

---

# Human Papilloma Virus Vaccine Awareness Among Patients Attending Gynecology Outpatient Clinic At Mansoura University Hospitals

---

Aya Badr- Eldin Abd-Elrahim  
Elgharabaly<sup>1\*</sup>, Mahmoud  
Mohamed Awad<sup>1</sup>, MD; Hanan  
Nabil Abd ElHafez<sup>1</sup>, MD;  
Mohamed Hassan Hussien<sup>1</sup>, MD  
Faculty of Medicine, Mansoura  
University, Egypt;

## **Statement of preceding presentation or publication:**

The manuscript has no preceding presentation or publication and/or abstract/poster presentation.

## **Source of funding:** Nil

## **Conflict of interest Statement:** Nil

**IRB (Date & No.) :** The study protocol was reviewed and approved by the Mansoura Faculty of Medicine Institutional Research Board (Code number: MS.22.05.2000. Date: 30/05/2022

**Short Running Title:** HPV Vaccine Awareness among Egyptian Females.

## **Abstract**

**Objective:** To evaluate the patient acceptance, satisfaction, and possible side effects of the human papilloma virus (HPV) vaccine among Egyptian females.

**Patients and Methods :** This was a cross-sectional study conducted to evaluate women's HPV infection knowledge and HPV vaccine acceptance in Egypt using a face-to-face interviewing questionnaire. The study included 408 Egyptian females aged 15 to 40 years who attended the gynecology outpatient clinic at Mansoura University Hospitals.

**Results:** Most of Egyptian females did not know what is HPV, the cause of HPV, and how it spreads. Only 48 females (12%) know about HPV vaccination, however, the majority of females (278 females; 68.1%) accepted to be vaccinated while 130 females refused owing to cost in 104 females (80%) or harm in 26 females (20%) from females who refused. Among the participating females who answered about side effect (104 females), 23 females (22.1%) confirmed that no side effects of the vaccine while erythema, pain, induration, and myalgia were reported in 39.4%, 36.5%, 0.9%, and 0.9%, respectively. There were statistically significant relations between accepting the vaccine and age ( $p=0.005$ ), residence ( $p=0.004$ ), marriage duration ( $p=0.01$ ), vaginal discharge ( $p<0.001$ ), and husband age ( $p=0.003$ ).

---

## **Corresponding author:**

Aya Badr-Eldin Abd-Elrahim  
Elgharabaly  
Department of Obstetrics and  
Gynecology  
Faculty of Medicine  
Mansoura, Egypt  
Tel.: +20 106 111 4729  
Email: es\_kg88@yahoo.com

**Conclusion:** Despite the low level of awareness about the vaccine among our population, we reported the potential acceptability of the vaccine.

**Keywords:** Human papilloma virus (HPV), Vaccine, Awareness, Cervical cancer.

## **Introduction**

Worldwide, HPV infection has been considered a prevalent sexually transmitted disease (STD). A lifetime exposure to one or more HPV types happens in at least 50% of sexually active females (1). In recent years, at least two hundred of HPV types have been recognized. Certain HPV types mainly infect skin and induce warts, on the other hand other HPV types mainly target mucosal tissues of cervical canal and oral cavity (2, 3).

Most of genital HPV infections are self-limited and occur without manifestations. On the other hand, a lot of epidemiologic researches have demonstrated that persistent infections with particular forms of HPV are an essential predisposing factor in the context of invasive cervical cancer (CC) development (4, 5).

Vaccines are considered the most efficient interventions in terms of infectious diseases (6). The eventual goal of HPV vaccination is to prevent invasive CC by preventing infection with major oncogenic types of HPV (7, 8).

On the other hand, it is noteworthy that awareness of HPV and the general attitude towards vaccination were important factors for the acceptance of vaccination among the population. Additionally, an increasing number of researches addressing the debate to get vaccinated are conducted nowadays, depicting the challenging and dynamic period of indecisiveness as regards HPV vaccination (9, 10).

In spite of the numerous reported researches emphasizing on the topic of HPV and vaccination recently, there is no detailed

data as regards the acceptance and obstacles accompanied by vaccination among the Egyptian people. To plan a practical vaccination program, it is of great importance to properly evaluate the degree of awareness and knowledge as regards HPV, and the general attitude towards HPV vaccination among the Egyptian people, as they are essential behavioral determinants which will actually interfere with the acceptance of vaccination among the Egyptian population. As a result, we conducted this study to gain a better understanding of this issue which might help generate novel ideas to make future generalizations of HPV vaccination possible in Egypt.

## **Patients and Methods**

This was a cross-sectional descriptive pilot study performed to assess women's HPV infection knowledge and HPV vaccine acceptance in Egypt. The study included 408 Egyptian females aged 15 to 40 years who attended the gynecology outpatient clinic at Mansoura University Hospitals from 1st March 2022 to 1st September 2022 (six months) after obtaining approval from the institutional review board (IRB), Faculty of Medicine, Mansoura University.

An informed consent was obtained from entire subjects after a compressive explanation of the study and its consequences. The research approval of the study was acquired from the IRB of the Faculty of Medicine at Mansoura University before starting the study.

