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Original Article

Illuminating Insights: Nursing Students' Knowledge and Attitudes toward Cervical Cancer Screening and HPV Vaccination in Egypt

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ABSTRACT

Background: Cervical cancer can severely affect a woman's health, leading to pain, infertility, and potential loss of life. Human papillomavirus (HPV) screening can increase survival rates and inhibit the progression of cervical cancer. **Aim**: Assess nursing students' Knowledge and Attitudes toward Cervical Cancer Screening and Human Papillomavirus Vaccination in Egypt. **Design**: A descriptive exploratory research design was followed in this study. **Settings**: This study was conducted at Faculty of Nursing affiliated to Mansoura, Delta University of Science and Technology and Port Said universities in Egypt. **Subjects**: A convenience sample of available (961) nursing students from different academic levels at faculty of nursing were enrolled. T**ools of data collection:** Data collection was done through structured assessment questionnaire, which is composed of Two tools: **Tool I**; **Part 1:** Nursing students' demographic characteristics, **Part 2:** Nursing student's knowledge related cervical cancer screening and HPV vaccine and **Tool II:** Nursing student's attitude regarding cervical cancer screening and HPV vaccines. **Results:** The majority (88.9%) of nursing students from different academic levels and different faculties have satisfactory level of knowledge regarding cervical cancer screening and HPV vaccines, also 73.5% of nursing students have satisfactory level of attitude (positive attitude). There is a highly statistical significant association between the level of knowledge of nursing students and the attitude level of nursing students With p value <0.001. **Conclusion**: these findings suggest a satisfactory level of Knowledge and positive attitude about cervical cancer and HPV vaccination among nursing students. **Recommendation**: Ongoing professional development programs for healthcare providers including nursing students should be implemented.

Key words: Attitudes, Cervical Cancer, HPV Vaccination, Knowledge, Nursing Students.

Introduction

As the fourth most prevalent disease in women, cervical cancer continues to remain an important global health issue, with an expected to 604,127 new cases and 341,831 deaths in 2020(Singh et al., 2023). About 1,320 new cases and 744 related fatalities were reported in 2020, making it the 13th most common malignancy among women in Egypt (Bruni et al., 2023).

Prolonged exposure to high-risk strains of the Human Papillomavirus (HPV) is the main cause of cervical cancer, although it can be avoided with early detection and successful vaccination. Approximately 70% of cervical cancer occurrences worldwide are caused by the most carcinogenic HPV types (16 and 18), which can be prevented with HPV vaccinations (Arbyn et al., 2020; Garland et al., 2022). Additionally, screening initiatives include HPV DNA testing and Pap smears, show a crucial role in early detection and prevention of disease progression. Regardless of these advances, the application of HPV vaccines and cervical cancer screening remains suboptimal in various regions, including Egypt (Morsy et al., 2022).

Cervical cancer, predominantly caused by chronic infection with oncogenic HPV strains, is still a major public health concern, especially in low- and middle-income nations (LMICs). While global efforts have led to substantial progress in prevention and early detection, significant disparities persist in awareness, access, and application of preventive facilities (Bruni et al., 2023; World Health Organization (WHO, 2023).

Preventive methods including cervical cancer screening and the Human Papillomavirus (HPV) vaccine are readily available, but their uptake in Egypt is still low, especially among young women (Ebeid, 2025). Countries like Egypt must concentrate on strengthening education and awareness efforts in response to the World Health Organization's 2020 Global Strategy to Eliminate Cervical Cancer, which aims to achieve 90% HPV vaccination coverage, 70% screening coverage, and 90% access to treatment by 2030 (WHO, 2023).

Nursing students represent a crucial demographic in the healthcare system, poised to influence public health outcomes through both their personal health behaviors and professional practice. Their knowledge and attitudes toward cervical cancer prevention can significantly impact their willingness to utilize screening services and advocate for such practices among patients. However, studies indicate that awareness and participation in cervical cancer preventive measures among Egyptian nursing students are suboptimal (Mahmoud et al., 2021).

This underscores a broader issue of limited awareness and engagement with cervical cancer preventive services among the female population in Egypt. Given the pivotal role of nursing students in health promotion and disease prevention, it is imperative to assess their current knowledge and attitudes toward cervical cancer screening and HPV vaccination. Understanding these factors is essential for developing targeted educational programs that can enhance their competency and proactive engagement in cervical cancer prevention strategies (Refaie et al., 2023). Addressing these gaps is essential to enhance the role of nursing students in combating cervical cancer through community outreach and patient education.

