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The relationship between knowledge levels of HPV and health literacy in youth – an example from Turkey

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ABSTRACT

Introduction and aim. Human papillomavirus (HPV) is a common infection responsible for many cancers. This study was conducted to determine the relationship between the knowledge level of HPV and the health literacy of youth living in Turkey.

Material and methods. The study sample comprised 543 youth aged 18 and 30 living in Turkey. The data were assessed with a questionnaire, the human papilloma virus knowledge scale (HPV-KS), and the health literacy scale (HLS) and the correlation between them.

Results. 50.6% of the youth informed that they are aware of HPV, and 54% of the youth know about the transmission mode of HPV. It was determined that knowing HPV increased 1.839 times by being a woman, 1.949 times by being married, and 14.339 times by knowing STIs. The HPV-KS total score average of the youth was low at 14.26 ± 7.04 , and the total score average of HLS was high at 107.91 ± 16.81 . A positive and significant correlation was found between HPV-KS total score, all sub-factor scores, HLS total score, and all sub-factors total score ($p < 0.001$).

Conclusion. Information studies on HPV should be increased by taking advantage of the generality of health literacy.

Keywords. health education, health literacy, HPV, sexually transmitted infections, youth

Introduction

Human papillomavirus (HPV) is the world's most common sexually transmitted disease. Transmission spreads through genital fluids or genital area contact, contaminated surfaces, perinatal transmission, and a chap on skin and mucosa. HPV is typically asymptomatic and diagnosed by an HPV DNA test.

Its treatment includes surgical excision of papilloma, topicals, and immune modulators. HPV results in skin, pharyngeal, vulvar, vaginal, penile, and anal cancers, especially cervix cancer.¹⁻³

It is known that every year, 530,000 women are infected with HPV worldwide, and 266 thousand of women die from this virus. It is estimated that the prevalence of HPV-infected individuals is around 11.7%. Cervical cancer caused by HPV takes fourth place in terms of prevalence among cancers in women. Data from 2018 revealed that 570,000 women were diagnosed with cervical cancer and 311,000 women died from this disease.^{4,5} Turkey has a population of 32.4 million women aged 15 and over at risk of cervical cancer. It is estimated that 2,532 women are diagnosed with cervical cancer annually, and 1,245 women die from this disease.⁶ The World Health Organization (WHO) data shows that women who die from cervical cancer in Turkey are 5.9 per 100 thousand.⁷

Vaccination, screening, early diagnosis, and treatment effectively reduce this virus's spread. WHO recommends that girls between the ages of 9 and 14 be vaccinated against HPV, in addition to screening and treatment services to reduce the risk of cancer in women.⁵ However, it is difficult to access the vaccine in our country because the HPV vaccine is not included in the free vaccine program, and the costs are high. Regular screening of women between the ages of 30 and 49, treatment and follow-up of infected women, and palliative care is recommended to eliminate HPV.⁵ Other ways to prevent HPV infection are monogamy, the popularization of condom use, the development of safe sexual behaviors, and increasing health education.^{2,3}

It is essential to prepare appropriate, cost-effective, easy-to-understand, and accessible materials and convey accurate information, especially to youth in the education and counseling of STIs. The concept of health literacy developed in recent years is known as a person's ability to read, understand and apply the information he/she has reached.⁸ Demand for preventive health services and vaccines includes knowing how and when to use prescription drugs or certain behaviors, including asking healthcare professionals about medical problems. Health literacy is essential in understanding why health behaviors do not improve. As a result of studies conducted in Turkey, it is known that health literacy is in good condition.⁹⁻¹¹ On the other hand, although information about HPV and its vaccine has been widely available in recent years, it is known that youth have insufficient knowledge of the subject.^{12,13} HPV is risky for young people, one of the risk groups for sexually transmitted infections, due to reasons such as being unheard of, ignorance and inadequacies in vaccination and lack of understanding of the importance of safe sexual intercourse. Reducing the spread of HPV will reduce associated cancers and reduce sexually transmitted infections and other opportunistic infections.

