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Knowledge of Human Papillomavirus (HPV) and the HPV Vaccine Among Medical and Nursing Students of Duhok, Iraq

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Abstract

Background: Human Papillomavirus infection is sexually transmitted and associated with several cancers, such as cancer of the cervix, vagina, vulva, head and neck, anal, and penile carcinoma. Health education plays a pivotal role in building knowledge and positive attitude about health issues.
Objectives: The current study aimed at assessing the knowledge of final and pre-final students of colleges of medicine and nursing.
Methods: This cross-sectional study was performed between September 2017 and December 2017. The project was carried out in the College of Nursing and Azadi Teaching Hospital of Duhok, Iraq. An HPV knowledge questionnaire was used covering three HPV-related subjects, including cervical cancer-HPV association, HPV features, and HPV vaccines. All final and pre-final students of the college of medicine and nursing were recruited.
Results: In cervical cancer-HPV association knowledge dimension, which composed of four questions, there were significant differences in knowledge regarding HPV-cancer association (77.6% for medical students versus 51.6% for nursing students, $P < 0.001$) and cancer prevention (81.9% versus 38.7%, $P < 0.001$), when the correct answers were stratified according to college. When the answers were stratified according to the study years, significant differences were found in awareness about the detection of HPV in cervical cancer between pre-final and final year students in college of medicine (68.3% for pre-final versus 87.5% for final $P = 0.02$) and college of nursing (33.3% versus 72.4%, $P < 0.001$). Then, the researchers tested awareness of HPV features and there were significant differences in the awareness of students between both colleges ($P < 0.01$ for all questions). A significant difference was found between males and females when they were asked about the genotypes and cervical cancer (67.3% for males versus 78% for females $P = 0.043$). Finally, this research tested the awareness of students about HPV vaccine. The participants were asked whether HPV vaccine protects against all STD; 81.9% of medical students and 60.5% of nursing students gave correct answers ($P < 0.001$).
Conclusions: The knowledge of students varied according to college, study year, and gender. Attention must be paid to HPV and quick revision is mandated to increase the awareness of students.

Keywords: HPV, Vaccine, Cervical Cancer-HPV Association, Iraq

1. Background

Human Papillomavirus causes oncogenic genital infection that plays an important role in the development of cancer of the cervix (1, 2). Infection with the virus is the most common sexually transmitted infection in the world and up to 80% of sexually active individuals will acquire an HPV infection of some type at one time in their lives (3). The family of the virus includes more than 100 genotypes and more than 40 of them infect humans. According to the association with cancer, the virus can be classified to high and low risk. Infection with low risk HPV strains is rarely associated with any substantial symptoms or morbidity. However, infection with high risk genotypes is a known cause of certain morbidities, including genital warts and cancers of the cervix, oropharynx (including base of tongue, tonsils, soft palate, and pharynx), anus, vulva, and penis (4).

Cervical cancer is a rare tumor in Kurdistan (including Erbil, Sulaymaniyah and Duhok cities), as in most Muslim countries (5). A previous research indicated increasing incidence of this cancer in Kurdistan from 0.29 per 100 000 in 2007 to 0.6 per 100 000 in 2009 (5). Recent data

showed increasing incidence of cervical cancer from 0.6 per 100 000 in 2010 to 2 per 100 000 in 2016. Few studies conducted in Iraq reported the incidence of HPV. In a study conducted in Kurdistan region of Iraq, 30.7% of studied HPV-positive samples were typed as genotype 16 and the majority of patients were infected with more than one genotype (6).

The HPV vaccine is crucial for the prevention of infection and subsequent cancer development. Available vaccines are highly effective for preventing infections by the HPV types they cover in males and females. Vaccination prevents genital warts, precancerous conditions, and caners. Several studies recruiting more than 70 000 women concluded that vaccination was a powerful tool for reducing death from cervical cancer (7). The vaccine was licensed in 2006, and since then more than 270 million doses of vaccine was produced and no major adverse reaction was reported (7). Health education plays a pivotal role in building knowledge and positive attitude about health issues. For medical and nursing students, it motivates the improvement of heath and spread of the message to others.