Significance of the Study

Worldwide, cervical cancer is still a major public health concern, especially in low- and middle-income nations like Egypt where knowledge and preventative measures are frequently lacking (WHO, 2024). The primary

cause of cervical cancer is the human papillomavirus (HPV), yet due to a lack of awareness, cultural obstacles, and false information, many areas still have poor rates of HPV vaccination uptake and frequent screening program participation (Reza et al., 2024). As aspiring front-line healthcare professionals, nursing students are essential in influencing patient choices, educating communities, and promoting preventative healthcare. Their level of knowledge and individual attitudes regarding HPV vaccination and cervical cancer screening can have a big influence on how these procedures are promoted and implemented in clinical settings.

Aim of the study:

The aim this study was to assess nursing students' Knowledge and Attitudes toward Cervical Cancer Screening and Human Papillomavirus Vaccination in Egypt.

Research questions:

- What is the nursing student's level of knowledge about cervical cancer screening and HPV vaccine?
- What is the nursing student's attitude toward cervical cancer screening and HPV vaccine?
- Is there a relationship exists between nursing student's knowledge and attitude toward cervical cancer screening and HPV vaccine?
- What is the relationship between demographic data of nursing students and study's variables?

Methods

Research design:-

This study used a descriptive exploratory research approach. A population, circumstance, or phenomena can be studied and described using a descriptive exploratory research methodology. It focuses on giving a thorough description of a subject's traits without changing variables or putting hypotheses to the test.

Setting:-

This study was conducted at Faculty of Nursing affiliated to Mansoura, Delta University of Science and Technology and Port Said universities in Egypt.

Sampling:

A convenience sample of available (961) nursing students at faculty of nursing were enrolled. They were aged between 18 - 23 years from different academic levels who agree to participate in the study and have a mobile phone.

Sampling: Stratified cluster sampling was used to choose the students. To reflect the various geographical regions of Egypt, three faculties were chosen. All student academic levels from each faculty were represented, including foundational, medical and surgical, maternal and gynecological, and internship students. A systematic random sample was then used to choose clusters (either section or clinical round) from the lists of clusters that were provided (every other cluster starting with the first on). Every student in the chosen clusters was present. The three faculties each received a proportionate share of the entire sample.

Tools of data collection:

Data collection was done through structured assessment questionnaire after reviewing related literature (Asgarlou, et al., 2016& Baharoon, et al, 20٢١): which is composed of two tools:

Tool I; Part 1: Nursing students' demographic characteristics: such as age, Academic level, grade of the last year, residence. Living status and Marital Status.

Part 2: Nursing student's knowledge related Cervical cancer screening and HPV vaccine: This part was developed to assess student's knowledge about cervical cancer screening and HPV vaccine and includes 27 close ended questions with the items (Meaning of cervical cancer, types, causes, risk factors, signs& symptoms, prognosis, diagnosis, early detection, prevention regarding cervical cancer, complications and methods of screening (awareness of pap smear screening)).

Scoring system:

A "one" was awarded for a right response, and a "zero" for a wrong one. The sum of the scores for the right answers was used to determine the overall knowledge score. The averages and standard deviations of the total potential score, which varied from 0 to 27 marks, were computed. Higher levels of knowledge of cervical cancer screening are reflected in the higher results.

The researchers developed the eight close ended questions in **Tool II:** Nursing Students' Attitudes Toward Cervical Cancer Screening and HPV Vaccines in Arabic after reviewing related literature.

The scoring system was as follows: (1) disagree and (2) agree. The total attitude score was calculated as follows: (negative attitude) <60% and (positive attitude) > 75%.

Validity and Reliability of the tool

Data collection tools were shown to and assessed by a panel of five nursing experts affiliated to faculty of nursing Mansoura university and port said university, three of them were Professors in medical surgical field while two of them were professor and assistant professor in maternal and gynecological nursing in order to confirm the face and content validity. The tools' overall look, length, format, language, clarity, and subject covering were all evaluated by the experts. "Rephrasing and canceling for two questions" was done in accordance with the panel's evaluation of the sentences' clarity and the content's appropriateness. The cervical tool's Cronbach's coefficient alpha was 0.765. Cronbach's alpha coefficients were calculated to evaluate the instrument's internal consistency.

Data collection:

1. A review of the past and recent related literature and studies about the knowledge and attitudes toward cervical cancer screening and HPV vaccines among nursing students at faculty of nursing using available periodicals and books in addition to internet search, to obtain the relevant tools.
2. Approval from the research ethics committee, Faculty of Nursing, Mansoura University (No. 0613) was obtained.
3. All study participants were informed that their participation in this study was entirely voluntary and they were free to decline to participate or to withdraw from the study at any time without any penalty or loss of benefits to which you are otherwise entitled. In addition, they were assured that their identities and responses to the questionnaire would be confidential.

4. The research tools were prepared and placed in the form of a Google Form and distributed to groups of students from different academic levels from the nursing faculties in Mansoura, Delta and Port Said. The purpose of the study was explained before starting the data collection process.
5. The data collection process continued from August 2024 for a full month, with each student allowed to access the questionnaire only once, using their university email.
6. The duration of filling out the sheet ranges between 10-20 minutes on average, taking into account filling in all the information shown to the students and moving between the questions in order to avoid the process of empty data.
7. The data was extracted in Excel sheet format to generate appropriate statistical data.

