Parents' Knowledge, Attitudes and Intention Toward Vaccinate their Daughters Against Human Papilloma Virus in the Kingdom Saudi Arabia

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Abstract

Background: Parents play an important role in encouraging their daughters to get the human papillomavirus (HPV) vaccine, as it is an effective way to prevent cervical cancer and other types of cancer associated with HPV. To obtain the optimal vaccine in the Kingdom of Saudi Arabia, it is important to evaluate the parents' level of knowledge and aṄtude, in addition to their intention to vaccinate their daughters. **aim**: To assess parents' knowledge, aṄtude, and intention toward vaccinating their daughters against HPV in King Saudi Arabia**.**

Method: A quantitative, descriptive, cross-sectional design was used to recruit a convenience sample of 259 parents whose daughters are between 9 and 12 years old in elementary government schools in Jeddah, in the Kingdom of Saudi Arabia, in the period from February 2024 to April 2024. Data were collected using two tools: The first tool was a self-administered questionnaire to identify the knowledge among parents regarding HPV. The second tool was a 5-point Likert scale to assess the parents' aṄtudes and intentions toward vaccinating their daughters against the human papillomavirus.

Result: The result of the study revealed that 67.6% of the studied parents had a poor level of knowledge, and 38.6% of them had a positive aṄtude regarding the HPV vaccine. It was added that the most associated factors that affected the studied parents 'intentions regarding vaccinating their daughters with the HPV vaccine were their level of knowledge and aṄtude towards their HPV infection and vaccine.

Conclusion: Still, there is a lack of knowledge and aṄtude among parents regarding the role of the HPV vaccine in preventing cervical cancer, which subsequently affects their intention to vaccinate their daughters**.**

Keywords: Human Papilloma Virus, intention, knowledge, aṄtude, and vaccine

INTRODUCTION

This chapter discusses background information regarding the study variables, Human papillomavirus, and parents' Knowledge, Attitudes, and Intentions, using online surveys in Saudi Arabia and outside of Saudi Arabia. In addition, this chapter discussed the statement of the problem, the research framework, and the aim of the study.

Human papillomavirus (HPV), a member of the Papillomaviridae family, is found worldwide and is known to cause cervical cancer **(Alhamlan et al. ,2021).** HPV is the virus that is responsible for the greatest number of sexually transmitted infections **(Jalil & Karevskiy, 2020).** According to some estimates, cervical cancer is the fourth most frequent kind of cancer seen in women across the globe, and HPV is a prominent cause of this disease **(Jalil & Karevskiy, 2020).** The annual costs of morbidity and mortality associated

with HPV-related diseases are estimated to be around $4 billion **(Petca et al., 2020).** The most common high-risk HPV 16 and 18 subtypes is closely associated with cervical cancer, and Low-risk HPV 6 and 11 subtypes are associated with genital warts**(Stathopoulos et al., 2023).** HPV infections can be dangerous because most infected people are asymptomatic, and most HPV infections are usually cleared from the body without treatment **(Alkhalawi, 2021).**

Globally 190 million women who received a diagnosis of an HPV clinical infection in 2012, approximately 528 000 also received a new diagnosis of cervical carcinoma, and 266 000 women died of this cancer (Alhamlan et al., 2021). People in Arab countries suffer serious health problems due to the increasing incidence of cervical cancer. This is mostly because there aren't enough vaccinations and screenings for cervical cancer (Explanatory Notes for 2021 Cervical Cancer Profiles, 2022). These results reflect the cultural and religious variables that are present in the area.

It was highly recommended by the World Health Organization (WHO) and is seen as a vital cost-effective public health strategy to provide the HPV vaccine to females between the ages of 9 and 14 years old. According to their calculations, the HPV vaccination will end up saving the lives of over 4 million women in low- and middle-income nations (WHO, 2018). As a result, it is suggested that teenagers, particularly females, get the vaccine (Chan et al., 2019). Although there is an HPV vaccination that is both safe and effective, there has been an increase in the number of instances of HPV and the issues that are linked with it in recent years (Patel et al., 2018). The Saudi Food and Drug Delivery (SFDA) has approved the administration of prophylactic HPV vaccinations to girls between the ages of 11 and 26 in this regard (Darraj et al., 2022).

Due to a lack of awareness and a negative attitude, about 87.3% of parents did not support their children's vaccination (Barnes et al., 2018). A study conducted in China revealed that the intention of mothers to vaccinate daughter against HPV was high (83.3%) and Greater preference for HPV was strongly associated with higher maternal education level and annual household income (Lin et al., 2021). While in the study conducted in Iran, HPV vaccination intention was very low 15.44 (18.44) and (69.84%) mothers had no knowledge of the HPV vaccine **(Azh et al., 2021).** Another study conducted on Korea, the mothers' score for intention to vaccinate their sons against HPV was 5.04 out of 7 **(Park, & Kim, 2020).** In Ethiopia, the study showed that (39.1%) and (40.2%) of the respondents were knowledgeable and had a favorable attitude toward the HPV, respectively **(Humnesa et al., 2022).**

In addition, Research conducted in Middle East and North Africa areas revealed a lack of awareness of HPV and the complications it might cause **(Darraj et al., 2022; Bencherit et al., 2022).** It differs from country to country how campaigns are carried out to educate people about the significance of vaccination. Studies conducted on both the regional and national levels in Saudi Arabia revealed that just a small percentage of people are aware of HPV **(Al Shdefat et al., 2022; Akkour et al., 2021).** in addition, lack of data available about the prevalence of HPV in Saudi Arabia **(Alshammari & Khan, 2022; Darraj et al., 2022; Mousa et al., 2019).**

A vaccine against HPV is an extremely efficient method for preventing sexually transmitted HVP and cervical cancer in females **(Portnoy et al., 2021).** The prevalence of sexually transmitted infections (STIs) continues to be highly correlated with social stratification. In addition, education plays a significant part and helps increase the overall understanding of HPV besides changing in the attitude and beliefs **(Azh et al., 2021).** When it comes to a wide variety of cancers, differences in awareness, belief and attitude status are linked to varying rates of survival. As a result, these characteristics could be responsible for a delay in the diagnosis or in people getting HPV vaccinations **(Hull et al., 2020).**

