Perception of University Students Regarding Human Papilloma Virus Vaccine

Samar Mohsen Mohamed Ali[(1)], Aziza Attia[(2)], Amira Morsy[(3)], Heba Mahmoud[(4)]

1. B.Sc. of Nursing, Year 2010
2. Professor of Maternity and Neonatal Health Nursing, Faculty of Nursing, Ain Shams University
3. Assistant Professor of Maternity & Gynecological Nursing, Faculty of Nursing, Ain Shams University
4. Assistant Professor of Maternity & Gynecological Nursing, Faculty of Nursing, Ain Shams University

Abstract

Background: Human papillomavirus (HPV) infection is one of the major causes of infection-related cancer **worldwide**. HPV vaccine is a prophylactic vaccine designed to prevent cervical cancer and other HPV-related cancers**. The aim** of this study was to assess Perception of university students regarding human papilloma virus vaccine. **Design:** A descriptive design was used. **Setting:** the study was conducted at 4 faculties of Ain shams University that chosen by random assignment **Sample:** A multi stage sample technique was used to recruit 377 students from the four grades of each faculty. **Data collection tools:** Two tools were used: **1**- Structured interviewing questionnaire. **2**- Likert -attitude scale: **Results:** the study showed that more than three quarter (76.1%) of the studied students had poor level of total knowledge about human papilloma virus vaccine. More than half (57.6%) of the studied students had negative total attitude regarding human papilloma virus vaccine. Moreover, there were no statistically significant relation between the type of studied students' faculty and their knowledge and attitude about human papilloma virus vaccine **Conclusion:** The most of the studied students had poor level of total knowledge regarding HPV and its vaccine. Finally, there was statistically significant positive correlation between studied students' total knowledge and total attitude. **Recommendations:** Developing guidelines and brochures to raising awareness about human papilloma virus infection and its vaccine between university students.

Keywords, university students, human papilloma virus vaccine, perception.

Introduction

Human Papillomavirus **(HPV)** infection is the most common sexually transmitted infection, responsible for a large number of pathologies in both women and men. HPV is found in more than 95 percent of women who develop cervical cancer The majority of cervical cancer-related deaths occur in developing countries, such as **Egypt** where a population of 25.76 million women over 15 years of age are at risk of developing cervical cancer ***(El-Mazzally & El-Mazzally, 2022).***

Over 200 HPV types have been identified and classified into high risk (HR) and low risk (LR) types on the basis of their potential to induce cancerous lesions. The most common types are HPV-16 and HPV-18 that responsible for more than 70% of all cases of cervical, vaginal and anal cancers and they account for about 30–40% of cancers of the vulva, penis and oropharynx **worldwide**. Nevertheless, non-oncogenic HPV types are extensively involved in the etiology of genital warts which, massively impact on the quality of life ***(Haręża, Wilczyński & Paradowska, 2022).***

Early age of first sexual intercourse, frequent sexual partners, smoking, and impaired immune function are all risk factors for chronic infection by sexually transmitted diseases. About 70–90% of HPV infections are asymptomatic and resolve spontaneously within 1–2 years, but persistent infections with HR types may progress to invasive cancer ***(Haręża, Wilczyński & Paradowska, 2022).***

The two most common clinically significant manifestations of genital HPV infection are Genital warts that are visualized without magnification, and cervical cellular abnormalities that are detected by Pap test screening. Vulvar warts can cause dyspareunia, pruritis, and burning discomfort. Moreover vaginal warts occasionally cause discharge, bleeding, or obstruction of birth canal (due to increased wart growth in pregnancy) and Perianal and intra-anal warts occasionally

causes pain, bleeding on defecation, or pruritis ***(Chilaka et al., 2021).***

According with the World Health Organization **(WHO),** vaccination against HPV is an essential strategy in preventing cervical cancer. After being licensed by the US Food and Drug Administration in 2006, prophylactic HPV vaccines have been proven to result in safe, effective, and long-lasting immunization against infection and the introduction of vaccines against high-risk HPV represents the primary prevention in reducing disease burden ***(Baldovin et al., 2019).***

There are four prophylactic vaccine designed to prevent cervical cancer and other HPV-related cancers or diseases. Two of them are currently licensed in many countries around the world, including **Egypt** to protect against HR HPV types 16 and 18: Cervarix (bivalent) and Gardasil (quadrivalent) vaccines. Both vaccines have good safety and efficacy profiles and are reported to provide cross-protection against non-vaccine HPV types. Both vaccines are currently not included in the national immunization program in Egypt. Regrettably, current and recent epidemiological data for HPV in Egyptian women are limited, and only a few publications on HPV prevalence and infection are available ***(Elazab et al., 2021).***

