Original Article

Human Papillomavirus (HPV) Awareness and Vaccine Hesitancy Among Medical Students: A Cross-Sectional Study on Knowledge, Stigma, and Preventive Behavior

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Abstract

Aim: Human papillomavirus (HPV) is a leading cause of several anogenital and oropharyngeal cancers, yet vaccination rates remain suboptimal globally. In addition to limited access and cost-related barriers, stigma surrounding HPV can hinder vaccine uptake and preventive health behavior. This study aimed to evaluate HPV-related knowledge, attitudes, and perceived stigma among medical students, and to identify key factors influencing vaccine acceptance.

Materials and Methods: A descriptive cross-sectional survey was conducted among 220 medical students. Participants completed a structured questionnaire including socio-demographic items, HPV Knowledge Scale, and questionnaires assessing vaccination attitudes and HPV-related stigma. Statistical analyses included chi-square, t-tests, analysis of variance, and correlation analysis.

Results: The mean age of participants was 22.6±1.3 years; 63.6% were female. Although overall HPV awareness was high, only 19.1% had received at least one dose of the vaccine. Cost was the most cited barrier (40.9%), and 65% indicated willingness, to be vaccinated, if the vaccine were free. Students with prior sexual experience were more likely to be vaccinated ($P = 0.043$). Knowledge scores increased with academic year ($P < 0.05$). A negative correlation was observed between knowledge and stigma scores ($r = -0.238$, $P < 0.001$). Nearly half reported they would feel shame or guilt if diagnosed, and 76% expressed concerns about the infection's impact on relationships. No significant gender differences were found in stigma.

Conclusion: Despite high awareness, persistent stigma remains among future healthcare providers, suggesting that medical education alone may be insufficient. Integrating value-sensitive, culturally informed content into medical training-alongside policy interventions to address vaccine affordability may be essential in reducing stigma and improving vaccination.

Keywords: Papillomavirus infections, papillomavirus vaccines, medical students, social stigma, vaccine hesitancy, cross-sectional studies

Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted infections (STIs) worldwide, affecting millions of individuals across diverse populations and age groups. Among over 100 known genotypes, low-risk types such as HPV-6 and HPV-11 are linked to benign conditions like genital warts, whereas high-risk types-particularly HPV-16 and HPV-18-are strongly associated with cervical, anal, and oropharyngeal cancers.[1]

Cervical cancer remains a significant public health concern, particularly in low- and middle-income countries, which account for over 80% of global cases and deaths due to limited access to screening and preventive care.[1,2] Persistent infection with high-risk HPV types is recognized as the primary cause of nearly all cervical cancer cases.[3,4]

The availability of prophylactic HPV vaccines-such as the bivalent (Cervarix®), quadrivalent (Gardasil®), and the more

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recent nonavalent vaccine (Gardasil 9®), which provides protection against nine HPV types (6, 11, 16, 18, 31, 33, 45, 52, and 58) offers strong protection against the most oncogenic HPV types.[2,5] Despite robust evidence supporting the efficacy and safety of HPV vaccines-with up to 100% protection against cervical intraepithelial neoplasia in HPV-naive individuals-the global coverage of HPV vaccination remains disappointingly low.[4] Factors such as socio-economic disparities, lack of awareness, cultural resistance, perceived stigma surrounding HPV and concerns regarding vaccine safety pose major barriers to widespread vaccine implementation, particularly in regions with high disease burden.[3,6-9]

Medical students, as future healthcare professionals, represent a crucial group in shaping public health outcomes. However, several studies suggest that even among medical students, knowledge and attitudes toward HPV vary considerably, often reflecting gaps in formal education and public discourse.[10,11] In addition, individuals may internalize feelings of shame, guilt, or fear of judgment associated with a potential HPV diagnosis.[7,10]

This study aims to evaluate medical students' knowledge, attitudes, and stigma perceptions regarding HPV and HPV vaccination. By identifying the extent of awareness and exploring potential barriers to vaccine acceptance in this population, the findings of this study may contribute to the refinement of educational strategies within medical curricula and support future health promotion efforts.

Materials and Methods

Study Design and Participants

This descriptive cross-sectional study was conducted from February to April 2025 at Demiroğlu University Faculty of Medicine, Department of Dermatology and Venereology. The study population included medical students from all academic years (1st to 6th year). According to the university records, a total of 480 students were enrolled in the 2024-2025 academic year. Using a 95% confidence level and a 5% margin of error, the minimum required sample size was calculated as 214 students. Ultimately, 220 students who agreed to participate and completed the survey in full were included in the final analysis. Inclusion criteria consisted of currently enrolled medical students who voluntarily agreed to participate, and provided informed consent. Students who failed to complete the questionnaire or declined participation were excluded. The study received approval from the Ethics Committee of Demiroğlu University (approval number: 51016662/44718, date: 26.02.2025). Written informed consent was obtained from all participants prior to data collection.

