



Evaluation of knowledge and attitudes of the faculty of medicine students about human papillomavirus infections, related cancers, and human papillomavirus vaccines

Tıp Fakültesi öğrencilerinin human papillomavirüs enfeksiyonları, ilişkili kanserler ve human papillomavirüs aşılı ile ilgili bilgi düzeyleri ve tutumlarının değerlendirilmesi

● Zührenur Yağan, ● Aysun Aldanmaz, ● Tahir Ertuğrul, ● Zeynep Beyza Tolan,
● Adnan Menderes Bilgiç, ● Aslı Bilgiç

Akdeniz University Faculty of Medicine, Department Dermatology and Venereology, Antalya, Türkiye

Abstract

Background and Design: The human papillomavirus (HPV) is a non-enveloped DNA virus infecting skin and mucosal surfaces and causes one of the most common sexually transmitted infections worldwide. Thus, physicians must know about HPV infections, associated cancers, and immunization for public health. This study aimed to determine the knowledge of medical faculty students about HPV infections, related cancers, and vaccines and examine related variables.

Materials and Methods: This descriptive study included all students in the first to fifth grades of the faculty of medicine. Data were collected with a two-part questionnaire consisting of 37 questions. Questionnaires were filled voluntarily. Data were analyzed with SPSS version 18.0.

Results: The study included 250 medical students, and 52.4% (n=131) were men. While 95.6% (n=239) stated that they were aware of HPV, only 39.2% thought that they had sufficient knowledge. The most important sources of information were lectures and the Internet. Only 3.6% (n=9) of the students had been vaccinated against HPV. The most important reason (58%) for not being vaccinated was not having heard of the HPV vaccine before or not knowing someone who had it, and the other important reason was economics. Nearly 80% of the students thought that HPV vaccines should be included in routine vaccination. While 60% of the students stated that they would get an HPV vaccine if a free vaccine is provided, the lack of sufficient information was cited as the most important reason (45%) against the widespread use.

Conclusion: The knowledge of medical school students about HPV infection and vaccines was not very sufficient, and the vaccination rate was low. Our results suggest that HPV-related courses in medical education and reimbursement of vaccines by health authorities require some adjustments in the core education curriculum and national health policies.

Keywords: Human papillomavirus, HPV infections, HPV-related cancers, HPV vaccines, faculty of medicine, students

Öz

Amaç: Human papillomavirüs (HPV) deri ve mukozal yüzeyleri enfekte eden zarfsız bir DNA virüsüdür ve dünyada en sık görülen cinsel yolla bulaşan enfeksiyonlardan biridir. HPV enfeksiyonları, ilişkili kanserler ve bağışıklama konusunda hekimlerin bilgi sahibi olması halk sağlığının korunmasında en önemli adımlardan biridir. Bu çalışma ile tıp fakültesi öğrencilerinin HPV enfeksiyonları, ilişkili kanserler ve HPV aşılı hakkındaki bilgi düzeylerinin saptanması ve ilişkili değişkenlerin incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Tanımlayıcı türde olan bu araştırmanın evrenini tıp fakültesi 1.-5. sınıflarda öğrenim gören tüm öğrenciler oluşturdu. Araştırma verileri, iki bölümden oluşan toplam 37 soruluk anket formu ile toplandı. Anket formları 1.-5. sınıf tıp fakültesi öğrencileri tarafından gönüllülük esasına dayanarak dolduruldu. Veriler SPSS 18,0 paket programıyla analiz edildi.

