and Suggestions

Following are the limitations and suggestions of the present study;

- i. The use of self-report questionnaires and convenience sampling may have introduced response and selection biases. Therefore, the findings may not be fully representative of the broader population of parents of adolescents in Pakistan.
- ii. The study was conducted within a limited geographical area, specifically Rawalpindi and Islamabad. Consequently, the findings may not capture the diverse cultural and contextual differences that exist across the provinces and regions of Pakistan.
- iii. The study focused on knowledge, vaccination fear and parental attitudes; however, other relevant factors, such as religious beliefs, trust in healthcare providers, exposure to social media, previous vaccination experiences were not examined. These factors may also contribute to parental decision-making regarding HPV

vaccination. iv. The non-significant associations between knowledge and vaccination fear, as well as between HPV knowledge and parental attitudes, indicate that knowledge alone may not fully explain parental responses toward HPV vaccination. Other unexamined factors may mediate or moderate these relationships.

v. The correlational design of the study limits the ability to establish causal relationships among HPV knowledge, vaccination fear, and parental attitudes. Therefore, the findings should be interpreted as associations rather than evidence that one variable causes changes in another.

vi. The study examined differences in parental responses according to the gender of their adolescent child however the gender of the parent was not examined as an influencing factor. This is an important limitation because mothers and fathers may differ in their knowledge, concerns, perceptions, and decision-making regarding HPV vaccination. Within Pakistan, where parental roles and involvement in adolescent health-related decisions may vary within families, considering parental gender could have provided a more comprehensive understanding influencing vaccination-related decisions.

5.8 Implications

The implications of the study are following;

- i. The findings can contribute to the existing literature on parental HPV vaccination decision-making in Pakistan and may provide a basis for future researchers, academics, and public health professionals to further investigate factors associated with HPV vaccine uptake.
- ii. Health authorities, schools and healthcare providers should collaborate to develop parent-centered and culturally responsive HPV awareness initiatives. Such initiatives should provide accurate information while addressing common misconceptions, concerns, and stigma surrounding HPV, vaccination, and reproductive health.
- iii. Since HPV knowledge alone may not be sufficient to reduce vaccination fear or develop favorable parental attitudes, future interventions should combine educational approaches with psychological, social and behavioral strategies. These

approaches may help address vaccine concerns, improve confidence, and support informed parental decision-making.

iv. The relatively strong contribution of vaccination fear to parental attitudes in the present findings highlights the importance of addressing fear as part of comprehensive HPV vaccination interventions. Psychologists and other mental health professionals may contribute by developing community-based strategies that address vaccine-related anxiety, misconceptions, and emotional barriers alongside educational interventions.

v. Future research should examine additional factors that were not assessed in the present study, including trust in healthcare providers, religious and cultural beliefs, social media exposure, previous vaccination experiences, and socioeconomic status, and perceived vaccine benefits and barriers. Examining these factors may provide a more comprehensive understanding of parental HPV vaccination decision-making.

vi. Future studies should consider more diverse and representative samples from different provinces and socioeconomic backgrounds of Pakistan. Probability-based sampling, where feasible, may improve the generalizability of findings to the wider population.

vii. Lastly, future research should also include adolescents, parents, healthcare professionals, and other relevant stakeholders to obtain multiple perspectives on HPV vaccination. Longitudinal or experimental designs are recommended to further examination.

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Appendix A

Consent Inform

You are invited to participate in a research study titled “Impact of Knowledge on Vaccination Fear, and Parental Attitudes toward Human Papillomavirus (HPV) among Parents of Adolescents.” This study aims to examine parent’s knowledge, fears about vaccination and attitudes related to Human Papillomavirus (HPV) and its prevention. Participation in this research is voluntary. If you agree to participate, you will be asked to complete a short questionnaire that will take approximately 10–15 minutes.

All information collected in this study will be kept strictly confidential. Your responses will remain anonymous, and no identifying information will be used in any other purpose. The data will be used solely for academic purposes as part of the researcher’s MS research project. You have the right to withdraw from the study at any time without any penalty or negative consequences. By signing this consent form, you acknowledge that you have read and understood the information provided above and agree to participate voluntarily in this research.

Participant’s Signature:

Date:

Demographic Information Sheet

Please tick () the option that best describes you. All information will remain confidential and will be used only for research purposes.

1. Age of Parent

- i. 25–30 years
- ii. 31–35 years
- iii. 36–40 years
- iv. 41–45 years
- v. Above 45 years

2. Marital Status

- i. Married
- ii. Divorced
- iii. Widowed
- iv. Separated

3. Educational Level

- i. Secondary education
- ii. Bachelor's degree
- iii. Master's degree or above

4. Employment Status

- i. Housewife
- ii. Employed (Full-time)
- iii. Employed (Part-time)
- iv. Self-employed

5. Monthly Family Income

- i. Less than 50,000 PKR
- ii. 50,000 – 100,000 PKR
- iii. 100,001 – 200,000 PKR
- iv. Above 200,000 PKR

6. Number of Children

- i. 1
- ii. 2
- iii. 3 or above

7. Age of Adolescent Child

- i. 9–11 years
- ii. 12–14 years
- iii. 15–17 years

8. Gender of Adolescent Child

- i. Male
- ii. Female

9. Have you ever heard about Human Papillomavirus (HPV)?

- i. Yes
- ii. No

10. Have you heard about the HPV Vaccine?

- i. Yes
- ii. No

11. Has your adolescent child received the HPV vaccine?

- i. Yes
- ii. No
- iii. Not sure

12. Family System?

- i. Joint
- ii. Nuclear

Appendix B

SCALE- 1

HPV Knowledge Questionnaire (HPV-KQ) 10- items

Instructions

Please indicate whether the following statements are True, False, or Don't Know.