2. Objectives

The aim of this paper was to test the knowledge of final and pre-final students of the colleges of medicine and nursing about cervical cancer-HPV association, HPV features, and HPV vaccines.

3. Methods

3.1. Study Design

This cross-sectional study was carried out between September 2017 and December 2017. The study was conducted at the College of Nursing and Azadi Teaching Hospital, Duhok, Iraq. A questionnaire was administered to pre-final and final year medical and nursing students at Duhok University. The subjects were chosen as the "best case scenario" of HPV knowledge in the society. During the survey, enrolled students were interviewed using a standardized questionnaire information that included age, gender, and year of study. All students of the college of Medicine and Nursing in final and pre-final years, who agreed to provide their consent were recruited.

The questionnaire composed of three dimensions, including cervical cancer-HPV relationship knowledge, HPV virologic features, and HPV vaccines. Each dimension composed of four dichotomous questions, zero was given to the wrong answer and one was given to the correct answer. The validity of this questionnaire was reviewed by two experts in the field of HPV and statistics to ensure its efficacy covered the area of investigation. The questions were written in simple language and were clearly explained to the participants by the project organizer.

The first dimension, which was about the HPV-cervical cancer association composed of four questions about the incidence of cervical cancer, HPV detection in cervical cancer tissue, cancer prevention, and HPV associations with other cancers. The second dimension was about HPV virologic features that included four questions about HPV-STD association, HPV-gender association, visibility of HPV lesions, and HPV genotypes. The third dimension was about HPV vaccine that included four questions about vaccine protection, vaccine timing, vaccine effectiveness, and pap smear after vaccine.

3.2. Sample

During the study period, all final and pre-final students in both colleges of medicine and nursing agreed to be involved in the study. The age range was 23 to 25 years old for medical students and 21 to 23 years old for nursing students.

3.3. Ethics

The questionnaire was reviewed by relevant experts of the University of Duhok and Zakho Ethics Committees. The study protocol and informed consent were approved by the Research Committee of the University of Zakho, Duhok city, Kurdistan region, Iraq. Informed consent was obtained from all recruited subjects.

3.4. Statistics

Levels of awareness and knowledge of HPV-cervical cancer association, HPV features, and vaccines were expressed as percentages. Data were entered in an Excel spreadsheet and then statistical analysis was performed using Minitab, and the chi square test. Differences were considered significant if $P < 0.05$.

4. Results

4.1. Studied Population

The total recruited students were 240 students, including 116 (56 final and 60 prefinal) medical students and 124 (58 final and 66 pre-final) nursing students. Amongst all cases, 113 were males. All students were unmarried and from Kurdistan. The average age of medical students was 24 ± 1 years while this was 22 ± 1 year for nursing students.

4.2. Cervical Cancer-HPV Relationship Knowledge

The researchers first asked a question about the incidence of cervical cancer in the region. In response to the question, 154 from 240 (64.2%) recruited subjects considered the incidence of cervical cancer low in the region. Then, the researchers stratified responses according to college. Overall, 90 of 116 (77.6%) medical students gave the correct answers when they were asked about HPV detection in 90% of cervical cancer whereas 64 of 124 (51.6%) nursing student gave the correct answers ($P < 0.001$). Then, the participants were asked about cancer prevention by preventing the infection. A significant difference was found in the correct answers between both colleges 95/116 (81.9%) for the college of medicine versus 48 out of 124 (38.7%) for nurse college ($P < 0.001$) (Table 1).

Then, the researchers stratified the answers according to the year of each college. In both colleges, significant differences were found in the correct answer rate when they were asked about HPV detection rates in cervical cancer. No significant differences were found regarding other questions (Table 1). Additionally, the response rates were stratified according to gender. No significant differences were found in response rates (Table 1).