Address for Correspondence/Yazışma Adresi: Aslı Bilgiç MD, Akdeniz University Faculty of Medicine, Department Dermatology and Venereology, Antalya, Türkiye

Phone: +90 242 249 67 07 **E-mail:** aslibilgictemel@gmail.com **Received/Geliş Tarihi:** 11.10.2022 **Accepted/Kabul Tarihi:** 11.01.2023

ORCID: orcid.org/0000-0001-7910-7908

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Bulgular: Çalışmaya 250 tıp öğrencisi katılmış olup, %52,4'ünü (n=131) erkekler oluşturuyordu. Öğrencilerin %95,6'sı (n=239) HPV enfeksiyonundan haberdar olduğunu ifade ederken, sadece %39,2'si bu konuda yeterli bilgisi olduğunu düşünüyordu. HPV enfeksiyon ve aşıları hakkında bilgi edinilen en önemli kaynakları dersler ve internet oluşturuyordu. Öğrencilerin sadece %3,6'sı (n=9) HPV aşısı olmuştu. HPV aşısı olmama nedenleri arasında en önemli neden toplam %58 ile daha önce HPV aşısını duymama veya yaptıran birini tanımama oluştururken, diğer önemli neden ekonomik sebeplerdi. Öğrencilerin %80'e yakını HPV aşısının rutin aşı takvimine girmesi gerektiğini düşünüyordu. Aşı takviminde ücretsiz aşı sağlandığı durumda öğrencilerin %60'a yakını HPV aşısı yaptıracağını ifade ederken, HPV aşısının yaygınlaşmasının önündeki en önemli neden (%45; n=111) olarak yeterli bilgiye sahip olunmaması gösterilmişti.

Sonuç: Çalışmamız sonucunda tıp fakültesi öğrencilerinin HPV enfeksiyonu ve aşıları ile ilgili bilgi düzeylerinin çok yeterli olmadığı ve aşı yaptırmama oranının da düşük olduğu ortaya konuldu. Sonuçlarımız HPV ile ilişkili olarak tıp eğitimi, sosyal güvence ve geri ödeme gibi konularda çekirdek eğitim müfredatında ve ulusal sağlık politikalarında bazı düzenlemeler gerektirdiğini düşündürmektedir.

Anahtar Kelimeler: Human papillomavirüs, HPV enfeksiyonları, HPV ilişkili kanserler, HPV aşıları, tıp fakültesi, öğrenci

Introduction

The human papillomavirus (HPV) is a double-stranded non-enveloped DNA virus belonging to the papillomavirus family that infects the skin and mucosal surfaces. HPV types that cause disease in humans are held responsible for various lesions from anogenital warts to cancer. HPV is one of the most common sexually transmitted infections worldwide¹. Most sexually active people have been infected with HPV at least once in their lifetime^{2,3}. HPV is transmitted not only sexually but also by contact of infected areas. Unfortunately, data on the incidence of HPV are insufficient^{4,5}.

More than 200 types of HPV have been identified until now⁶. Non-oncogenic low-risk HPV infections (HPV types 6 and 11, etc.) cause genital warts and recurrent respiratory papillomatosis, whereas oncogenic high-risk HPV infections (HPV types 16 and 18, etc.) cause mostly cervical cancers, as well as penile, vulvar, vaginal, anal, and oropharyngeal cancers and precancerous lesions^{7,8}. HPV types 6 and 11 are responsible for >90% of anogenital warts, and HPV types 16 and 18 are responsible for >70% of cervical cancers. Other types that are responsible for cervical cancer include HPV 45 (6.7%), HPV 31 (2.9%), HPV 33 (2.6%), HPV 52 (2.3%), and HPV 56 (2.2%)⁹. According to 2017 data from the Health Research Institute of the Ministry of Health in Türkiye, cervical cancer occurs in 4.0 per 100,000 in 2014¹⁰. More than 50% of every new 1.500 cases of cervical cancer result in death¹¹. An individual can obtain HPV infections throughout his/her life⁵. Thus, the most important step is to use primary methods of preventing infection. The most important caution is the HPV vaccine. At present, although three types of vaccines (cervarix, Gardasil, and Gardasil-9) have been produced for HPV infection, only two types (cervarix and Gardasil) are available in our country. The bivalent vaccine cervarix is against HPV types 16 and 18; Gardasil is against HPV types 6, 11, 16, and 18; and Gardasil-9 protects against HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58. All three vaccines were prepared using recombinant technology and were obtained from noninfectious HPV particles that did not contain DNA. It is not infectious or oncogenic. Three doses are administered intramuscularly at 0, 2, and 6 months and preferably before sexual activity, meaning before any risk of HPV transmission¹². HPV vaccination is routinely recommended for adolescents and young adults in many countries. However, it has not yet been included in routine vaccination program by the Ministry of Health in our country. Studies have reported that the incidence of HPV infection and HPV-related diseases decreased after the start of HPV vaccination^{13,14}. The HPV vaccination rate is low in our country, which may be because people have concerns about the side effects, safety, and cost of the vaccine¹⁵.

