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The Relationship Between Human Papillomavirus Knowledge and Health Literacy in University Students: Descriptive Correlational Study

Üniversite Öğrencilerinde İnsan Papillomavirüsü Bilgisi ve Sağlık Okuryazarlığı Arasındaki İlişki: Tanımlayıcı İlişkisel Araştırma

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ABSTRACT Objective: This study aimed to assess the level of knowledge about human papillomavirus (HPV), the health literacy status, and the HPV vaccination status of university students in Türkiye, and to examine the relationship between HPV knowledge and health literacy. **Material and Methods:** This study was based on a descriptive-relational design and involved 387 university students. The study utilized a descriptive characteristics questionnaire, HPV Knowledge Scale, and Health Literacy Scale to collect the research data. It performed a face-to-face approach to collect research data between February 1-April 1, 2024. It also used descriptive analyses (number, percentage), chi-square analyses, and Pearson correlation analyses to evaluate the research data. The study utilized the strengthening the reporting of observational studies in epidemiology (cross-sectional studies) guide to report the research data. **Results:** Of the participant students, 65.6% were women, 30.5% of their mothers had primary school education, and 34.4% had difficulty accessing health institutions. The study results indicated that 8.5% of the student's received education on HPV, 6.5% contacted healthcare professionals about HPV vaccines, and 7.2% and 10.1% received advice from their families and healthcare professionals, respectively, about the application of HPV vaccination. The average score of the students on the HPV Knowledge Scale was 6.06±7.09 (minimum: 0, maximum: 33), and 7.5% of the participant students reported receiving the HPV vaccine. The study also identified a positive and significant relationship between HPV knowledge and health literacy (r=0.113, p=<0.001). **Conclusion:** The students have a low level of knowledge about HPV, and only a small portion of them have received training on the subject. Given that HPV infection-related health problems, including cervical cancer, are a critical public health concern, this study recommends providing education and information about HPV infection prevention and HPV vaccine application.

Keywords: Human papillomavirus; HPV vaccines; students; health literacy

ÖZET Amaç: Bu araştırma, Türkiye'deki üniversite öğrencilerinin insan papillomavirüsü [human papillomavirus (HPV)] hakkındaki bilgi düzeyini, sağlık okuryazarlığı durumunu ve HPV aşı durumunu değerlendirmek ve HPV bilgisi ile sağlık okuryazarlığı arasındaki ilişkiyi değerlendirmek amacıyla planlanmıştır. **Gereç ve Yöntemler:** Tanımlayıcı-ilişkisel çalışma olarak yürütülen bu araştırma, 387 üniversite öğrencisi tamamlanmıştır. Araştırma verileri; tanımlayıcı özellikler soru formu, HPV Bilgi Ölçeği ve Sağlık Okuryazarlığı Ölçeği ile toplanmıştır. Araştırma verileri, 1 Şubat-1 Nisan 2024 tarihleri arasında yüz yüze toplanmıştır. Araştırma verilerinin değerlendirilmesinde; tanımlayıcı analizler (sayı, yüzde), ki-kare analizleri ve Pearson korelasyon analizleri kullanılmıştır. Araştırma verilerinin raporlanmasında, epidemiyolojide gözlemsel çalışmaların raporlanmasının güçlendirilmesi (kesitsel çalışmalar) rehberi kullanılmıştır. **Bulgular:** Öğrencilerin %65,6'sı kadın, %30,5'inin anne eğitim düzeyi ilkokul ve %34,4'ü sağlık kurumlarına erişimde zorluk yaşamaktadır. Araştırmada, öğrencilerin %8,5'inin HPV ile ilgili bir eğitim aldığı, %6,5'inin HPV aşıları ile ilgili sağlık çalışanları ile iletişime geçtiği, %7,2'sinin ailesinden ve %10,1'inin sağlık çalışanlarından HPV aşı uygulaması hakkında öneri aldığı tespit edilmiştir. Öğrencilerin, HPV Bilgi Ölçeği puan ortalaması 6,06±7,09 (minimum: 0, maksimum: 33) olup; %7,5'inin HPV aşısı yaptırdığı tespit edilmiştir. Araştırmada, HPV bilgisi ile sağlık okuryazarlığı arasında pozitif yönde, zayıf düzeyde ve anlamlı ilişki olduğu (r=0,113; p=<0,001) tespit edilmiştir. **Sonuç:** Öğrencilerin, HPV bilgi seviyeleri oldukça düşüktür ve çok sınırlı bir bölümü HPV hakkında eğitim almıştır. Rahim ağzı kanserleri de dâhil olmak üzere HPV enfeksiyonuna bağlı sağlık sorunlarının önemli bir halk sağlığı sorunu olduğu dikkate alınarak, HPV enfeksiyonunda korunma ve HPV aşı uygulaması hakkında eğitim ve bilgilendirmelerin yapılması önerilmektedir.