Statistical Analysis

The Master Chart was created once the data was retrieved into Microsoft Excel (MS Office 365). Version 22.0 of the Statistical Package for the Social Sciences (SPSS) program was used to analyze the data. Nominal data were displayed as numbers and percentages after statistical analysis of the data across groups. The mean and standard deviation were used to express continuous data (such age, etc.), and the Chi square test was used when it was acceptable to compare the data. The statistical significance threshold was set at a P value of 0.05.

Results:

Table (1) shows that the majority of the studied students (84.3%) aged between 18 > 21years with **Mean ±SD (**19.3 ±1.5). Concerning academic level 53.4% of the students fall under the first level, followed by those who fall under the second level (28.1%) at a rate of 46.5% affiliated with Delta University, followed by 38.0% affiliated with Mansoura University. Regarding grade of the last year 48.7% of them got an A grade, while ٩.٨% of them got a D. (69.4%) of them coming from rural areas living with family (90.5%) and 97.3 are single students.

Fig (1) shows that 88.9% of nursing students from different academic levels and different faculties had satisfactory level of knowledge regarding cervical cancer screening and HPV vaccines.

Fig (2) illustrates that 63.8% of nursing students had heard of cervical cancer before,while 36.2% of them had not heard of it before.

Fig(3) shows that 57.6% of nursing students had their source of knowledge about pap smear screening from nursing text books followed by doctors with (32.5%).

Table(2) clarifies that the majority of nursing students answered correctly with agree to all items of the attitudes questionnaire regarding cervical cancer screening and HPV vaccines, with percentages ranging between 88.8%-99.7%.

Fig (4) illustrates that 73.5% of nursing students from different academic levels and different faculties have positive attitude regarding cervical cancer screening and HPV vaccines.

Table (3) displays that there are highly statistical significant association between nursing students' knowledge level and the demographic

data of the academic level and the last year's grade (<0.001**).

Table (4) demonstrates that there is a statistically significant association between nursing students' attitude level and faculty demographic data (0.002) and a highly statistically significant association between nursing students' attitude level and academic level and grade from the previous year (<0.001**).

Table 1. Distribution of demographic characteristics of the study sample (n=961)

	N	%
Age (years)		
18 > 21	810	84.3
21 – 23	135	14.0
> 23	16	1.7
Mean ±SD	19.3 ±1.5	
Academic level		
1st	513	53.4
2nd	270	28.1
3rd	115	12.0
4th	45	4.7
Intern student	18	1.9
Area of residence		
Urban	294	30.6
Rural	667	69.4
Faculty		
Faculty of Nursing Mansoura University	365	38.0
Faculty of Nursing Delta University	447	46.5
Faculty of Nursing Port said University	149	15.5
Grade of last year		
A	468	48.7
B	247	25.7
C	152	15.8
D	94	9.8
Living status		
Family	870	90.5
Relatives	13	1.4
Student's hostile	78	8.1
Marital Status		
Single	935	97.3
Married	26	2.7