In 2020, Saudi Arabia reported 358 new cases of cervical cancer and 179 deaths due to its complications **(Human Papillomavirus and Related Diseases Report. 2021).** Fortunately, HPV infection is considered as a preventable disease by using vaccination which is available in Saudi Arabia for free. The HPV vaccine can decrease HPV 6, 11, 16, 18 infections and genital growths by up to 90% and also can decrease high-grade cervical lesions by up to 85**(Almaghlouth et al.,2022).**

There are some number of studies published regarding knowledge, awareness, and acceptance about the HPV vaccine. One of the studies conducted among Arab countries reported poor awareness and knowledge of HPV **(Alsous et al. 2021).** Females in Saudi Arabia have low awareness and knowledge of HPV, its vaccine, and cervical cancer **(Alrajeh & Alshammari, 2020).** Another study showed that only 4% of participants had received their HPV vaccination, Knowledge, awareness, and attitude levels were all 35% with mean of 1.14, 28% with a mean of 3.03, and 51% with a mean of 2.02, respectively, and the most common reasons for refusing vaccinations are "belief we are healthy" (48%), followed by "lack of information" (38%) (**Almaghlouth et al., 2022).**

LITERATURE REVIEW

Cervical malignant growth is the fourth most common disease among women worldwide. According to the most recent worldwide malignant growth occurrence and mortality estimates, 604,000 women will be diagnosed with cervical cancer in 2020, with 342,000 dying because of the disease (Sung et al., 2021).

HPV is a virus family with over 200 different serotypes. The most common sexually transmitted infection is HPV, and skin-to-skin contact is sufficient for viral transmission (Stathopoulos et al.,2020). HPV types 16 and 18 are considered high risk, accounting for more than 70% of all cervical cancers in women and genital and oropharyngeal cancers in both men and women. 90% of genital warts are caused by serotypes 6 and 11. The global prevalence of HPV infection in cervical cancer is estimated to be between 85 and 95% (Stathopoulos et al.,2020). The sexual transmission is the most well-documented. However, some studies show that it is not a gender model. Because there are no symptoms, most people are unaware they have the infection **(Mabeya et al., 2021).**

The risk factors for HPV vaccine hesitancy among parents studied in Kenya showed a negative perception about the effectiveness of the vaccine, with vaccine hesitancy attributed to safety concerns (76%) and feelings that the child was too young (48%) **(Kolek et al., 2022)** Positive vaccine beliefs and knowledge were associated with parental willingness to vaccinate their children. Mothers' willingness to vaccinate was negatively associated with low levels of parenteral education and being younger (**Kolek et al., 2022).**

A human papillomavirus (HPV) infection is caused by a small ribonucleic acid (DNA) infection **(Kotkar & Gokhale, 2020)**. The round twofold abandoned viral genome that contaminates the skin and mucosal cells is approximately 8 kB long and encodes six early proteins involved in viral replication **(Kotkar & Gokhale, 2020).** L1 and L2 are viral primary proteins, and cytology screening (Pap smear) and HPV vaccinations are the two most effective ways to prevent CC and other HPV infections **(Guo et al., 2022).** A pap smear is a simple procedure that can remove cancerous cells and prevent cervical cancer in its early stages **(Akinleye et al., 2020).**

The knowledge, attitude and intention of parents to vaccinate against HPV:

Knowledge of HPV infection and the vaccination program in the country play an important role in vaccination. According to studies conducted in Saudi Arabia, they had little knowledge of HPV and its vaccine **(Almehmadi et al., 2019)**. A third (32.9%) were aware of the HPV vaccine, and the most common source of their knowledge was

physicians (38%), while the most common barrier to vaccination was their belief that they were not at risk (75.2%). Approximately 90.0% of well-informed parents were willing to vaccinate their children **(Almehmadi et al., 2019)**.

Parental knowledge and acceptance are critical factors in HPV vaccination uptake. Parents and caregivers should be aware of the risks associated with not immunizing their children, as well as national HPV vaccination recommendations. Few studies have looked at Saudi parents' knowledge of human HPV vaccination, but most studies show that HPV knowledge needs to be improved **(Mabeya et al., 2021)**. It includes communicating and understanding how HPV infection drives cancer incidence in humans.

Another two studies in Saudi Arabia focused on the lack of knowledge, attitudes, and perceptions about HPV and the vaccine **(Alshammari & Khan, 2022; Darraj et al., 2022).** The first study was conducted in Saudi Arabia, and it discovered that 33.7% of respondents were aware of HPV, while 45.1% believed it was uncommon in the country. 26.4% thought it caused genital warts, and nearly 29.5% thought it was a sexually transmitted disease. Nearly 76.2% did not believe it could occur without symptoms **(Alshammari & Khan, 2022).** The second study from Jizan showed that knowledge about HPV was 1.99 out of 10. Approximately half of those polled denied that HPV is a common sexually transmitted infection **(Darraj and colleagues ,2022)**. Furthermore, 53% were interested in the HPV vaccine, and 63% agreed that the vaccine could prevent warts and cervical cancer.About 30% of the participants opposed the vaccine due to religious reasons **(Darraj et al., 2022).**

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Study found that both male and female parents in Saudi Arabia's western region had little knowledge of HPV infection and its vaccine. As a result, only 7.2% had vaccinated their female children. The majority of parents who were knowledgeable about the HPV vaccine were eager to vaccinate their children **(Alkalash et al., 2022).** In another study, 91% of 296 study participants knew about immunizations for themselves and their children **(Al-Hussein et al., 2022).**

Other studies found that cultural concerns regarding screening and vaccination for a conventionally known sexually transmitted infection were an emerging theme in addition to not perceiving cervical cancer screening as necessary because women with no signs and symptoms Approximately 30% of healthcare providers other than physicians were unaware of prevention methods, and 63.3% did not practice any screening methods and attributed the lack of screening to "no specific reasons at all." **(Jradi, & Bawazir,2019).**