Anahtar Kelimeler: İnsan papillomavirüsü; HPV aşıları; öğrenciler; sağlık okuryazarlığı

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Human papillomavirus (HPV) infection is the most common viral infection among sexually transmitted infections (STIs) worldwide.[1] HPV infections result in several cancers and health problems in men and women, including anogenital warts (condyloma), recurrent respiratory papillomatosis, cervical intraepithelial neoplasia, oropharyngeal cancers, penile, anal, vaginal, vulvar, and cervical cancers.[2] A significant portion of cervical cancers are associated with HPV infection, and cervical cancer is the fourth most frequent type of cancer among women. According to global cancer statistics, there were 604,000 new cases of cervical cancer and 342,000 cervical cancer-related deaths in 2020.[3] HPV-related diseases, including cervical cancers, are a significant public health issue that results in substantial financial losses.[2]

Although HPV infections, HPV infections-related cancers, and financial losses are a global issue, these adverse conditions can be controlled and prevented with HPV vaccines. HPV vaccines are a highly effective public health intervention for reducing oropharyngeal and genital cancers, especially cervical cancer.[4] According to the Centers for Disease Control and Prevention (CDC), the use of HPV vaccines in the United States reduced the HPV infections causing HPV cancer and genital warts among adolescent girls and young adult women by 88% and 81%, respectively. The CDC Advisory Committee on Immunization Practices recommends two doses of HPV vaccine routinely before first sexual contact at ages 11-12.[5,6] Additionally, the CDC advises HPV vaccination for women ages 13-26 and men ages 13-21 who have never been vaccinated and are not sexually active.[6,7]

Despite the availability of HPV vaccines that are effective in preventing various health problems and HPV infection-related cancers, it is striking that HPV vaccination rates are considerably low worldwide. The literature review reportedly indicated that the HPV vaccination rate was 26.5% in the United States, 46% in Italy, and less than 1% in Japan.[1,2,8] The analysis of the determinants of HPV vaccine acceptance revealed that numerous factors, especially knowledge and awareness about HPV, and subsequently, parental attitudes, culture, vaccine provider recommendations, financial reasons, and social media messages, influenced HPV vaccine acceptance.[4,8-11] Moreover, the concept of health literacy (HL), which plays a significant role in numerous health-related decisions and outcomes, is a considerable determinant in increasing the HPV vaccine dose and vaccination coverage.[1,2] The literature also emphasizes that the HL dimension of the issue should be evaluated while addressing health problems due to the multifaceted nature of health decisions and behaviors.[12] Additionally, considering that HPV vaccination rates, a preventive public health intervention, are linked with HL, the literature also expresses the necessity and significance of conducting more research analyzing HPV vaccination and HL to eliminate knowledge gaps on this topic and increase vaccination rates.[9,12]

Both genders may display HPV infections in their teens and adulthood. Given that the majority of HPV infections ensue in youth and early adulthood, university students, a young demographic with a sizable population, seem to be a potential target group to focus on. Research involving university students also reported that HPV vaccination rates and HPV knowledge levels are lower among them.[8,9] Furthermore, university students are a more significant population considering that they will be the parents of the future and contribute to the healthy growth and development of future generations.

