Medicine

OPEN

Assessment of health literacy and HPV knowledge among university students
An observational study

Elif Şenocak Taşçı, MD[a,*][ORCID], Dilşat Baş, PhD[b], Simge Kayak, PhD[b], Sema Anık, PhD[b], Aleyna Erözcan, PhD[b], Özlem Sönmez, MD[c]

Abstract

Health literacy (HL) level is related to promotion of health, improved health behaviors, and early diagnosis of diseases, as well as the appropriate of health services. Human papillomavirus (HPV) vaccination is the primary method of protection against cervical cancer and recommended for women aged 9 to 27. This study aims to assess the university students' knowledge about HPV and the association between HL and HPV vaccination. In this cross-sectional and descriptive study, an electronic survey was used. Demographic characteristics and anthropometric measurements of the participants were questioned. HPV Knowledge Scale (HPV-KS) and Turkish Health Literacy Scale (THLS-32) were used to evaluate HPV knowledge and HL. Statistical analyzes were performed with SPSS version 26. A total of 361 university students (74% women), aged 21.98 ± 4.72 years, were included in the study. About 52% of the participants were health sciences students. The total THLS-32 score was 34.68 ± 9.37 (95% CI = 33.71–35.65), and the total adequate/excellent HL level was 51%. The mean HPV-KS score of the participants was 10.28 ± 8.15 (95% CI = 9.44–11.12) of a possible 35. Health sciences students had higher rates of HPV awareness (78% vs 65%; $P = .007$). General HPV knowledge level was significantly better among women ($P < .001$), >20 years ($P = .002$), and those with a family history of cancer ($P < .001$) and significantly lower among students at prep or first year of school ($P < .001$). There was a weak, positive relation between THLS-32 and HPV-KS score ($R = 0.136$; $P = .01$). Participants with higher levels of HPV knowledge ($P = .034$) and total HPV-KS score ($P = .025$) were statistically significantly higher in students with adequate/excellent HL. Our results reveal that knowledge about HPV vaccination is closely related to HL levels. Educational interventions on HL may be considered to increase HPV vaccination rates.

Abbreviations: HL = health literacy, HPV = human papillomavirus, HPV-KS = human papillomavirus knowledge scale, SPSS = Statistical Package for the Social Sciences, THLS-32 = Turkish Health Literacy Scale.

Keywords: health literacy, human papillomavirus, student, university, vaccine

1. Introduction

Human papillomavirus (HPV) infection remains 1 of the most prevalent sexually transmitted infections worldwide, with approximately 14 million new cases annually, creating a significant burden on public health.[1] HPV is associated with a spectrum of conditions ranging from benign warts to malignancies, including cervical, anal, penile, and oropharyngeal cancers. In recent decades, the development and widespread adoption of HPV vaccines have offered a transformative approach to preventing HPV-related diseases. In 2006, the first HPV vaccine became available to prevent cervical cancer.[2] With growing evidence, 3 HPV vaccines (Gardasil 9, Gardasil, and Cervarix) were approved by the Food and Drug Administration for both females and males.[3] Although the recommended age for vaccination is 9 to 26 years, in 2019, the Centers for Disease Control and Prevention approved Gardasil 9 for men and women aged 29 to 45 years. This recent development is significant for preventing HPV-related cancers. However, despite the proven efficacy and safety of HPV vaccination, uptake rates remain suboptimal in many regions due to challenges such as financial constraints, concerns about safety, and limited healthcare access.[4] These barriers may be overcome by improving health literacy.