In Greece A study found that 99.4% of parents of girls aged 11-18 years knew about HPV and 98.8% knew there was a vaccine available against HPV, indicating that increased knowledge, perceptions, and practices of parents of girls aged 11-18 years correlated positively with HPV vaccination. Although 47% of the parents said their daughters had been vaccinated against HPV, further investigation revealed that only 35% had received all of the recommended doses **(Naoum et al., 2022)**

According to "Explore parents' knowledge about HPV infection and their awareness of the HPV vaccine," researchers found that urban place of residence, medical education of parents, a pediatrician's recommendation of the HPV vaccination, and HPV vaccination free of charge are factors that significantly increased the probability of a positive parental decision to vaccinate a child (Rancic, et al.,2022).

positive attitude toward vaccination, including HPV vaccination from her 9-year-old to her 14-year-old daughter, stems from her belief that HPV vaccination aids in the prevention of cervical cancer. While vaccination can generally prevent infections, negative attitudes arise when parents believe that the HPV vaccine is too new or ineffective and their daughter is too young (Galbraith-Gyan et al., 2019).

Educational interventions can strengthen fathers' positive attitudes toward HPV vaccination, but they are less likely to continue the vaccination of their daughters. It has been shown that there is no effect on enhancing positive intention to support decision-making or improving intention to support decision-making (Miyoshi et al. 2020).

However, acceptance of vaccination at relatively high levels is low. This is because less than half (32.81%) of parents are willing to have their child vaccinated against HPV and lack of knowledge and concerns about side effects are reasons for not doing so (Kılıçaslan et al., 2022).

METHODOLOGY

The research method describes the techniques and strategies used to find and analyze data related to a specific topic of research. Therefore, the design of a study by a researcher to achieve both valid and reliable results and research aims is known as research methodology Chaudhari, A. (2021). Research methods are categorized into several types according to the nature and purpose of the study. This chapter presents the study design, setting, sample, sampling procedure, ethical considerations, measurement method, which includes the development of the tools, validity, reliability, and pilot study, data collection process, and analysis.

Study Design

A cross-sectional quantitative descriptive design used in this study. This design involved the collection of data at one point in time in which all of the phenomena under study were captured across one data collection period. Cross-sectional designs are especially appropriate for describing the status of a phenomenon or any relationships among the phenomena at a fixed point (Polit & Beck, 2022).

Study participant and Sample

The current study used a convenience sampling, the total population in selected schools was 700. The estimated sample size was calculated utilizing the following formula: -

$$n = \frac{N}{1+Ne2}$$

1. Where N = total number of populations = 700
2. E= a margin of error.
3. N is the calculated sample size It would be (N=259) participants.

The study population of this research included all students' parents in the public elementary schools between May 2023 and March 2024.

Inclusion criteria: are being parents of a student aged from 9 to 12 and being willing to participate in the study.

Exclusion criteria are these parents were excluded for experiencing the disease, missing or invalid information from the study, an inability to speak Arabic, and an inability to read or write.

Data Collection Procedure

The researcher recruited eligible participants who met the inclusion criteria after getting the approval. Then, the purpose of the study was explained to the participants to obtain their consent to participate in the study. Data collection started upon ethical approval clearance from the various research ethics boards. Data was collected from February 2024

to April 2024. The researcher sends the Monkey Online structure questionnaire link through WhatsApp of students' parents group. To ensure obtaining the consent of the participants, an explanation of the purpose of the study and confidentiality of information present at the beginning of the questionnaire. Participating in the questionnaire provides consent of the participants to be part of this study

Pilot Study: Before starting the actual study, the researcher selected about 10% (26 parents) of the parents who met the inclusion criteria for the selected study setting to participate in a pilot study. The pilot study was carried out once approval was received to conduct the study. Parents who participated in the Pilot study were excluded from the study sample.

Ethical Considerations

This proposal was approved by the Fakeeh College for Medical Sciences' Institutional Review Board (IRB). Then, permission was obtained from the Institutional Review Board (IRB) of the General Administration of Girls Education in Jeddah to conduct the data collection. An informed consent was obtained from the participants after explaining the purpose of the study. The name or identity of personal data was not included in the digital data (it was anonymous). In addition, information received from the participants was handled confidently, and privacy was guaranteed for all participants. The data was kept in strict confidence and used only for research purposes.

Data Analysis

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentages for categorical data, and the arithmetic mean and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi-square test (X2). In addition, the r- test were used to identify the correlation between the study variables. The level of significance was:

Statistically significant $p < 0.05$

-Highly statistically significant $p < 0.001$

-Not significant $P > 0.05$

This chapter covers the method of data collection. The cross-sectional quantitative, descriptive, design used in this study. The questionnaire used to collect the data for parents whose daughters are between 9 and 12 years old in elementary government schools in Jeddah, in the Kingdom of Saudi Arabia, was a Monkey Online structure questionnaire. The study focused on a convenience sample of parents. Ethical approval was granted, and the tools were entered and analyzed using SPSS version 25.

RESULT

This chapter reports the result of the study, that answered the research questions, that is concerned with the studied parents' knowledge and attitude about HPV vaccine immunization. In addition, this chapter also describes factors affecting parents' intention to vaccinate their daughters against HPV.

The studied subjects include a total of 259 parents of school girls, the inclusion criteria included parents who had a student aged from 9 to 12 and were willing to participate in the study.

Table (1); Distribution of demographic characteristics of studied participants (n=259).

Table (1) reveals that the vast majority of the studied participants (90.3%)were mothers of daughters, nearly half 49.4% were in the age group from 30-39 years old, more than half 51.0% of them had a university education, 52.5% of them were working in a part-time

employee, moreover, the vast majority 92.7% of them were married, and nearly one – quarter 25.9% of them had from 3-5 number of children.