Within the parameters of this information, it is explicit that HPV infection is a considerable public health issue, and the HPV vaccine is an effective public health intervention in preventing various cancers, especially cervical cancers. Additionally, HL is a significant determinant in HPV vaccine acceptance, and university students are a group to take into consideration for HPV knowledge level and HPV vaccine application. Research on HPV vaccination among Turkish university students has revealed that they mainly focused on students' HPV knowledge status, HPV vaccination rates, and students' views on protection from HPV infections.[13-15] There have been several studies on the relationship between HPV knowledge and HL in some countries, such as the United States of America and Italy; however, there has been no research on the relationship between HPV infection knowledge level, vaccination status, and HL in Türkiye.[2,9] As a result, the current Turkish literature considerably lacked these subjects. In light

of all these data, this study aimed to assess the relationship between HPV infection knowledge, HPV vaccination status, and HL among university students in Türkiye. The study also included male participants, anticipating that awareness of STIs, including HPV infection among men, would lead to behavioral changes for both genders and could be a key factor in protecting against STIs.[8]

The findings of this study may anticipatingly guide plans for raising the general public's HPV vaccination rates, preventing various cancers, especially cervical cancer, and minimizing financial losses. Within its parameters, this study aspired to find answers to the following questions.

- What is the HPV infection knowledge of university students?
- What is the HPV vaccination status of university students?
- What is the relationship between HPV knowledge and the HL of university students?

MATERIAL AND METHODS

RESEARCH AIM AND TYPE

This research was designed as a descriptive-relational study to analyze HPV knowledge, HPV vaccination status, and the relationship between HPV knowledge and HL of students studying at a state university in Türkiye. The study also used the guidelines for strengthening the reporting of observational studies in epidemiology (cross-sectional studies) in reporting the research data.[16]

Research Location, Population, and Sample

The research population consisted of students studying at a state university in Türkiye. There were 13,084 students at this state university in the 2023-2024 academic years. In calculating the research sample size, the study used the limited population formula, where the number of units is known and the population is less than 15,000. Considering the formula $n=N\ (t1\text{-}a)^2\ (p.q)/S^2 2\ (N\text{-}1)+S^2\ (p.q)$, where N=15,000, p=frequency of occurrence (50%), q=frequency of nonoccurrence (50%), S: 5% sampling error, t=1.96 corresponding to 5% for type 1 (alpha) error, the study identified the sample size as 375 individuals.[17] As a result, the study involved 384 students to complete the research process.

DATA COLLECTION TOOLS

The study used a descriptive characteristics questionnaire, Health Literacy Scale (HLS-14), and HPV Knowledge Scale (HPV-KS) to collect the research data.

Descriptive characteristics questionnaire: As developed by the literature review, this form consists of 2 sections: the sociodemographic characteristics and the HPV infection information.[2,4,8,9] The sociodemographic characteristics section has 10 questions about gender, age, marital status, etc. However, the HPV infection information section contains 18 questions to evaluate topics such as familiarity with the HPV vaccine, getting vaccinated by the HPV, information sources about the HPV vaccine, etc.

Health Literacy Scale: HLS-14, developed by Suka et al. in Japan, evaluates the HL of adults. The scale comprises 3 subscales: functional HL (items 1-5, Cronbach's alpha value 0.83), interactive HL (items 6-10, Cronbach's alpha value 0.85), and critical HL (items 11-14, Cronbach's alpha value 0.76). It also contains 14 items. The Cronbach's alpha value for the entire scale is 0.81, and the scores assigned to answers are as follows: 1: Strongly disagree, 2: Disagree, 3: Neutral, 4: Agree, and 5: Strongly agree. The functional HL subscale also retains reverse-scored items. The total scale scores range between 14-70. A high total scale score interpretively indicates a high HL.[18] Türkoğlu and Kılıç performed the Turkish validity and reliability study of the scale, identifying that the scale as in its original structure. They also reported that Cronbach's alpha values for functional, interactive, critical HL, and the entire scale were 0.85, 0.90, 0.87, and 0.85, respectively.[19] Cronbach's alpha values for this study were calculated as 0.81, 0.87, 0.92, and 0.87, respectively.