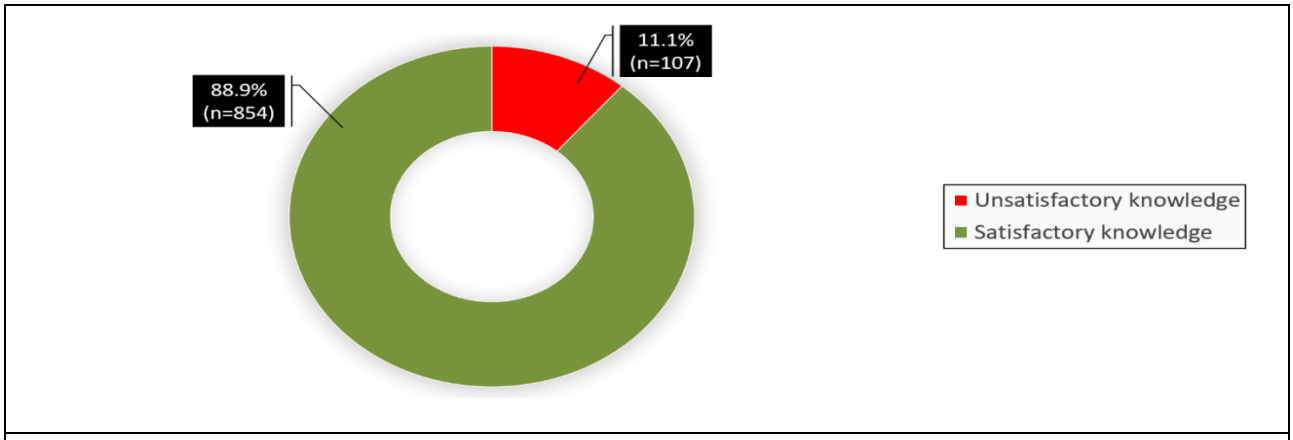

Figure 1. Distribution of the Knowledge level

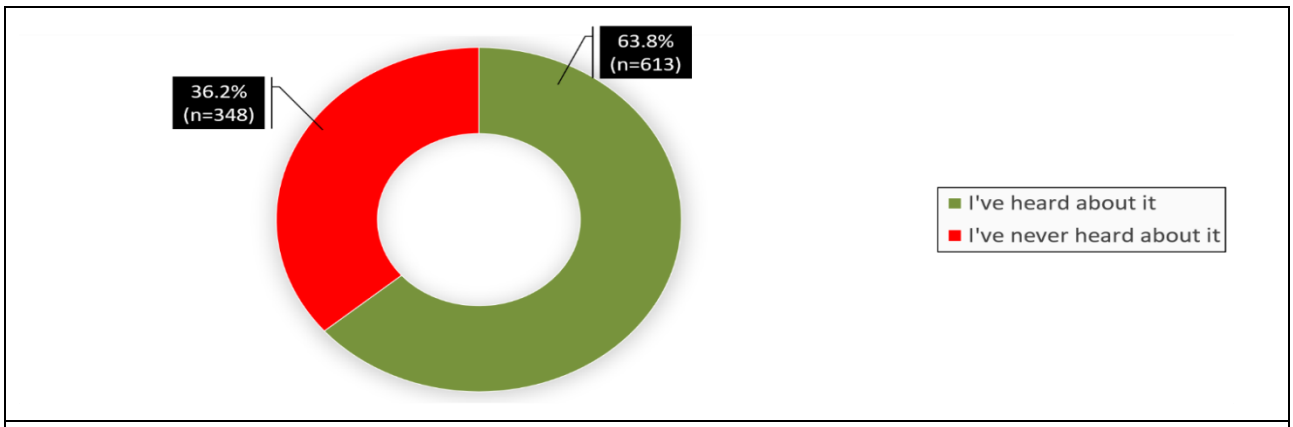

Figure 2. Distribution of the awareness of pap smear screening

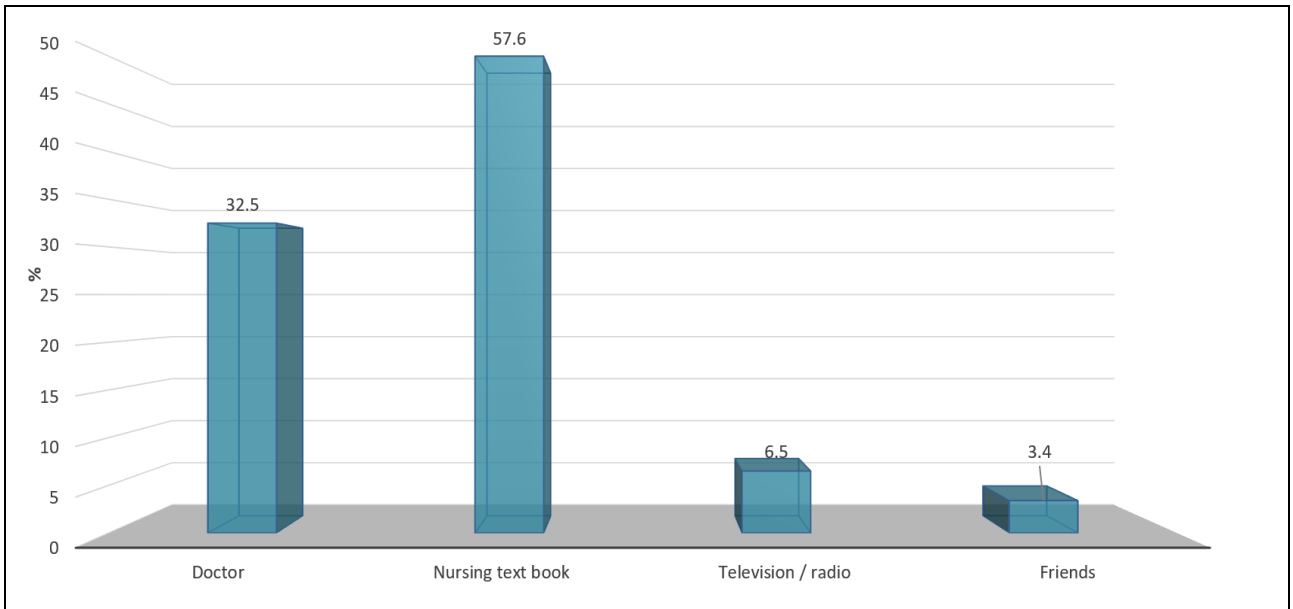

Figure 3. Distribution of the Source of knowledge of pap smear

Table 2. Distribution of the Attitude regarding cervical cancer screening and HPV vaccines among nursing student(n=961)