## **Methods**

All cases were subjected to a face-to-face interviewing questionnaire focusing on personal history taking e.g., age, sex, and residency, history of HPV infection symptoms e.g., genital warts, around the genitals and anus, genital irritation, or pain, and history of CC symptoms of e.g., pain during sex, pain in the pelvic region, abnormal discharge from the vagina, or abnormal bleeding, which include

after sexual intercourse and so on.

After a detailed description of HPV infection and its severity, the HPV vaccine was offered to all participating females. The acceptance rate, of females who took the vaccine, was measured as a primary outcome in our study.

In the case of vaccine acceptance, all cases that agreed to take the vaccine continued the study and were subjected to assessing the secondary outcomes, including:

1. Vaccination satisfaction: Satisfaction of females as regards the HPV vaccine was evaluated at three and six months post-vaccination as to whether they were satisfied or not and if they recommended it to others.
2. Vaccination side effects : Also, side effects of the HPV vaccine were evaluated at the time of vaccine administration, as well as 3 and 6 months post-vaccination as to whether they have side effects or not.

**Statistical analysis:** Data were analysed by utilizing SPSS version 22. Qualitative data were presented as numbers and percentages. Quantitative data were tested for normal distribution by using the Shapiro-Wilk test, then described as mean and SD for normally distributed data and median and range for non-normal distribution of data. The proper statistical tests were applied based on the data type with the following recommended tests: Chi-Square for categorical variable. Student t-test and Mann Whitney U test for continuous variables.

## Results

The females' age ranged from 15 to 40 years with a mean  $\pm$  SD of  $34.77 \pm 6.65$  years. The majority of females were from urban areas (354 females; 86.8%). More than half of the females (56.6%) were housewives. (Table 1)

Concerning marital status, 407 females (99.8%) were married. The marriage duration ranged from 1 to 25 years with a median of 12 years. Only one female married twice (0.2%).

(Table 1)

None of the females were smokers or exposed to an abnormal sexual offense. The majority of the females had no vaginal discharge (231 females; 56.6%). Pain during intercourse was reported in 175 females (43%).(Table 1)

The age of female husbands ranged from 25 to 52 years with a mean  $\pm$  SD of  $40.09 \pm 6.98$  years. The majority of husbands were employees (62.5%). Smoking was reported in 176 husbands (43.1%). Regarding marriage numbers, 402 husbands (98.5%) get married once, and 6 husbands (1.5%) get married twice. Two husbands (0.5%) practiced abnormal sexuality. Finally, 183 husbands (44.9%) had genital warts.

Table 2 shows the knowledge among participants about HPV and CC. On asking the participating females about HPV, most of them 341 females (83.5) did not know what is HPV, the cause of HPV, and how it spreads, 364 females (89.3%) did not know any information about HPV spread, Only 44 females (10.4%) know about spread (sexual transmitted, skin or mucosal contact). 94 females; 23 % had genital warts. Among the participating females, 150 females (36.8%) did not know about cervical cancer, 258 females (63.2%) heard about cervical cancer, 371 females (90.9%) did not know any relation between HPV and cancer cervix, 37 females (9.1%) know about relation between HPV and cervical cancer from media, they discovered CIN with genital warts or family history of cervical cancer, 11 females (2.7%) think no relation between HPV and other cancer, 13 females (3.3%) think relation between HPV and other cancer, majority of females 384 (94%) did not know relation between HPV and other cancer. In addition, most of females did not know about HPV prevention, pap smear tests for cervical screening, or HPV vaccine.

The knowledge among participants about the HPV vaccine is demonstrated in Table 3. Only 48 females (12%) know about



HPV vaccination, however, the majority of females (278 females; 68.1%) accepted to be vaccinated while 130 females refused owing to cost in 104 females (80%) or harm in 26 females (12%) among females who refused. The knowledge vaccination types, in 106 females (26%), preferred Gardasil Regarding the vaccine schedule after awareness, 304 females (74.5%) did not know about types and all schedules. As regards the need for Pap smear screening after vaccination, 16 females (2.4%) answered yes, 96 females (23.52%) answered no and 304 females (74.5%) did not know. Concerning the disease (genital warts and cervical cancer) protected using vaccine after awareness, 246 females (60.3%) knew it while 162 females (39.7%) did not know. More than half of the participating females (60.3%) confirmed that they would permit their daughter to get the vaccine while 39.7% refused, suggesting vaccine unsafely in 70 females (43.2%) or because they are against vaccine in 92 females (22.54%). Concerning the effect of vaccines, 68 females (16.6%) believed that vaccines have no impact on daily activity, 340 females (83.3%) did not know any information about effect of vaccine impact on daily activity as majority of females did not know about vaccine.

