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Human Papillomavirus (HPV) Awareness Among Female Students at the Higher Institute of Medical Sciences and Technologies in Al-Khums, Libya

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ABSTRACT

Background: Human Papillomavirus (HPV) is a non-enveloped, double-stranded DNA virus that targets cutaneous and mucosal cells. It is primarily associated with sexually transmitted infections and is a leading cause of cervical and anogenital malignancies. Objective: To evaluate the level of knowledge regarding HPV among female students at the Higher Institute of Medical Sciences and Technology in Al-Khums. Methodology: A cross-sectional survey was conducted during October and November 2025, utilizing a convenience sampling technique and a self-administered questionnaire. The survey collected demographic data and assessed nine knowledge-based items. Data were analyzed using SPSS version 27.Results: The findings revealed that while (59.8%) of students had heard of HPV, (66.5%) exhibited a low level of overall knowledge. Although (84.3%) recognized the link between the virus and cervical cancer, only (55.5%) correctly identified its transmission routes. Misconceptions were prevalent, with (59.8%) believing that infection is rare. Awareness of the vaccine was moderate (72.4%), yet knowledge regarding the optimal timing for vaccination remained low. No statistically significant correlation was found between the students' academic specialization and their level of knowledge. Conclusion: Significant knowledge gaps persist, hindering the adoption of effective preventive measures. The lack of understanding regarding transmission mechanisms and the misconception of low infection risk remain major challenges. These results underscore the urgent need for comprehensive awareness campaigns designed to enhance correct knowledge and rectify misconceptions among students.

الوعي بفيروس الورم الحليمي البشري (HPV) بين طالبات المعهد العالي للعلوم الطبية والتقنيات في الخمس، ليبيا

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الكلمات المفتاحية:

فيروس الورم الحليمي البشري
سرطان عنق الرحم
الوعي والمعرفة
ليبيا

الملخص

الخلفية: يُعدّ فيروس الورم الحُليمي البشري (HPV) فيروسًا خاليًا من الغلاف، ويتميز بحمض نووي ريبوزي منقوص الأكسجين مزدوج السلسلة (DNA) يهاجم خلايا الجلد والأغشية المخاطية. يرتبط هذا الفيروس بالأمراض المنقولة جنسيًا، ويؤدي إلى أورام عنق الرحم والمنطقة الشرجية التناسلية. الهدف تقييم المستوى المعرفي حول فيروس الورم الحُليمي البشري لدى طالبات المعهد العالي للعلوم والتقنيات الطبية بالخمس. المنهجية: أُجريت دراسة مسحية مقطعية خلال شهري أكتوبر ونوفمبر 2025، باستخدام أسلوب أخذ العينات الميسرة واستبيان ذاتي التعبئة. شمل الاستبيان البيانات الديموغرافية وتسعة بنود معرفية، وحُللت البيانات باستخدام برنامج (SPSS) الإصدار 27.النتائج: أظهرت النتائج أن (59.8%) من الطالبات سمعن بفيروس الورم الحُليمي البشري، إلا أن(66.5%) منهن أظهرن مستوى معرفة منخفضًا. وعلى الرغم من أن (84.3%) عرفن أن الفيروس يسبب سرطان عنق الرحم، إلا أن (55.5%) فقط أدركن طرق انتقاله الصحيحة. كما سادت بعض المفاهيم الخاطئة؛ إذ اعتقدت (59.8%) أن الإصابة نادرة. وكان الوعي باللقاح معتدلًا (72.4%)، لكن المعرفة بالتوقيت الأمثل للتطعيم كانت منخفضة، ولم يظهر ارتباط ذو دلالة إحصائية بين التخصص العلمي ومستوى المعرفة. الخلاصة: توجد فجوات معرفية واسعة تعرقل اتخاذ إجراءات وقائية فعالة، حيث يستمر نقص المعرفة بآليات الانتقال والمفاهيم الخاطئة حول ندرة الإصابة. تُبرز هذه النتائج الحاجة الماسة إلى تطوير حملات توعوية شاملة تهدف إلى تعزيز المعرفة الصحيحة وتصحيح المفاهيم الخاطئة لدى الطالبات.