	Disagree		Agree	
	N	%	N	%
I am aware about the risk of HPV infection	9	0.9	952	99.1
I am satisfied with my knowledge of HPV and its preventive measures	17	1.8	944	98.2
I am willing to recommend HPV vaccine for others	108	11.2	853	88.8*
I am willing to inform my friends/relatives to get a PAP smear	9	0.9	952	99.1
If I had a chance, I would have got HPV vaccine?	52	5.4	909	94.6
If you were handed a pamphlet about the Pap smear, would you make the test?	89	9.3	872	90.7
Pap smear is unpleasant/embarrassing	3	0.3	958	99.7*
Would they recommend it as an obligatory vaccine for school girls in Egypt	9	0.9	952	99.1

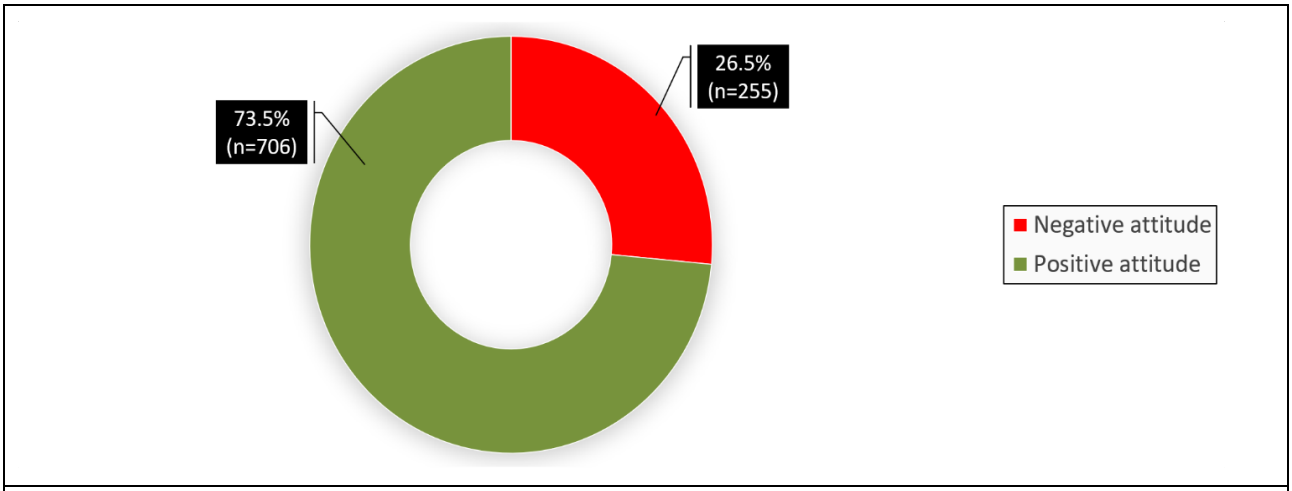

Figure 4. Distribution of the total attitude level

Table 3. Association between demographic characteristics of the study sample and knowledge level(n=961)

	Unsatisfactory knowledge (n=107)		Satisfactory knowledge (n=854)		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
Age (years)						
18 > 21	92	86.0	718	84.1		
21 – 23	13	12.1	122	14.3		
> 23	2	1.9	14	1.6	0.380	0.827
Academic level						
1st	82	76.6	431	50.5		
2nd	25	23.4	245	28.7		
3rd	0	0.0	115	13.5		
4th	0	0.0	45	5.3		
Intern student	0	0.0	18	2.1	35.458	<0.001**
Area of residence						
Urban	31	29.0	263	30.8		
Rural	76	71.0	591	69.2	0.149	0.699
Faculty						
Faculty of Nursing Mansoura University	40	37.4	325	38.1		
Faculty of Nursing Delta University	51	47.7	396	46.4		
Faculty of Nursing Port said University	16	15.0	133	15.6	0.069	0.966
Grade of last year						
A	2	1.9	466	54.6		
B	9	8.4	238	27.9		
C	41	38.3	111	13.0		
D	55	51.4	39	4.6	320.004	<0.001**
Living status						
Family	98	91.6	772	90.4		
Relatives	0	0.0	13	1.5		
Student's hostile	9	8.4	69	8.1	1.657	0.437
Marital Status						
Single	105	98.1	830	97.2		
Married	2	1.9	24	2.8	0.387	0.824

Chi – square / fisher's exact test

Table 4. Association between demographic characteristics of the study sample and attitude level(n=961)