Globally, as of 2017, 71 countries had introduced HPV vaccination for girls, and 11 countries also for boys. Moreover, HPV immunization also is recommended for unvaccinated females aged more than 12 (in particular to 25-years-old women that undergo cervical screening for the first time) and for men who have sex with men. To date, over 100 countries in the world have approved one or more HPV vaccines and over 80 countries have established national HPV vaccination programs ***(Chen et al., 2021).***

Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information or environment; it includes knowledge and attitude ***(Aksan, 2021).***

The acceptance of HPV vaccine depends on a broad range of factors, including awareness, beliefs, knowledge and perceptions. Young adults are likely to have just assumed a central role in their healthcare decision-making and potential barriers to vaccination are likely to be different compared with those identified ordinarily among parents of young children ***(Cocchio et al., 2020)***

Nurses are at the forefront of health-care provision and can significantly influence the delivery of healthcare. They are vital to the functionality of the health-care system and are considered the ideal patient advocates because of their regular contact with patients. The nature of the nursing professional authority enhances nurses' ability to influence vaccine decisions; as a result, patients commonly seek out nurses for health-related advice ***(Alex et al., 2020).***

Nurses have been regarded as ideal primary contacts for immunization information and concerns as well as immunization adherence. Nurses are considered one of the primary sources of information and guidance about recommended student vaccinations. In the case of the HPV vaccination, school nurses are important in educating parents about the importance of HPV vaccination in teens and simultaneously advocate cervical cancer. The provision of counseling to prevent HPV vaccine hesitancy is essential due to the complex pathogenesis of cervical cancer development and sensitivity surrounding HPV infections ***(Lin et al., 2022).***

Significance of the study:

Human papilloma viruses **(HPVs)** are a group of double stranded DNA viruses belonging to the family Papovaviridae. HPVs are responsible for causing genital warts, non-cancerous lesions and tumors and are implicated in about 98%of cervical cancers and 30 to 50% of Head and Neck cancers. Apart from these tumors, about56 % of vaginal cancers and a small percentage of anal, penile and vulvar cancers are also attributed to HPV infections ***(Devi et al., 2019).***

The peak incidence of infection occurs about 10 years after sexarche, usually between 24 and 30 years of age for both sexes. Although the prevalence decreases with age, a second late peak of incidence in women in the fifth decade may occur. The episodes of clinical manifestation have a mean duration of two and a half months. The incidence of anal infection is high among men who have sex with men (MSM). Lesions in men appear to be less persistent than in women ***(Magalhães et al., 2021)***.

Approximately, 80% of sexually active individuals will be infected by HPV during their

lifetime. Most of these infections are immunologically controlled within 1–2 years. Prevalence of HPV acquisition, persistence, and infection are correlated with sexual behaviour, viral load, anatomical site, local immunity and clearance. After exposure, if the infection persists, it can cause cellular changes that can lead to certain types of cancers ***(Wierzbicka et al., 2023).***

It was estimated that every year 969 women are diagnosed with cervical cancer and 631 die from the disease. Cervical cancer ranks as the 14th most frequent cancer among women in **Egypt** and the 11th most frequent cancer among women between 15 and 44 years of age. Data is not yet available on the **HPV** burden in the general population of Egypt. In October 2014, a very important multicenter observational study in Egypt concluded that the prevalence of **HPV** among Egyptian women aged 18 years or more is about 10.4% with the highest prevalence observed among women aged 45 - 54 years ***(Elazab et al., 2021).***

Also, head and Neck Squamous Cell Carcinomas (HNSCCs) include cancers of the oral cavity, oropharynx, and larynx, have an estimated annual burden of 330,000 deaths and more than 650,000 incident cases, making it the sixth most common cancer **worldwide**. **In Egypt** studies have shown that HNSCCs account for about 17–20%of all cancers. The situation in Egypt is still unclear where limited data is available with only few studies in this issue ***(Salem et al., 2020)***.

So, it is important to investigate knowledge and attitude towards HPV and vaccination among university students, also considering that in this period of their life there may be a shift in health care decision-making from parents and guardians to the students themselves. In order to raising awareness about HPV and its vaccine and as a result reducing cervical cancer and other disease burden among university students and their future kids ***(Cocchio et al., 2020).***

Aim Of The Study

This study aimed to assess perception of University Students Regarding Human Papilloma Virus Vaccine.

The aim was accomplished through the following objectives:

1-Assessing the University Students knowledge about human papilloma virus vaccine.

2- Assessing the University Students attitude regarding Human Papilloma Virus Vaccine.

Research Questions:

1. What is the university student's knowledge about human papilloma virus vaccine?

2. What is the university students attitude regarding human papilloma virus vaccine?

SUBJECTS &METHODS

Research Design:

A descriptive design was utilized to fulfill this study's aim.