Among the participating females answered about side effects, 23 females (22.1%) confirmed that no side effects of the vaccine while 38 females (36.4%), 38 females (36.5%), one female (0.9%) and one female (0.9%) reported that vaccine causes erythema, pain, induration, and myalgia, respectively. Nearly three-quarters of females (302 females; 74%) did not know about the effect of the vaccine on fertility, while 87 females (21.3%) believed that the vaccine impacts fertility, and 19 females (4.7%) answered no effect of the vaccine on fertility. The impact of vaccine on early menopause knowledge 322 females (78.9%) reported who did not know, sixty females (14.7%) answered no impact of vaccine on early menopause, while 26 females (6.3%) believed that HPV vaccine has impact on early menopause, in

addition, 108 females (26.4%) thought that the vaccine affected promiscuity. However, 278 females (68.1%) believe that our community is appropriate for vaccines after awareness. (Table 4)

There were statistically significant relations between accepting the vaccine and age ( $p=0.005$ ), residence ( $p=0.004$ ), marriage duration ( $p=0.01$ ), vaginal discharge ( $p<0.001$ ), and husband age ( $p=0.003$ ). (Table 5)

Whereas, no statistically significant relations were observed between accepting the vaccine and occupation ( $p=0.06$ ), marital status ( $p=1.0$ ), marriage number ( $p=1.0$ ), pain during intercourse ( $p=0.242$ ), the husband's occupation ( $p=0.112$ ), husband's marriage number ( $p=0.09$ ), husband's abnormal sexuality ( $p=1.0$ ), and husband's genital warts ( $p=0.357$ ). (Table 5)

## **Discussion**

HPV infection is common among young females. On the other hand, the majority of the infections are managed with six to twelve months and only a small percentage develop a persistent infection (11). In the current study, most of the females were asymptomatic, two females complained (0.5%) of vaginal bleeding, 81 females (19.9%) had offensive yellowish discharge and 94 females (23%) suffered from whitish creamy discharge. Pain during intercourse was reported in 175 females (43%). Nearly a quarter of females (96 females; 24%) had history of genital warts. All of these symptoms may suggest HPV infection or early CC. This was proved in our work as Pap smears revealed that 166 females (40.7%) were infected with HPV and 242 females (59.3%) had no HPV. History of histopathological examination confirmed carcinoma in situ (CIN) in one case. However, confirming the diagnosis and following up on the diagnosed disease was beyond the aim of our work.

Accordingly, HPV infection among Egyptian women who had cervical cytology or clinical

genital warts , older than 17 years old who were who attended the gynecology outpatient clinic at Mansoura University Hospitals was 24%. However, previous Egyptian studies showed a much lower prevalence rate of HPV infection, representing 10.3% (12), 15.06% (13), and 23.3% (14).

The variation in the prevalence rates of HPV reported by various researchers could be explained by first, the nature of HPV infections being transient and resolving on their own, so the prevalence of HPV may change over time. Second, different inclusion criteria for participant women may lead to variation in HPV prevalence. Third, the difference in sensitivity of the tests used to measure the prevalence might be a contributing factor. Fourth, the different socioeconomic status of participants , different behavior changes, different risk factors as immunocompromised females who had HIV infection , diabetes mellitus or autoimmune diseases .

Concerning the knowledge of HPV infection, 88% of females did not know what is HPV, the cause of HPV and how it spreads which was higher than that reported by a previous Egyptian study by Shaltout et al. who mentioned that few women (33.2%) in their study had formerly heard of HPV (12).

Generally, this may imply conservative sexual behaviour in Egypt. In addition, discussing such issues is comparatively very low among subjects in society with no formal sexual education (15).

Among the participating females, the majority of females (90.9%) didn't know about the relation between HPV and cancer cervix. Furthermore, most of them didn't know about HPV prevention, pap smear tests for cervical screening, or HPV vaccine.

The current results demonstrate that there exist gaps in the knowledge of women on this topic, in particular with regard to the latest data on cancer cervix prevention through HPV testing and vaccination, indicating improper knowledge as regards cervical cancer

epidemiology in comparison with different researches performed all nations(16-18). Therefore, Egyptian females may be facing a threatening health trouble of increased cervical cancer. This is most lyowing to the absence of efficient cervical cancer screening plans and vaccination programs too. Additionally, there is low knowledge and attitude among overall populations as regards the HPV vaccine in certain communities(16, 19).

Our findings were in accordance with the results by Alsous et al. who studied the knowledge and awareness as regards HPV infection and its vaccination among females in Arab communities. They found a relatively low knowledge of the strong correlation between HPV and cervical cancer among Arab women (20).

In a Greek study, Farazi et al. proposed that further data requires to be transmitted to Greek females and males on HPV testing and vaccination (21).

In our study, only 48 females (12%) knew about HPV vaccination .The awareness about the vaccine was lower than that reported in preceding researches conducted by Yu et al. and Zhang et al. who recorded that only 19.33% and 25.1%, respectively of all females in their works were aware of HPV before the study (22, 23) Also, it was lower than that mentioned by Marek et al. study which found that 35% of female subjects recorded they had heard about the HPV vaccine before the survey (24) and lower than the results from Bowyer et al. study (73%) (25).

Regional researches conducted in Riyadh (26), Abu Dhabi (27), and Bahrain (28) also recorded comparable figures (34.5%, 29%, and 31.3% respectively).

Our findings suggested lower awareness and poorer knowledge of HPV vaccination among the Egyptian subjects. This might be accompanied byseveral factors, including low education levels, traditional thought, and poor governmental role concerning increasing the knowledge level.

However, the awareness about the vaccine was higher than that reported in preceding researches conducted by Yu et al. and Zhang et al. who recorded that only 19.33% and 25.1%, respectively of all females in their works were aware of HPV before the study (22, 23) and lower than the results from Bowyer et al. study (73%) (25).