No.	Item	True	False	Don't Know
1.	HPV is a very common viral infection.	☐	☐	☐
2.	HPV can be transmitted through sexual contact.	☐	☐	☐
3.	Some types of HPV can cause cervical cancer.	☐	☐	☐
4.	HPV infection can occur even without visible symptoms.	☐	☐	☐
5.	HPV can affect both males and females.	☐	☐	☐
6.	HPV infection can clear naturally without treatment.	☐	☐	☐
7.	HPV vaccination can help prevent certain types of HPV infection.	☐	☐	☐
8.	HPV vaccination is most effective before becoming sexually active.	☐	☐	☐
9.	Regular screening helps detect HPV-related cervical cancer early.	☐	☐	☐
10.	HPV infection always leads to cancer.	☐	☐	☐

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SCALE- 2**Vaccination Fear Scale (VFS) 6- items****Instructions**

Please read each statement carefully and indicate your level of agreement regarding HPV vaccination for adolescents.

Rating Scale

1 = Strongly Disagree 2 = Disagree
 3 = Neutral 4 = Agree
 5 = Strongly Agree

No.	Statement	1	2	3	4	5
1.	You are very afraid that the HPV vaccine could harm your child.	☐	☐	☐	☐	☐
2.	You feel uncomfortable when thinking about your child receiving the HPV vaccine.	☐	☐	☐	☐	☐
3.	Your hands get clammy or sweaty when you think about your child getting the HPV vaccine.	☐	☐	☐	☐	☐
4.	You are afraid that the HPV vaccine might cause side effects in your child.	☐	☐	☐	☐	☐
5.	You cannot sleep because you worry about having to decide whether your child should get the HPV vaccine.	☐	☐	☐	☐	☐
6.	Your heart races or pounds when you think about your child receiving the HPV vaccine.	☐	☐	☐	☐	☐

SCALE- 3**Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) –
16 Items****Instructions**

Please indicate how much you agree or disagree with the following statements regarding HPV vaccination.

Response Options (4-Point Likert Scale):

1 = Strongly Disagree

2 = Disagree

3 = Agree

4 = Strongly Agree

1. The HPV vaccine might cause short term problems, like fever or discomfort.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
2. The HPV vaccine is being pushed to make money for drug companies.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
3. The HPV vaccine might cause lasting health problems.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
4. If a teenage girl gets this HPV vaccine, she may be more likely to have sex.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
5. I think the HPV vaccine is safe.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
6. Your child is too young to get the HPV vaccine.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
7. How hard do you think it would be to find a provider or clinic where you can afford the vaccine?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

8. How hard do you think it would be to find a clinic that is easy to get to?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
9. How hard do you think it would be to find a provider or clinic that has the vaccine available?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
10. I am concerned that the HPV vaccine costs more than I can pay.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
11. How hard do you think it would be to find a provider or clinic where you don't have to wait long to get an appointment?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
12. How effective do you think the HPV vaccine is in preventing genital warts?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
13. How effective do you think the HPV vaccine is in preventing cervical cancer?
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
14. I don't have enough information about the HPV vaccine to decide whether to give it to my child.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
15. The HPV vaccine is so new that I want to wait a while before deciding if my daughter should get it.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree
16. Other parents in my community are getting their daughters the HPV vaccine.
☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree



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May 06, 2026

RESEARCH ETHICS COMMITTEE CERTIFICATE OF REVIEW AND SUPPORT

This is to certify that Project titled: "Impact of Knowledge on Vaccination Fear and Parental Attitudes toward HPV among Parents of Adolescents" submitted by Scholar: Samra Nasir MSP243033 and supervised by: Ms. Sadaf Zeh reviewed by the Research Ethics Committee of Faculty of Management and Social Science, meets the requirements of the American Psychological Association's Ethical guidelines for Human Research and is **REVIEWED** and **APPROVED** by Research Ethics Committee of Faculty of Management and Social Sciences.

It is the Scholar's responsibility to ensure that all researchers associated with this project are aware of the conditions of approval and which documents have been approved.

The Scholar is required to notify the Research Ethics Committee in case of any amendment in the project, specifically:

- Any significant change to the project and the reason for that change, including an indication of ethical implications (if any)
- Serious adverse effects on participants and the actions taken to address those effects
- Any other unforeseen events or unexpected developments that merit notification
- The inability of the Principal Investigator to continue in that role, or any other change in research personnel involved in the project
- A delay of more than 12 months in the commencement of the project; and,
- Termination or closure of the project.

Dr. Sabahat Haqqani

Convener, Research Ethics Committee
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May 06, 2026

SUBJECT: REQUEST FOR DATA COLLECTION

Capital University of Science and Technology (CUST) is a federally chartered university. The university is authorized by the Federal Government to award degrees at Bachelor's, Master's and Doctorate level for a wide variety of programs.

Ms. Samra Nasir registration number MSP243033 is a bona fide student in MS Psychology program at this University from Fall-2024 till date. In partial fulfillment of the degree, she is conducting research on "Impact of Knowledge on Vaccination Fear and Parental Attitudes toward HPV among parents of adolescents". In this continuation, the student is required to collect data from your institute.

Considering the forgoing, kindly allow the student to collect the requisite data from your institute. Your cooperation in this regard will be highly appreciated.

Please feel free to contact undersigned if you have any query in this regard.

Best Wishes,

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