Table (1): Distribution of demographic characteristics of studied participants (n = 259)

Demographic characteristics	Item	Frequency	%
Relation to girls	Father	25	9.7
	Mother	234	90.3
Age in years	30-39	128	49.4
	40-49	101	39.0
	50-59	27	10.4
	≥ 60 years	3	1.2
Level of education	Primary education	15	5.8
	Lower secondary education	18	6.9
	Upper secondary education	70	27.0
	University education	132	51.0
	Master's degree/ PhD	24	9.3
Employment	Employed	123	47.5
	Not employed	136	52.5
Nationality	Saudi	185	71.4
	Non-Saudi	74	28.6
Marital status	Married	240	92.7
	Divorced	19	7.3
Number of children	One child	15	5.8
	1-2	49	18.9
	3-5	67	25.9
	More than 5	128	49.4

Figure 1 illustrates that 69.5% of the studied participants had their HPV knowledge from nurses, 57.9% from their family doctor, and 55.9% of them from internet and social media.

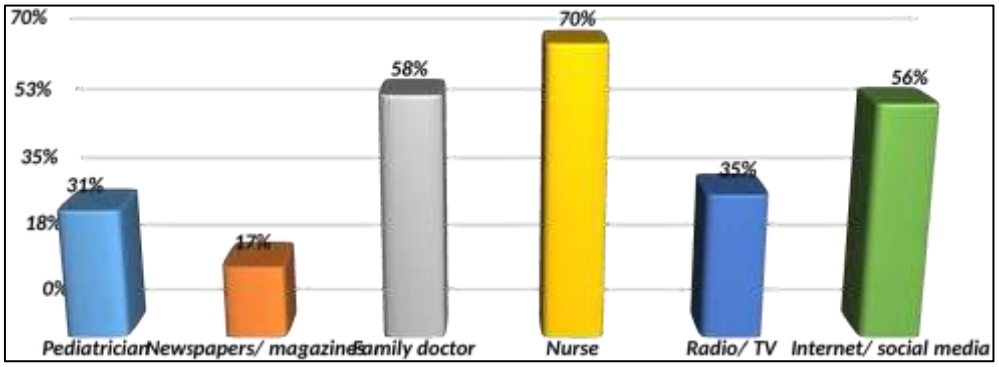

Figure (1): Percentage of HPV knowledge resources among the studied participants.

Studied participant's knowledge regarding HPV.

Table (2): Distribution of Human Papilloma Virus (HPV) infection knowledge of the studied participants (n= 259).

Item	Correct		Incorrect		Don't know	
	No	%	No	%	No	%
Mode of transmission of HPV	123	47.5	80	30.8	56	21.7
Persons who get infected with HPV	147	56.8	82	31.6	30	11.4
Diseases related to HPV	104	40.2	60	23.1	95	36.7
Preventive of HPV infection transmission.	124	47.9	50	19.3	85	32.8
Total HPV infection knowledge score	**Good**		**Fair**		**Poor**	
	37	14.3	66	25.5	156	60.2

Table 2, reveals that more than half (56.8%) of the studied participants had correct answers regarding the Persons who get infected with HPV, 4705% & 47.5% of them had correct knowledge regarding preventive HPV infection transmission and mode of transmission of HPV respectively. on the other hand, more than one-third 36.7% & 32.8% of them don't know the diseases related to HPV.

Table (3): Distribution of Human Papilloma Vaccine knowledge of the studied participants (n= 259).

Item	Correct		Incorrect		Don't know	
	No	%	No	%	No	%
HPV vaccination included in the immunization calendar	97	37.5	80	30.9	82	31.6
recommended age for HPV vaccine	120	46.3	60	23.2	79	30.5
Persons who get HPV vaccine	83	32.0	80	30.9	96	37.1
Purpose of using HPV vaccine	100	38.6	80	30.9	79	30.5
Total HPV vaccine knowledge score	**Good**		**Fair**		**Poor**	
	20	7.7	45	17.4	194	74.9

Table 3 reveals that nearly half (46.3%) of the studied participants had correct answers regarding the recommended age for the HPV vaccine, 38.6& 37.5% of them had correct knowledge regarding the Purpose of using the HPV vaccine, and HPV vaccination included in the immunization calendar. on the other hand, more than one-third 37.1% of them don't know the person who got the HPV vaccine. in addition, only 7.7% of the studied participants had good knowledge regarding human papilloma vaccine. Moreover, nearly three-quarters of the studied parents 74.9 % of them had poor knowledge regarding the HPV vaccine.

Figure 2 illustrates that more than two-thirds 67.6% of the studied participants had poor HPV knowledge, and 21.6 % of them had a fair knowledge level. On the other hand, only 10.8% of them had a good HPV knowledge level.

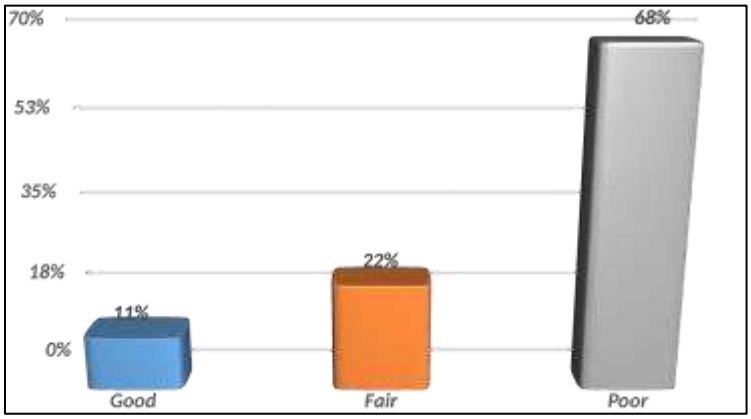

Figure (2): Percentage of HPV knowledge total score of the studied participants.

4.1 Studied participant's attitudes regarding HPV.

Table (4): Distribution of Human Papilloma Vaccine attitude of the studied participants (n= 259).