Introduction

One of the most common STIs affecting the genital area is (HPV) [1]. It is the principal factor behind cervical neoplastic disease, as well as 15 other forms of cancer, such as anal, vulvar, vaginal, penile-associated, cervical, head, and oropharyngeal tumors [2-4]. Of the high-risk HPV genotypes 16 and 18 are principally responsible for cervical neoplastic diseases. Type 16 accounts for (50%) of all cases, while types 16 and 18 together contribute to more than seven-tenths of cervical cancers on a global scale [5,6]. Malignancy of the

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cervix ranks as the fourth most prevalent oncological condition within the female population [2]. Adults of both genders are susceptible to HPV infection across various age groups, and while reinfection is uncommon, it can occur. The highest incidence of infection typically follows the initiation of sexual relations, as the virus is transmitted through direct genital contact, even in the absence of symptoms [1]. A range of behavioral and sexual factors contribute to an increased risk of squamous cell carcinoma, which may be a precursor to cervical cancer, These factors include having Numerous partners, early initiation onset of sexual activity, and sexual involvement with non-circumcised. Additionally , infection with the Trichomonas vaginalis parasite, smoking, and inadequate hygiene are considered risk factors [7,8]. More than half a million new diagnoses of uterine cervical cancer were recorded in women worldwide in 2020, resulting in more than 300,000 deaths [9]. In Brazil, approximately 17,000 new cases were recorded annually between 2023 and 2025, The occurrence rate amounts to 13.25 newly diagnosed cases per 100,000 female population [10]. At present, three prophylactic formulations are accessible for the prevention of papillomavirus infection: the bivalent preparation, conferring immunity against genotypes 16 and 18; the quadrivalent preparation, offering protection against types 6, 11, 16, and 18; and the nine-valent preparation, which targets nine distinct viral strains, encompassing high-risk variants implicated in cervical malignancy [11]. The World Health Organization (WHO) has authorized the use of the HPV immunization before sexual activity as a key strategy for preventing cervical cancer. Some countries have also begun vaccinating males to prevent anal neoplastic diseases and venereal warts among men and women [12]. In 2006, the U.S. Food and Drug Administration (FDA) granted initial approval for the first (HPV) vaccine [13]. Adopting effective vaccination strategies improves awareness and access to the vaccine, particularly in developing countries, thus contributing to reducing socioeconomic disparities [14]. Most women who are aware of the risk factors for cervical cancer are more likely to recognize their own risk and seek medical attention earlier. Furthermore, women who are aware of their condition are more likely to adopt preventive practices that reduce their risk of developing the disease [15,16]. Vitamins contribute to promoting optimal health across various body systems [17]. Accurate knowledge of HPV infection and cervical cancer may be essential for making a decision about vaccination. Prior to vaccination, many studies have shown a lack of awareness of HPV (i.e., whether participants had even heard of it) and a lack of knowledge about its relationship to cervical cancer [18], [19]. There is little research that has discussed the acquisition of accurate knowledge about HPV infection. Current studies indicate that levels of accurate knowledge about HPV and its association with cervical cancer are significantly low [20], [21]. Despite the availability and effectiveness of vaccines, awareness is more strongly associated with higher levels of education [13]. Insufficient awareness and inaccurate information lead to hesitancy, thus reducing vaccination rates. Therefore, community awareness and education efforts are crucial for increasing vaccination uptake [22]. Cervical cancer incidence rates in Libya range from 1.8% to 5% of all cancers diagnosed in women [23] .Libya and the United Arab Emirates are the only two Arab countries that have included the HPV vaccine in their health programs [24]. Despite this, few studies have addressed the level of knowledge and awareness about cervical cancer and assessed the use of screening methods among women of reproductive age in Libya [23,25]. This lack may be attributed to the limited availability of appropriate screening programs. It is worth noting that most cancer awareness campaigns for women in Libya focus heavily on breast cancer. Furthermore, there is no known published data on the level of cervical cancer awareness among healthcare professionals in Libya. Given their crucial role in promoting awareness and changing community behaviour, further efforts in this area are needed.