Undoubtedly, the knowledge, attitudes, and behaviors of physicians about HPV infections, associated cancers, and immunization are one of the most important steps in protecting public health. In addition, medical school students who are in the age group at risk for HPV are also at risk for HPV infection and its complications. Therefore, this group must have sufficient knowledge about HPV infection, associated cancers, and HPV vaccines.

Therefore, this study aimed to determine the level of knowledge of medical faculty students about HPV infections, related cancers, and HPV vaccines and examine variables that are thought to be related to the current knowledge and attitudes.

Materials and Methods

This descriptive study examined the entire student population. All students in the first to fifth grades of the faculty of medicine were invited to participate in this study. The Akdeniz University Faculty of Medicine Ethics Committee approval was received for the study (approval number: 2/23, date: 20.01.2022).

Data collection

After obtaining the necessary research permission from the ethics committee, permission was obtained from the Dean of the Faculty of Medicine, and the questionnaires were collected through the student affairs unit from the first to fifth grades. The questionnaires were filled voluntarily as a self-report method.

Data collection tool

Research data were collected by a two-part questionnaire, which was prepared by the researchers following a literature review. The first part collected socio-demographic information (age, sex, department, place of residence, family education, health insurance, etc.), and the second part consisted of questions including information about HPV, related cancers, and knowledge and attitudes about HPV vaccines. The questionnaire consisted of 37 (12+25) closed-ended questions (Annex 1 and Annex 2). Data from students who voluntarily answered all the questions were received by clicking on the survey link and selecting at least one option for each question.

Statistical Analysis

Data were analyzed with the SPSS statistics version 18.0 (SPSS Inc., Chicago, NY, USA). Continuous variables were expressed as mean + standard deviation (minimum-maximum values), and categorical variables were expressed as numbers and percentages. Differences between categorical variables were analyzed by the chi-square test. A statistical significance level was accepted as <0.05.

Results

In total, 250 medical students participated in the study, 47.6% (n=119) were female, and 52.4% (n=131) were male. Moreover, 36.4% (n=91) of the participants were in the second grade, 23.6% (n=59) were in the third grade, and 22% (n=55) were in the first grade. As regards the education level of the mothers, college and university graduates (38%, n=95) were the most common, followed by primary school graduates (23.6%, n=59) and high school graduates (22.8%, n=57). Regarding the education level of the fathers, 58% (n=145) were college and university graduates and 18% were high school graduates. For the monthly income levels, the largest income group was those with a monthly income of >10,000 TL/month with 33%, whereas 63.2% (n=158) stated that their income was equal to their expenses. Moreover, 38% of the families of all students lived in the Mediterranean Region. When asked about the settlement where the students lived for the longest time, the largest group (38.4%) consisted of those living in metropolitan cities. While 42% of the students stayed in dormitories, 37.2% stayed at home with their friends. Most of the students (83.6%) did not use cigarettes or alcohol (57.2%), and 27.6% (n=69) did not have social security. The socio-demographic data of the participants are summarized in Table 1.

When the answers about HPV were examined, 95.6% (n=239) of the students stated that they were aware of HPV infection, whereas only 39.2% thought that they had enough knowledge. As regards the source of information about HPV infection and vaccines, 79.6% of those who knew HPV learned from classes, and 30% suggested that they learned from the Internet. While 12 (4.8%) students did not know the transmission routes of HPV infection, 79 (31.6%) students did not know about the treatment of HPV infection, and 60 (24%) students did not know the age group in whom HPV vaccine is recommended. While 152 (60.8%) students stated that routine HPV vaccination was recommended before the first sexual intercourse, 140 (56%) students knew that HPV vaccination was not covered by the state. Only 9 (3.6%) students had an HPV vaccine previously.