In spite of the low level of awareness about the vaccine among our population, the majority of females (278 females; 68.1%) accepted to be vaccinated. This was consistent with studies from other countries (65.7–96%) (29, 30). Nearly half of the females (49.3%) received the Gardasil vaccine which protects against nine HPV types (6, 11, 16, 18, 31, 33, 45, 52, and 58) (31). Regarding the vaccine schedule, 209 females (51.2%) knew about all schedules.

We found that 130 females refused the vaccination owing to a number of factors. First of all, the cost of vaccine in 104 females (80%). Previous studies have emphasized cost concerns as a main issue impeding the uptake of HPV vaccine (32, 33). In addition, an Australian study demonstrated that 38% of women wouldn't be vaccinated if they needed to pay the charge of vaccination (34). Another study in China demonstrates that only 25.4% of parents accepted a price (23). Unfortunately, the price might be an essential factor to interfere with the HPV vaccination rate if the HPV vaccines are approved in Egypt. Secondly, an absence of confidence in the safety of the vaccine in 46 females (35.4%), reflecting the doubts about vaccine efficiency and safety. This is because when a novel vaccine was approved to be used, subjects became more cautious as regards vaccination.

In a recent Egyptian study, Zakzook et al. disagreed with our findings. They revealed that more than three-quarters of female university students refused the vaccine due to many factors such as it being very expensive, a afraid of taking it, proposing it increases the possibility of cervical cancer, and the risk of

HPV infection, besides, they didn't prefer to have too many vaccines and it is inconvenient for them to have three injections within six months (35).

Also, Farsi et al. displayed that less than half of the studied participants were interested in receiving the HPV vaccine (36). Liu et al. revealed that nearly one-quarter of students accepted to take the vaccine (37).

In this work, more than half of the participating females (60.3%) confirmed that they would allow their daughter to get the vaccine while 39.7% refused, suggesting vaccine unsafely in 89 females (54.6%) or because they are against vaccine in 74 females (45.4%). This may be owing to the distrusting issues as regards a novel vaccine and trust in their spouses to not give them sexually transmitted diseases. However, in Egypt, mothers influence decisions, in particular for their young female children; as a result places with a high concentration of mothers such as antenatal classes, markets, and parent-teacher forum meetings could be engaged to enhance HPV awareness.

A systematic review measuring parents' attitudes towards the HPV vaccine for their children demonstrated that the vaccination choice was mainly reliant on the child's age. Some of the comprised researches demonstrated that parents favored not to vaccinate their children if they through them to be very young or sexually inactive, on the other hand parents were keener on vaccination of their children when they were older or sexually active (38).

In a Chinese study by Choi et al., regarding acceptability, 37.6% (34.5–40.8%) of the mothers were willing to have their daughters vaccinated, however, this is linked to the cost of the vaccine (8).

In our study, concerning the effect of vaccines, 68 females (16.6%) believed that vaccines have no impact on daily activity. Among the participating females, 23 females (22.1%) confirmed that no side effects of the vaccine



while 41 females (39.4%), 38 females (36.5%), one females (0.7%), and one female (0.9%) reported that vaccine causes erythema, pain, induration, and myalgia, respectively. Nearly three-quarters of females (302 females; 74%) did not know about the effect of the vaccine on fertility, while 87 females (21.3%) believed that the vaccine impacts fertility, and 19 females (4.7%) answered no effect of the vaccine on fertility. 26 females (6.3%) reported that the vaccine has an impact on early menopause, in addition, 108 females (26.4%) thought that the vaccine affected promiscuity. However, all participating females believe that our community is appropriate for vaccines.

Systemic review and meta-analysis, evaluating HPV vaccine safety and adverse effects, Gonçalves et al 2014. found that pain was the commonest detected adverse event. Such effects could be owing to a potential related inflammation process. Fatigue has been considered as the most related effect noticed then fever, intestinal manifestations, swelling, and headache (39).

Based on a Japanese study by Ozawa et al 2017., it was suggested that HPV vaccination is associated with the transiently high prevalence of chronic regional pain syndrome, impaired cognition and affection of autonomic functions among vaccinated cases (40).

On the other hand, Schuler et al stated that there is a great concern about vaccine-associated infertility with the HPV vaccine (41). However, a number of studies showed no effect of the HPV vaccine on fertility, concluding that the vaccine is safe even in pregnant females. Besides, some authors stated that if a woman has received an HPV vaccine and is planning to become pregnant, there is no need to postpone pregnancy, as the HPV vaccines are inactive (42, 43).

We observed some relationships between accepting vaccines and different factors. There were statistically significant relations between accepting the vaccine and age ( $p= 0.005$ ), residence ( $p= 0.004$ ), marriage duration ( $p=$

$0.01$ ), vaginal discharge ( $p< 0.001$ ), and husband age ( $p= 0.003$ ).

In agreement with the current results, Alsous et al found a strong relationship between the acceptance of vaccines and age (20). Also, in other researches, age, education, and residence were demonstrated to be accompanied by HPV awareness (44, 45). Contrary to our results, a Saudi study demonstrated that the acceptance of vaccines is strongly related to marital status (46).