Materials and Methods

Study Design and Setting

This cross-sectional survey was conducted with female students from the Higher Institute of Medical Sciences and Technologies in Al-Khums, across all academic levels, during October and November 2025. All participants were informed that their participation was voluntary and that completing the questionnaire constituted consent to publication. They were also informed that the collected information would remain anonymous and that they had obtained the necessary approvals from the institute's administration. The convenience sampling method was used to collect data. The questionnaire was distributed as a self-response form to female students in their classrooms. This method was chosen to give participants more privacy and time to reflect. The questionnaire consisted of 22 items adapted from a previous study on HPV awareness among university students in Pakistan [24].

Study Instrument

A survey was conducted with 30 participants to test the clarity of their understanding of the concepts and the time required for their responses. These participants were not included in the final statistical analysis. The first part of the survey included inquiries about the participants' sociodemographic characteristics, such as age, marital status, place of residence, and academic specialization. The second part assessed participants' knowledge of HPV.

To assess participants' knowledge, nine closed-ended yes/no questions were used: one for general awareness of the virus, and eight for specific knowledge on transmission modes, associated diseases, risk factors, and asymptomatic infection likelihood.

A numerical scoring method was adopted to evaluate participants' responses to eight knowledge-based questions, whereby one point was assigned for each correct answer and zero for each incorrect answer. Accordingly, the total knowledge score for each participant was calculated as the sum of their individual item scores. Subsequently, the overall knowledge level was categorized into three groups: poor (0–2), moderate (3–5), and good (6–8).

Data Collection

Data were collected from students at the institute in Al-Khums, with no specific inclusion or exclusion criteria. Informed consent was obtained from all participants, and survey completion was considered implicit consent to participate.

Contents of the questionnaire

The questionnaire comprised four sections: demographic characteristics (six variables), general HPV knowledge (yes / no questions), specific knowledge on symptoms, prevention, and prevalence, and vaccine awareness (five items).

Ethical Considerations

Participants were informed of the purpose of this study and were asked to complete the questionnaire voluntarily after

obtaining their informed consent. Responses were anonymous and completely confidential.

Statistical Analysis

Data were analyzed and entered using SPSS version 27. Centralized statistics were used, and the data were examined using SPSS version 27. The analysis plan was based on the nature of the study variables to achieve the study's objective, which was to measure the level of general knowledge about the HPV among the study participants. Descriptive statistical methods were used to calculate the frequency and percentage of responses for each of the nine items. These methods were also used to describe the variance between correct and incorrect responses, allowing for the identification of strengths and gaps in general awareness.

Results

Regarding the demographic characteristics of the participants, a total of 272 female students were contacted, and 254 of them responded to the questionnaire, representing a response rate of (93.4%). The demographic distribution of the participants was as follows: the vast majority were unmarried (89.4%), while married women constituted (10.2%), and one divorce case was recorded (0.4%). The mean age of the participating students was 20.5 years (SD ± 4), indicating that the group consisted mainly of first-year university students. The participants were distributed across seven different academic disciplines. The General Sciences Department and the Clinical Nutrition Technology Department recorded the highest participation rates (20.1%).They were followed by Medical Laboratory Technology (18.9%) and Diagnostic Radiology (15.7%). General Nursing and Pharmacy Technology had similar participation rates (10.2%) and (9.8%), respectively, while Midwifery and Neonatology had the lowest participation rate (5.1%). Regarding place of residence, the results showed that the majority of participating students lived in the city (65.4%), while the remaining third lived in rural areas (34.6%).