Among the reasons for not being vaccinated with HPV, the most important one was not knowing about HPV vaccines before (58%) or not having anyone vaccinated in the family and their surroundings, and another important reason was related to economics. In this study, 79.6% (n=199) of the students thought HPV vaccine should be included in the routine vaccination program. While 58.8% of the students stated that they would be vaccinated against HPV if a free vaccine was provided, 31.2% were doubtful. When asked about the most important obstacles to widespread HPV vaccination, the most important reason (44.4%; n=111) was suggested as the lack of sufficient information (Table 2).

While a healthy comparison cannot be made because of the limited number of students when sex differences are examined, students who stated that they should have an HPV vaccine were mainly consisted of women (68.9% of women, n=82) (p=0.043). While all students who had previous HPV vaccination were female (n=9, p=0.001), the number of women among those who wanted the inclusion of the HPV vaccine in the routine vaccination schedule (p=0.012) and who stated that they would have the HPV vaccine if possible were significantly higher than men (n=81, p=0.034).

Table 1. Socio-demographic characteristics of medical students participating in the study

Socio-demographic data	n=250, (%)
Female	119 (47.6)
Male	131 (53.4)
Grades	n (%)
Grade 1	55 (22.0)
Grade 2	91 (36.4)
Grade 3	59 (23.6)
Grade 4	9 (3.6)
Grade 5	36 (14.4)
Education level (mothers)	
Illiterate	13 (5.2)
Literate	7 (2.8)
Primary school	59 (23.6)
Secondary school	19 (7.6)
High school	57 (22.8)
College-university	95 (38.0)
Education level (fathers)	
Illiterate	1 (0.4)
Literate	4 (1.6)
Primary school	31 (12.4)
Secondary school	22 (8.8)
High school	47 (18.8)
College-university	145 (58)
Region of the family hometown	
Mediterranean Region	95 (38)
Eastern Anatolian Region	20 (8)
Southeast Anatolian Region	43 (17.2)
Black Sea Region	20 (8)
Central Anatolian Region	29 (11.6)
Aegean Region	26 (10.4)
Marmara Region	17 (6.8)
Longest lived place ever	
Village	21 (8.4)
Town	69 (27.6)
City	64 (25.6)
Metropolitan city	96 (38.4)
Current living status	
I'm living with my family	49 (19.6)
I live in dormitories	105 (42)
I'm sharing a home with friends	93 (37.2)
I'm staying with my relatives	3 (1.2)
Monthly income status	
Income less than expenses	48 (19.2)
Income equal expense	158 (63.2)
Income more than expenses	44 (17.6)
Smoking	
Yes	41 (16.4)
No	209 (83.6)
Alcohol consumption	
Yes	107 (42.8)
No	143 (57.2)
Health insurance	
Yes	181 (72.4)
No	69 (27.6)

Table 2. Level of knowledge and attitudes of medical students about HPV infections, related cancers, and vaccines

Questions: variables	Number of patients: n (%)
Have you heard of HPV infection?	
Yes	239 (95.6)
No	11 (4.4)
Do you have knowledge about HPV?	
I know enough	98 (39.2)
I have knowledge but not enough	117 (46.8)
I have very little knowledge	25 (10)
I have no idea	10 (4)
Sources of HPV information/knowledge	
School (lessons)	173 (69.2)
Friends	15 (6)
Family	3 (1.2)
Internet	52 (20.8)
Television	2 (0.8)
Book/magazine/poster/brochure	5 (2)
What is your sexual relationship status?	
I have no relationship	181 (72.4)
Protected intercourse	41 (16.4)
Unprotected intercourse	1 (0.4)
Protected/unprotected intercourse	27 (10.8)
What are the diseases caused by HPV?	
Genital warts, cervical cancer, and penile cancer	205 (82)
I do not know	45 (18)
Is there a cure for HPV?	
Yes	125 (50)
None	46 (18.4)
I do not know	79 (31.6)
Source of information about HPV vaccines	
School (lessons)	156 (62.4)
Friends	19 (7.6)
Family	9 (3.6)
Internet	61 (24.4)
Television	1 (0.4)
Book/magazine/poster/brochure	4 (1.6)
What is the most appropriate age range for HPV vaccination?	
0-10	11 (4.4)
11-26	151 (60.4)
26-40	28 (11.2)
I do not know	60 (24)
What is the best time for HPV vaccination?	
Before the first sexual intercourse	152 (60.8)
During the sexually active period	28 (11.2)
I do not know	70 (28)