Descriptive research design is non-experimental design describe a particular situation or event that already exists. It is made to explain or predict what the situation might be in the future or how it might be changed ***(Sirisilla & Sirisilla 2023).***

Setting:

The study was conducted on 4 faculties of Ain shams University that chosen by random assignment.1 medical (faculty of Nursing) and 3 non-medical Faculties (faculty of Computer & Information, faculty of law and faculty of AL son) were included.

Sample Type and technique:

1- Simple random technique was used in the current study to select the faculties.

2- A multi stage simple random technique was used to select students from each grade .

Total Ain Shams University includes 18 colleges, 5 of them medical colleges and 13 non-medical colleges. The ratio of medical colleges to non-medical ones was approximately 1:3. Four colleges were chosen randomly to conduct the study through "blinded tossing technique.

Inclusion Criteria:

The sample was selected according to the following criteria:

-The age from 18 years old and above.

-Male and female university students.

-Medical and non-medical university students from the four grades of colleges from the previously mentioned settings.

Sampling:

Sample Size: To determine the sample size, Stephen Thompson equation (n) was used ***Steven, (2012).*** It was as follows:

Sample equation

$$= \frac{N \times p(1-p)}{[N-1 \times (d2 \div Z2)] + P(1-P)}$$

Where:

P= 0.5

D= 0.05

N= 20,500

Sample size =377

Where (N) The sample size of the community, (Z) the standard score for the level of significance (0.05), the level of confidence (0.95) is equal to (1.96), (d) the error rate is equal to (0.05) and the probability value is (0.50).

By applying the previous equation to the study population, the total sample size was 377.

Tool of data collection:

Two tools were used for data collection:

1-

Structuredinterviewingquestionnaire:

It was designed by the researcher after reviewing the related literature and it was reviewed by supervisors. It was written in an Arabic language for gathering data and it included (23 questions, multiple choice &closed ended questions) divided into two parts:

Part 1: Designed to assess the general characteristics of the university students under study such as age of students, marital status, family income, address questions from (1to6).

Part 2: It was adapted from ***Mushasha et al. (2021),*** questions from (7 to 23)**.** It was designed to assess students' knowledge about HPV and its vaccine such as definition of HPV, mode of transmission, Manifestations, High risk factors, target group for vaccination and prevention methods of HPV. Modification was done to fulfilling the aim of this study .It was 15 statements and the researcher took 9 statements and added 8 statements to complete the required data needed and it became finally 17 statements.

Scoring system regarding students' knowledge about HPV and its vaccine:

- Correct answers scored as (3)
- Incomplete correct answers scored as (2)
- Incorrect or didn't know answers scored as (1)

The total knowledge score level:

-Scoring system responses ranged from (1,2 and 3)and the total knowledge score was (51) and divided as the following:

-Scores of less than 50% (<25 score) were considered Poor knowledge.

-Scores from 50% to 75% (25 ≤38 score) were considered average knowledge.

1-P= 0.5 - Scores of more than75% (>38-51score) were considered good knowledge.

Z=1.96

2-Likert -attitude scale:

A five points Likert -type scale was used to assess attitude of university students regarding HPV vaccine. It was adapted from ***Villanueva et al. (2019)***. The researcher added and modified some questions at likert scale for fulfilling the aim of the study. It contained 12 statements (question from 24 to 35) such as the vaccine prevents cervical cancer, the side effects of the vaccine are mild and tolerable……etc, with 5 responses (Strongly agree = 5, agree = 4, unsure = 3, disagree = 2, strongly disagree = 1). The highest score given to the most positive perception and the total score (60) are categorized as the following:

Total attitude scoring system:

-Scores of <60% (<36 score) were considered negative attitudes.

-Scores of ≥60% (36-60 score) were considered positive attitude.

Tools validity:

Tools of the study was given to three panel expertise in the field of obstetric and gynecological nursing to test the content validity of the tools and clarified the sentences as well as appropriateness of content, modification was done and rephrasing to some statement.

Tools reliability:

The internal consistency was measured to identify the extent to which the items of tools measured the same concept and correlated with each other, using Cronbach alpha test on clarity of sentences, appropriateness of contents and sequence of items. Cronbach alpha test for interviewing questionnaire = 0.78 for 17 items and Cronbach alpha test for attitude = 0.81 for 12 items.

Ethical Considerations:

The ethical research considerations in this study were included the following:

- T

he research approval was obtained from

Scientific Research Ethical Committee in Faculty of Nursing at Ain Shams University before starting the study.

- Then Official permission was obtained from the dean of the Ain Shams University.
- The researcher clarified the objective and aim of the study to the university students included in the study.
- The researcher assuring and maintaining anonymity and confidentiality of the subject data.
- The researcher took oral consent from the university students to participate in the study and informed them that they had the right to withdraw from the study at any time without penalties.
- Offered answer to all the university students questions.
- Tools of data collection did not touch student's religious, dignity, culture. And ethical issues.
- Tools of data collection were burnet after statistical analysis done.