Measurement Tools

The study employed a structured, face-to-face questionnaire composed of four main sections.

Socio-demographic Questionnaire

This section collected data on participants' age, gender, academic year, and history of sexual activity.

HPV Knowledge Scale (HPV-KS)

The HPV Knowledge Scale (HPV-KS) was originally developed by Waller et al.[12] to assess individuals' factual knowledge regarding HPV, including its modes of transmission, associated diseases, risk factors, and preventive strategies. The scale was subsequently translated and psychometrically validated for use in the Turkish population by Bozkurt and Özdemir[13] The Turkish version of the scale comprises 33 items, each rated as true, false, or don't know. Each correct response is scored as 1, while incorrect or uncertain responses receive 0 points; yielding a total score range from 0 to 33. Higher scores reflect a greater level of knowledge about HPV. The Turkish adaptation has demonstrated acceptable reliability and content validity (Cronbach's alpha > 0.80), making it a suitable instrument for assessing HPV-related knowledge among Turkish-speaking populations.[13]

HPV Vaccination Attitudes Questionnaire

This section, developed by the researchers based on a review of prior literature on HPV vaccination behaviors and attitudes, assessed participants' awareness and perceptions regarding HPV and the HPV vaccine, along with their self-reported vaccination status.[14-17]

HPV-Related Stigma Questionnaire

Developed by the researchers based on existing literature, this scale evaluates stigmatizing beliefs and attitudes toward individuals with HPV infection or those who receive the HPV vaccine.[7,8,14,18-22] The scale consists of 15 items rated on a five-point Likert scale ranging from "strongly disagree" to "strongly agree."

Statistical Analysis

All data were analyzed using IBM SPSS Statistics version 23. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize participants' characteristics. The Shapiro-Wilk test was applied to assess the normality of continuous variables. Chi-square tests were used for comparisons between categorical variables.

For continuous variables, independent samples t-tests were used for normally distributed data, while the Mann-Whitney U test was applied for non-parametric data. One-way analysis of variance (ANOVA) was used to compare mean knowledge scores across academic years when assumptions of homogeneity were met. In cases where variance homogeneity could not be assumed, Welch's ANOVA was applied. For post hoc comparisons, Tukey's test was used when variances were equal, and the Games-Howell test was employed when variances were unequal. A *P* value of < 0.05 was considered statistically significant.

Results

A total of 220 medical students participated in the study. The mean age was 22.6±1.3 years. The study population consisted of 63.6% female (n = 140) and 36.4% male (n = 80) students. When the academic year was considered, 17.3% were in their sixth year (n = 38), followed by 28.2% in the fifth year (n = 62), 15.9% in the fourth year (n = 35), 14.1% in the third year (n = 31), 9.1% in the second year (n = 20), and 15.5% in the first year (n = 34). Regarding marital status, 99.5% of participants (n = 219) reported being single, while only 0.5% (n = 1) stated they were married.

As for sexual experience, 50.0% (n = 110) reported having prior sexual experience, 33.6% (n = 74) reported no sexual experience, and 16.4% (n = 36) preferred not to disclose this information. A statistically significant association was found between sexual experience and HPV vaccination status, with participants who reported prior sexual experience being more likely to have received the HPV vaccine ($\chi^2 = 6.28$, $P = 0.043$).

Regarding HPV vaccination, 19.1% of participants (n = 42) reported having received the HPV vaccine, 64.5% (n = 142) stated they had not been vaccinated, and 16.4% (n = 36) indicated that they were considering getting vaccinated in the future. Among all participants, 15.5% (n = 34) reported receiving the full three-dose HPV vaccine series, while 2.3% (n = 5) had received two doses and 1.4% (n = 3) had received only one dose.

In terms of perceived barriers to vaccination, which were presented in Figure 1, cost was the most frequently cited obstacle, reported by 40.9% of participants. When asked about their primary sources of information on HPV, 69.1% (n = 152) of participants reported medical school courses as a source, followed by 26.8% (n = 59) who cited internet or social media, 23.2% (n = 51) who mentioned healthcare professionals, 11.4% (n = 25) who learned from friends or family, and only 1.4% (n = 3) who obtained information from TV or print media.

As shown in Table 1**,** most participants considered HPV a serious health concern and believed in the effectiveness of HPV vaccination. However, a substantial portion (11.4%) expressed concerns about receiving the vaccine, primarily due to potential side effects or safety issues. Additionally, approximately two-thirds (65.0%) indicated they would be willing to get vaccinated if it were provided free of charge.