Table 2. continued

Questions: variables	Number of patients: n (%)
How many types of HPV vaccines are there in Türkiye?	
1	14 (5.6)
2	42 (16.8)
3	29 (11.6)
I do not know	165 (66)
Does the national health insurance cover HPV vaccination?	
Yes	14 (5.6)
No	140 (56)
I do not know	96 (38.4)
Have you had an HPV vaccine?	
Yes	9 (3.6)
No	241 (96.4)
If you have not had an HPV vaccine, what is the reason?	
Never heard before	47 (18.8)
It is expensive	90 (36)
I do not know about its side effects	15 (6)
It is harmful	0
There is no one in my family and friends/relatives	98 (39.2)
Would you like to have the HPV vaccine if you have the opportunity?	
Yes	147 (58.8)
No	25 (10)
Not sure	78 (31.2)
Should HPV vaccination be included in routine vaccination program?	
Yes	199 (79.6)
No	7 (2.8)
Not sure	44 (17.6)
What do you think is the biggest obstacle for the widespread use of the HPV vaccine?	
Fear of side effects	9 (3.6)
Not having enough information	111 (44.4)
Excess cost	64 (25.6)
Not included in routine vaccination program	35 (14)
Not covered by the national health insurance	31 (12.4)
HPV: Human papillomavirus	

Discussion

This study showed that while most of our medical faculty students were aware of HPV infection, information about HPV infection, related cancers, and vaccines was insufficient. Although only a very limited number of female students had HPV vaccination, the most important reason for not being vaccinated was the lack of knowledge about HPV vaccines. While nearly 80% of the students thought about the inclusion of the HPV vaccine in the routine vaccination, the most important obstacles to the widespread use of the vaccine were the lack of sufficient information and economic reasons.

In our study, having a high number of male participants (52.4%) differs from the female dominance in the previous literature^{10,11}. However, other results of our study were similar to those of previous studies. This suggests that the results of these studies accurately reflect the knowledge and attitudes of society.

While 36.4% (n=91) of our participants consisted of second-grade students in which the special study module activity was held, participation from all grades was similar in general, except for the fourth grades. However, the limited number of participants distributed over different grades does not allow a healthy comparison between these grades in terms of knowledge and attitudes about HPV. In the study by Emre et al.¹⁶, the level of knowledge about the HPV vaccine and its application was significantly higher, especially in second-grade and/or higher-grade students, and knowledge regarding HPV vaccines increased significantly as grades in medical school increased. Similar results were found in the study by Wong and Sam¹⁷ on medical students. Again, Güvenç et al.¹⁸ found that the level of knowledge about HPV vaccines in nursing students was significantly increased among higher classes; the level of knowledge was the lowest in the first grades compared with other classes. In another study, the level of knowledge about HPV increases in the upper classes according to the years of education¹⁹.

Regarding students' knowledge about HPV, 95.6% (n=239) were aware of HPV infection, whereas only 39.2% thought they had enough knowledge. In addition, a substantial part of the students did not have sufficient knowledge about the transmission routes of HPV, at-risk population who should be vaccinated, vaccines in our country, price of the vaccine, and whether it was covered by the state or not. These results suggest that sufficient information is not given about HPV in the lessons^{16,20,21}. However, as in other developing countries, the decrease in the age of first sexual intercourse and the increase in characteristics such as having more than one sexual partner increase the risk for sexually transmitted infections. Thus, medical students must have adequate knowledge about HPV infections, associated cancers, and current HPV vaccines.