4.3. HPV Features Knowledge

When students were asked about the general features of HPV, 70% of the total recruited subjects gave correct answers (Table 2). The researchers compared the general knowledge about HPV between the college of nursing and the college of medicine. Significant differences between the two colleges were found in response to all questions. In addition, in the college of nursing, significant differences were found between the final and pre-final years (Table 2). Then, the responses were stratified according to gender; correct answers in females were significantly higher than that of males when they were asked about the association of all HPV genotypes with cervical cancer (Table 2).

4.4. HPV Vaccine Knowledge

The knowledge of the students about HPV vaccine was examined. Significant differences were found in the responses between the college of medicine and that of nursing (Table 3). Significant differences were found in the knowledge of HPV vaccine between the final and pre-final students in both colleges (Table 3). The researchers stratified the questions according to gender; females gave a higher correct answer about the ability of vaccine to protect against all STD infections. No significant differences were found regarding other questions (Table 3).

5. Discussion

High-risk HPV infection causes approximately 5% of all cancers worldwide (8). In the United States, HPV-associated cancers cause approximately 3.3% of all cancer cases among women and 2% of the total cancer cases among men diagnosed in 2009 (8). Cervical cancer alone represents 53% of the total number of HPV-associated cancers among women and 33% of all HPV-associated cancers. There is a trend towards increasing incidence of cervical cancer in Duhok city and Kurdistan region/Iraq (5).

For the prevention of any disease, health education is the first step in the long-term plan. This study recruited medical and nursing students as the "best case scenario" of HPV knowledge in the society. In this study, about 64% of the surveyed students believed that the incidence of cervical cancer is low in the region. However, 51.6% of nursing students gave correct answers when they were asked about the incidence of the cancer in the region, while more than 77% of medical students responded with the correct answer. In a previous study conducted in Scotland recruiting medical students, around 45% of the students knew that HPV is a major predisposing factor for cervical cancer (9). Additionally, 77.6% of medical students believed that HPV could be found in 90% of cervical cancers whereas 51.6% of the nursing students gave the correct answers. Moreover, 62% of the recruited subjects knew the association between HPV and cervical cancer. In a study conducted in England recruiting 420 subjects, poor knowledge of HPV and its association with cervical cancer were found (10). In the same study from Scotland, no difference was found between females and males (9). In agreement with the Scottish study, in the current study, no significant difference was found between males and females. In a study conducted in Sweden, a significant difference was found between females (11.8%) and males (3.1%) when they were asked about the association between HPV and cervical cancer (11). In agreement with this, females showed significantly higher level of awareness about the association between HPV and cervical cancer in England (10). The researchers asked about the efficacy of the vaccine against cervical cancer. No difference was found between females and males. In a study conducted in Italy, around 8% of the recruited samples were aware that the vaccine may prevent the cancer. No significant difference was found between females and males responding to this question (12).

Recent surveys in a number of countries have indicated a lack of understanding of the sexually transmitted nature of HPV infection even among educated youth (11, 13, 14). In a study conducted in Brazil, 19% of the recruited subjects knew that HPV infection is a sexually transmitted disease (15). In the current study, 70% of the recruited sub-

Table 1. Students Responses About the Association Between Cervical Cancer and HPV Infections According to College, Gender and Year of Study[a]