Aim

For all these reasons, this research was conducted to determine the relationship between knowledge levels of HPV and the health literacy of youth among the risk groups for HPV.

Material and methods

This study was conducted in a descriptive and cross-sectional type to determine the relationship between knowledge levels of HPV and health literacy of youth aged 18 and 30 living in Turkey. The research population consisted of youth between 18 and 30 living in Turkey. The study was conducted between 10 May and 30 August 2022.

A total of 16,940,475 people between the ages of 18 and 30 from 'Results of Address Based Population Registration System 2021' of the Turkish Statistical Institute (TUIK) and the formula ($n = N \cdot t^2 \cdot p \cdot q / d^2 (N-1) + t^2 \cdot p \cdot q$), where the population is known, determined that the prevalence of HPV in the population was 15% in line with the literature and this determined the number of samples.^{14,15} The number of samples was 543, with a 95% confidence interval and a 0.03 sensitivity. Data were collected online as this study was conducted during the COVID-19 pandemic, and maximum diversity was aimed. We targeted Turkish-speaking people between the ages of 18 and 30 living in Turkey and recruited through Instagram, Facebook and LinkedIn. Each researcher shared a web link on their social media page. We implemented a continuous recruitment strategy from October – December 2023 until the target number of participants were enrolled. Participants were not compensated. The survey was anonymous and the young people could leave the study at any time. Young people were able to move on to other questions based on the questions covering the inclusion and exclusion criteria at the beginning of the form. Those who did not complete these questions were excluded from the study because they could not see the other questions. Young people who answered all questions were considered to have completed the survey. Data was collected through a secure method of Google surveys and each survey took an average of 5–10 minutes to complete. Ethical approval of the study (Date: 08.04.2022 Issue: E-14679147-663.05-266758) was obtained.

Introductory information form examining demographic data, human papilloma virus knowledge scale, and health literacy scale were used as data collection tools.

Introductory information form

It consists of 15 questions developed by the researchers to determine the socio-demographic status of youth.¹⁶

Human papilloma virus knowledge scale (HPV-KS)

Developed by Waller et al. in 2013 and which validity and reliability of the Turkish version were studied by Demir and Özdemir in 2019, HPV-KS was developed to measure individuals' knowledge levels of HPV, HPV vaccine, and screening tests. In the scale, it is researched whether individuals have heard of HPV, HPV vaccine, and HPV screening tests before and to what extent they know these issues. The total score to be obtained from HPV-KS is between 0 to 35, and a high score indicates a high knowledge level of HPV, HPV screening tests, and the HPV vaccine. The Cronbach α value of the scale was calculated as 0.96.^{17,18}

Health literacy scale (HLS)

HLS was developed by Toçi et al. in 2013, and a validity and reliability study of the Turkish version made by Aras and Bayık Temel in 2017. The scale has four sub-dimensions: accessing information, understanding information, appraising, and applying. Low scores indicate insufficient, problematic, and poor health literacy, while high scores indicate adequate and very good health literacy. The higher the score is, the higher the individual's health literacy level is. The Cronbach α value of the scale was calculated as 0.91.^{19,20}

The data were evaluated by entering SPSS 21.0 package program (IBM, Armonk, NY, USA). Data were analyzed by number, percentage, mean, Standard deviation, Anova, t test, Logistic regression, and Pearson correlation coefficient.

In our study, the normality of the distribution of the variables was examined with the Kolmogorov-Smirnov test, and the homogeneity of the variances was evaluated with the Levene test. The Cronbach Alpha value of HPV-KS was found to be 0.90, and the Cronbach Alpha value of the Health Literacy Scale was found to be 0.96.