Similar to the literature, in the present study, female students were significantly more knowledgeable and enthusiastic than male students regarding the HPV vaccination, getting the vaccine if possible, and thinking that it should be included in the routine vaccination^{16,20,21}. These results indicate that women are more knowledgeable than men on these issues.

In the study by Emre et al.¹⁶, similar to our study, the students suggested that they learned about HPV infection and vaccination mostly from classes (79.6% and 74.7%, respectively) and Internet (30% and 24%, respectively). In recent studies, the Internet is the most frequently identified source of information outside the classroom and is the most easily accessible information source used by all segments of society today. These results make us think that education materials using verbal, written, and visual communication tools could be more helpful in teaching HPV-related precautions²¹.

In the present study, only 3.6% (n=9) of the students have previous HPV vaccination, and remarkably, all of them were women. In the study by Emre et al.¹⁶, women were more common (56.3%) among the students who were vaccinated. In the survey of 85 medical school students who had HPV vaccination in the adult immunization

outpatient clinic of Ege University, 94% (n=80) of those who were vaccinated were women²³. The finding that knowledge levels about HPV infection and vaccines were higher among women in nearly all studies suggests that HPV vaccines are only protective against cervical cancers and that the vaccine is only for women prevails. However, HPV is transmitted between sexual partners, and some types cause genital warts, precancerous lesions, and cancers in men.

Although the number of students who were vaccinated was relatively high in our study, it remained at a very low level, similar to the literature^{10,11}. In a study by Naki et al.²⁴ who analyzed 311 healthcare providers, the awareness of HPV infection and malignancy was higher among physicians, and they were more willing to be vaccinated. However, the number of physicians who preferred to be vaccinated was similar to all other healthcare providers (52.7% vs. 57%), and the numbers were quite low²⁴.

In the study by Özaran et al.²¹, the most important reason for not having the HPV vaccine was the lack of sufficient information, similar to our study. In the study by Emre et al.¹⁶, unlike our study, the main reason for not being vaccinated was the belief that a person was not at risk (40.1%), followed by not having enough knowledge about the vaccine (28.2%), and the high price of the vaccine (25.9%). Economic reasons were also among the most important reasons in previous studies^{10,11}. Considering that the financial situation affects people's decisions in many areas of life, including HPV vaccines in health insurance and having payment coverage for the vaccine have utmost importance in making progress with HPV infections and related cancers.

In the present study, nearly 80% of the students thought about the inclusion of HPV vaccination in the routine vaccination, similar to previous studies. While approximately 60% of the students stated that they would get vaccinated if a free vaccine was provided, >30% were doubtful. These results showed similar rates to the literature^{10,11,25}. In a study conducted with medical school students who had HPV vaccination in the adult immunization outpatient clinic of Ege University, 94% of the participants preferred the inclusion of the vaccine in the childhood vaccination program²³. Moreover, 78% (n=66) of the participants knew someone in their family or friends who were vaccinated for HPV. This rate was higher than that reported in all studies conducted in our country. These results show that the awareness and acceptance of HPV vaccines and the vaccination rates might increase with the increasing knowledge and practices in society.

One of the strengths of our study is that our study reflects the knowledge, opinions, and attitudes of medical students, who are the main force for public health; furthermore, our study included the ideas and attitudes of students who have different levels of knowledge about HPV and HPV vaccines.

Studies have reported that those who do not have sufficient knowledge about HPV do not recommend HPV vaccination, and the suggestions of healthcare professionals regarding vaccination increase the acceptability of the vaccines^{20,21,26-28}. Vaccination rates could increase after sufficient education^{29,30}. For all these reasons, lessons and educational programs regarding HPV, related cancers, and HPV vaccines should be included in the pre-graduate curriculum and post-graduate training programs, especially in medical faculties, which could create a healthcare force with up-to-date knowledge.