	Negative attitude (n=255)		Positive attitude (n=706)		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
Age (years)						
18 > 21	215	84.3	595	84.3		
21 – 23	34	13.3	101	14.3		
> 23	6	2.4	10	1.4	1.113	0.573
Academic level						
1st	211	82.7	302	42.8		
2nd	44	17.3	226	32.0		
3rd	0	0.0	115	16.3		
4th	0	0.0	45	6.4		
Intern student	0	0.0	18	2.5	134.873	<0.001**
Area of residence						
Urban	81	31.8	213	30.2		
Rural	174	68.2	493	69.8	0.224	0.636
Faculty						
Faculty of Nursing Mansoura University	120	47.1	245	34.7		
Faculty of Nursing Delta University	99	38.8	348	49.3		
Faculty of Nursing Port said University	36	14.1	113	16.0	12.375	0.002*
Grade of last year						
A	9	3.5	459	65.0		
B	46	18.0	201	28.5		
C	108	42.4	44	6.2		
D	92	36.1	2	0.3	553.278	<0.001**
Living status						
Family	230	90.2	640	90.7		
Relatives	1	0.4	12	1.7		
Student's hostile	24	9.4	54	7.6	3.089	0.213
Marital Status						
Single	251	98.4	684	97.3		
Married	4	1.6	22	3.1	1.715	0.424

Chi – square / fisher's exact test

Table 5. Association between the knowledge level and attitude level(n=961)

	Unsatisfactory knowledge (n=107)		Satisfactory knowledge (n=854)		Chi – square	
	n	%	n	%	X^2	P
Attitude level						
Negative attitude	81	75.7	174	20.4		
Positive attitude	26	24.3	680	79.6	149.308	<0.001**

Chi – square test

Discussion:

Cervical cancer ranks third globally in terms of cancer mortality among females and is the second most common type of cancer to be diagnosed. Around eighty-five percent of all cervical cancer-related deaths and eighty-three percent of new cases worldwide occur in underdeveloped nations. It is mostly brought on by the human papillomavirus (HPV), which can be avoided by adopting safe sexual practices and receiving vaccinations (Mengesha et al., 2020).

The knowledge and attitudes of nursing students at the faculty of nursing in Egypt on HPV vaccinations and cervical cancer screening have not yet been sufficiently documented. Therefore, the purpose of this study is to evaluate nursing students' pertinent knowledge and attitudes on HPV vaccinations and cervical cancer screening.

In relation to the study sample's demographics, it was revealed that the majority of the studied students aged between eighteen to twenty years these results were agreed with the study (Júnior et al., 2021) stated the largest size of participants were between eighteen to twenty three years old. This young age group may be more receptive to educational initiatives to raise knowledge of HPV and the prevention of cervical cancer, as early exposure to such knowledge can foster long-term health behavior changes (Abdel-Rahman et al., 2023). Also, the results of the present study agree with (Zakzook et al., 2022) stated that more than half of the sample was over the age of twenty with more than two thirds of them were from rural settings which proposes that admission to healthcare and preventive facilities may be more limited in these regions compared to urban areas.

Rural regions often face obstacles to cervical cancer screening and HPV vaccination, including geographic, economic, and cultural challenges (Kassem et al., 2024). These findings suggest the need for targeted interventions in rural areas to expand accessibility to HPV vaccination and screening services, perhaps through mobile clinics or community-based outreach programs. Additionally, the study exposed that majority of participants lived with their families, indicating strong familial support structures. This could be a key factor in facilitating discussions about health and well-being.

Previous studies have shown that family support is a crucial determinant in promoting health-seeking behaviors, including vaccination and preventive screenings (Hassan et al., 2024).As nursing students often play a key role in community health education, family-oriented interventions could be integrated into future programs to enhance the uptake of cervical cancer preventive measures. The majority of participants were single which could indicate a lack of immediate family responsibilities and potentially more time and flexibility to engage in health education programs.

Regarding academic distribution around more than half of students in the first and more than quarter of participants in 2nd years of study, reflects a range of knowledge and experience levels. The early years of nursing education are an

ideal time to introduce essential topics like cervical cancer prevention, as these students are still forming their professional identities and knowledge base (Khalil et al., 2023). It is therefore critical that educational programs targeting cervical cancer screening and HPV vaccination be integrated into the curricula at an initial stage to lay the foundation for future health advocacy.

Also, near of half of participants had received grades of A suggesting a relatively high academic achievement among the study participants. Academic success is often associated with better access to educational resources, and higher grades could indicate a greater capacity for absorbing and applying health education material. Therefore, these students may be more likely to implement and promoter for health behaviors such as cervical cancer screening and vaccination in their professional practice (Taha et al., 2023).

Regarding knowledge about cervical cancer screening and HPV vaccines the present study showed that the vast majority of students had satisfactory level of knowledge regarding knowledge about cervical screening and HPV vaccines, the present study findings agree with (Al-Shehri & Al-Mazrou, 2024) they reported that well-informed students are more likely to practice and advocate for preventive health behaviors. Also, the majority of students expressed satisfaction with their knowledge of HPV and its preventive measures. This suggests that the training provided at faculty of nursing is effective in ensuring students feel competent and well-informed regarding HPV-related health issues. The agreement of students on this topic reflects the success of public health education programs that have targeted university students, particularly in nursing, to empower them with the necessary knowledge to advocate for preventive health behaviors (Taha et al., 2024).