Human Papillomavirus Knowledge Scale: As developed by Waller et al., the HPV-KS measures individuals' knowledge about HPV infection, HPV test, and HPV vaccine. The scale consists of four sub-dimensions: general HPV knowledge (items 1-16), HPV screening test knowledge (items 17-22), gen-

eral HPV vaccine knowledge (items 23-27), and knowledge about the current HPV vaccination program (items 28-33). It also consists of 33 items. The scale responses are "true", "false", and '"I do not know". The evaluation scores of the scale are as follows: "1 point" for questions answered correctly and "0 points" for questions answered incorrectly or replied as "I do not know". The total score to potentially acquire from the scale ranges from 0 to 33. A higher total score refers to a higher knowledge about HPV infection, HPV test, and HPV vaccine. Studies reported the Cronbach's alpha value for the entire HPV-KS as 0.79.[20] Demir Bozkurt and Özdemir also made the Turkish validity and reliability evaluation of the scale. Accordingly, they found the scale similar to the original structure, with four sub-dimensions and 33 items. The Cronbach's alpha values of the entire scale and its sub-dimensions (general HPV knowledge, HPV screening test knowledge, general HPV vaccine knowledge, and knowledge about the current HPV vaccination program) were 0.96, 0.93, 0.81, 0.90, and 0.72, respectively.[21] Cronbach's alpha values for this study were calculated as 0.93, 0.92, 0.70, 0.79, and 0.63, respectively.

DATA COLLECTION PROCESS AND INCLUSION CRITERIA

The study used a face-to-face approach to collect the research data at the university where the research was conducted, in locations such as campus, canteen, and sitting areas, between February 1-April 1, 2024. Researchers informed students about the research subject and content during the data collection. They subsequently shared data collection forms with students who agreed to participate in the study. Researchers allowed 5-6 minutes for students to respond to the data collection tools, and the data collection process took place after obtaining approval from the ethics committee and relevant institutions. The study included students who were actively studying at the university where data was collected and who volunteered for the research during the academic year in which the research was conducted.

DATA ANALYSIS

The study used the SPSS 25.0 software program to analyze the research data. It used numbers, percentages, mean, and standard deviation to analyze the descriptive data. The study evaluated the total score distribution of the HLS-14 and HPV-KS scales with the Kolmogorov-Smirnov test and also scrutinized the skewness and kurtosis values of both scales (HLS-14 skewness: -0.165, kurtosis: -0.655; HPV-KS skewness: 0.864, kurtosis: -0.498). In line with these findings, the study assumed that the data set followed a normal distribution. Considering participants' HPV vaccination statuses, the study performed 4-way and multi-way chi-square analyses to assess their differences in sociodemographic characteristics and various features, such as knowledge about HPV infection, status of receiving HPV education, and HPV vaccine recommendation. The study also employed an independent samples t-test to determine the difference between the participants' scale scores based on their HPV vaccination status. Pearson correlation analysis also evaluated the relationship between HLS-14 and HPV-KS. The interpretation of the correlation coefficients was as follows: (r) 0.00-0.19, 0.20-0.39, 0.40-0.69, 0.70-0.89, and 0.90-1.00 refer to none or negligible, poor (low), moderate, strong (high), and highly stronger relationship, respectively.[22] The study also used a 95% confidence interval and a 5% margin of error while interpreting all analysis results.

ETHICAL ISSUES

Before initiating the research, the study received its ethics committee approval (Artvin Çoruh University Scientific Research and Publication Ethics Committee; date: November 11, 2023; no: E-18457941-050.99-113250) and other relevant institutional permissions (date: December 19, 2023; no: E-91797675-605.01-117579; date: December 20, 2023; no: E-50789670-605.01-117838). Researchers informed the students about the research topic and content and received their written consent for participation in the research. This research followed the ethical principles of the Declaration of Helsinki.

RESULTS

Of the students participating in the research, 65.6% were women, 30.5% of their mothers had primary school education, and 43.4% had no social security (Table 1).