II-Administrative Design

Approval to conduct this study was obtained from Dean of Faculty of Nursing, Ain Shams University through an issued letter containing the title and aim was directed to the of Dean Ain Shams University then to the dean of the four mentioned faculties for obtaining approval for data collection.

III-Operational design:

The operational design included **preparatory phase**, **Pilot** study and **field** work.

A. **Preparatory phase:**

Literature review of the past and current, local and international books, Journals, magazines, scientific periodicals and online references was conducted to develop the study tools and to get acquainted with the various aspects of the research questions.

B. Pilot Study:

A pilot study was carried out on the university students who were admit to previous mentioned study setting who met the inclusion criteria in October 2021. The pilot study was 38 students (10% from total sample size) were included in the study sample as faculty of nursing (3students), faculty of Computer & Information (5students), faculty of law (22students) and from faculty of AL son (8students).No modification was done in the tools of data collection .So, the pilot study sample number (38 students) was not excluded from the study.

C.Field Work:

Approval obtained from the dean of the four mentioned faculties, researcher attended the previous mentioned setting 3 days a week (Sunday, Monday and Tuesday) from 9 Am to 2 pm and specified Sunday for faculty of Law, Monday for faculty of AL son and Tuesday for faculty of nursing and faculty of computer and information because they were having less number of students until collecting the data from the predetermined sample size that took 3 months in the first term from October to December 2021.

The researcher had introduced herself to the students; the aim of the study was explained to the students to gain their confidence and trust to participate in the study. Then oral consent from students was obtained. The data collection was done using 2 tools (Interviewing questionnaire and Likert attitude scale tool) that were filled by the students in the lecture hall.

The average number of students per day were from 7 – 8 students.

- The duration of each interview was 15 -25 minutes.

Limitation of the study:

- Lectures appointments hinder the meeting with some students during data collection.
- Some students were not motivated to complete the study (8 students). So, the researcher excluded them from the study and were replaced by other students to complete the required sample size.

IV-Statistical design:

Data entry in the study was be done by using quality control through two stages which were coding and data entry. Obtained data was be statistically analyzed, organized & presented in numbers, percentage, table, figures, & diagrams as required & suitable statistical tests was used to test the significance of results obtain through statistical package for social science (SPSS version 25). Statistical presentation and analysis of the present study was conducted using the mean, standard deviation, correlation, Chi-square. Eventually, statistical significance considered at p-value <0.05.

Level of significance was accepted at:

- P-value > 0.05 Non-Significant (NS)

- P-value < 0.05 Significant (S)
- P-value < 0.01Highly significant (HS)

Results

Table (1): Shows that, 97.3 % of the studied students their age ranged between 18-21 with **Mean±SD= 18.49±0.75** and most of them (91.5 %) were single. Regarding to residence 81.7% of the studied students were from urban area and 92.3% of them had enough income.

Figure (1): Clarifies that, 10.6 % of the studied students had good level of knowledge and 26.5 % of them had average level of knowledge, while 62.9 % of them had poor level of knowledge their total knowledge level.

Table (2): Clarified that, 66.7% & 64.7% of the studied students at Faculty of computer and information and Faculty of law had poor level of knowledge regarding HPV vaccine respectively and 27.0 % of the studied students at faculty of Al son had average level of knowledge regarding HPV vaccine, while 22.6% of the studied students at faculty of nursing were had good level of knowledge regarding HPV vaccine. Moreover, there no statistically significant relation between the type of studied students' faculty and their knowledge about HPV vaccine.

Figure (2): Showed that, 37.7% & 36.8% of the studied students received their knowledge about HPV from media and internet respectively, while 15.1% & 9.4% received their knowledge from family and friends and Lecture respectively.

Figure (3): Clarifies that, 57.6 % of the studied students had negative attitude, while 42.4% of them had positive attitude regarding HPV vaccine.

Table (3): Clarifies that, 62.7 % & 86.8 % of the studied students at Faculty of computer and information and faculty of Al son had negative attitude regarding HPV vaccine respectively, while 61.3% of the studied students at faculty of nursing had positive attitude regarding HPV vaccine despite their poor knowledge regarding HPV and its vaccine. Moreover, there no statistically significant relation between the type of studied students' faculty and their attitude level about HPV vaccine.

Table (4): Illustrated that, there were a highly statistically significant relation between studied students' total knowledge level and their residence and income ($p \leq 0.000$), while there was a statistically significant difference between studied students' total knowledge and their age ($p \leq 0.05$)

Table (5): Illustrates that, there were a highly statistically significant relation between studied students' total attitude level and age ($p > 0.000$), while there was a statistically significant difference between studied students' total attitude level and their residence ($p > 0.05$).

Table (6): Shows that, there was statistically significant positive correlation between studied students' total knowledge and total attitude ($p=0.000$).