Health literacy (HL), the ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions, is increasingly recognized as a critical determinant of health outcomes and healthcare utilization.[5] In an era marked by complex healthcare systems, rapid technological advancements, and an abundance of health information sources, disparities in health literacy pose significant challenges to achieving optimal health outcomes for individuals and populations alike. Inadequate HL levels also decrease individuals' participation in cancer preventive behaviors. There are limited studies with conflicting results in the literature on HPV knowledge and HL.[6,7]

Considering the optimal age of 18 to 26 years for HPV vaccination, understanding the level of knowledge and awareness regarding HPV among university students is paramount given their age and potential risk factors associated with HPV transmission. University students represent a population transitioning into adulthood, often experiencing newfound independence and engaging in sexual behaviors that may increase their susceptibility to HPV infection. Assessing the knowledge of HPV among this demographic population not only provides insight into prevalent sexually transmitted infections but also serves as a crucial indicator of the effectiveness of current educational initiatives and their potential impact on public health. Thus, the current study aimed to assess university students' knowledge about HPV and the associations between HL and HPV knowledge and vaccination.

2. Materials and methods

This study was conducted as a cross-sectional survey among university students. It was presented to volunteers between April and June 2023. The survey consisted of 3 parts: demographics (age, gender, university information, academic year, family history), health literacy and HPV knowledge. Participants whose native language was Turkish and aged ≥ 18 years were eligible. Volunteers from all years of both private and public universities were included in the study. All the participants were informed about the study methods, and written informed consent was obtained from each participant. The survey took approximately 20 minutes to complete via Google sheets after the participants were informed about the survey face-to-face. The sample size was calculated using G-power analysis with an alpha level of 0.05 and a desired power of 0.95 to compare the means between 2 independent groups.

The health literacy level of the students was measured with Turkish Health Literacy Scale (THLS-32). Developed in 2012 by the European Health Literacy Research Consortium,[8] the THLS-32 was launched in 2016 by the Ministry of Health after reliability and validity studies were conducted. It utilizes a 5-point Likert scale (1 = *very easy*, 2 = *easy*, 3 = *hard*, 4 = *very hard*, and 5 = *no idea*). Standardization of the indexes was achieved through the formula [index = (average − 1) × (50/3)], generating values between 0 and 50. These scores are then categorized into 4 levels: 0 to 25 points for inadequate health literacy, 26 to 33 points for limited health literacy, 34 to 42 points for adequate health literacy, and 43 to 50 points for excellent health literacy.

The HPV Knowledge Scale (HPV-KS), developed by Waller et al in 2013,[9] was used to measure individuals' knowledge of HPV, HPV testing and vaccination. A validated Turkish version of the scale was used.[10] The subscales of the HPV-KS are general HPV knowledge, HPV testing knowledge, HPV vaccine knowledge, and HPV vaccine availability. Participants marked each item as "Yes," "No," or "I don't know." Each correct answer is scored as "1," and wrong answers and "I don't know" statements are scored as "0." The total HPV-KS score ranges between 0 and 33.

All the statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version 26.0 (IBM

Corp. Armonk, NY, USA). The Kolmogorov–Smirnov test was used to test the normality of the scores obtained for continuous variables with statistical methods. Categorical variables are presented as frequencies (n, %), and continuous variables are presented as the means, standard deviations and 95% CIs. Differences between 2 groups in continuous variables were evaluated by the Mann–Whitney *U* test; differences between more than 2 groups were measured with the Kruskal–Wallis test. For multiple quantitative comparisons, Dunn multiple comparison test was used to determine which groups caused the difference. Pearson Chi-square test was used for qualitative comparisons between groups. The level of relationship between 2 continuous variables was examined with the Spearman correlation test. Pearson *R* correlation coefficient was used to examine the correlation and strength of the association between HPV awareness and knowledge scores and health literacy. The results were evaluated at a 95% confidence interval, and $P \leq .05$ was considered to indicate statistical significance.

3. Results

3.1. Patient characteristics

A total of 361 university students were included in the study. The students' ages ranged between 18 and 25 years, with a mean of 21.98 years. The majority of the students were female (74%, n = 267). About 80% (n = 74) of the students were studying at a private university, and 52% were studying in a department related to health sciences. About 43% (n = 155) of the students were in their prep/first year, 24% (n = 88) were sophomers, and 33% (n = 118) were seniors. Thirty-nine percent of the students had a family history of cancer. The detailed demographic characteristics of the participants are shown in Table 1.