TABLE 1: Sociodemographic characteristics of the participants (n=387)

Characteristics	n	%	Characteristics	n	%
Gender			Marital status		
Female	254	65.6	Single	375	96.9
Male	133	34.4	Married	12	3.1
Mother's education level			Father's education level		
Illiterate	74	19.1	Illiterate	20	5.2
Literate	75	19.4	Literate	45	11.6
Primary school graduate	118	30.5	Primary school graduate	103	26.6
Secondary school graduate	50	12.9	Secondary school graduate	84	21.7
High school	52	13.4	High school	101	26.1
University and above	18	4.7	University and above	34	8.8
Doing regular physical activity			Economical situation		
Yes	126	32.6	Good	47	12.1
No	261	67.4	Middle	284	73.4
			Bad	56	14.5
Availability of social security			Having difficulty accessing health institutions		
There is	219	56.6	Yes	133	34.4
None	168	43.4	No	254	65.6

TABLE 2: Some health behaviours, HPV infection and vaccine characteristics of the participants (n=387)

Characteristics	n	%	Characteristics	n	%
Reading written materials from health institutions			Follow official organizations' pages regarding HPV vaccines		
Yes	192	49.6	Yes	32	8.3
No	195	50.4	No	355	91.7
Hearing about HPV vaccine			HPV vaccine information source (n=169)		
Yes	169	43.7	Health workers	24	6.2
No	218	56.3	Textbooks	75	44.4
			WHO, MoH	9	5.3
			Parents	7	4.2
			Social media	54	32.0
HPV vaccine-family recommendation			HPV vaccine-healthcare worker recommendation		
Yes	28	7.2	Yes	39	10.1
No	357	92.7	No	348	89.9
Getting HPV training			Contacting healthcare professionals regarding HPV		
Yes	33	8.5	Yes	25	6.5
No	354	91.5	No	362	93.5
Get vaccinated against HPV			HPV vaccine dose (n=29)		
Yes	29	7.5	1 dose	13	44.8
No	358	92.5	2 dose	15	51.7
			3 dose	1	3.4
Hearing the concept of HL			Getting HL training		
Yes	177	45.7	Yes	57	14.7
No	210	54.3	No	330	85.3
Having a routine health check-up			Having information about STIs		
Yes	156	40.3	Yes	222	57.4
No	231	59.7	No	165	42.6
Knowing about cancer screenings			Desire to be vaccinated against HPV		
Yes	198	51.2	Yes	93	24.0
No	189	48.8	No	294	76.0

HPV: Human papillomavirus; HL: Health literacy; WHO: World Health Organization; MoH: Ministry of Health; STI: Sexually transmitted infection

About 7.2% and 10.1% of the participant students got HPV vaccination-related recommendations from their families and healthcare professionals about HPV vaccines, respectively. Additionally, 8.5% of the students received HPV-related education, 6.5% contacted healthcare professionals about HPV vaccines, and 8.3% visited HPV vaccine websites of the official institutions. The study also identified that 57.4% and 51.2% of the participating students were aware of the STIs and cancer screenings, respectively. As a result, while 7.5% of the students stated that they received the HPV vaccination and 24% wanted to get the HPV vaccination, 56.2% of the stu-

TABLE 3: HPV-KS and HLS-14 mean scores of the participants

Scales	Minimum-maximum	X̄±SD
HPV-KS total	0-33	6.06±7.09
HPV-KS-f1 (General HPV knowledge)	0-16	3.70±4.45
HPV-KS-f2 (HPV screening test knowledge)	0-6	0.71±1.23
HPV-KS-f3 (General HPV vaccine knowledge)	0-5	0.96±1.46
HPV-KS-f4 (Knowledge about the current HPV vaccination program)	0-6	0.67±1.11
HLS-14 total	14-70	52.07±10.25
HLS-14-f1 (Functional HL)	5-25	18.36±4.54
HLS-14-f2 (Interactive HL)	5-25	18.59±4.90
HLS-14-f3 (Critical HL)	4-20	18.84±5.10

HPV-KS: Human Papillomavirus Knowledge Scale; HLS-14: Health Literacy Scale; HL: Health literacy; SD: Standard deviation