Ebu et al., analysing the causes for a negative attitude towards vaccination, demonstrated that the greatest percentage of unvaccinated subjects agreed with the statement that there was limited data as regards HPV vaccination. In addition, in the same study, significant associations were demonstrated between age, marital status, education level, and work duration in a health facility with the acceptance of HPV vaccination (47).

Raiz et al. noticed that there was a significant correlation between the participants' age, marital status, education level, and positive attitude as regards cancer cervix screening and prevention. Subjects, who were of the younger age group, were married, and those who had higher education were observed to have a positive attitude than their counterparts. There was no significant relation demonstrated between positive attitude and the socioeconomic status of subjects (18).

This study is strengthened by including a large sample size for analyzing the awareness, knowledge, and acceptability of the HPV/HPV vaccine in a major sample of Egyptian females. This will help identify specific factors that affect acceptance, and to develop tailored vaccination strategies. In addition, conduction of face-to-face meetings confirmed the inclusion of illiterate subjects and as a result greater cure rates to all questions.

Despite the promising results of the current study, the cross-sectional nature of the study has been considered the main limitation owing to the lacking a control group, which may lead

to some bias regarding the results. In addition, our study was conducted only at Mansoura University Hospitals and wasn't a multi-center study.

## **Conclusion**

Despite the low level of awareness about the vaccine among our population, we reported the potential acceptability of the vaccine. However, the majority of the subjects agreed to vaccination, it might not essentially indicate their true intent to receive it even when the HPV vaccine is recommended and available. This indirectly relates to the lack of knowledge as regards the virus and its correlation with cancer cervix as well as with different malignant tumours.

Additional studies to assure the existing HPV vaccines is required. An organized vaccination program is recommended to increase vaccination coverage and improve the completion of the vaccination schedule, especially among sexually active females .A national HPV awareness campaign must be stratified in Egypt to raise knowledge about the HPV vaccine.

**Table 1.Demographic characteristics, medical history, and special habits of the studied females.**

	N	%
<b>Age/years</b> Mean $\pm$ SD (min-max)	34.77 $\pm$ 6.65 (15-40)	
<b>Residence</b>		
Rural	54	13.2
Urban	354	86.8
<b>Occupation</b>		
Housewife	231	56.6
Employee	127	31.1
Manual worker	50	12.3
<b>Marital status</b>		
Married	407	99.8
Divorced	1	0.2
<b>Duration of marriage(years)</b> Median (min-max)	12(1-25)	
<b>Number of marriages (two)</b>	1	0.2
<b>Smoking</b>	0	0.0
<b>Abnormal Sexual offense</b>	0	0.0
<b>Vaginal Discharge</b>		
no	231	56.6
vg bleeding	2	0.5
offensive yellowish	81	19.9
whitish creamy	94	23.0
<b>Pain duration intercourse</b>	175	43
<b>Age of husband(years)</b> Mean $\pm$ SD (min-max)	40.09 $\pm$ 6.98 (25-52)	
<b>Occupation of husband</b>		
Employee	255	62.5
Manual worker	153	37.5
<b>Traveling abroad</b>	192	47.1



<b>Smoking</b>	176	43.1
<b>Number of marriage</b>		
One	402	98.5
Two	6	1.5
<b>Abnormal sexuality</b>	2	0.5
<b>Genital warts</b>	183	44.9

**Table 2. The knowledge about HPV**

	N=408	%
<b>What is HPV</b>		
Don't know	341	83.5
Know	67	16.5
<b>HPV cause</b>		
Genital warts	67	16.5
Don't know	341	83.5
<b>HPV spread</b>		
Sexual transmitted ,skin con-		
tent	44	10.7
Don't know	364	89.3
<b>Having Genital wart</b>	98	24
<b>Think about cervical cancer</b>		
Don't know	150	36.8
I know	258	63.2
<b>Persons can be infected by HPV</b>		
Don't know	368	90.1
Male &Female	45	10.9
<b>HPV related to cancer cervix</b>		
Don't know	371	90.9
Yes	37	9.1
<b>HPV related to other cancer</b>		
No	11	2.7
Yes	13	3.3
Don't know	384	94
<b>Prevention of HPV</b>		
Don't know	372	91.2
Cervical screening	16	3.9
Vaccination & cx screening	20	4.9
<b>History of Pap smear test</b>		
Don't know	347	85.1
Yes	61	14.9

**Table 3. The Knowledge about HPV vaccine among studied cases.**

	N=408	%
<b>Knowledge about HPV vaccine</b>		
Yes	48	12
Don't know	359	88
<b>Accept to be vaccinated after awareness</b>	278	68.1
<b>If No, Why?</b>	<b>N=130</b>	
Harm	26	20
Cost	104	80
<b>If Yes, What is type of vaccine after awareness?</b>		
Don't know	304	74.5
Gardasil	106	26
<b>Vaccine schedule</b>		
Don't know	304	74.5
0,2,6 months	106	26
<b>Need for Pap smear screening after Vaccine</b>		
Don't know	304	74.5
Yes	16	2.4
No	96	23.52
<b>vaccine protect against cancer cervix after awareness</b>		
-ve	162	39.7
+ve	246	60.3
<b>Allowing daughter to get vaccine</b>		
No	162	39.7
Yes	246	60.3
<b>if No, Why?</b>	<b>N=162</b>	
Not safe	70	43.2
I'm against	92	22.54
<b>Effect of vaccine on daily activities</b>		
Don't know	340	83.3
No disruption	68	16.6
<b>Protection period</b>		
I don't know	374	91.6
>10 years	61	14.9