Table (1): Distribution of the studied students regarding their general demographic characteristics (n=377).

Socio demographic characteristics	No.	%
Age		
18 – 21	367	**97.3**
> 21	10	2.7
Mean ±SD	**18.49±0.75**	
Marital status		
Single	345	**91.5**
Married	32	8.5
Residence		
Rural	69	18.3
Urban	308	**81.7**
Income		
Enough	348	**92.3**
Not enough	29	7.7

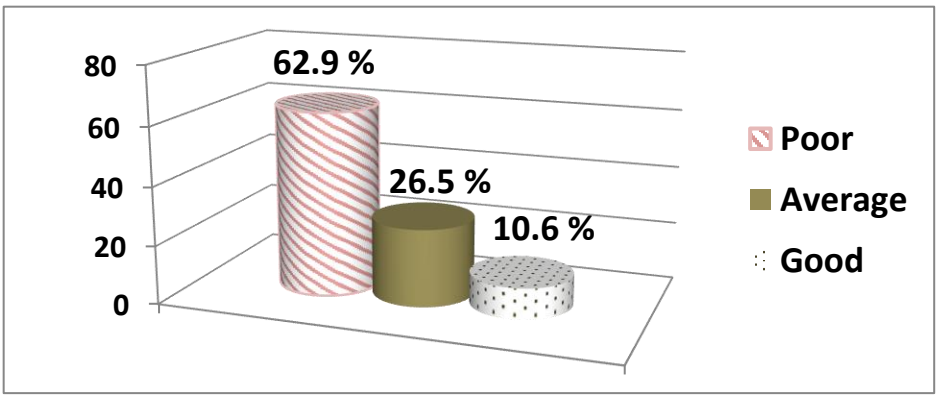
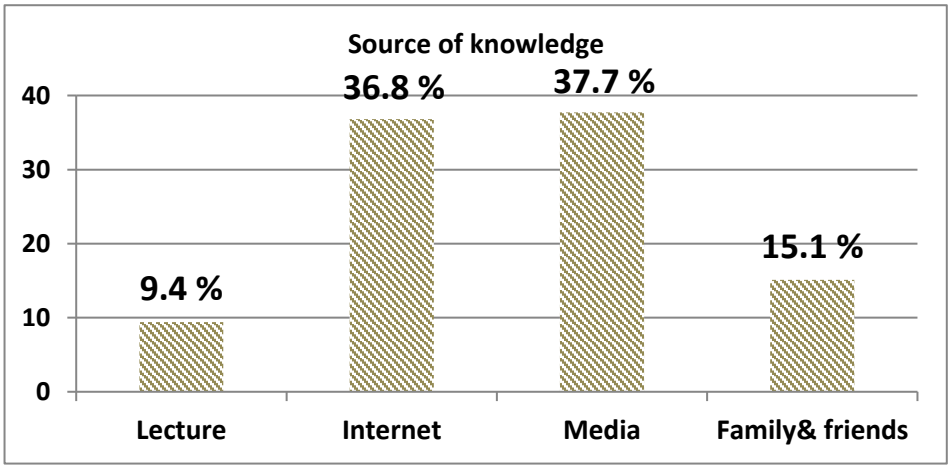


Figure (1): Percentage distribution of studied students regarding their total knowledge level (n=377).

Table (2): Distribution of the studied students regarding their knowledge about human papilloma virus vaccine for each faculty (n=377).

Items	Poor		Average		Good		X^2	p-value
	No.	%	No.	%	No.	%		
Faculty of Nursing (n=31)	14	45.2	10	32.3	7	**22.6**	5.272	0. 509
Faculty of computer and information (n=51)	34	**66.7**	12	23.5	5	9.8		
Faculty of law (n=221)	143	**64.7**	58	26.2	20	9.0		
Faculty of Al son n=74)	46	62.2	20	**27.0**	8	10.8		
Total (n=377)	237	**62.9**	100	**26.5**	40	**10.6**		

Figure (2): Distribution of studied students regarding their source of knowledge (n=377).