TABLE 4: Some sociodemographic, HPV and HL characteristics of the participants according to their HPV vaccination status (n=387)

Variables	Vaccinated n (%)	Not vaccinated n (%)	Test value	p value
Categorical variables				
Gender				
Female	18	236	0.047**	0.688
Male	11	122		
Economical situation				
Good	**9 (31)**	38 (10.6)	11.381**	0.003
Middle	15 (52.7)	269 (75.1)		
Bad	5 (17.2)	51 (14.2)		
Hearing about HPV vaccine				
Yes	**19 (65.5)**	139 (38.8)	7.911**	0.005
No	10 (34.5)	219 (61.2)		
HPV vaccine-family recommendation				
Yes	**7 (24.1)**	29 (5.9)	10.661**	0.003
No	22 (75.9)	335 (94.1)		
HPV vaccine-healthcare worker recommendation				
Yes	**8 (27.6)**	31 (8.7)	8.619**	0.005
No	21 (72.4)	327 (91.3)		
Contacting healthcare professionals regarding HPV vaccine				
Yes	**6 (20.7)**	19 (5.3)	8.113**	0.007
No	23 (79.3)	339 (94.7)		
Hearing the concept of HL				
Yes	**7 (24.1)**	170 (47.5)	4.989**	0.019
No	22 (75.9)	188 (52.5)		
Getting HL training				
Yes	**9 (31.0)**	48 (13.4)	5.307**	0.024
No	20 (69.0)	310 (86.6)		
Continuous variables	X̄±SD	X̄±SD	Test value	p value
HPV-KS total	8.89±7.88	5.83±6.99	t: 2.226	0.025
General HPV knowledge	5.31±4.92	3.57±4.39	t: 2.024	0.044
HPV screening test knowledge	1.23±1.27	0.68±1.22	t: 2.017	0.047
General HPV vaccine knowledge	1.34±1.58	0.93±1.44	t: 1.443	0.150
Knowledge about the current HPV vaccination program	1.10±1.47	0.63±1.07	t: 2.175	0.030
HLS-14 total	52.41±9.58	52.04±10.32	t: 0.185	0.854
Functional HL	18.51±4.53	18.35±4.55	t: 0.182	0.856
Interactive HL	18.82±4.12	18.57±4.96	t: 0.263	0.793
Critical HL	19.06±4.76	18.82±5.13	t: 0.245	0.806

**Yates chi-square (continuity correction); HPV: Human papillomavirus; HL: Health literacy; SD: Standard deviation; t: Independent samples t-test; HPV-KS: Human Papillomavirus Knowledge Scale; HLS-14: Health Literacy Scale

TABLE 5: Correlation of students' HPV-KS and HLS-14 scores

		HPV-KS	HPV-KS-f1	HPV-KS-f2	HPV-KS-f3	HPV-KS-f4	HLS-14	HLS-14-f1	HLS-14-f2	HLS-14-f3
HPV-KS	r value	1	0.941**	0.734**	0.811**	0.737**	0.133**	0.184**	0.057	0.059
	p value		**0.000**	**0.000**	**0.000**	**0.000**	**0.009**	**0.000**	0.267	0.248
HPV-KS-f1	r value		1	0.544**	0.640**	0.555**	0.194**	0.218**	0.108*	0.112*
	p value			**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.034**	**0.027**
HPV-KS-f2	r value			1	0.607**	0.597**	-0.018	0.077	-0.072	-0.055
	p value				**0.000**	**0.000**	0.724	0.130	0.158	0.278
HPV-KS-f3	r value				1	0.624**	0.077	0.133**	0.015	0.027
	p value					**0.000**	0.132	**0.009**	0.776	0.590
HPV-KS-f4	r value					1	-0.008	0.042	-0.011	-0.048
	p value						0.871	0.407	0.830	0.342
HLS-14	r value						1	0.568**	0.841**	0.854**
	p value							**0.000**	**0.000**	**0.000**
HLS-14-f1	r value							1	0.129*	0.145**
	p value								**0.011**	**0.004**
HLS-14-f2	r value								1	0.796**
	p value									**0.000**
HLS-14-f3	r value									1
	p value									

*Correlation is significant at the 0.05 level; **Correlation is significant at the 0.01 level; HPV-KS: Human Papillomavirus Knowledge Scale; HLS-14: Health Literacy Scale

dents expressed that they never heard of the HPV vaccine (Table 2).