Item	Highly		Disagree		Uncertain		Agree		Highly agree	
	No	%	No	%	No	%	No	%	No	%
HPV vaccine is safe and	29	11.2	119	45.9	64	12.7	33	24.7	14	5.5
HPV vaccine reduces the risk of having HPV infection	26	10	123	47.5	34	23.6	61	13.1	15	5.8
HPV vaccine is a useless	49	18.9	90	34.7	63	7.3	19	24.3	38	14.8
Benefits thanks to vaccination are greater than risks	47	18.2 %	117	45.2 %	54	8.9 %	23	20.8 %	18	6.9 %
Parents not vaccinating their children put other people at risk	20	7.7 %	138	53.3 %	30	25.5 %	66	11.6 %	5	1.9 %
Afraid of mild side effects of HPV vaccine for your daughter	44	17.0 %	110	42.5 %	13	34.7 %	90	5.0 %	2	0.8 %
Fear of infertility from HPV vaccine for your daughter in the	54	20.8 %	93	35.9 %	53	13.9 %	36	20.5 %	23	8.9 %
Thinks HPV vaccine is effective in preventing cervical cancer	49	18.9 %	106	40.9 %	22	30.9 %	80	8.5 %	2	0.8 %

Table 4, indicates that 20.8% of the studied participants highly disagreed that they fear infertility from the HPV vaccine for their daughter in the future, and more than half of them 53.3% disagreed that Parents not vaccinating their children put other people at risk.in addition, 34.7% of them were uncertain regarding being afraid of the mild side effects of the HPV vaccine for their daughter, and 14.8% of them highly agreed that the HPV vaccine is a useless measure.

Figure 3, illustrates that nearly two-thirds (61.4%)of the studied participants had negative attitudes toward HPV, while only 38.6% of them had a positive attitude toward HPV.

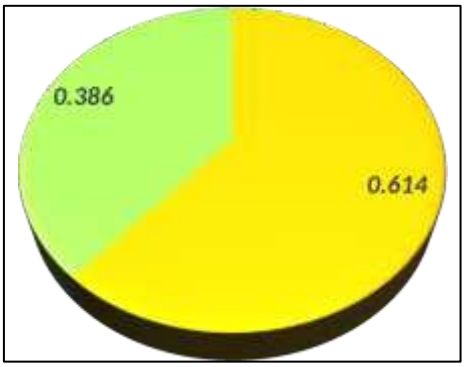

Figure (3): Percentage of HPV attitude total score of the studied participants.

Relations between the studied participant's demographic characteristics and their total HPV - - - knowledge and attitude level.

Table (5): Distribution of Parental intention towards HPV vaccination (n= 259).

Variable	Item	Frequency	%
Giving HPV vaccine to daughter	Highly disagree	59	22.8
	Disagree	87	33.6
	Uncertain	83	32.0
	Agree	15	5.8
	Highly agree	15	5.8

Table 5, indicates that more than half of the studied participants 22.8 & 33.6% highly disagreed and disagreed with giving HPV vaccine for their girls. On the other hand, 32.0% of them were uncertain and only 5.8% of them only agreed and highly agreed to give HPV vaccine to their girls.

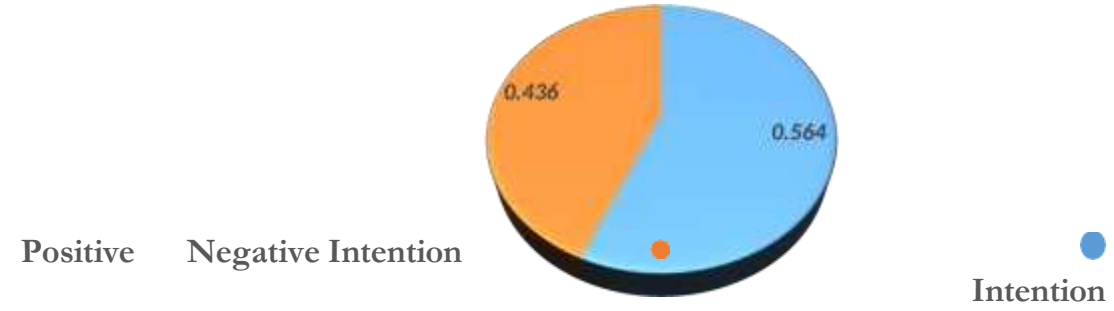

Figure (4): Percentage of studied parents' intentions regarding vaccinating their daughters with the HPV vaccine.

Figure 5 illustrates that the majority of parents (83.3%) who agreed to give the HPV vaccine added that they give the HPV vaccine to their girls to protect them against genital cancer

and genital words, 76.7% of them added that they give HPV to comply with immunization schedule, and 73.3% added that they give to protect their future sexual partners against genital infection.

Table (6): Distribution of relation between studied participants' Human Papilloma Vaccine

Demographic characteristics	Item	Total knowledge score						Chi Square test	P value
		Poor		Fair		Good			
		No	%	No	%	No	%		
Relation to girls	Father	16	9.1	4	7.1	5	17.9	2.91	>0.05
	Mother	159	90.9	52	92.9	23	82.1		
Age in years	30-39	84	48.0	30	53.6	14	50.0	6.09	>0.05
	40-49	67	38.3	20	35.7	14	50.0		
	50-59	21	12.0	6	10.7	0	0.0		
	≥ 60 years	3	1.7	0	0.0	0	0.0		
Level of education	Primary education	9	5.1	4	7.1	2	7.1	4.09	>0.05
	Lower secondary	10	5.7	5	8.9	3	10.7		
	Upper secondary	51	29.1	11	19.6	8	28.6		
	University education	90	51.4	29	51.8	13	46.4		
	Master's degree/ PhD	15	8.6	7	12.5	2	7.1 %		
Employment	Employed	77	44.0	34	60.7	12	42.9	5.02	>0.05
	Not employed	98	56.0	22	39.3	16	57.1		
Nationality	Saudi	124	70.9	44	78.6	17	60.7	3.00	>0.05
	Non-Saudi	51	29.1	12	21.4	11	39.3		
Marital status	Married	163	93.1	52	92.9	25	89.3	0.532	>0.05
	Divorced	12	6.9	4	7.1	3	10.7		
Number of children	One child	11	6.3	4	7.1	0	0.0	5.61	>0.05
	1-2	36	20.6	8	14.3	5	17.9		
	3-5	42	24.0	19	33.9	6	21.4		

	More than 5	**86**	**49.1**	**25**	**44.6**	**17**	**60.7**		

knowledge total level and their demographic characteristics (n= 259).