Results

The average age of the youth participating in the study was 23.91 ± 6.35 , 69.1% of the participants (n=375) were women, 30.9% (n=168) were men, 45.3% (n=246) in the 21–24 age group, 82.5% (n=448) were single, 42.7% (n=232) were high school graduates and 47.5% (n=258) were university graduates or higher. It was determined that 66.5% (n=361) of the youth had a middle income, and 24.7% (n=134) were working in wage-earning employment.

67.4% (n=366) of the participants stated that they have knowledge of STIs and 57.8% (n=314) stated that they need health education for STIs. 50.6% (n=275) of the youth informed that they had heard of HPV, and 54% (n=293) informed that they knew the transmission mode of HPV.

The participants' knowledge of HPV and STIs is given in Figure 1.

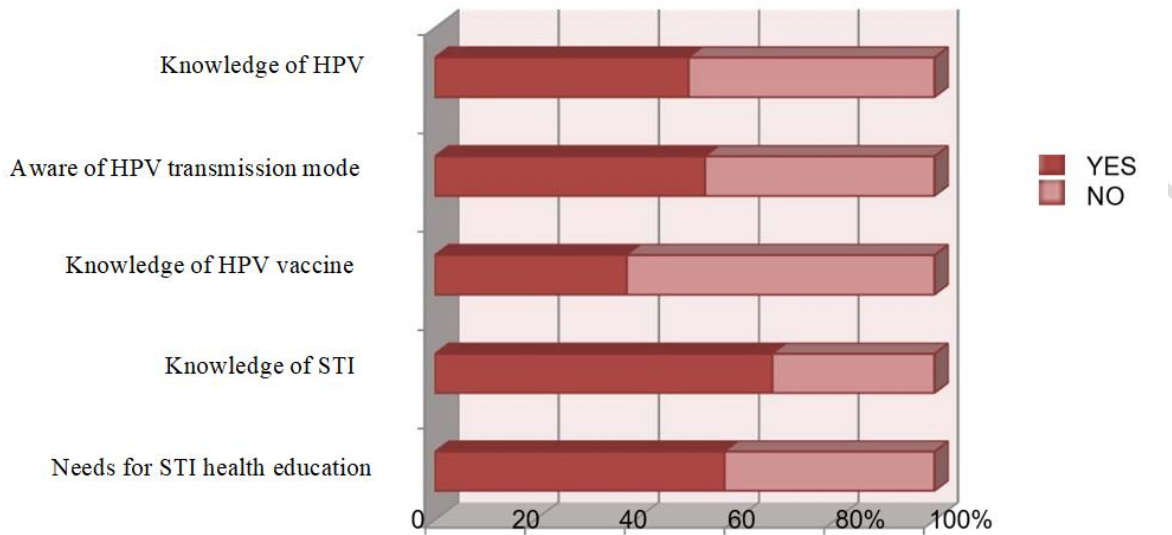


Fig. 1. Participants' knowledge status of HPV and STIs

When the socio-demographic characteristics of the youth and the score averages of HPV-KS and HLS were compared, the difference between HPV-KS total score average and employment status was found to be statistically significant ($p < 0.05$). The difference between HLS total score average and gender, marital status, and age was found to be statistically significant ($p < 0.05$) (Table 1).

Table 1. HPV-KS and HLS score averages of the youth participating in the study by socio-demographical characteristics (n=310)^a

			HPV-KS	HLS		
	n	%	$\bar{X} \pm SD$		$\bar{X} \pm SD$	
Gender						
Woman	226	72.9	14.37±6.89	t= -	109.91±14.	t=
Men	84	27.1	13.95±7.46	p=0.64	102.50±21.	p=0.00
				2	21	4*
Age						
18–20 years	93	30	13.24±6.53	F=1.52	104.87±2.0	F=3.22
				6	4 ^b	9
21–24 years	144	46.5	14.53±6.84	p=0.21	108.87±19.	p=0.04