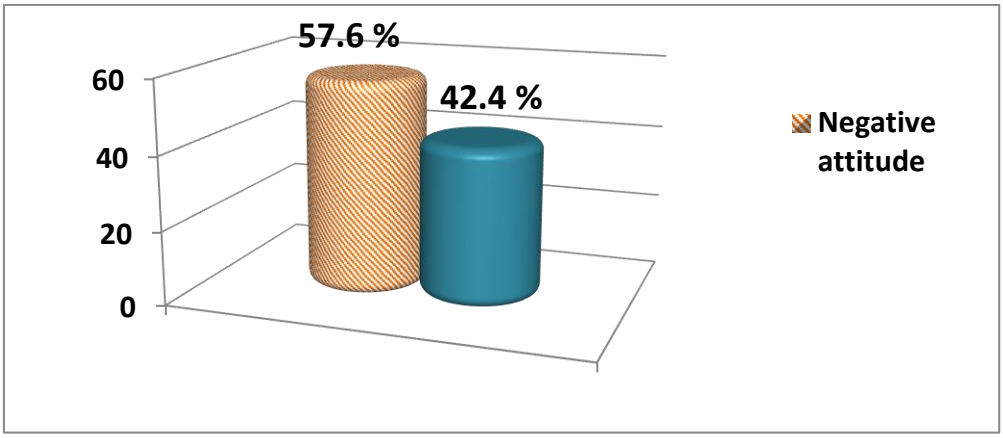


Figure (3): Distribution of studied students' total attitude level regarding human papilloma virus vaccine (n=377).

Table (3): Frequency distribution of the studied students' total attitude level regarding human papilloma virus vaccine for each faculty (n=377).

Items	Negative		Positive		X^2	p-value
	No.	%	No.	%		
Faculty of Nursing (n=31)	12	38.7	19	**61.3**	**7.541**	**0.057**
Faculty of computer and information(n=51)	32	**62.7**	19	37.3		
Faculty of law (n=221)	131	**59.3**	90	40.7		
Faculty of Al son(n=74)	42	**86.8**	32	43.2		
Total (n=377)	217	57.6	160	42.4		

Table (4): Relation between total knowledge level and general characteristics among studied students (n=377).

Items	Poor (n=237)		Average (n=100)		Good (n=40)		X^2	p-value
	No.	%	No.	%	No.	%		
Age								
18 – 21	227	95.8	100	100.0	40	100.0	6.068	0.048*
>21	10	4.2	0	0.0	0	0.0		
Marital status								
Single	219	92.4	90	90.0	36	90.0	0.655	0.721
Married	18	7.6	10	10.0	4	10.0		
Residence								
Rural	198	83.5	70	70.0	40	100.0	18.653	0.000**
Urban	39	16.5	30	30.0	0	0.0		
Income								
Enough	218	92.0	100	100.0	30	75.0	25.243	0.000**
Not enough	19	8.0	0	0.0	10	25.0		

No significant at p >0.05. * Statistically significant at p ≤ 0.05.
****Highly statistically significant at p ≤ 0.001.**

Table (5): Relation between total attitude level and personal characteristics among studied students (n=377).

Items	Negative (n=217)		Positive (n=160)		X^2	p-value
	No.	%	No.	%		
Age						
18 – 21	217	100.0	150	93.8	13.932	0.000**
>21	0	0.0	10	6.3		
Marital status						
Single	201	92.9	144	90.0	0.818	0.236
Married	16	7.4	16	10.0		
Residence						
Rural	188	86.6	120	75.0	8.339	0.003*
Urban	29	13.4	40	25.0		
Income						
Enough	198	91.2	150	93.8	0.814	0.241
Not enough	19	8.8	29	7.7		

No significant at p >0.05. *** Statistically significant at p ≤ 0.05.**
****Highly statistically significant at p ≤ 0.001.**

Table (6): Correlation between total knowledge level and total attitude among studied students (n=377).

Total attitude	Total knowledge	
	R	p-value
	0.581	0.000**

****Highly statistically significant at p ≤ 0.001.**

Discussion

Human papillomavirus is one of the most common sexually transmitted infections in the world. Human papillomavirus vaccine is unique and challenging in many ways as HPV vaccine is the first vaccine developed to prevent cervical cancer ***(Zhang et al., 2021).*** So this study was conducted to assess Perception of University Students regarding Human Papilloma Virus Vaccine.

Concerning demographic characteristics of studied students, the results of the current study illustrated that, most of studied students their age ranged between 18-21years old with **Mean±SD=18.49±0.75.** Also, most of them were single, from urban area and had enough income.

The study was congruent with ***You et al., (2020)*** who studied "Human papillomavirus (HPV) vaccine uptake and the willingness to receive the HPV vaccination among female college students in China" and illustrated that nearly three quarters of studied students were aged between 19–22 years old and the majority of them were single and sexually inactive. In addition, this finding was agreement with ***Koutrakou et al., (2022)*** who studied "Knowledge and Perceptions of Greek Students about Human Papilloma Virus, Vaccination and Cervical Cancer Screening" and revealed that the majority of students their age were between 18–21 years old also almost all participants were from urban residence and two thirds of them were single. This similarity may be due to that study was conducted on the students who around this age.

Conversely the current study was incongruent with ***Villanueva et al., (2019)*** who conducted a study aimed to determine the knowledge and attitudes of nursing students about HPV and its vaccine as well as their intentions towards personal vaccination and revealed that about two thirds of students were from rural areas and had middle income. This variance may be due to difference of the studied sample.