Table 6, shows that there was no statistically significant relation between Human Papilloma Vaccine knowledge total level and their age, level of education, employment, nationality, marital status, and number of children (p-value >0.05).

Table (7): Distribution of relation between studied participants' Human Papilloma Vaccine
attitude total level and their demographic characteristics (n= 259).

Table 7, indicates that there was no statistically significant relation between Human Papilloma Vaccine attitude total level and their age, level of education, employment, nationality, marital status, and number of children (p-value >0.05).

Demographic characteristics	**Item**	**Total attitude score**				**Chi Square test**	**P value**
		Negative		**Positive**			
		No	**%**	**No**	**%**		
Relation to girls	Father	15	9.4%	10	10.0%	0.023	>0.05
	Mother	144	90.6%	90	90.0%		
Age in years	30-39	83	52.2%	45	45.0%	2.33	>0.05
	40-49	58	36.5%	43	43.0%		
	50-59	17	10.7%	10	10.0%		
	≥ 60 years	1	0.6%	2	2.0%		
Level of education	Primary education	8	5.0%	7	7.0%	4.04	>0.05
	Lower secondary education	11	6.9%	7	7.0%		
	Upper secondary education	49	30.8%	21	21.0%		
	University education	79	49.7%	53	53.0%		
	Master's degree/ PhD	12	7.5%	12	12.0%		
Employment	Employed	73	45.9%	50	50.0%	0.411	>0.05
	Not employed	86	54.1%	50	50.0%		
Nationality	Saudi	107	67.3%	78	78.0%	3.44	>0.05
	Non-Saudi	52	32.7%	22	22.0%		
Marital status	Married	150	94.3%	90	90.0%	1.70	>0.05
	Divorced	9	5.7%	10	10.0%		
Number of children	One child	7	4.4%	8	8.0%	2.04	>0.05
	1-2	31	19.5%	18	18.0%		
	3-5	44	27.7%	23	23.0%		
	More than 5	77	48.4%	51	51.0%		

4.2 Studied participant's intentions regarding the HPV vaccine.

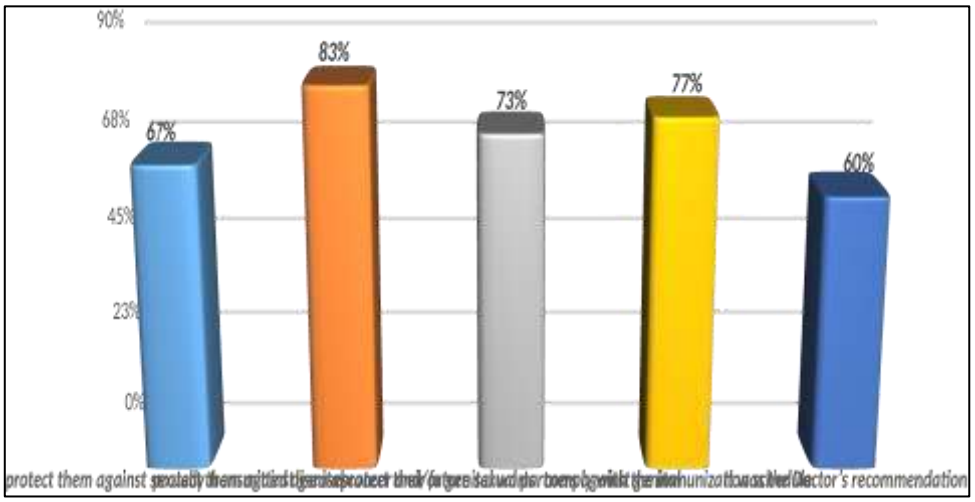

Figure (5): Percentage of causes regarding why the parents agreed to give HPV vaccine to their girls.

Figure 6, shows that the vast majority of parents 95.9%, 92.5%, and 89.0% of them added that they disagreed with giving their girls HPV vaccine because their daughters are too young to be vaccinated, they didn't consider their daughters at risk of being infected with HPV, and in their opinion, too many vaccines are given to their daughters respectively.

Figure (6): Percentage of causes regarding why the parents disagreed to give HPV vaccine to their girls.

Figure 7, illustrates that the vast majority of the studied participants 92.7%, and 86.5% need specific information about HPV vaccine efficiency and specific information about vaccine safety. Moreover, nearly three-quarters of them need general information about the HPV vaccine.

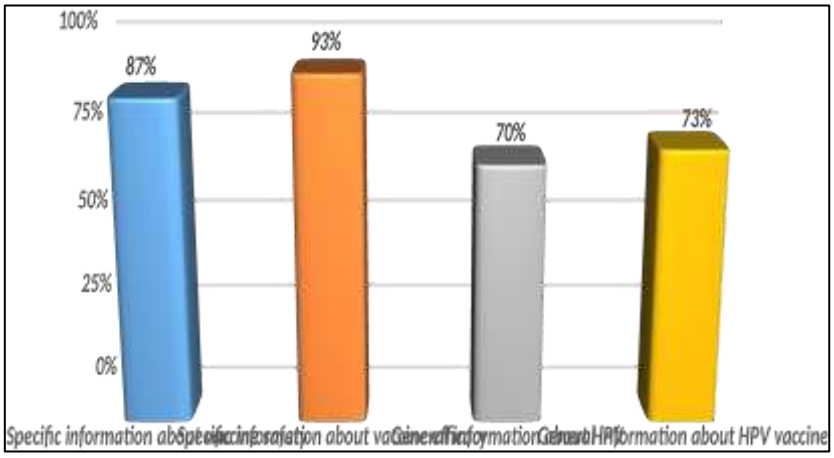

Figure (7): Percentage of types of information that are required by the studied participants.