Considering the total scores of the students from the HPV-KS and HLS-14 scales, the study found that their HPV-KS and HLS-14 total score averages were 6.06±7.09 and 52.07±10.25, respectively. Additionally, the average sub-dimension scores of the HPV-KS, namely general HPV knowledge, HPV screening test knowledge, general HPV vaccine knowledge, and knowledge about the current HPV vaccination program scores, were 3.70±4.45, 0.71±1.23, 0.71±1.23, and 0.67±1.11, respectively (Table 3).

According to participating students' HPV vaccination status, they displayed some differences in terms of their sociodemographic characteristics and other features, such as familiarity with the HPV vaccine and receiving vaccination-related recommendations. Accordingly, the analysis results revealed that those students who displayed considerably better financial situation (p=0.003), being aware of the HPV vaccine (p=0.005), receiving advice from their families (p=0.003) and healthcare professionals regarding the HPV vaccine application (p=0.005), communicating with healthcare professionals about HPV vaccine (p=0.007), being aware of the concept of HL (p=0.019), and receiving education on HL (p=0.024) had more application of HPV vaccination. Analysis of the students' average HPV-KS and HLS-14 scores, based on their HPV vaccination status, also revealed that those students who had received the HPV vaccination had higher HPV-KS total scores; however, their HLS-14 score averages displayed no difference (Table 4).

Analysis of the relationship between the participants' HPV knowledge and HL identified a positive, poor/negligibly low relationship (r=0.113, p=0.009) between the total scores of the HPV-KS and the HLS-14. Similarly, there was a poor/negligibly low relationship between general HPV knowledge (HPV-KS-f1) and HLS-14 total scores (r=0.194, p=<0.001), as well as interactive HL (r=0.108, p=0.034) and critical HL (r=0.112, p=0.027) total scores. There was also a poor/negligibly low relationship between general HPV knowledge (HPV-KS-f1) and functional HL (r=0.218, p=0.009) total scores. However, there was no relationship between the HL, HPV screening test knowledge, and knowledge about the HPV vaccination program (Table 5).

DISCUSSION

HL can be a determining factor in preventive health practices, including HPV vaccine acceptance.[2,23] Despite the availability of HPV vaccines for use in both men and women worldwide, it is well-known that HPV immunization rates are not at the ideal levels.[24] More research on this topic is required to deeply comprehend the relationship between HL and HPV knowledge and to increase HPV vaccination acceptance. As a result, this research aimed to assess the relationship between HPV knowledge and HL among university students studying at a state university in Türkiye.

The current study found that over half of the participating students were unaware of the HPV vaccine, and roughly half were ignorant of the STIs. HPV is one of the most common STI infections that leads to a variety of health issues in men and women, including genital warts, cervical cancers, and penile cancers.[3,25] HPV-related cancers and health issues are a significant public health concern and can be controlled and reduced with HPV vaccines.[6] The findings, within the parameters of this study, are highly dramatic and tragic. It is essential to raise the STI knowledge and awareness of university students, who constitute a significant portion of society and will constitute future generations.[26,27]

This study identified that 7.5% of the students had HPV vaccination. Several subject-related studies in Türkiye reported that university students' HPV vaccination rates ranged from 0.9% to 7.3%.[13,28-30] Studies in different countries also documented that the rate of at least one dose of HPV vaccination among university students was 41.7% in France, 39.1% in Italy, and 47% in the United States.[31-33] Additionally, studies conducted among university students documented that 11% in China and 18.9% in Lebanon had the HPV vaccine.[34,35] Although the findings of this study are comparable with the nationally reported vaccination rates in other studies, the HPV vaccination rates among university students in Türkiye are much lower than in many countries.