The study was supported by ***Alshammari & Khan, (2022)*** who conducted a study aimed to determine university students' knowledge, attitudes and perceptions regarding HPV and its vaccine and revealed that more than half of their studied sample was from non-health science studying students including

faculty of Education, faculty of Art Humanistic and Faculty of Social Sciences.

The results of the current study revealed that, the minority of the studied students had good total level of knowledge about HPV vaccine. From the researcher's point of view, the lower level of knowledge may be attributed to that non-health science students were more likely to participate in the present study, lack of conducted educational program or lack of social media and television published information regarding HPV vaccine. The current study was congruent with ***Mushasha et al., (2021*)** who showed that the majority of the respondents were not at all less knowledgeable about HPV and its vaccines.

In addition, the study was in the same line with ***Sulemana & Ardic, (2023)*** who studied "Human Papilloma Virus Infection and Vaccine Knowledge Levels, Attitudes, Beliefs in University Students: Turkey and Ghana Comparison" *and* revealed that students have low level of knowledge about HPV infection and vaccine with mean (3.28 ± 2.14).

Conversely the study was disagreed with ***Farsi et al., (2020)*** who revealed that nearly half of participants had high knowledge regarding HPV vaccine. This might be due to presence of knowledge about HPV itself and also may be due to studying field of dental. HPV-related knowledge was significantly higher in clinical students.

Regarding distribution of studied students according to their knowledge about HPV for each faculty, the current study clarified that, about two thirds of the studied students from faculty of computer and information, also from faculty of law had poor level of knowledge regarding HPV vaccine and more than one quarter of the studied students from faculty of Al son had average level of knowledge regarding HPV vaccine, while less than one quarter of the studied students at faculty of nursing were had good level of knowledge regarding HPV vaccine.

From the researcher's point of view, this might be interpreted that nursing is one of the science faculty that might had such information about HPV in their curriculum or clinical field training and they might acquire such information throughout their studying years so that, they might had more information than non-medical faculties as faculty of computer and information and faculty of Law.

The study was congruent with ***Dönmez et al., (2019)*** who conducted a study on 690 female nursing Students by using a pretested HPV and cervical cancer awareness questionnaire and found that more than one quarter of faculty of nursing had good knowledge level regarding HPV vaccine.

The current study illustrated that, there were no statistically significant relation between the type of studied students' faculty and their knowledge and attitude about HPV vaccine (tables2&3). From the investigator's point of view, this could be due to lack of awareness about HPV in both medical and Para-medical faculties due to that the virus is uncommon in Egypt.

The study was agreed with **Liu, *et al, (2021)*** who studied "Difference between Medical and Nonmedical Students on Knowledge, Practice, and Attitude towards the Human Papillomavirus Vaccine in China" and revealed that there was no statistically significant difference in knowledge of medical and para medical students regarding HPV.

Conversely the study disagreed with ***Najafi-Sharjabad & Rayani, (2019)*** who studied "The relationship between knowledge, attitude and acceptance of Human Papilloma Virus (HPV) vaccination for cervical cancer prevention among students at Bushehr University" who revealed that there were highly statistically significant difference in students' knowledge and attitude among medical faculties as (nursing and dentistry) and para medical faculties.

Regardig source of knowledge for the studied students about HPVthe results of the current study showed that, more than one third of the studied students received their knowledge about HPV from media and internet while less than one fifth of them received their knowledge from family and friends and less than one tens of them received their knowledge from Lecture. From the researcher aspect, this could be due to the availability of most information on the internet and the accessibility of searching for information on the Google engine and social media that reflect the importance of internet and media as valuable source of information.

This result was supported by ***Yesaya, (2020)*** who conducted a study on "Knowledge,

attitude, and practice towards Human Papilloma Virus (HPV) and its vaccination among students at the University of Eastern" and revealed that most of the students had heard of HPV, over half of the surveyed indicated health care providers internet or mass media as a source of their information .Conversely the study was incongruent with ***Koutrakou et al., (2022)*** whose findings revealed that more than half of participants received their knowledge from their families and more than one third of them received their knowledge from the school.

Regarding total students' attitude about HPV vaccine, the current study revealed that more than half of the studied students had negative attitude regarding HPV vaccine. From the investigator's point of view, this could be due to that respondents had very little knowledge of the HPV infection and vaccine, lack of awareness campaign regarding HPV infection and its vaccines led to negative attitude toward HPV vaccination.

The study was supported by ***Liu, Di & Tao, (2020)*** who conducted a study aimed to assess the knowledge, practice and attitude towards HPV vaccination among college students in Beijing, China and revealed that most participants had negative attitude and perception toward HPV and its vaccination.

In addition, the study was agreed with ***Zakzook, Hegazi, & El-Sayed, (2022).*** Who studied "Assessment of University Student's Attitude towards Human Papilloma Virus Infection, Vaccination and their Vaccine Acceptability" and revealed that most of studied students had negative attitude towards human papilloma infection & vaccination.