**Table 4. Knowledge about HPV vaccine side effects among studied cases.**

	N=408	%
<b>Side effects</b>		
No	23	22.1
Pain	38	36.4
Myalgia	1	0.96
Erythema	41	39.5
Induration	1	0.96
<b>Effect of HPV vaccine on fertility</b>		
No	19	4.7
I don't know	302	74.0
Yes	87	21.3
<b>HPV vaccine on early menopause</b>		
No	60	14.7
I don't know	322	78.9
Yes	26	26.4
<b>Vaccine to promiscuity</b>		
No	40	9.8
I don't know	260	63.7
Yes	108	26.4
<b>system appropriate for vaccine (community)</b>	278	68.1
<b>Regular cervical cancer screening</b>		
Don't know	318	77.9
yes	90	22

**Table 5. The relation between demographic characteristics and vaccine acceptance among studied cases**

	Accepting vaccine		Test of significance
	No N=130(31.9%)	Yes N=278(68.1%)	
<b>Age/years</b> Mean±SD	33.42±7.16	35.41±6.31	t=2.83 p=0.005*
<b>Residence</b> Rural Urban	8(6.2) 122(93.8)	46(16.5) 232(83.5)	χ <sup>2</sup> =8.33 P=0.004*
<b>Occupation</b> Housewife Employee Manual worker	82(63.1) 30(23.1) 18(13.8)	149(53.6) 97(34.9) 32(11.5)	χ <sup>2</sup> =5.77 P=0.06
<b>Marital status</b> Married Divorced	130(100) 0	277(99.6) 1(0.4)	FET=0.469 P=1.0
<b>Duration of marriage(years)</b> Median (min-max)	10(1-23)	12(1-25)	Z=2.58 P=0.01*



<b>Number of marriage</b>			
One	130(100)	277(99.6)	FET=0.469
Two	0	1(0.4)	P=1.0
<b>Vaginal Discharge</b>			
No	51(39.2)	180(64.7)	
Vaginal bleeding	0	2(0.7)	
Offensive yellowish	33(25.4)	48(17.3)	MC=26.68
Whitish creamy	46(35.4)	48(17.3)	P≤0.001*
<b>Pain duration intercourse</b>	73(56.2)	173(62.2)	$\chi^2=1.37$ P=0.242
<b>Age of husband (years)</b>			
Mean±SD	38.58±7.61	40.79±6.58	t=3.01 p=0.003*
<b>Occupation of husband</b>			
Employee	74(56.9)	181(65.1)	$\chi^2=2.53$
Manual worker	56(43.1)	97(34.9)	P=0.112
<b>Traveling abroad</b>	65(50.0)	127(45.7)	$\chi^2=0.662$ P=0.416
<b>Smoking</b>	61(46.9)	115(41.4)	$\chi^2=1.12$ P=0.291
<b>Number of marriage</b>			
One	130(100)	272(97.8)	$\chi^2=2.85$
Two	0	6(2.2)	P=0.09
<b>Abnormal sexuality</b>	0	2(0.7)	FET=0.940 P=1.0
<b>Genital warts</b>	54(41.5)	129(46.4)	$\chi^2=0.847$ P=0.357