According to Mengesha, et al, 2020, less than one-fourth of the sample under study knew a lot about cervical cancer and how to prevent it. This suggests that even the vast majority of those who were aware of the illness lacked sufficient understanding of cervix uteri cancer. This finding runs counter to the study's findings of (Eittah et al., 2020) who found that most students had heard of cervical cancer, had little knowledge of HPV, and did not consider HPV infection to be a significant risk factor for the disease; only one quadrant of students agreed that HPV infection is a risk factor. According to another survey, more than one-fourth of students were unaware of any risk factors, and the majority of students were unaware of the causes of this particular type of cancer (Programa et al., 2020).

The present study illustrates that nearly two thirds of nursing students have heard of cervical cancer before,while the rest of them had not heard of it before. These results disagree with the study (Programa et al., 2020; Eittah et al., 2020) demonstrated that more than half of students never heard of cervical cancer. This may be due to lack of community awareness about cervical cancer as it is not often discussed in the media or health campaigns compared to other diseases such as breast cancer or diabetes, which reduces students'

knowledge of it. In addtition The sensitive nature of the topic because cervical cancer is linked to reproductive and sexual health, some communities and schools may avoid discussing it due to cultural or religious sensitivities.

Regarding source of knowledge of nursing students about Pap smear screening the present study showed that more than half of nursing students heard about Pap smear screening from nursing textbooks. From researcher point of view, the students rely on books as the primary, reliable source of information, including scientific explanations of diseases and their prevention, as they trust in the source: Students typically view books as more reliable and scientifically reviewed sources than the internet or the media, especially when it comes to sensitive health topics like cancer. In addition, lack of media awareness as in some areas, there may not be sufficient television or social media awareness campaigns about cervical cancer, making books the primary available source.

As regard to risks associated with HPV infection, the vast majority of participants are aware of the risks associated with HPV infection is an encouraging indicator of the effectiveness of educational initiatives in nursing programs. This high level of awareness suggests that educational curricula in nursing education are successfully conveying important information about HPV and its link to cervical cancer. Similar studies emphasize the importance of early health education in improving awareness of HPV risks, which is crucial for the prevention of HPV related diseases (Abdel-Rahman et al., 2023).

Regarding the willing of students to recommend the HPV vaccine to others. The present study reported that majority of participants are willing to recommend the HPV vaccine to others. This finding suggests that the students recognize the importance of vaccination as a key preventive measure. Studies from similar contexts highlight the role of nursing students as future health advocates, where their attitudes towards vaccination have a direct impact on public health initiatives (Soliman et al., 2024). The high levels of agreement on this item demonstrate that these future healthcare providers are not only knowledgeable but also supportive of vaccines as an effective means to reduce cervical cancer risks.

Inform their friends and relatives about the importance of HPV vaccine and Pap smears further illustrates the advocacy role that these students are likely to play in their communities. This result reflects a deep commitment to public health education and awareness. Previous studies have emphasized the pivotal role of healthcare professionals and students in disseminating information about cancer screening programs and encouraging preventive health behaviors (Kassem et al., 2024).

Regarding the willingness of nursing students vast majority of participants indicated they would choose to receive the HPV vaccine if given the opportunity is highly encouraging. It demonstrates that nursing students, who are expected to serve as role models in health promotion, are confident in

the vaccine's safety and efficacy. This finding is consistent with global trends in which educated populations exhibit high levels of vaccine acceptance, underscoring the importance of vaccination in preventing HPV-related cancers (Soliman et al., 2024).

Also, The majority of participants would agree to undergo a Pap smear if provided with educational materials, such as a pamphlet, highlights the effectiveness of informational resources in motivating health behaviors. These findings align with research that suggests providing clear, accessible, and informative resources can significantly increase participation in cancer screening programs (Hassan et al., 2024).

Despite the overall positive outlook, there were some areas where disagreement was notable. A smaller proportion of students disagreed with the statement, "Pap smear is unpleasant/ embarrassing", which may indicate that certain stigmas or misconceptions still exist among students, even though to a lesser extent. Previous studies have also noted that cultural perceptions about the Pap smear, especially in conservative regions, can lead to resistance in seeking cervical cancer screening (Kassem et al., 2024). While most students did not perceive the Pap smear as unpleasant, this small percentage of disagreement suggests that addressing cultural sensitivities and perceptions surrounding the procedure remains a crucial component of health education.

The vast majority of participants supported the idea of making the HPV vaccine. This strong support for policy change suggests that these students not only understand the significance of HPV vaccination in preventing cervical cancer but also believe in the importance of public health interventions to reduce the burden of the disease. (Mansour et al., 2024).