				9	69	1*
25 years and over	73	23.5	15.03±7.94		111.49±15.06 ^a	
Marital status						
Single	261	84.2	14.10±6.90	t= -0.892	107.10±17.30	t= -2.348
Married	49	15.8	15.08±7.79	p=0.37	112.20±13.24	p=0.02
				3		1*
Education						
Maximum secondary school graduates	19	6.1	12.32±5.68	F=0.78	104.53±12.79	F=0.43
High school graduates	142	45.8	14.31±7.68	p=0.45	108.36±17.03	p=0.64
University and higher graduates	149	48.1	14.46±6.54		107.91±17.09	
Family income status						
Income more than expenses	42	13.6	16.55±8.89	F=2.672	109.57±16.60	F=0.703
Income equals expense	205	66.1	13.99±6.67	p=0.07	108.20±17.22	p=0.49
Income less than expenses	63	20.3	13.60±6.64		105.86±15.63	
Working status						
Working	79	25.5	15.96±7.85	t=2.319	110.32±15.57	t=1.479
Not working	231	74.5	13.68±6.66	p=0.02	107.08±17.17	p=0.14

^a X – mean, SD – standard deviation, F – One Way Anova, t – Student T, * – p<0.05, * – a-b: difference between groups

According to the logistic regression analysis, it was determined that the state of knowing HPV increased 1.839 times by being a woman, 1.949 times by being married, and 14.339 times by knowing STIs (p<0.05) (Table 2).

Table 2. Results of logistic regression analysis on HPV knowledge of youth^a

	B	S.E.	Wald	df	Sig.	95% C.I.for EXP(B)		
						Exp(B)	Lower	Upper
Gender	0.609	0.219	7.748	1	0.005	1.839	1.198	2.825
Age	-0.038	0.181	0.044	1	0.834	0.963	0.675	1.374
Marital status	0.667	0.313	4.554	1	0.033	1.949	1.056	3.597
Education	-0.019	0.166	0.013	1	0.909	0.981	0.709	1.358
Working status	0.106	0.274	0.149	1	0.699	1.112	0.650	1.902
Knowledge of STI	2.663	0.249	113.976	1	<0.001	14.339	8.794	23.379

^a B – regression coefficient, SE – standard error, Wald – Chi-square value, df – degree of freedom, p – significance level (p<0.05), Exp (B) – odds ratio (OR)

HPV-KS total score average of the youth was found to be 14.26±7.04, and the HLS score average was 107.91±16.81. Youth's HPV-KS and Health Literacy Scales Total Score and Sub-Factors Total Score Averages are given in Table 3.

Table 3. HPV-KS and HLS total scores and sub-factors score averages of youth

	Average±SD	Min–max	n
HPV-KS total score	14.26±7.04	0–33	310
HPV-KS sub-factor 1: General knowledge of HPV	9.05±3.50	0–16	310
HPV-KS sub-factor 2: Knowledge of the current HPV vaccination schedule	1.24±1.52	0–6	310
HPV-KS sub-factor 3: General knowledge of the HPV vaccine	2.20±1.76	0–5	310
HPV-KS sub-factor 4: General knowledge of HPV screening test	1.77±1.68	0–6	310
HLS total score	107.91±16.81	25–125	310
HLS sub-factor 1: Access to Information	21.51±3.86	5–25	310
HLS sub-factor 2: Understanding information	30.71±4.89	7–35	310
HLS sub-factor 3: Appraisal/evaluation	34.64±5.99	8–40	310

HLS sub-factor 4: Application/use	21.05±4.18	5–25	310
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A positive and significant correlation was found between the HPV-KS total score and all sub-factor scores of the youth, and the HLS total score and all sub-factors total scores ($p < 0.001$) (Table 4).