Table1: Demographic data of respondents in the survey

Female		n= 245
Marital status	**n**	%
Married	26	**10.2**
Single	227	**89.4**
Divorced	1	**0.4**
Scientific specialization		
General Section	51	**20.1**
laboratory technology	48	**18.9**
Pharmacy Technology	25	**9.8**
Nutrition Technology	51	**20.1**
Radiation Technology	40	**15.7**
General Nursing	26	**10.2**
Midwifery Neonatology	13	**5.1**
Place of residence		
City	166	**65.4**
Rural	88	**34.6**
Age (Mean ±SD)		**20.5 ±1.4**

By surveying the general knowledge of participating female students about the HPV, 152 students (59.8%) indicated that they had heard of it before, while 102 students (40.2%) had not. This indicates a basic awareness among the majority of the sample, but a significant portion still requires further basic education. The results showed a good understanding of the main mode of transmission, with 141 students (55.5%) correctly stating that the virus is transmitted through sexual contact. In contrast, 113 students (44.5%) were unaware of its transmission methods, highlighting the need to strengthen and enhance knowledge about these methods.Awareness of the risks and problems associated with HPV infection was the most prevalent among the participants, with the majority of students (84.3%) reporting that HPV causes cervical cancer. The results also demonstrated a good understanding of its prevalence, with (61.4%) stating that the virus can infect both sexes. Furthermore, a similar number of students (61.4%) were aware that HPV causes other types of genital cancers, such as penile and anal cancer. Regarding less serious clinical manifestations, (54.7%) stated that the virus causes external genital growths. Despite a high level of awareness of the serious effects, the data revealed a lack of knowledge and misconceptions about key aspects of the virus's prevalence an nature of infection. Specifically, (59.8%) reported that HPV infection is rare. This percentage indicates a widespread misconception that infection with the virus is uncommon, which may lead to students' underestimation of the risks of exposure. Responses regarding the asymptomatic aspect showed a clear divergence in understanding the possibility of infection without clinical manifestations. (47.2%) and (52.8%) answered "yes" and "no," respectively. This distribution indicates a lack of clear, specific, and agreed-upon knowledge about the asymptomatic aspects of common HPV infection. The majority of female students (55.5%) did not agree that the incidence of the disease is highest among females in their third decade of life, and this does not correspond with medical references that often state that this age group is the most susceptible to the disease Table 2.

Figure 1 shows the level of knowledge about HPV among the 254 participating female students. The lowest level of knowledge was recorded at(66.5%), followed by moderate knowledge at (32.3%), while only (1.2%) had high knowledge. This distribution reflects a significant lack of access to essential information about the virus, which was examined across several areas, including modes of transmission, the nature of infection, and serious complications. These results clearly indicate a substantial knowledge gap among the majority of participants, limiting

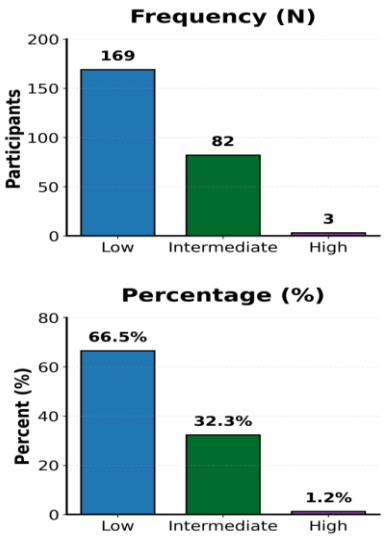

Figure 1: Knowledge about HPV

their ability to adopt effective preventive measures. Therefore, these findings underscore the critical importance

of developing targeted awareness campaigns to raise awareness, focusing on core knowledge related to the spread and long-term health risks of this virus.