Study Limitations

The most important study limitations include the single-center setting, limited number of participating students, and not having an equal number of students from all grades of the medical faculty. Moreover, the study was based on voluntary answers to questionnaires sent only by e-mail because of the COVID-19 pandemic.

Conclusion

The results of this study revealed that the level of knowledge of medical faculty students about HPV infections and vaccines is not sufficient and the vaccination rate is quite low. Thus, obtaining accurate information about HPV vaccines and vaccinating health workers can contribute to public health awareness and increase immunization rates. Our results suggest making some arrangements in national health policies regarding HPV-related cancers and vaccination programs within the scope of social security and/or reimbursement and organizing training in the core educational curriculum within the scope of medical education and in on-campus social centers that students can easily access.

Ethics

Ethics Committee Approval: The Akdeniz University Faculty of Medicine Ethics Committee approval was received for the study (approval number: 2/23, date: 20.01.2022).

Informed Consent: Informed consent has been taken from all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Z.Y., A.A., T.E., Z.B.T., A.M.B., A.B., Concept: Z.Y., A.A., T.E., Z.B.T., A.M.B., A.B., Design: Z.Y., A.A., T.E., Z.B.T., A.M.B., A.B., Data Collection or Processing: Z.Y., A.A., T.E., Z.B.T., A.M.B., A.B., Analysis or Interpretation A.B., Literature Search: Z.Y., A.A., T.E., Z.B.T., A.M.B., A.B., Writing: Z.Y., A.A., A.B.