4.3 Correlation between studied participants' total HPV knowledge, attitude, and intention to give HPV vaccine to their daughters.

Table (8): Correlation between studied participants' total HPV knowledge, attitude, and intention to give HPV vaccine to their daughters. (n= 259).

Variables	Test	Parent intention	Knowledge	Attitude
Parent intention	r	1	.715**	.478**
	p-value		.000	.000

Knowledge	**r**	**.715****	**1**	**.347****
	p-value	**.000**		**.000**
Attitude	**r**	**.478****	**.347****	**1**
	p-value	**.000**	**.000**	

Table 8 illustrates that there was a highly statistically significant correlation between the studied participants' intention toward giving of HPV vaccine to their daughters, and HPV knowledge and attitude level, which means increasing participants' knowledge and attitude, will increase their intention (p- value <0.001**).

Table (9): Binary regression of studied parents' intention towards giving HPV vaccine for their daughters and predicators factors.

Table 9; illustrates that the studied parents' knowledge and attitude are the major predictors factors toward studied patients' intention toward giving their daughters HPV vaccine.

**. Correlation is significant at the 0.01 level (2-tailed).

Variables	**Item**	**Exp(B)**	**95% C.I.for EXP(B)**		**Sig**
			Lower	**Upper**	
relation (1)	Father				
	Mother	.376	.062	2.284	.288
Age	30-39				.713
	40-49	1.217	.393	3.766	.734
	50-59	2.590	.477	14.066	.270
	≥ 60 years	.608	.016	22.609	.788
Level of education	Primary education				.539
	Lower secondary education	1.862	.080	43.162	.698
	Upper secondary education	.989	.099	9.928	.993
	University education	2.056	.215	19.653	.532
	Master's degree/ PhD	.556	.037	8.367	.671
Employment	Employed				
	Not employed	.876	.257	2.985	.833
Nationality	Saudi				
	Non-Saudi	2.117	.572	7.834	.261
Marital status	Married				
	Divorced	.440	.035	5.571	.526
Number of children	One child				.987
	1-2	.721	.057	9.059	0.800
	3-5	1.103	.280	4.346	0.889
	More than 5	.885	.238	3.298	0.886
Knowledge		206.837	40.951	1044.706	0.000

Attitude	54.544	16.089	184.916	0.000

A total of 259 parents participated in the study, and the results revealed a poor level of knowledge regarding HPV. Furthermore, the study found that the most significant factors that affected parents' intentions to vaccinate their daughters with the HPV vaccine were their level of knowledge and attitude towards their HPV infection and vaccine.

DISCUSSION

Human papillomavirus (HPV) is the main cause of almost every case of cervical cancer, and it is also responsible for several urogenital and oropharyngeal cancers. The main mode of HPV transmission is sexual contact, but research has shown that it can be also transmitted in different ways, such as transmission from mother to child during childbirth. Cervical cancer is the fourth most common cancer type in women worldwide, accounting for 604,127 cases in 2020, while it is also the fourth cause of cancer death in women globally with 341,831 deaths. The result of the current project already answered the research questions and revealed that 67.6 % of the studied parents had a poor level of knowledge, and 38.6% of them had a positive attitude regarding the HPV vaccine and added that the most associated factors that affected studied parents' intentions regarding vaccinating their daughters with HPV vaccine are their level of knowledge and attitude towards their HPV infection and vaccine.

Part I: sociodemographic data of studied students

As regards the present study findings, it was revealed that the vast majority of the studied participants were mothers of daughters, and nearly half of them were in the age group of 30-39
years old. Those study findings are by **Hendaus, (2021)**, who pointed out that 54.5% of participants' age ranged from 30-39 years old.

More than half of them had a university education, and working in as part-time employees. Those study findings are matched with **Biyazin et al.,(2021),**Who added that more than half of the studied parents had a university education.

Concerning the marital status of the studied parents, the vast majority of them were married, and nearly one–quarter of them had 3-5 children. Those findings are in the same line with **Hendaus, (2021),** who added that 89.8% of studied parents were married.

Part II: Studied parents' knowledge regarding HPV.

As regards studied parents' knowledge regarding HPV, it was illustrated that more than two-thirds of the studied participants had poor HPV knowledge, and nearly one-quarter of them had a fair knowledge level. On the other hand, only 10.8% of them had a good HPV knowledge level. The present study findings agreed with **Alshehri et al., (2023)**, who added that 46.1% of studied parents had poor knowledge about HPV, in a descriptive cross-sectional study to evaluate "The Association Between Parents' Knowledge About Human Papillomavirus and their Intention to Vaccinate Their Daughters study ".

In addition, **Akkour et al., (2021), & Alkalash et al., (2022)**, in Saudi Arabia, added that the studied participants had a poor level of knowledge regarding HPV & HPV vaccination. The lack of
knowledge among Saudi parents about HPV and its vaccine may be due to a lack of extensive educational campaigns, especially in primary healthcare centers and public schools, and parents'

reliance on the basic vaccinations listed in their children's vaccination cards, which does not include the HPV vaccines. Nevertheless, it is good that despite having low knowledge about HPV, Saudi parents support vaccination against HPV and other STIs. On the other hand, the present study findings are disagreed with by **Hendaus, (2021)**, in Qatar vin a descriptive stud to evaluate ". Parents attitudes toward the human papilloma virus (HPV) vaccine: A new concept in the State of Qatar", added that the studied parents had good level of knowledge regarding the HPV vaccine.

As regards the studied parents' knowledge regarding the HPV vaccine, the present study results added that nearly three-quarters of the studied parents 74.9% had poor knowledge regarding the HPV vaccine than half of the studied participants had correct answers regarding the recommended age for the HPV vaccine, 38.6& 37.5% of them had correct knowledge regarding the purpose of using the HPV vaccine, and HPV vaccination included in the immunization calendar. Those study findings agreed with **Alshehri et al., (2023)**, who pointed out that the studied parents had correct knowledge regarding the importance of using the HPV vaccine and the age at which they should give the vaccine to their daughters.