Regarding students' understanding of how HPV is transmitted, the survey results revealed significant knowledge gaps. The majority of respondents (44.2%) answered "I don't know." In contrast, (36.2%) correctly stated that the virus is transmitted through direct skin-to-skin contact with the genitals, while (16.2%) incorrectly identified transmission through contact with bodily fluids such as blood. A further (3.4%) believed it is transmitted through coughing and sneezing, indicating a lack of knowledge about its transmission methods. Concerning the health problems associated with the virus, the results showed a weak understanding. Most participants (46.5%) were aware of its link to cervical cancer. However, only a small percentage (4.4%) were aware of its link to penile cancer or genital warts (5.5%). Worryingly, (7.7%) mistakenly believed that it causes HIV, while (36.8%) answered that they were unaware of any related health problems. Regarding methods of preventing the virus, (51.7%) reported that vaccination is a basic preventive measure, and this is a positive point of importance in preventing infection. However, there was a clear misunderstanding, as (6.9%) believed that antibiotics protect against infection. The participants also reduced the effectiveness of using condoms in preventing the virus (0.8%), while (10.8%) reported abstaining from intercourse, and the percentage of "I don't know" reached (29.7%), which confirms the urgent need to promote awareness Table 3. Statistical analysis of the data in Table (4) showed that the average percentage of correct knowledge was (74.4%), with a standard deviation of 11.44. The highest percentage of correct answers was recorded regarding the use of the vaccine (86.2%), indicating a basic and widespread awareness of the existence of a preventive vaccine. The lowest percentage of correct answers was recorded regarding the optimal timing for vaccination (57.5%). This result is highly significant, as pre-exposure vaccination is considered the most important and effective preventive measure. Regarding cervical screening after vaccination, (84.6%) indicated its importance, which is a significant and accurate understanding. The level of knowledge regarding the vaccine's effectiveness in preventing cervical cancer and identifying the target group for vaccination was at an average level (74.4%).

Distribution of Participants by Scientific Specialization and the extent of knowledge concerning (HPV).

table 5 shows a clear variation in knowledge levels among the different medical specializations. The Pharmacy department recorded the highest percentage of moderate knowledge and was the only department where the percentage of moderate knowledge exceeded the percentage of low knowledge, reaching (60%). Despite this clear descriptive variation, the chi-squared analysis did not show a statistically significant correlation between scientific specialization and knowledge level at the significance level ($\alpha \leq 0.05$), with a p-value of (0.062). Therefore, the observed differences between specializations can be attributed to random factors within this studied sample and do not constitute sufficient evidence of a true correlation at the population level.

Multiple responses were selected by the respondents; therefore the sum of response may not be always 100%.

Table2: General knowledge about human papillomavirus

Statement	Yes		No	
	no	%	no	%
Before taking this survey, had you ever heard of HPV (human papillomavirus)?	152	59.8	102	40.2
Is HPV sexually transmitted?	141	55.5	113	44.5
Are HPV infections rare?	152	59.8	102	40.2
Does HPV cause cervical cancer?	214	84.3	40	15.7
Can HPV infect both men and women?	156	61.4	98	38.6
Is the rate of human papillomavirus infection highest among women in their twenties?	113	44.5	141	55.5
Can human papillomavirus (HPV) infection occur without symptoms?	120	47.2	134	52.8
Does HPV cause genital warts affecting external genitalia (e.g., testes)?	139	54.7	115	45.3
Can HPV cause other types of genital cancers (such as penile and anal cancer)?	156	61.4	98	38.6

Table3: Knowledge about human papillomavirus.

Statement	no	%
Human papillomavirus-related health complications		
Squamous cell carcinoma of the cervix	126	46.5
Carcinoma of the penis	12	4.4
Condylomata acuminate	15	5.5
Acquired immunodeficiency syndrome	21	7.7
Don't know	97	35.8
Preventive strategies for HPV infection		
Non-participation in sexual behavior	28	10.8
Prophylactic vaccination	134	51.7
condom utilization	2	0.8
Antibiotics	18	6.9
Don't know	77	29.7
Methods of transmission of the human papillomavirus		
Respiratory droplet transmission	9	3.4
Sexual skin contact	96	36.2
Contact with bodily fluids (blood)	43	16.2
Don't Know	117	44.2

Table4: Respondents' knowledge and understanding of human papillomavirus vaccines.