t: Student t-test, FET: Fisher exact test, \*statistically significant

Z:mann Whitney U test, MC: Monte Carlo test,  $\chi^2$ =Chi-Square test

## References

1. Biyazin T, Yilma A, Yetwale A, Fenta B, Dagnaw Y. Knowledge and attitude about human papillomavirus vaccine among female high school students at Jimma town, Ethiopia. *Hum Vaccin Immunother*. 2022;18(1):2036522.
2. Athanasiou A, Bowden S, Paraskevaïdi M, Fotopoulou C, Martin-Hirsch P, Paraskevaïdis E, et al. HPV vaccination and cancer prevention. *Best Pract Res Clin Obstet Gynaecol*. 2020;65:109-24.
3. Brianti P, De Flammineis E, Mercuri SR. Review of HPV-related diseases and cancers. *New Microbiol*. 2017;40(2):80-5.
4. Moraros J, Bird Y, Barney DD, King SC, Banegas M, Suarez-Toriello E. Pilot Study. *Californian Journal of Health Promotion*. 2006;4(3):177-86.
5. Zhang Y, Wang Y, Liu L, Fan Y, Liu Z, Wang Y, et al. Awareness and knowledge about human papillomavirus vaccination and its acceptance in China: a meta-analysis of 58 observational studies. *BMC Public Health*. 2016;16(1):216.
6. Levine OS, Bloom DE, Cherian T, de Quadros C, Sow S, Wecker J, et al. The future of immunisation policy, implementation, and financing. *Lancet*. 2011;378(9789):439-48.
7. Lei J, Ploner A, Elfström KM, Wang J, Roth A, Fang F, et al. HPV Vaccination and the Risk of Invasive Cervical Cancer. *N Engl J Med*. 2020;383(14):1340-8.
8. Choi HC, Leung GM, Woo PP, Jit M, Wu JT. Acceptability and uptake of female adolescent HPV vaccination in Hong Kong: a survey of mothers and adolescents. *Vaccine*. 2013;32(1):78-84.
9. Jarrett C, Wilson R, O'Leary M, Eckersberger E, Larson HJ. Strategies for addressing vaccine hesitancy - A systematic review. *Vaccine*. 2015;33(34):4180-90.
10. Thanasa E, Thanasa A, Kamaretsos E, Paraoulakis I, Balafa K, Gerokostas EE, et al. Awareness Regarding Human Papilloma Virus Among Health Professionals and Will to Accept Vaccination: A Systematic Review. *Cureus*. 2022;14(10):e30855.
11. Youssef MA, Abdelsalam L, Harfoush RA, Talaat IM, Elkattan E, Mohey A, et al. Prevalence of human papilloma virus (HPV) and its genotypes in cervical specimens of Egyptian women by linear array HPV genotyping test. *Infectious Agents and Cancer*. 2016;11(1):6.
12. Shaltout MF, Sallam HN, AbouSeeda M, Moïety F, Hemeda H, Ibrahim A, et al. Prevalence and type distribution of human papillomavirus among women older than 18 years in Egypt: a multicenter, observational study. *International Journal of Infectious Diseases*. 2014;29:226-31.
13. Abdel Aziz. MT, Abdel Aziz. MZ, Atta HM, Shaker OG, MM AF, Mohsen GA, et al. Screening for human papillomavirus (HPV) in Egyptian women by the second-generation hybrid capture (HC II) test. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*. 2006;12(7):MT43-9.
14. Ibrahim SA, Abdel-Salam SA, Amer MI, El-Sayed AA, Hassan RA. Prevalence of human papilloma virus (HPV) and type distribution of genotypes (6, 11, 16 and 18) among Egyptian women. *Egyptian Journal of Medical Microbiology*. 2020;29(4):45-50.
15. Alomair N, Alageel S, Davies N, Bailey JV. Factors influencing sexual and reproductive health of Muslim women: a systematic review. *Reprod Health*. 2020;17(1):33.
16. Husain Y, Alalwan A, Al-Musawi Z, Abdulla G, Hasan K, Jassim G. Knowledge towards human papilloma virus (HPV) infection and attitude towards its vaccine in the Kingdom of Bahrain: cross-sectional study. *BMJ Open*. 2019;9(9):e031017.

17. Steben M, Durand N, Guichon JR, Greenwald ZR, McFaul S, Blake J. A National Survey of Canadian Adults on HPV: Knowledge, Attitudes, and Barriers to the HPV Vaccine. *J Obstet Gynaecol Can.* 2019;41(8):1125-33.e6.
18. Riaz L, Manazir S, Jawed F, Arshad Ali S, Riaz R. Knowledge, Perception, and Prevention Practices Related to Human Papillomavirus-based Cervical Cancer and Its Socioeconomic Correlates Among Women in Karachi, Pakistan. *Cureus.* 2020;12(3):e7183.
19. Gamaoun R. Knowledge, awareness and acceptability of anti-HPV vaccine in the Arab states of the Middle East and North Africa Region: a systematic review. *East Mediterr Health J.* 2018;24(6):538-48.
20. Alsous MM, Ali AA, Al-Azzam SI, Abdel Jalil MH, Al-Obaidi HJ, Al-abbadi EI, et al. Knowledge and awareness about human papillomavirus infection and its vaccination among women in Arab communities. *Scientific Reports.* 2021;11(1):786.
21. Farazi PA, Hadji P, Roupia Z. Awareness of human papilloma virus and cervical cancer prevention among Greek female healthcare workers. *Eur J Cancer Prev.* 2017;26(4):330-5.
22. Yu Y, Xu M, Sun J, Li R, Li M, Wang J, et al. Human Papillomavirus Infection and Vaccination: Awareness and Knowledge of HPV and Acceptability of HPV Vaccine among Mothers of Teenage Daughters in Weihai, Shandong, China. *PLoS One.* 2016;11(1):e0146741.
23. Zhang SK, Pan XF, Wang SM, Yang CX, Gao XH, Wang ZZ, et al. Perceptions and acceptability of HPV vaccination among parents of young adolescents: a multicenter national survey in China. *Vaccine.* 2013;31(32):3244-9.
24. Marek E, Dergez T, Rebek-Nagy G, Kricskovics A, Kovacs K, Bozsá S, et al. Adolescents' awareness of HPV infections and attitudes towards HPV vaccination 3 years following the introduction of the HPV vaccine in Hungary. *Vaccine.* 2011;29(47):8591-8.
25. Bowyer HL, Marlow LA, Hibbitts S, Pollock KG, Waller J. Knowledge and awareness of HPV and the HPV vaccine among young women in the first routinely vaccinated cohort in England. *Vaccine.* 2013;31(7):1051-6.
26. Ortashi O, Raheel H, Shalal M, Osman N. Awareness and knowledge about human papillomavirus infection and vaccination among women in UAE. *Asian Pac J Cancer Prev.* 2013;14(10):6077-80.
27. Hussain AN, Alkhenizan A, McWalter P, Qazi N, Alshmassi A, Farooqi S, et al. Attitudes and perceptions towards HPV vaccination among young women in Saudi Arabia. *J Family Community Med.* 2016;23(3):145-50.
28. Moosa K, Alsayyad AS, Quint W, Gopala K, DeAntonio R. An epidemiological study assessing the prevalence of human papillomavirus types in women in the Kingdom of Bahrain. *BMC Cancer.* 2014;14:905.
29. Lenselink CH, Gerrits MM, Melchers WJ, Massuger LF, van Hamont D, Bekkers RL. Parental acceptance of Human Papillomavirus vaccines. *Eur J Obstet Gynecol Reprod Biol.* 2008;137(1):103-7.
30. Jaspers L, Budiningsih S, Wolterbeek R, Henderson FC, Peters AA. Parental acceptance of human papillomavirus (HPV) vaccination in Indonesia: a cross-sectional study. *Vaccine.* 2011;29(44):7785-93.
31. WHO. World Health Organization. Immunization, Vaccines and Biologicals; Human papillomavirus vaccines (HPV). Available at: [https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-vaccines-\(hpv\)](https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/human-papillomavirus-vaccines-(hpv)). 2022.
32. Nnodu O, Erinoshó L, Jamda M, Olaniyi O, Adelaiye R, Lawson L, et al. Knowledge and attitudes towards cervical