Table 4. The relationship between total scores of HPV-KS and HLS^a

		HPV-KS	HPV-KS SUB 1	HPV-KS SUB 2	HPV-KS SUB 3	HPV-KS SUB 4	HLS	HLS SUB1	HLS SUB2	HLSSU B3
HPV-KS sub factor 1	r	0.903**								
	p	0.000								
HPV-KS sub factor 2	r	0.730**	0.511**							
	p	0.000	0.000							
HPV-KS sub factor 3	r	0.802**	0.602**	0.517*						
	p	0.000	0.000	0.000						
HPV-KS sub factor 4	r	0.804**	0.605**	0.544**	0.587**					
	p	0.000	0.000	0.000	0.000					
HLS	r	0.292**	0.281***	0.153*	0.262**	0.223**				
	p	0.000	0.000	0.007	0.000	0.000				
HLS sub factor 1	r	0.332**	0.310***	0.181*	0.271**	0.295**	0.876**			
	p	0.000	0.000	0.001	0.000	0.000	0.000			
HLS sub factor 2	r	0.242**	0.237**	0.115*	0.214**	0.192**	0.887**	0.759**		
	p	0.000	0.000	0.043	0.000	0.001	0.000	0.000		
HLS sub factor 3	r	0.258**	0.264**	0.118*	0.236**	0.178**	0.936**	0.762**	0.757**	
	p	0.000	0.000	0.038	0.000	0.002	0.000	0.000	0.000	
HLS sub factor 4	r	0.214**	0.189**	0.145*	0.217**	0.145*	0.835**	0.622**	0.613**	0.744**
	p	0.000	0.001	0.011	0.000	0.011	0.000	0.000	0.000	0.000

^a r – Pearson correlation coefficient, * – $p < 0.05$, ** – $p < 0.01$

Discussion

It was determined that 50.6% of the participants were aware of HPV, but only 39.4% were aware of the HPV vaccine. With this result, it can be concluded that almost one out of every two young people has no knowledge about HPV. 93% of the students had heard of HPV in a study conducted with midwifery students. In comparison, 16.8% of the students stated that they had heard of HPV before in another study conducted with university students studying other than health.^{13,21} A study conducted with university students in Indonesia reported that 90% of the youth have heard of HPV, and 68% have knowledge of the HPV vaccine.²² It was determined that 89.7% of the students studying in the health department in Romania have heard of HPV, and 32.2% have poor knowledge of the HPV vaccine.²³ In a study conducted in Turkey, it was reported that 58.6% of the youth had heard of the HPV vaccine before, and 57.1% were doubtful about whether the HPV vaccine would be protective or not.¹² The youth's knowledge level of HPV and its vaccine differs between studies. It can be said that the reason for this is related to the differences between the panel, countries, and the studied departments. HPV vaccines are not sufficiently promoted in Turkey. The fact that the vaccine is provided for a fee and that not every individual has the financial means to afford this vaccine are barriers to vaccination. We may attribute the insufficient knowledge of HPV of the youth participating in our study to the fact that HPV is not common yet, and the HPV vaccine is not included in the vaccination schedule in Turkey.

Vaccination against HPV is the primary protection, and it is recommended by WHO.⁵ Nearly half of the participants have heard of the HPV vaccine, and 38.3% have knowledge of the vaccine. In a study conducted in Italy, although 42.1% of the participants have heard of HPV, only 15.3% know that the vaccine is available in the country.²⁴ It was determined that 67.4% of the youth in our study know STIs, and more than half of them need health education. This indicates that youth do not have enough knowledge of HPV and other infections. The study conducted with young Thai women revealed that the scoring average of knowledge of HPV is moderate, and there is a greater need for health education.²⁵ Studies indicate that even if there is knowledge of HPV, it is not enough. For this reason, it may be said that youth, a significant risk group, need a comprehensive education. Although the majority of the participants in the study were university graduates, it is noteworthy that their knowledge of HPV and other STIs was insufficient. University students need to be informed about sexual health.