Statement	Correct		Incorrect	
	no	%	no	%
Does a vaccine exist that provides protection against HPV?	219	86.2	35	13.8
Does HPV vaccination reduce the risk of cervical cancer?	189	74.4	65	25.6
Once vaccinated, women no longer have to be screened for cervical cancer	215	84.6	39	15.4
The HPV vaccine is intended solely for individuals who are sexually active.	189	74.4	65	25.6
Should the HPV vaccine be taken before a person starts having sexual intercourse?	146	57.5	108	42.5

Table5: Distribution of Participants by Scientific Specialization and the extent of knowledge concerning HPV

Scientific specialization			Low knowledge		Intermediate knowledge		High knowledge	
	no	%	no	%	no	%	no	%
General Section	51	20.1	37	72.5	14	27.5	0	0.0
Nutrition	51	20.1	36	70.6	14	27.5	1	2.0
Midwifery	13	5.1	8	61.5	5	38.5	0	0.0
X-rays	40	15.7	31	77.5	8	20.0	1	2.5
Pharmacy	25	9.8	10	40.0	15	60.0	0	0.0
Nursing	26	10.2	21	80.8	5	19.2	0	0.0
Laboratory	48	18.9	26	54.2	21	43.8	1	2.1
Total	254	100	169	66.5	82	32.3	3	1.2
P-VALUE						P=0.062		

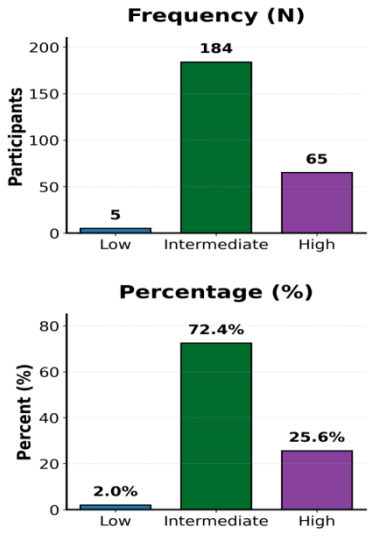

Fig 2: Participants' knowledge and awareness about HPV vaccine

Figure 2: The majority of the sample (72.4%) possess moderate knowledge about the HPV vaccine, reflecting a broad awareness of its existence and effectiveness in preventing cervical cancer. A significant group (25.6%) demonstrates a high level of knowledge, evident in their understanding of detailed aspects such as the importance of vaccination before engaging in sexual intercourse. These findings contrast sharply with the prevalence of low knowledge about the virus itself (66.5%), which may reflect a limited focus in awareness campaigns on prevention compared to highlighting the importance of infection and its complications. Conversely, the relatively small percentage of low knowledge (2.0%) indicates partial success in disseminating basic information about the virus. It is recommended to develop integrated awareness programs that link understanding the virus with knowledge of the vaccine, while further correcting misconceptions to raise the level of knowledge from moderate to high.

Discussion

In spite of the grave clinical consequences attributable to HPV alongside the presence of available vaccination options to protect against infection, college students in universities around the world still have knowledge and awareness of diseases related to this virus and ways to prevent it [25,26]. This study demonstrated that participants' knowledge of the virus was minimal, regardless of their diverse medical specialties. They had heard of the virus (59.8%), and about (40.2%) of them were aware that infection with this virus is relatively. This is consistent with a study conducted in Pakistan [26], and with a study completed in Saudi universities (62.7%) [29]. These findings align with research carried out at Keele University in the United Kingdom, which indicated that approximately The majority of female subjects (three in four) possessed prior knowledge of this viral agent [30]. Although these findings diverge from those of a comparable investigation performed in Nigeria, where merely (17.7%) of female students demonstrated awareness of human papillomavirus causes cervical cancer [31]. While the majority of participants (84.3%) acknowledged that HPV precipitates cervical cancer, a parallel Malaysian study similarly revealed that nearly 80% of medical trainees possessed knowledge regarding the carcinogenic association of this viral agent [32], Furthermore, these findings align

with those documented in a comparable investigation assessing medical students' cognizance of cervical malignancy and their appreciation of prophylactic immunization significance [29], [33], [34].

(59.8%) reported that HPV infection is rare, and this is a misleading answer that reflects a lack of knowledge about the virus and is consistent with what was stated in the study [26].

In the same vein, approximately three-fifths of participants affirmed that this pathogen affects males and females alike, corroborating earlier reports [26], [35]. Regarding transmission of the virus through sexual contact, more than half of the participants (55.5%) reported this, which is consistent with what was stated in the study [26].