Concerning the main source of studied participants' information regarding the virus the present study findings revealed that more than two-thirds of them knew nurses, family doctors, and of internet and social media. Those study findings are in the same line with **Naoum et al., (2022),** in the study evaluated "Knowledge, Perceptions, and Attitudes Toward HPV Vaccination: A Survey on Parents of Girls Aged 11-18 Years Old in Greece.", they added that physicians' internet/social media, and friends/family. As regards the studied participants' knowledge regarding HPV infection., the present study findings added that nearly half of the studied parents had correct knowledge regarding preventive HPV infection transmission and the mode of transmission of HPV respectively. Those findings are matched with **Naoum et al., (2022),** who added that the majority of the studied parents correctly know the HPV mode of transmission.

Part III: Studied parents' attitude to HPV vaccination

As regards the attitude of the studied parents toward HPV, the present study revealed that nearly two-thirds of them had negative attitudes toward HPV. Those findings may be due to the lack of knowledge among the studied participants, also the lack of health educational programs regarding the HPV vaccine and its important role in the prevention of cervical cancer among females. Those study findings agreed with **Grandahl et al., (2018)**, in across sectional study in Thailand the study to assess" Parents' knowledge, beliefs, and acceptance of the HPV vaccination about their socio-demographics and religious beliefs". who added that more than half of the studied parents had a negative attitude towards giving HPV vaccine to their daughters. On the other hand, the present study findings disagree with **Hendaus, (2021),** who added that a large proportion of parents residing in Qatar have a positive perception regarding the HPV vaccine. Parents' attitudes and perceptions are considered indispensable targets for community health intervention. This disagreement may be due to that the majority of the study participants were non-Non-Qatari participants, which interprets why their attitudes differ from the current study participants. As regards the studied patients' attitude, the present study findings indicate nearly one– quarter of them highly disagreed that they fear infertility from the HPV vaccine for their daughter in the future, and more than half of them disagreed that Parents not vaccinating their children put other people at risk.in addition. Those study results agreed with **Alshehri et al., (2023)**, who added that the studied parents highly disagreed that they fear HPV vaccine side effects. Regards the intention of the studied parents toward giving their daughters the HPV vaccine, and the attitude and knowledge of the studied parents as factors affecting their intention,

the present study findings revealed that there was a highly positive association between the knowledge and attitude of the studied participants. Those results are in the same line with **Sinuraya et al., (2022)** found positive correlations (p-value <0.001) between the participants' knowledge-attitude. Moreover **Wu et al., (2023),** in the study to assess" HPV vaccine information, knowledge, attitude, and recommendation intention among male college students in China.", added that there was a highly significant positive association.
Regarding factors affecting the studied parents' intention toward giving the HPV vaccine to their daughters, the present study findings revealed that the majority of parents who agreed to give the HPV vaccine to protect them against genital cancer and genital words, comply with the immunization schedule, and protect their future sexual partners against genital infection. Those study findings are in the same line with **Grandahl et al., (2018)**, who pointed out that the studied parents added that they agree to vaccinate their daughters against HPV infection to protect them from genital cancer, and genital infection.
Concerning the reason that the studied parents disagreed to give HPV vaccination to his/ her daughters the present study result revealed that the vast majority of parents disagreed with giving their girls HPV vaccine because their daughters are too young to be vaccinated, they didn't consider their daughters at risk of being infected with HPV, and in their opinion, too many vaccines are given to their daughters. those study findings are agreed with
The study also found another major reason for parents' reluctance to vaccinate their daughters against the HPV vaccine, which is the lack of recommendations from healthcare providers, and ask for further knowledge from healthcare provider. It was noted that the majority of the parents in this study did not receive recommendations from their child's healthcare provider to get the vaccine, which is in line with **Alkalash et al., (2022)**, who indicated that the parents added that they don't have adequate knowledge from healthcare providers regarding HPV infection and vaccine.
Regarding the relationship between studied parents' HPV vaccine knowledge and attitude and their characteristics, the present study findings indicated that there was no statistically significant relation between Human papilloma vaccine knowledge and attitude level and their age, level of education, employment, nationality, marital status, and several children (p-value >0.05). Those study findings disagree with **Alshehri et al., (2023)**, who added that there was no statistically significant relation found between parents' Human papillomavirus vaccine knowledge and attitude level and their age, level of education, nationality, and marital status. Those findings may be due to that both studies were done in Saudi Arabia.

CONCLUSION

Based on the result of the current study, it was concluded that more than two-thirds of the studied participants had poor HPV knowledge, nearly two-thirds of the studied participants had negative attitudes toward vaccinating their daughters' HPV, and more than half of the studied parents disagreed to vaccinate their daughters. Moreover there was highly statistically significant correlation between the studied participants' intention toward giving of HPV vaccine to their daughters, and HPV knowledge and attitude level, which means increasing participants' knowledge and attitude, will increase their intention.

Recommendation

In light of the current research finding it is recommended that:

- Health education programs, training courses, and workshops for parents regarding the effect of using the HPV vaccine in the prevention of HPV infection.

- In educational curricula should have essential knowledge about the most common types of infection that are easily prevented by vaccines.
- The public broadcasting industry must disseminate carefully designed messages to all communities about human papillomavirus in general and the vaccine in particular.
- Considering Saudi society's values, the basic education sector must educate parents and female students about the benefits of the HPV vaccine in all government schools by presenting awareness lectures.
- Activate mass Media role in improving awareness of parents regarding the importance of HPV vaccination.
- Further research regarding the effect of the HPV vaccine on girls that already had vaccines, to evaluate its safety.

In summary, this study is among the first in the nursing field to assess parents' HPV vaccination intention and knowledge, as well as to explore the factors that may affect their decision. This chapter provides recommendations for improving parental education about HPV and its vaccine based on an analysis of the study's findings.

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