Another area of divergence is found in the recommendation of the HPV vaccine as a mandatory requirement for schoolgirls in Egypt, The present study findings revealed that vast majority of the participants accepted to take the HPV vaccination, recommend it as an obligatory vaccine for school girls in Egypt due to they were aware of its protection against both cervical cancer and genital warts. This might be due to many factors such as it is very expensive, afraid from the disease. In agreement with the findings of the current study (Baharoon, et al., 2021) they displayed that more than half of the studied participants had interested in receiving the HPV vaccine.

In accordance with the present study findings, Di, Liu & Tao (2020) they revealed that nearly one quarter of students accepted to take the vaccine. Additionally, according to the study's findings, less than half of survey respondents said they would want to get the HPV vaccine because they felt at danger of getting the illness (Begoihn et al., 2019). Also, Amicizia, et al., (2020) they reported that more than three quarters strongly agreed to have their own child vaccinated. This can be explained by the fact that they were more receptive to the vaccine since they knew more about HPV infection and immunization.

The study's findings showed that most participants had a generally positive attitude about HPV vaccinations and cervical cancer screening. More than half of the students had a good attitude toward HPV infection and vaccination, which is in line with the current findings (Jin Lee, Jin, et al., 2022). This can be the result of information acquired during the faculty study phase. Additionally, a study by Phaild et al. (2021) discovered that about three-quarters of the sample had a positive opinion regarding the HPV vaccine.

Additionally, the results of this study concur with those of Naz et al. (2017), who found that over 50% of college students had a favorable opinion of the HPV vaccine. This might be as a result of the study participants being medical students who were well-versed in vaccinations generally and their significance in preventing disease. Furthermore, the results of this study concur with those of Abdulkarim et al. (2016), who found that over 50% of participants had a favorable opinion of the HPV vaccine among Saudi Arabian young women. This could be because it was given away for free. Additionally, the vast majority of participants had a positive attitude toward HPV vaccination, as demonstrated by Jeyachelvi et al. (2016). This could be because they thought the vaccine was safe.

While, in disagreement with the present findings, (Sallam et al., 2021) they reported that the majority of participants had negative attitude towards HPV vaccine coverage among the study participants.

Nursing students' attitude level and their overall level of knowledge were shown to be very statistically significantly correlated, according to the study's findings. The university curriculum provided the participants with important knowledge regarding HPV vaccines and cervical cancer, which may have influenced their preventive behaviors and health views. These results are consistent with a study by Ahmed et al. (2018) that found a substantial positive connection between attitude level and total knowledge.

The current study's findings concurred with those of Adesina et al. (2018), who found that respondents who knew a lot about HPV and cervical cancer had more favorable attitudes and were more eager to discuss these topics. This result is consistent with earlier studies that highlight how information shapes attitudes and actions related to health (Khalil et al., 2024).

Furthermore, this finding contradicts that of Jeyachelvi et al. (2016), who showed that although participants had positive attitudes toward HPV vaccination, they lacked substantial knowledge and had serious misconceptions about important information. Different demographic traits, customs, and beliefs of the population under research may be the cause of the discrepancy between the current study's results and this one.

This study opens new avenues for public health initiatives towards knowledge and attitude of nursing students about cervical cancer and HPV vaccination highlight the need to include preventive health and chronic diseases in school curricula, enhancing future generations' awareness

of the importance of early detection and prevention. This could be a proactive step toward building a healthier and more informed society, capable of adopting preventive practices that reduce future incidence rates.

Conclusion:

In conclusion, our results indicate that nursing students affiliated with Mansoura, Delta University of Science and Technology, and Port Said universities had a satisfactory level of knowledge and positive attitude regarding cervical cancer and HPV vaccine.

Recommendations:

Several important suggestions can be made to improve cervical cancer prevention initiatives in Egypt in light of the study's findings:

- As to the report, a national HPV vaccination program should be implemented, and adolescent females between the ages of 12 and 17 should be eligible for reimbursement and formal recommendations for vaccination.
- Together, these findings demonstrate the critical need to establish a national awareness strategy regarding cervical cancer, HPV, and HPV vaccination that addresses common misconceptions and obstacles to service uptake by utilizing contemporary communication skills, especially social media platforms, through workshops and national public health campaigns aimed at the general public and healthcare professionals.
- To further reduce the incidence of HPV-related illnesses, it is imperative that the HPV vaccine be approved in Egypt and incorporated into the vaccination schedule. To boost involvement in these preventative actions, government-backed projects, subsidized programs, and mobile clinics could be implemented.
- Nursing students and other healthcare professionals should have access to ongoing professional development programs to keep them up to date on the most recent developments in cervical cancer prevention. Throughout their careers, these programs can assist in reinforcing the significance of these preventive steps.

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