Regarding the appearance or absence of symptoms, (47.2%) of the participants answered that there were no symptoms of illness during infection with the virus. This is similar to a study conducted by [29]. This shows a knowledge gap between the participants, as medical studies have revealed that most cases of infection are asymptomatic [36].

Additionally, (55.5%) of participants reported that the rate of HPV infection is not high among women in their twenties and thirties, which is attributed to limited cognizance concerning the recommended age of exposure. More than half of the participants (54.7%) indicated that the virus causes genital warts, which is consistent with the findings [24,31], but not with the findings of [29].

(61.4%) of the participants indicated that the HPV causes penile cancer, which contradicts the results of the study [26]. Regarding the methods of transmission of the virus, the answer (36.2%) is that it is transmitted through direct contact with the genitals, and this result is inaccurate compared to the study [13].

Regarding health problems associated with the HPV, (46.5%) reported that it causes cervical cancer, (7.7%) reported that it causes HIV, and (5.5%) reported that it causes genital warts, which contradicts the findings [37]. Conversely, (35.8%) stated that they were unaware of how the virus is transmitted.

This study revealed a deficiency in knowledge about health problems related to the HPV (35.8%), while participants demonstrated a lack of awareness regarding methods of prevention and transmission of the virus (29.7%) and (44.2%), respectively. This result indicates a weak level of knowledge, especially considering that all participants were from medical specialties. Addressing this knowledge gap requires organizing lectures and guidance sessions about HPV, the diseases it causes, methods of prevention, and modes of transmission to enhance the understanding of these future specialists. The vast majority of respondents (86.2%) acknowledged the availability of prophylactic immunization against HPV, indicating a high level of awareness. This aligns with general trends suggesting a high level of basic awareness among health education students. These results are consistent with the study by [29,36]. However, these results differ from a study conducted in Jordan, which showed a significantly lower level of awareness [39]. Regarding precise knowledge about the vaccine as a preventative measure, (74.4%) of participants reported. The participants believed that it prevents cervical cancer, at a high percentage, but it was less than the percentage of students who possessed knowledge regarding of a preventive vaccine. This discrepancy indicates that the students are familiar with protective vaccine presence but are unaware of its preventive role. In contrast, the result of this study is less than what was stated in the study [40].

(84.6%) of the female students correctly explained that vaccinated women need to undergo a cervical cancer screening after receiving the preventive dose of the vaccine. This is a clear understanding of the relationship between the importance of vaccination and periodic screening after its use. This high level of knowledge exceeds that of the study by [26].

(74.4%) of participants correctly answered that immunization extends beyond sexually active populations. This favorable outcome reflects substantial comprehension regarding prophylactic significance, corroborating previous investigations [26], especially when compared to a study in which only (24%) of Egyptian health education students answered correctly [40].

(57.5%) of participants correctly answered that the optimal timing for vaccination is before the onset of sexual activity. However, this percentage remains low, as (42.5%) of participants still hold a misconception about the importance of vaccination at this time. This demonstrates a lack of knowledge regarding the preventive principle of vaccination and its administration at an early age. This is a knowledge gap that needs to be addressed, as the World Health Organization emphasizes the importance of vaccination before puberty to ensure the highest level of protection.

Conclusion

The cross-sectional study, which included (254) female university students, revealed a critical knowledge gap regarding the HPV .Although (84.3%) recognized the association between this pathogen and cervical malignancy, merely (55.5%) knew about its transmission through sexual contact, and (59.8%) mistakenly believed that infection with this disease is rare. The results also showed a weakness in knowledge of the optimal time to receive the vaccine (57.5%), despite (51.7%) recognizing the importance of preventive vaccination. The results showed no statistically significant correlation between health specialization and level of knowledge level ($p=0.062$).This necessitates the development of comprehensive university awareness programs targeting all female students equally, with a focus on correcting misconceptions about how the virus is transmitted and improving awareness of the optimal timing for vaccination before engaging in sexual activity.

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