- cancer and human papillomavirus: a Nigerian pilot study. *Afr J Reprod Health*. 2010;14(1):95-108.
33. Makwe CC, Anorlu RI, Odeyemi KA. Human papillomavirus (HPV) infection and vaccines: knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. *J Epidemiol Glob Health*. 2012;2(4):199-206.
  34. Hausdorf K, Newman B, Whiteman D, Aitken J, Frazer I. HPV vaccination: what do Queensland parents think? *Aust N Z J Public Health*. 2007;31(3):288-9.
  35. Zakzook H, Hegazi S, El-Sayed H. Assessment of University Student's Attitude towards Human Papilloma Virus Infection, Vaccination and their Vaccine Acceptability. *Mansoura Nursing Journal*. 2022;9(2):577-87.
  36. Farsi NJ, Baharoon AH, Jiffri AE, Marzouki HZ, Merdad MA, Merdad LA. Human papillomavirus knowledge and vaccine acceptability among male medical students in Saudi Arabia. *Hum Vaccin Immunother*. 2021;17(7):1968-74.
  37. Liu Y, Di N, Tao X. Knowledge, practice and attitude towards HPV vaccination among college students in Beijing, China. *Hum Vaccin Immunother*. 2020;16(1):116-23.
  38. Trim K, Nagji N, Elit L, Roy K. Parental Knowledge, Attitudes, and Behaviours towards Human Papillomavirus Vaccination for Their Children: A Systematic Review from 2001 to 2011. *Obstet Gynecol Int*. 2012;2012:921236.
  39. Gonçalves AK, Cobucci RN, Rodrigues HM, de Melo AG, Giraldo PC. Safety, tolerability and side effects of human papillomavirus vaccines: a systematic quantitative review. *Braz J Infect Dis*. 2014;18(6):651-9.
  40. Ozawa K, Hineno A, Kinoshita T, Ishihara S, Ikeda S-i. Suspected Adverse Effects After Human Papillomavirus Vaccination: A Temporal Relationship Between Vaccine Administration and the Appearance of Symptoms in Japan. *Drug Safety*. 2017;40(12):1219-29.
  41. Schuler CL, Hanley CJ, Coyne-Beasley T. Misconception: human papillomavirus vaccine and infertility. *Clinical pediatrics*. 2014;53(2):158-65.
  42. Bonde U, Joergensen JS, Lamont RF, Mogensen O. Is HPV vaccination in pregnancy safe? *Human vaccines & immunotherapeutics*. 2016;12(8):1960-4.
  43. Narducci A, Einarson A, Bozzo P. Human papillomavirus vaccine and pregnancy. *Canadian Family Physician*. 2012;58(3):268-9.
  44. McBride KR, Singh S. Predictors of Adults' Knowledge and Awareness of HPV, HPV-Associated Cancers, and the HPV Vaccine: Implications for Health Education. *Health Educ Behav*. 2018;45(1):68-76.
  45. Blake KD, Ottenbacher AJ, Finney Rutten LJ, Grady MA, Kobrin SC, Jacobson RM, et al. Predictors of human papillomavirus awareness and knowledge in 2013: gaps and opportunities for targeted communication strategies. *Am J Prev Med*. 2015;48(4):402-10.
  46. Gadeer RHA, Mohamed Wahby Salem A. Knowledge and Acceptability of Human Papilloma Virus Vaccine among Health Colleges' Students at King Abdul Aziz University, Jeddah Saudi Arabia, 2018 (A Cross-Sectional Study). *Indian Journal of Public Health Research & Development*. 2020;11(10).
  47. Ebu NI, Abotsi-Foli GE, Gakpo DF. Nurses' and midwives' knowledge, attitudes, and acceptance regarding human papillomavirus vaccination in Ghana: a cross-sectional study. *BMC Nurs*. 2021;20(1):11.