Questions	Incidence of Cervical Cancer in Kurdistan Region	HPV Detected in More Than 90% of Cervical Cancer	HPV Prevention Prevent the Cancer	HPV Associated with Cervical Cancer or with Cervical Cancer, Head and Neck Cancers	Total
College					
Medicine, N = 116	77 (66.4)	90 (77. 6)	95 (81.9)	21 (18.1)	283 (60.7)
Nursing, N = 124	77 (62.1)	64 (51.6)	48 (38.7)	27 (21.8)	216 (43.7)
Total, N = 240	154 (64.2)	154 (64.2)	143 (59.6)	48 (20.8)	499 (51.9)
P value	0.89	< 0.001	< 0.001	0.303	< 0.001
Gender					
Male, N = 113	71 (62.8)	74 (65.5)	70 (61.9)	20 (17.7)	235 (51.9)
Female, N = 127	83 (65.4)	80 (63)	73 (57.9)	28 (22)	264 (51.9)
Total, N = 240	154 (64.2)	154 (64.2)	143 (59.6)	48 (20.8)	499 (51.9)
P value	0.27	0.395	0.309	0.26	0.9
Medicine					
Prefinal, N = 60	40 (66.7)	41 (68.3)	48 (80)	9 (15.3)	138
Final, N = 56	37 (66.1)	49 (87.5)	47 (84)	12 (21.4)	145
P value	0.56	0.02	0.46	0.285	0.1
Nursing					
Prefinal, N = 66	47 (71.2)	22 (33.3)	22 (33.3)	13 (19.7)	104
Final, N = 58	30 (51.7)	42 (72.4)	26 (44.8)	14 (24)	112
P value	0.016	< 0.001	0.16	0.368	0.057

[a] Values are expressed as No. (%).

Table 2. Students Responses About HPV Clinical Features Infections According to College, Gender and Year of Study[a]

Questions	HPV is STD	HPV Not Affect Male	HPV Has Always Visible Signs and Symptoms	HPV is of Many Genotypes and All Associated with Cervical Cancer	Total
College					
Medicine, N = 116	85 (73.3)	104 (89.7)	97 (83.6)	104 (89.7)	390 (84.05)
Nurse, N = 124	61 (49.2)	91 (73.4)	62 (50)	71 (57.3)	285 (57.4)
Total, N = 240	146 (60.8)	195 (81.3)	159 (66.3)	175 (72.9)	675 (70.3)
P value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Gender					
Male, N = 113	68 (60.2)	91 (80.5)	72 (63.7)	76 (67.3)	307 (67.9)
Female, N = 127	78 (61.4)	104 (81.9)	87 (68.5)	99 (78)	368 (72.4)
Total, N =240	146 (60.8)	195 (81.3)	159 (66.3)	175 (72.9)	675 (78.4)
P value	0.478	0.458	0.259	0.043	0.1
Medicine					
Prefinal, N = 60	41 (68.3)	53 (88.3)	44 (73.3)	53 (88.3)	191
Final, N = 56	44 (78.6)	52 (92.9)	54 (94.4)	52 (92.9)	202
P value	0.193	0.418	0.001	0.418	0.002
Nursing					
Prefinal, N = 66	44 (66.6)	33 (50)	43 (65.2)	45 (68.2)	165
Final, N = 58	17 (29.3)	57 (98.3)	18 (31)	29 (50)	121
P value	< 0.001	< 0.001	< 0.001	0.023	0.025

[a] Values are expressed as No. (%).

jects gave the correct answers. The high awareness level in the current study might be explained by the fact that the recruited subjects had higher educational levels than subjects recruited in previous studies. It was also previously shown that awareness observed in females was significantly higher than that found in males (11, 12). In the current study, no significant difference was found between males and females. Significant differences between the two colleges were found in response to all questions of the HPV features. Also, in the college of nursing, significant differences were found between the final and pre-final years. More efforts are needed to spread the message of HPV fea-

Table 3. Students Responses About HPV Vaccines According to the College, Gender and Year of Study[a]