3.2. Health literacy level of students

The mean total THLS-32 score was 34.68 ± 9.37 (95% CI 33.71–35.65, Table 2). There was no statistically significant difference in the THLS-32 scores of participants according to demographic characteristics (Table 1). A total of 51.2% (n = 185) of the participants had adequate or excellent health literacy, and 48.8% of them had inadequate or limited health literacy. A total of 55.7% (n = 201) of the participants had adequate health literacy in accessing health information, 51.8% in understanding health information, 36.8% in assessing health information, and 47.9% in using/practicing health information (Table 2).

3.3. HPV knowledge level

The mean total HPV-KS score of the students was 10.28 ± 8.15 (95% CI = 9.44–11.12) (Table 3). The mean scores of the subscales were as follows: general HPV knowledge, 6.43 ± 4.79 (95% CI = 5.94–6.93); HPV screening test knowledge, 1.24 ± 1.52 (95% CI = 1.08–1.40); HPV vaccine knowledge, 1.63 ± 1.77 (95% CI = 1.45–1.82); and HPV vaccine availability knowledge, 0.98 ± 1.34 (95% CI = 0.84–1.12). HPV knowledge levels were significantly greater among females (P < .001), students aged 20 years or older (P = .002), and those with a family history of cancer (P < .001). Preparatory or first-year students had a lower level of HPV knowledge (P < .001) (Table 1). The general HPV awareness level of the students was 72%, the HPV test awareness level was 66%, and the HPV vaccine awareness level was 64%. The students who studied in a health sciences-related department had significantly greater levels of HPV awareness than did the other students (78% vs 65%; P = .007) (Table 4).

Table 1

Characteristics of participants and mean HPV-KS and THLS-32 score.

	n (%)	HPV-KS		THLS-32	
		Mean ± SD	P	Mean ± SD	P
Age			.002[†*]		.884[†]
≤20	167 (46.3)	8.86 ± 7.77		34.52 ± 9.94	
>20	194 (53.7)	11.50 ± 8.29		34.82 ± 8.86	
Gender			<.001[†*]		.628[†]
Female	267 (74)	11.42 ± 8.07		34.97 ± 9.35	
Male	94 (26)	7.05 ± 7.52		33.87 ± 9.43	
University			.101[†]		.617[†]
Public	74 (20.5)	11.69 ± 8.58		35.24 ± 9.13	
Private	287 (79.5)	9.92 ± 8.01		34.54 ± 9.43	
Faculty			.255[†]		.206[†]
Health sciences	186 (51.5)	10.96 ± 7.90		34.89 ± 9.20	
Others	175 (48.5)	9.56 ± 8.37		34.46 ± 9.56	
Class level			<.001[†*]		.651[‡]
Prep/freshman1	155 (42.9)	7.95 ± 7.91	Dif**=1<2,3	33.68 ± 10.82	
Sophomere/junior2	88 (24.4)	11.86 ± 7.64		34.91 ± 8.17	
Senior3	118 (32.7)	12.16 ± 8.12		35.83 ± 7.96	
Family history of cancer			<.001[†*]		.052[†]
Yes	140 (38.8)	12.15 ± 8.22		35.67 ± 9.61	
No	221 (61.2)	9.10 ± 7.90		34.05 ± 9.18	

Bold values are statistically significant, P < .05.
HPV-KS = human papillomavirus knowledge scale, SD = standard deviation, THLS-32 = Turkish Health Literacy Scale.
[†]Mann–Whitney U test.
[‡]Kruskal–Wallis H test.
[*]P < .05.
[**]Signifies the difference between 1, 2 and 3.

Table 2

Health literacy scale of participants.

	Mean ± SD (95% CI)	Adequate/excellent HL, n (%)
Treatment and Health Care Service	35.31 ± 8.85 (34.40–36.23)	193 (53.5)
Disease Prevention and Health Promotion	34.14 ± 10.54 (33.05–35.23)	152 (42.1)
Accessing Health Information	36.36 ± 9.82 (35.34–37.38)	201 (55.7)
Understanding Health Information	35.81 ± 9.53 (34.82–36.79)	187 (51.8)
Assessing Health Information	32.43 ± 10.67 (31.33–33.53)	133 (36,8)
Using/Practicing Health Information	34.17 ± 10.27 (33.10–35.23)	173 (47.9)
THLS-32 total score	34.68 ± 9.37 (33.71–35.65)	185 (51.2)

HL = health literacy, SD = standard deviation, THLS-32 = Turkish Health Literacy Scale.