Our study determined that being a woman, being married, and knowing STIs increased the knowledge level of HPV. Women generally do not tend to share their sexual experiences when they are not married. On the other hand, married women may be sensitive about gynecological examinations. It is likely that they have been informed about HPV screening during gynecological examinations. Men,

on the other hand, may feel more comfortable about HPV transmission. This may be due to men's lack of knowledge about HPV and its risks. A study conducted with youth between 18 to 30 in Sweden revealed that education level, gender, and economic income are associated with knowledge of HPV. In the same study, most participants knew that HPV is an STI and that both men and women can be infected. However, it was reported that they did not know that HPV can cause cancers other than cervical cancer.²⁶ A study of university students in Poland reported that almost three quarters of young people did not know that HPV can cause oral cancer. However, HPV is responsible for oral cancers as well as cervical cancer.²⁷ According to data from Turkey, it is estimated that HPV-related cancers affect women more and are approximately five times higher in women than men.²⁸ Women are more exposed to the negative consequences of HPV and other sexually transmitted infections. In Turkey, women who apply to gynecology outpatient clinics in Turkey are also informed about and administered pap-smears. However, there is no platform to inform men about this issue. Therefore, men are still one of the effective factors in increasing the spread.

In our study, the HPV-KS total score average of the youth was found to be 14.26 ± 7.04 . In different studies conducted in Turkey, it was reported that the HPV-KS total score average of midwifery students was 21.21 ± 4.69 , and university students was 14.3 ± 9.7 . It is thought that the education of midwifery students for genital infections and women's cancers is reflected in their scores.^{16,21} Similar to this situation, in another study, it was found that young women studying in the fields of medicine and biology had better HPV knowledge than other women.²⁹ It is thought that the low score average of the youth participating in our study is due to the difference in the number of participants, and the participants of people from all educational levels.

In different studies conducted in our country, it is seen that health literacy is at a reasonable level. When HLS scores were examined in studies conducted in Turkey, it was determined that surgical patients scored 100.82 ± 15.62 , old individuals scored 113.03 ± 12.24 , and nursing students scored 107.3 ± 15.1 .^{9,10,11} It was determined that the HLS total score of youth participating in our study was 107.91 ± 16.81 , which was good. Health literacy may be defined as the individual's understanding and interpretation of the information and acting accordingly when a patient is intended to be provided with medical information. Therefore, it may be said that the health education given to youth in our country will improve their health behaviors. When developing health education programs, especially sexual health should be included in the curriculum. This will reduce the prevalence of cervical and other HPV-related cancers in Turkey in the long term. Deaths, health and economic losses due to cancers will improve.

In our study, a positive and significant correlation was found between HPV-KS total score and all sub-factor scores of the youth, and HLS total score and all sub-factors total score ($p < 0.01$). In two

similar studies conducted at different times, it was determined that health literacy increased as young university students' knowledge level of HPV increased.^{30,31} Although high health literacy is a social advantage, HPV and similar STIs should be brought to the agenda in broader fields. Information about HPV will play an active role in screening tests and the spread of the vaccine. Introducing HPV to society will inform youth about its possible risks and consequences and demand more protection, treatment, or care.

Study limitations

The limitations of the study include the lack of face-to-face interviews with young people and lack of motivation to fill out the study forms. This study cannot be generalized due to the lack of access to young people in different regions of the country.

Study strengths

The strengths of this study are that the number of samples representing the population was reached and the scarcity of similar studies in Turkey.

Conclusion

It was determined that youth in Turkey have insufficient knowledge of HPV and its vaccine. Our study revealed that the knowledge level of HPV is low in people with low health literacy, men, singles, and those who do not know about STIs, and the risk groups that should be focused on in solving the problem were determined.

It should benefit from a good health literacy level, and studies should be conducted to inform the youth. Information studies should be maintained by public service announcements and short notes, primarily through social media tools used by youth actively. The centers providing screening services should be increased and promoted. On the other hand, the HPV vaccine, sold for a fee, is recommended to be included in the national vaccination program.