Questions	HPV Vaccine Protect Against All STD	Vaccine Is Most Effective for People Never Had Sex	Vaccine Prevent Infection with all HPV Genotypes	After Vaccination No Need for Pap Smear	Total
College					
Medicine, N = 116	95 (81.9)	30 (25.9)	107 (92.2)	96 (82.8)	328 (70.6)
Nurse, N = 124	75 (60.5)	43 (34.7)	71 (57.3)	51 (41.1)	240 (48.3)
Total, N = 240	170 (70.8)	73 (30.4)	178 (74.2)	147 (61.3)	568 (59.1)
P value	< 0.001	0.089	< 0.001	< 0.001	< 0.001
Gender					
Male, N = 113	72 (63.7)	38 (33.6)	82 (72.6)	63 (55.8)	255 (57.7)
Female, N = 127	98 (77.2)	35 (27.6)	96 (75.6)	84 (66.1)	313 (61.6)
Total, N =240	170 (70.8)	73 (30.4)	178 (74.2)	147 (61.3)	568 (59.1)
P value	0.016	0.19	0.349	0.065	0.24
Medicine					
Prefinal, N = 60	9 (15)	43 (71.7)	54 (90)	44 (73.3)	150
Final, N = 56	21 (37.5)	53 (94.6)	54 (96.4)	53 (94.6)	181
P value	0.006	0.002	0.27	0.004	< 0.001
Nursing					
Prefinal, N = 66	5 (7.6)	52 (78.8)	50 (75.8)	44 (66.7)	151
Final, N = 58	38 (65.5)	18 (31)	20 (34.5)	29 (50)	105
P value	< 0.001	< 0.001	< 0.001	0.04	0.01

[a] Values are expressed as No. (%).

tures for medical and nursing students. The awareness of such students may increase the knowledge of the society.

Regarding knowledge about the vaccine, public knowledge of vaccination is pivotal to ensure good vaccination coverage. The HPV vaccine is protective against infections and subsequent cancer. Surveys performed before the approval of HPV vaccines found a low level of awareness of HPV vaccine (16, 17). Then, other knowledge surveys were conducted testing the knowledge of young women about the HPV vaccine. Again, low level of knowledge was shown (11, 12). Results of the current project are in line with previous studies. In this study, 40.4% of the surveyed population did not appear to appreciate the importance of vaccine in preventing HPV infections. In a study conducted in China recruiting healthcare providers, the awareness of the vaccine was very low (18). Also, significant differences were found in the answers of prefinal and final students. This may indicate a weak coverage of this subject in both colleges. The curriculum should be reviewed and more attention must be given to HPV vaccines.

Significant differences were found in the correct answers between the college of medicine and the college of nursing. In response to all questions, medical students gave higher rates of correct answers. This justifies an urgent plan to review the curriculum and to increase the awareness of nursing students about HPV.

Footnotes

Authors' Contribution: Study concept and design: Wahida A Ibrahim, Shameran Daniel, Nawfal Hussein and Mahde Saleh Assafi; acquisition of data: Wahida A Ibrahim, Shameran Daniel, Mahde Saleh Assafi; analysis and interpretation of data: Wahida A Ibrahim, Shameran Daniel, Nawfal Hussein, Mahde Saleh Assafi and Ramadan Othman; drafting of the manuscript: Wahida A Ibrahim, Shameran Daniel, Nawfal Hussein, Mahde Saleh Assafi and Ramadan Othman; critical revision of the manuscript for important intellectual content: Wahida A Ibrahim, Nawfal Hussein and Ramadan Othman; statistical analysis: Wahida A Ibrahim, Shameran Daniel, Mahde Saleh Assafi, Ramadan Othman; administrative, technical, and material support: Wahida A Ibrahim, Nawfal Hussein and Ramadan Othman; study supervision: Nawfal Hussein and Ramadan Othman.

Conflict of Interests: All authors mentioned no conflict of interest.

Ethical Considerations: The questionnaire was reviewed by relevant experts of the University of Duhok and Zakho Ethics Committees. The study protocol and informed consent were approved by the research committee at the university of Zakho, Duhok city, Kurdistan region, Iraq. Informed consent was obtained from all recruited subjects.

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