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References

- Baseman J, Koutsky L: The epidemiology of human papillomavirus infections. *J Clin Virol* 2005;32:16-24.
- Satterwhite CL, Torrone E, Meites E, et al.: Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. *Sex Transm Dis* 2013;40:187-93.
- Myers ER, McCrory DC, Nanda K, Bastian L, Matchar DB: Mathematical model for the natural history of human papillomavirus infection and cervical carcinogenesis. *Am J Epidemiol* 2000;151:1158-71.
- Güner H, Taşkıran Ç: Epidemiology of cervical cancer and the role of human papilloma virus. *Türk Jinekoloji ve Obstetrik Derneği Dergisi* 2007;4:11-9.
- Ceyhan M: Human papillomavirus (HPV) aşılı. *Klinik Gelişim* 2012;25:36-9.
- de Villiers EM, Fauquet C, Broker TR, Bernard HU, zur Hausen H: Classification of papillomaviruses. *Virology* 2004;324:17-27.
- Cogliano V, Cogliano V, Baan R, Straif K, Grosse Y, Secretan B, El Ghissassi F; WHO International Agency for Research on Cancer. Carcinogenicity of human papillomaviruses. *Lancet Oncol* 2005;6:204.
- Türk Dermatoloji Derneği, Cinsel Yolla Bulaşan Hastalıklar Tedavi Rehberleri. Çev: Aydoğan K, Dicle Ö, Doğan B, Keçici AS, Köse O, Serdaroğlu S, 2015.
- Hacimustafaoğlu M: İnsan Papilloma Virus (HPV) Aşılı. *Çocuk Dergisi* 2007;7:27-30.
- Türkiye Cumhuriyeti Sağlık Bakanlığı Sağlık İstatistikleri Yıllığı, 2016 [29.08.2018]. (erişim tarihi: 22.12.22). Available from: <https://dosyasb.saglik.gov.tr/Eklenti/13183,sy2016turkcepdf.pdf?0>
- Parkin DM, Bray F, Ferlay J, Pisani P: Global cancer statistics. *CA cancer J Clin* 2005;55:74-108.
- Dede M: Prophylactic HPV vaccines: current approaches. *Gülhane Tıp Dergisi* 2010;52:148-56.
- Smith LM, Strumpf EC, Kaufman JS, Lofters A, Schwandt M, Lévesque LE: The early benefits of human papillomavirus vaccination on cervical dysplasia and anogenital warts. *Pediatrics* 2015;135:1131-40.
- Drolet M, Drolet M, Bénard É, et al.: HPV Vaccination Impact Study Group. Population-level impact and herd effects following human papillomavirus vaccination programmes: a systematic review and meta-analysis. *Lancet Infect Dis* 2015;15:565-80.
- Şahbaz A, Erol O: HPV aşılı uygulamaları. *J Turk Soc Obstet Gynecol* 2014;2:126-30.
- Emre N, Özşahin A, Edirne T: Pamukkale University Medical Faculty Students' Knowledge Level of Human Papilloma Virus Infection and Vaccine. *Euras J Fam Med* 2020;9:42-50.
- Wong LP, Sam IC: Ethnically diverse female university students' knowledge and attitudes toward human papillomavirus (HPV), HPV vaccination and cervical cancer. *Eur J Obstet Gynecol Reprod Biol* 2010;148:90-5.
- Güvenç G, Akyüz A, Seven M: Determination of the knowledge and attitudes of nursing students about human papilloma virus infection and its vaccines. *Gülhane Medical Journal* 2012;54:104-10.
- Durusoy R, Yamazhan M, Taşbakan MI, et al: HPV vaccine awareness and willingness of first-year students entering university in Western Turkey. *Asian Pac J Cancer Prev* 2010;11:1695-701.
- Kızılca Çakaloz D, Öztürk G, Çoban A, Karaçam Z: Determination of the knowledge and opinions of midwifery students about cervical cancer and Human Papilloma Virus vaccination. *Journal of Adnan Menderes University Health Sciences Faculty* 2018;2:55-64.
- Özsaran Z, Demirci S, Aras AB: Tıp Fakültesi öğrencileri arasında HPV bilgi düzeyini değerlendiren anket çalışması. *Türk Jinekolojik Onkoloji Dergisi* 2011;2:40-4.
- Aksoy H, Dağcıoğlu K, Durmuş M, et al.: The knowledge level of medical students about cervical cancer and their attitudes towards Human Papilloma Virus vaccine. *Jour Turk Fam Phy* 2021;12:66-75.
- Erdem HA, Işıköz Taşbakan M, Şanlıdağ G, Kanpak ES, Pullukçu H: We Get Vaccinated, But Do We Really Know Why?: Evaluation of Knowledge on HPV Infection and Vaccination in Medical School Students with HPV Vaccine. *FLORA* 2020;25:62-8.
- Naki MM, Celik H, Api O, Toprak S, Ozerden E, Unal O: Awareness, knowledge and attitudes related to HPV infection and vaccine among non-obstetrician-gynecologist healthcare providers. *J Turk German Gynec Assoc* 2010;11:16-21.
- Başlı M, Aksu H, Toptaş B: Knowledge and Views about Human Papilloma Virus and HPV Vaccine of School of Health High Students Who Studying at a University. *J Ankara Health Sciences* 2019;1:1-17.
- Önsüz FM, Topuzoğlu A: The evaluation of the knowledge levels and attitudes of medical students who have accomplished obstetric and gynaecological diseases internship in a medical school about human papilloma virus vaccine. *Taf Prev Med Bull* 2011;10:557-64.

27. Daley MF, Liddon N, Crane LA, et al.: A national survey of pediatrician knowledge and attitudes regarding human papillomavirus vaccination. *Pediatrics* 2006;118:2280-9.
28. de Carvalho NS, Teixeira LM, Pradel EM, Gabardo J, Joly C, Urbanet AA: Vaccinating against HPV: physicians' and medical students' point of view. *Vaccine* 2009;27:2637-40.
29. Belani HK, Sekar P, Guhaniyogi R, Abraham A, Bohjanen PR, Bohjanen K: Human papillomavirus vaccine acceptance among young men in Bangalore, India. *Int J Dermatol* 2014;53:486-91.
30. Poole DN, Tracy JK, Levitz L, et al.: A cross-sectional study to assess HPV knowledge and HPV vaccine acceptability in Mali. *PLoS One* 2013;8:e56402.