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Declarations

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Author contributions

Conceptualization, M.A.S. and E.Y.A.; Methodology, E.Y.A.; Software, M.A.S. and E.Y.A.; Validation, M.A.S. and E.Y.A.; Formal Analysis, M.A.S.; Investigation, E.Y.A.; Resources, E.Y.A.; Data Curation, X.X.; Writing – Original Draft Preparation, X.X.; Writing – Review & Editing, M.A.S.; Supervision, M.A.S.

Conflicts of interest

The authors have no relevant financial or non-financial interests to disclose.

Data availability

Data available on request from the authors.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University Dicle (Date:11.04.2022/No: E-14679147-663.05-266750).

References

1. Çevik E, Coşkun AM. Current Approach to HPV Infection and the role of the midwife. *KSHED*. 2021;7(3):215-229.
2. Alp Avcı G, Bozdayı G. Human papilloma virus. *Kafkas J Medical Sci*. 2013;3(3):136-144. doi: 10.5505/kjms.2013.52724
3. Tanner E, Alexander CJ. Genital Kanal Enfeksiyonları. In: *Johns Hopkins Jinekoloji ve Obstetri El Kitabı*. Fortner KB, Szymanski LM, Fox HE, ed. Güneş Tıp Kitabevi; 2008:289.
4. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer J Clin*. 2018;68:394-424. doi: 10.3322/caac.21492
5. World Health Organization site. Cervical cancer 2022. <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>. Accessed October 11, 2023.
6. HPV Information Center 2021. Turkey human papillomavirus and related cancers, fact sheet; 2021. https://hpvcentre.net/statistics/reports/TUR_FS.pdf. Accessed October 10, 2023.
7. World Health Organization site. Turkey cervical cancer profile 2021. <https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/cxca/cxca->

profiles/cxca-profiles-en.pdf?sfvrsn=d65f786_23&download=true_ Accessed October 14, 2023.

8. Yeşildal M, Kaya ŞD. The relationship between digital literacy and health literacy in adult individuals: The case of Konya. *Sağlık Bilimleri Dergisi*. 2021;30:174-181.
9. Çetin F, Yılmaz E. The effects of health literacy levels of patients in surgical clinic on health perception and surgical fear. *İzmir Katip Çelebi University Faculty of Health Science Journal*. 2022;7(1):61-67.
10. Tuğut N, Yılmaz A, Yeşildağ Çelik B. The relationship between nursing students' health literacy levels and healthy lifestyle behaviors. *Journal of Cumhuriyet University Health Sciences Institute*. 2021;(6)2:103-111.
11. Bakır S, Yağız Altıntaş R, Şahin S, Ertem G. determining the health literacy level of students at the university of the third age. *Avrasya Sağlık Bilimleri Dergisi*. 2022;5(3):12-18.
12. Dönmez S, Gümüşsoy S. Adolescents' knowledge, attitude, behavior and barriers regarding human papillomavirus vaccine and cervical cancer. *International Anatolia Academic Online Journal Health Sciences*. 2020;6(3):323-336.
13. Çınar İ, Ozkan S, Aslan G, Alatas E. Knowledge and behavior of university students toward human papillomavirus and vaccination. *APJON*. 2019;6(3):300.
14. Turkish Statistical Institute. Address based population registration system results, 2021. <https://data.tuik.gov.tr/Bulten/Index?p=45500>. Accessed October 11, 2023.
15. Usubütün A, Alemany L, Küçükali T, et al. Human papillomavirus types in invasive cervical cancer specimens from Turkey. *International Journal of Gynecological Pathology*. 2009;28:541-548.
16. Karahan S, Agadayı E, Koç MM, et al. Knowledge, attitudes, and behaviors of medical school students about human papilloma virus (HPV) and HPV vaccine. *KSU Medical Journal*. 2023;18(3):78-85.
17. Waller J, Ostini R, Marlow L, McCaffery K, Zimet G. Validation of a measure of knowledge about human papillomavirus (HPV) using item response theory and classical test theory. *Prev Med*. 2013;56(1):35-40. doi: 10.1016/J.YPMED.2012.10.028
18. Demir Bozkurt F, Özdemir S. Validity and reliability of a Turkish version of the human papillomavirus knowledge scale: a methodological study. *J Turk Ger Gynecol Assoc*. 2023;24:177-186.
19. Toci E, Burazeri G, Jerliu N, et al. Health literacy, self-perceived health and self-reported chronic morbidity among older people in Kosovo. *Health Promot Int*. 2015;30(3):667-674. doi: 10.1093/heapro/dau009