Table 3

HPV knowledge scale.

	Items	Min to max	Mean ± SD (95% CI)
General HPV knowledge	16	0 to 16	6.43 ± 4.79 (5.94–6.93)
HPV testing knowledge	6	0 to 6	1.24 ± 1.52 (1.08–1.40)
HPV vaccine knowledge	5	0 to 5	1.63 ± 1.77 (1.45–1.82)
HPV vaccine availability knowledge	6	0 to 6	0.98 ± 1.34 (0.84–1.12)
HPV-KS total	33	0 to 33	10.28 ± 8.15 (9.44–11.12)

HPV-KS = human papillomavirus knowledge scale, Max = maximum, Min = minimum, SD = standard deviation.

3.4. The relationship between students' health literacy and HPV knowledge level

A statistically significant weak positive relationship was found between the students' total THLS-32 score and total HPV-KS score ($R = 0.136$; $P = .010$) (Table 5). The total HPV knowledge score and general HPV knowledge of students with adequate/excellent health literacy levels were significantly higher ($P = .025$ and $P = .034$, respectively).

4. Discussion

The students from different universities who participated in the current study had low levels of knowledge about HPV, with the lowest knowledge being about HPV vaccination. Female participants and students with a family history of cancer had higher levels of HPV knowledge. The score also increased with age and education level. HPV awareness was better among students studying in health-related departments. On the other hand, the HL levels of the population were adequate. The HL level was found to be significantly related to HPV knowledge scores.

Hearing about HPV and HPV vaccination differ between studies, especially between those performed in developing and developed countries. In a study performed by Borlu et al, 78.3% of the participants had heard of HPV, and only 36.1% had heard of HPV vaccination, similar to the findings of a Saudi Arabian study.[11,12] In another Turkish study, 24.3% of respondents reported hearing about the HPV vaccine.[13] The increased rates observed in our study, general HPV awareness as 72%, HPV test awareness as 66% and HPV vaccine awareness as 64%, are probably due to the increase in knowledge over the years or the female predominance in our study population. Another significant difference was observed between females' and males' knowledge. Yam et al, as well as Tepe et al, did not find any

difference between females and males in their studies investigating the level of knowledge on HPV and vaccination.[14,15] Females often exhibit greater familiarity with HPV transmission, prevention methods such as vaccination, and associated risks of cervical cancer. This significant difference observed in our study highlights the need for interventions to implement more gender-sensitive attitudes.

Our study suggested that individuals with a family history of cancer exhibit greater knowledge of HPV and its implications. This heightened awareness may stem from increased engagement with healthcare providers due to familial cancer risk, leading to more frequent discussions about preventive measures and screening protocols. Additionally, individuals with a family history of cancer may have personal motivation to seek out information about HPV and its role in carcinogenesis. Furthermore, family experiences with cancer may foster a proactive approach to health-seeking behaviors, prompting individuals to actively seek out and absorb information about HPV and its associated risks.

Increased knowledge about HPV and vaccination among medical students has been shown in previous studies.[11,15] It is predictable since it is part of their education. In our study, the students from different health-related departments also presented increased knowledge about HPV, but no difference was observed in terms of vaccination knowledge. This may be attributed to the basic information given about HPV in every field of health. Still, in a study done by Vieira et al among undergraduate students in the field of health and medicine 69.3% of the participants were unaware of the relationship between HPV and head and neck cancers where 34.6% claimed that HPV may not cause oral cancer.[16] Even a study done among health professionals in Brazil showed that only 32.8% of the individuals had sufficient