This result was disagreed with ***Trucchi et al., (2020)*** who conducted a study to evaluate knowledge and attitudes about HPV infection, related diseases, and prevention and propensity towards HPV vaccine among undergraduate students and revealed that most participants had good attitude toward HP and associated vaccines. This variance may be due to difference of study sample.

Concerning total students' attitude toward HPV and their faculties, the current study illustrated that nearly two thirds of the studied students at Faculty of computer and information and the majority of students at faculty of Al son had negative attitude regarding HPV vaccine respectively, while less than two thirds of the studied students at faculty of nursing had positive attitude regarding HPV and its vaccine.

From the investigator point of view, this could be due to that theoretical faculties had poor knowledge and lack of awareness about the importance of prevention of HPV infection to decrease the risk for cervical cancer that reflected on their attitude. Whenever, medical faculties such as faculty of nursing slightly more aware about HPV and importance of infection prevention that inreturn improving their attitude.

The study was supported by ***Dönmez et al., (2019)*** who revealed that non-medical faculties as Management, Education, Human and social sciences and Mathematics and natural sciences had more negative attitude toward HPV and possible vaccines than faculties of medical field as nursing and health science who had more positive attitude toward HPV and methods of immunization.

Concerning to relation between total knowledge level and general characteristics of studied students, the results of the current study revealed that, there were a highly statistically significant relation between studied students' total knowledge level and their residence and income, while there was a statistically significant relation between studied students' total knowledge and their age. From the investigator's point of view, this could be related to that as the students' age increase, their awareness and perception increased subsequently.

The results of the current study was congruent with ***Yu et al., (2020)*** who studied "Evaluation of knowledge and attitude toward HPV and vaccination among medical staff, medical students, and community members in Fujian province" and revealed that there was highly statistically significant relation between total students' knowledge and their age, place of residence, income and educational level.

Conversely, the study was incongruent with ***Atitt-Allah et al., (2019)*** who indicated that, there was no statistically significant relation between total knowledge score regarding HPV infection and its vaccination and personal characteristics of the studied sample (age, residence, marital status and mother's education) ($P > 0.05$). This can be due to the fact that the sample was homogeneous and similar in

most personality traits and therefore there is no relationship between personal traits and level of knowledge. Regarding relation between total attitude and personal characteristics of studied students, the current study illustrated that there was a highly statistically significant relation between studied students' total attitude level and age while there was a statistically significant relation between studied students' total attitude level and their residence.

The study was agreed with ***Liu et al., (2019)*** who studied "Effect of an educational intervention on HPV knowledge and attitudes towards HPV and its vaccines among junior middle school students in Chengdu" and revealed that there was highly significant difference between studied students' total attitude and their age and place of residence.

Also, the study was disagreed with ***Liu & Tao (2020)*** who studied "Knowledge, practice and attitude towards HPV vaccination among college students in Beijing" who found that, there was no statistically significant relation between total attitude score regarding HPV infection and its vaccination and personal characteristics of the studied students (age, residence, marital status and mother's education) (P> 0.05).

Concerning the correlation between total students' knowledge level and their total attitude, the results of the current study revealed that there was statistically significant positive correlation between studied students' total knowledge and total attitude, from the investigator's point of view, this could be interpreted that Providing accurate information regarding the importance, safety, and effectiveness of the HPV vaccination in the prevention of cervical cancer can significantly improve the attitude towards the prevention of HPV and vaccines uptake in return.

The study was supported by ***Shetty et al., (2021)*** who conducted an exploratory study of "Undergraduate healthcare student perspectives regarding human papillomavirus and vaccine intent in India" and illustrated that there was significant correlation between students' knowledge and their attitude toward HPV. In addition, the study was congruent with ***Khatiwada et al., (2021)*** who studied "Knowledge, attitude and acceptability of the human papilloma virus vaccine and vaccination among university students in Indonesia" and revealed that there was highly significant relation between studied students' knowledge and their attitude toward HPV and its vaccination.

So it is important to use various teaching strategies in learning process to promote students' knowledge and attitude regarding HPV vaccine. The nurse educators have an important role to prepare the next generation of students that have good knowledge and attitude regarding HPV vaccine for their health and their future child's health.

Conclusion

The findings of the present study concluded that the most of the studied students had poor level of total knowledge regarding HPV and its vaccine. Also, there was statistically significant positive correlation (p=0.000) between studied students' total knowledge and total attitude regarding HPV and its vaccine.

Recommendations

Based on the study results, the following recommendations can be given:

1) Developing guidelines and brochures to raising awareness about human papilloma virus infection and its vaccine.

2) Conduct awareness programs about HPV screening and its vaccine for cervical cancer prevention among university students.

Future studies

Barriers to human papilloma virus vaccine between school students.

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