20. Aras Z, Bayık Temel A. Evaluation of validity and reliability of the Turkish version of health literacy scale. *FNHD*. 2017;25(2):85-94.
21. Genç Koyuncu R. Analysis of midwifery students' knowledge of human papilloma virus: A descriptive survey study. *And Bül*. 2022;24:118-126.
22. Khatiwada M, Kartasasmita C, Mediani HS, Delprat C, Hal GV, Dochez C. Knowledge, attitude and acceptability of the human papilloma virus vaccine and vaccination among university students in Indonesia. *Front Pub Health*. 2021;9:616456. doi: 10.3389/fpubh.2021.616456
23. Voidăzan TS, Budianu MA, Rozsnyai FF, Kovacs Z, Uzun CC, Neagu N. Assessing the level of knowledge, beliefs and acceptance of hpv vaccine: a cross-sectional study in Romania. *Int J Environ Res Public Health*. 2022;19:6939. doi: 10.3390/ijerph19116939
24. Di Guiseppe G, Abbate R, Liguori G, Albano L, Angelillo IF. Human papillomavirus and vaccination: knowledge, attitudes, and behavioral intention in adolescents and young women in Italy. *Br J Cancer*. 2008;99(2):225-229. doi: 10.1038/sj.bjc.6604454
25. Juntasopeepun P, Davidson PM, Suwan N, Phianmongkhon Y, Srisomboon J. Human Papillomavirus Vaccination Intention among Young Women in Thailand. *Asian Pac J Cancer Prev*. 2011;12(12):3213-3219.
26. Dahlström AL, Sundström K, Young C, Lundholm C, Sparén P, Tran NT. Awareness and knowledge of human papillomavirus in the Swedish adult population. *J Adolesc Health*. 2012;50(2):204-206. doi: 10.1016/j.jadohealth.2011.05.009
27. Lewandowski B, Czenczek-Lewandowska E, Pakla P, et al. Awareness of Polish undergraduate and graduate students regarding the impact of viral infections and high-risk sexual behaviors on the occurrence of oral cancer. *Medicine*. 2018;97(41):12846. doi: 10.1097/MD.00000000000012846
28. T.R. Ministry of Health. Türkiye kanser istatistikleri 2017. https://hsqm.saglik.gov.tr/depo/birimler/kanser-db/istatistik/Turkiye_Kanser_Istatistikleri_2017.pdf. Accessed October 14, 2023.
29. Węgorowski P, Michalik J, Turkowska K, et al. Evaluation of the knowledge of the issues related to human papillomavirus infections within young women. *Eur J Clin Exp Med*. 2018;16(4):308-316. doi: 10.15584/ejcem.2018.4.7
30. Albright AE, Allen RS. HPV Misconceptions among college students: the role of health literacy. *J Community Health*. 2018;43:1192. doi: 10.1007/s10900-018-0539-4

31. Kitur H, Horowitz AM, Beck K, Wang MQ. HPV Knowledge, Vaccine Status, and Health Literacy Among University Students. *J Cancer Educ.* 2021;37:1606-1613. doi: 10.1007/s13187-021-01997-1

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