knowledge whereas 67.2% were labeled as having insufficient knowledge about HPV.[17] Lower levels of information on vaccination given in our country were also shown in a study done by Tepe et al.[15] Although the majority of the study population were medical students, approximately 64% of the participants had knowledge about vaccination. In another study performed in our country, it was only 22.4%.[18] In contrast, in a Greek study of a similar population aged 17 to 24, 95.9% of students knew about the vaccine.[19] Consistent with our findings, studies have also shown a lower level of knowledge in first-grade students than in higher-grade students.[11,20] Higher education fosters a culture of HL, empowering students to seek out and critically evaluate information from diverse sources, including scientific journals and public health organizations. The lack of comprehensive sexual education in schools and social taboos surrounding discussions of sexual health also contribute to lower knowledge levels and restricted use of HPV vaccination in our country. Studies performed in Turkey have shown that university students mostly use the internet and social media to obtain information about sexual health, but only 22.5% acquire their knowledge from their parents.[21,22] Addressing these barriers requires a multifaceted approach, including targeted education campaigns, provider training, and policy initiatives to improve vaccine access and affordability, as well as culturally sensitive communication strategies to increase awareness and acceptance of HPV vaccination.

Compared to those in other studies, the HL levels were higher in our study, with 51.2% having excellent/adequate HL levels. In a study done in Turkish population of women aged 30 years and older, only 19.7% had adequate levels of HL.[23] The European Health Literacy Study, on the other hand, revealed 52.5% adequate/excellent HL levels.[24] Our study seems to have better literacy levels than other studies performed in our country. This may be attributed to the young educated population of our study. Although a review of the literature links HL with knowledge of health, there are conflicting results about HPV knowledge and HL levels.[25] In a study performed to assess the influence of HL on HPV knowledge in women living with HIV, there was no correlation in knowledge scores among women with high and low HL levels.[6] In contrast, Kitur et al's study revealed a positive association between HL and HPV knowledge among university students.[7] Lee et al[26] also reported low vaccination rates among young adults with low HL levels.

In the era of technology, students increasingly turn to digital sources for health information.[27] The accessibility and abundance of online resources offer unprecedented opportunities for self-directed learning and empowerment. However, the reliability and accuracy of such information remain a concern, as students may encounter misinformation or conflicting advice. Thus, while the internet and technology serve as valuable tools for health education, complexity may negatively affect HL. Individuals with higher HL demonstrate a greater ability to

Table 4

HPV awareness of students.

	All students n (%)	Health sciences n (%)	Others n (%)	P
HPV awareness				**.007***
Yes	259 (71.7)	145 (78.0)	114 (65.1)	
No/I don't know	102 (28.3)	41 (22.0)	61 (34.9)	
HPV test awareness				.278
Yes	237 (65.7)	127 (68.3)	110 (62.9)	
No/I don't know	124 (34.3)	59 (31.7)	65 (37.1)	
HPV vaccination awareness				.063
Yes	232 (64.3)	128 (68.8)	104 (59.4)	
No/I don't know	129 (35.7)	58 (31.2)	71 (40.6)	

Bold values are statistically significant, P < .05.
HPV = human papillomavirus.
*P < .05, Pearson Chi-square test.

Table 5

HPV knowledge level of students according to their health literacy level.

HPV-KS	THLS-32	n	Mean ± SD (95% CI)	P
General HPV knowledge	Adequate/excellent	185	6.99 ± 4.65 (6.32–7.67)	**.034***
	Inadequate/limited	176	5.84 ± 4.88 (5.12–6.57)	
HPV testing knowledge	Adequate/excellent	185	1.36 ± 1.58 (1.13–1.59)	.157
	Inadequate/limited	176	1.11 ± 1.45 (0.90–1.33)	
HPV vaccine knowledge	Adequate/excellent	185	1.79 ± 1.82 (1.53–2.06)	.099
	Inadequate/limited	176	1.46 ± 1.71 (1.21–1.71)	
HPV vaccine availability knowledge	Adequate/excellent	185	1.12 ± 1.43 (0.91–1.33)	.059
	Inadequate/limited	176	0.83 ± 1.22 (0.65–1.01)	
HPV-KS total score	Adequate/excellent	185	11.26 ± 8.08 (10.09–12.44)	**.025***
	Inadequate/limited	176	9.24 ± 8.12 (8.04–10.45)	