Analysis of the HPV-KS score distribution revealed that while participating students' HPV-KS total score average was 6.06±7.09. These results indicated that students had a poor (significantly low) level of knowledge about HPV infections, HPV vaccines, and HPV screenings. Consistent with the current study findings, numerous research in the literature also reported that university students displayed low knowledge of HPV infection and vaccination.[29,35] Consequently, the current study findings highlight the urgency of students' educational needs about HPV infection and HPV vaccines. Furthermore, the fact that almost all of the students (91.5%) have received no education about HPV vaccines is another indicator of this requirement.

The study revealed that the HPV vaccination was more common among students who were considerably in better financial status, knew about the HPV vaccines, received advice about the vaccines from their families and medical professionals, communicated with medical professionals about HPV vaccines, were aware of the HL concept, and received education on this topic. The reason why HPV vaccination is more common in students with higher socioeconomic standing may be related to the fact that HPV vaccines in Türkiye fall under the specific vaccination category, and its application requires payment. On the other hand, the primary justification why HPV vaccination is more prevalent among those students who know about HPV vaccines, receive advice about HPV vaccines from their families and/or healthcare professionals appears to be related to students' higher level of awareness in protection against STIs and HPV-related infections and higher vaccination rates. Additionally, HPV vaccination is more prevalent among students who are aware of the HL concept and receive education on this topic since they potentially take responsibility for protecting and improving their health, and those students who are knowledgeable on this subject use preventive health practices more frequently. Consistent with the current research findings, studies in the literature reported that the HPV vaccination rate was higher among those students who were considerably in better financial conditions; who received advice about HPV vaccination, and who were aware of HPV vaccines.[1,2,31]

These findings deliver some clues on how to increase HPV vaccination rates among university students, young adults, and the general public. Accordingly, to minimize HPV-related health issues

and extend the rate of HPV vaccination in society, health professionals should inform the public, especially parents, and provide advisory services about the significance of HPV vaccines and HPV vaccine application during admission to primary healthcare institutions and hospitals. Additionally, integrating CBYE, HPV infection, and HPV vaccines in HL education programs planned for adolescents, young adults, and adults may help increase vaccine acceptability.

The study found a positive and significant relationship between HPV knowledge and HL. Additionally, students who received education on HL displayed a higher rate of HPV vaccination, another substantial outcome of the study. Given this relationship and the difference between HL and HPV, attempts to raise the HL level of university students may considerably contribute to increasing HPV vaccination rates. Further supporting this theory is that the students who received the HPV vaccine in the study scored higher on HPV knowledge scores. Indeed, the literature reports that low HL level is associated with lower vaccination rates and lower use of protective-preventive health approaches.[23] These data, within the scope of this study, highlight the necessity of planning to improve HPV and HL knowledge.

LIMITATIONS

Despite being the first to analyze the relationship between HPV knowledge and HL among Turkish university students, this study has certain limitations. First and foremost, the scope of the study was a university located in only one city center in Türkiye. The data collection process took place on the central campus; in other words, this study did not collect data on different university campuses. As a result, it is viable to generalize the research results to the student group from which the data was collected. Notwithstanding these limitations, the research findings indicate that students have significant knowledge gaps and educational needs about STIs and HPV vaccines.

CONCLUSION

As designed to assess the HPV knowledge, HPV vaccination status, and the relationship between HPV knowledge and HL among students studying at a state university in Türkiye, this study revealed that the students' HPV infection and HPV vaccine knowledge was considerably low (poor) and merely 7.5% of the students reported having received HPV vaccination. The study also identified a relationship between HPV knowledge and HL. Additionally, only a few students received education about HPV vaccines and communicated with healthcare professionals about HPV vaccines.

The current study findings support and contribute to the existing literature. Given that HPV-related health problems and various cancers are a significant public health concern and lead to substantial financial losses, this study mainly recommends that students should be educated and informed about HPV infection and HPV vaccines. Additionally, considering that healthcare professionals are a valuable source of information while making health decisions, including vaccines, they should deliver individuals with information about HPV vaccines during their admissions to primary healthcare institutions and hospitals. Finally, it is advised that future studies assess how HPV infection- and HPV vaccines-related education influences students' HPV knowledge and HPV vaccination rates.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

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