Bold values are statistically significant, P < .05.
HPV-KS = human papillomavirus knowledge scale, SD = standard deviation, THLS-32 = Turkish Health Literacy Scale.
*P < .05.

comprehend and navigate complex health information, enabling them to access, understand, and evaluate resources related to HPV more effectively. Furthermore, individuals with higher HL are more likely to engage in proactive health-seeking behaviors, such as routine screenings and vaccination, and to understand the importance of preventive measures in reducing HPV-related morbidity and mortality. Moreover, higher HL levels facilitate informed decision-making regarding HPV testing, treatment options, and follow-up care. Recognizing the link between HL and HPV knowledge underscores the importance of implementing strategies to enhance HL among populations at risk, thereby empowering individuals to make informed choices about their sexual health and overall well-being. Universities should increase educational interventions for HL, which will increase not only HPV knowledge but also the ability to retain information in all areas of health. The future of the community will be directed by university students, so having sufficient knowledge is important not only for their health but also for the community.

This study has several limitations. The first limitation to consider is the lack of information about the sexual activity of the participants because it is considered inappropriate in our culture. Data about HPV vaccination rates are also missing since they are not incorporated into Turkey routine immunization schedule and are again deemed inappropriate. Another limitation is the uneven distribution of sex, which may cause bias. On the other hand, there are several strong points, such as the fact that the data gained from different universities and different departments help to generalize the information and give room to different opinions from different education levels. The validated Turkish versions of the scales were used to rule out bias. To our knowledge, this is the second study evaluating the HPV perception of university students, but it is the first study including students from different universities.

5. Conclusion

Our study highlights the importance of health literacy and its impact on university students' perceptions of HPV and vaccination, suggesting that educational interventions on health literacy may be considered to increase HPV awareness and vaccination rates.

Author contributions

Conceptualization: Dilşat Baş, Simge Kayak, Aleyna Erözcan.
Data curation: Dilşat Baş, Sema Anık, Aleyna Erözcan.
Formal analysis: Dilşat Baş, Sema Anık.
Investigation: Dilşat Baş.
Methodology: Dilşat Baş.
Project administration: Dilşat Baş.
Supervision: Simge Kayak.
Writing – original draft: Elif Şenocak Taşçı, Özlem Sönmez.
Writing – review & editing: Elif Şenocak Taşçı, Özlem Sönmez.

References

[1] Vickers M, Green CL, Lee HY, Pierce JY, Daniel CL. Factors associated with HPV vaccination uptake and HPV-associated cancers: a county-level analysis in the state of Alabama. J Community Health. 2019;44:1214–23.
[2] National Cancer Institute (2023) Human papillomavirus (HPV) vaccines. National Institute of Health; 2023. Available at: https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer. Accessed April 12, 2023.
[3] Centers for Disease Control and Prevention (2023) Human Papillomavirus (HPV) Vaccination: What Everyone Should Know. Available at: https://www.cdc.gov/vaccines/vpd/hpv/public/index.html#:~:text=Three%20HPV%20vaccines—9%2Dvalent,that%20cause%20most%20HPV%20cancers. Accessed April 12, 2023.
[4] Cartmell KB, Young-Pierce J, McGue S, et al. Barriers, facilitators, and potential strategies for increasing HPV vaccination: a statewide assessment to inform action. Papillomavirus Res. 2018;5:21–31.
[5] Institute of Medicine (US) Committee on Health Literacy. In: Nielsen-Bohlman L, Panzer AM, Kindig DA, eds. Health Literacy: A Prescription to End Confusion. Washington (DC): National Academies Press; 2004.
[6] Suk R, Montealegre JR, Nemutlu GS, et al. Public knowledge of human papillomavirus and receipt of vaccination recommendations. JAMA Pediatr. 2019;173:1099–102.
[7] Kitur H, Horowitz AM, Beck K, Wang MQ. HPV knowledge, vaccine status, and health literacy among university students. J Cancer Educ. 2022;37:1606–13.
[8] Sørensen K, Van den Broucke S, Fullam J, et al. (HLS-EU) Consortium Health Literacy Project European. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health. 2012;12:80.
[9] Waller J, Ostini R, Marlow LA, 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;56:35–40.
[10] 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;24:177–86.
[11] Borlu A, Gunay O, Balci E, Sagiroglu M. Knowledge and attitudes of medical and non-medical Turkish university students about cervical cancer and HPV vaccination. Asian Pac J Cancer Prev. 2016;17:299–303.
[12] Gari A, Ghazzawi MA, Ghazzawi SA, et al. Knowledge about cervical cancer risk factors and human papilloma virus vaccine among Saudi women of childbearing age: a community-based cross-sectional study from Saudi Arabia. Vaccine X. 2023;15:100361.
[13] Onan A, Ozkan S, Korucuoğlu U, et al. Knowledge on and attitude toward human papillomavirus infection and its vaccine in a Turkish subpopulation. Turkiye Klinikleri J Med Sci. 2009;29:594–8.
[14] Yam PWA, Lam PL, Chan TK, et al. A cross sectional study on knowledge, attitude and practice related to human papillomavirus vaccination for cervical cancer prevention between medical and nonmedical students in Hong Kong. Asian Pac J Cancer Prev. 2017;18:1689–95.
[15] Bayramoğlu Tepe N, Ozcorekci O. Knowledge about the human papillomavirus among high school and university students a comprehensive questionnaire study from Southeast Turkey. J Obstet Gynaecol Res. 2020;46:907–16.
[16] Vieira VK, Wendt GW, Ferreto LED, Pascotto CR, Lucio LC. University students' knowledge about the relation between human papillomavirus (HPV) and head and neck and oral cancers. Asian Pac J Cancer Prev. 2022;23:2719–26.
[17] Grigolo AV, Wendt GW, Lucio L. Factors associated with HPV knowledge among professionals in the city of Francisco Beltrão, Brazil. J Community Health. 2023;48:652–8.
[18] Yilmazel G, Duman ND. Knowledge, attitudes and beliefs about cervical cancer and human papilloma virus vaccination with related factors in Turkish University Students. Asian Pac J Cancer Prev. 2014;15:3699–704.
[19] Michail G, Smaili M, Vozikis A, Jelastopulu E, Adonakis G, Poulas K. Female students receiving postsecondary education in Greece: the results of a collaborative human papillomavirus knowledge survey. Public Health. 2014;128:1099–105.
[20] 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.
[21] Arslan E, Bektaş H, Basgöl S, Demir S, Vural PI. Knowledge and behavior of university students related to sexual health. STED. 2014;23:174–82.
[22] Kim HW, Park S, Ahn HY, Park EJ. The effects of an HPV education program by gender among Korean university students. Nurse Educ Today. 2015;35:562–7.
[23] Çelikkalp U, Irmak AY. Cancer screening behaviors and health literacy levels of women aged 30 and over in the northwest Turkey. Eur J Gynecol Oncol. 2024;45:96–105.
[24] Sørensen K, Pelikan JM, Röthlin F, et al. HLS-EU Consortium. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health. 2015;25:1053–8.
[25] Lindau ST, Tomori C, Lyons T, Langseth L, Bennett CL, Garcia P. The association of health literacy with cervical cancer prevention knowledge and health behaviors in a multiethnic cohort of women. Am J Obstet Gynecol. 2002;186:938–43.
[26] Lee HY, Lee J, Henning-Smith C, Choi J. HPV literacy and its link to initiation and completion of HPV vaccine among young adults in Minnesota. Public Health. 2017;152:172–8.
[27] Stellefson M, Hanik B, Chaney B, Chaney D, Tennant B, Chavarria EA. eHealth literacy among college students: a systematic review with implications for ehealth education. J Med Internet Res. 2011;13:e102.