HPV-KS results, which assess students' knowledge levels, are shown in Table 2. Female students scored significantly higher than males in the HPV testing knowledge section (*P* = 0.003), while no significant differences were observed in other domains. As shown in Table 3, total HPV-KS scores and all subscale scores increased progressively with academic year. Students in higher academic years, particularly from the 3rd year onward, demonstrated significantly greater HPV-related knowledge compared to those in the 1st and 2nd years

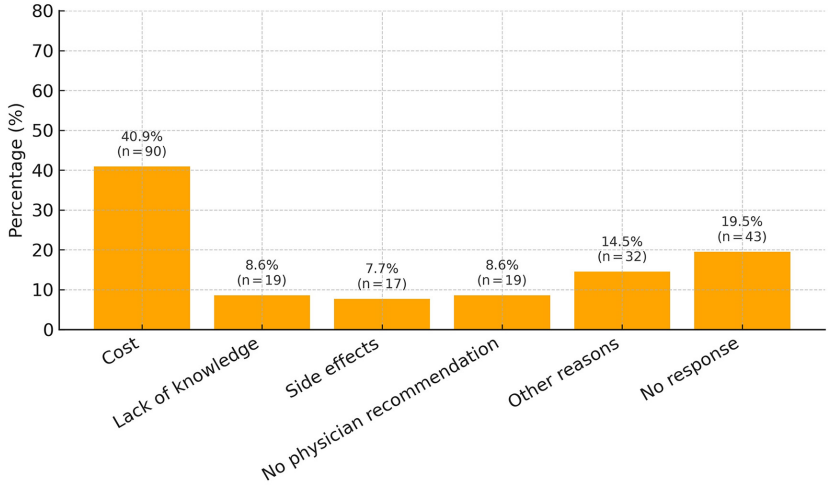

Figure 1. Perceived barriers to HPV vaccination
HPV: Human papillomavirus

($P < 0.05$). Post hoc comparisons, (Games-Howell or Tukey tests) indicated that the 1st and 2nd year students formed a statistically distinct group with lower knowledge scores, while the 6th year students consistently had the highest scores across all domains.

As summarized in Table 4, stigmatizing beliefs related to HPV were common. Nearly half of the students (46.8%) reported that a positive HPV status would cause feelings of guilt, and 76.3% believed it could negatively impact romantic relationships. Furthermore, 77.3% stated they would avoid a relationship with someone diagnosed with HPV. Social stigma was also apparent, as 34.6% perceived individuals with HPV as sexually irresponsible, 43.7% believed that a person with HPV is socially stigmatized, and 5.9% reported they would hesitate to disclose an HPV diagnosis to their physician. Statistical analysis revealed no significant gender-based differences in participants' responses to the HPV stigma and social perception items, indicating similar levels of perceived stigma among both male and female students. A total stigma score was calculated by summing all 15-item responses on the HPV stigma scale, with response options scored from 1 (strongly disagree) to 5 (strongly agree). A statistically significant negative correlation was found between HPV-KS scores and total stigma scores ($r = -0.238$, $P < 0.001$), suggesting that participants with higher levels of HPV knowledge tended to exhibit lower levels of stigma.

Table 1. Attitudes and awareness towards HPV and HPV vaccination

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
HPV is a serious health problem	2.3% (n = 5)	2.7% (n = 6)	5.0% (n = 11)	22.7% (n = 50)	67.3% (n = 148)
I believe HPV vaccination is effective in preventing cancer	2.3% (n = 5)	1.8% (n = 4)	9.5% (n = 21)	21.4% (n = 47)	65.0% (n = 143)
It is recommended that the HPV vaccine should also be administered to males	3.2% (n = 7)	1.4% (n = 3)	8.2% (n = 18)	29.1% (n = 64)	58.2% (n = 128)
I feel concerned about receiving the HPV vaccine (e.g., side effects, safety)	39.5% (n = 87)	30.5% (n = 67)	18.6% (n = 41)	9.1% (n = 20)	2.3% (n = 5)
I would get the HPV vaccine if it were free	1.4% (n = 3)	2.7% (n = 6)	11.4% (n = 25)	21.4% (n = 47)	43.6% (n = 96)

HPV: Human papillomavirus

Table 2. Comparison of HPV knowledge scale scores by gender

HPV-KS	Female (mean ± SD)	Male (mean ± SD)	*P* value
General HPV knowledge (16 items)	12.15±2.43	11.82±3.13	0.397
HPV testing knowledge (6 items)	3.31±1.61	2.62±1.68	0.003
HPV vaccination knowledge (7 items)	5.09±1.63	4.87±1.75	0.364
HPV vaccine availability (4 items)	1.94±1.02	1.76±1.08	0.212
Total HPV-KS score (33 items)	22.48±5.47	21.06±6.19	0.083

HPV-KS: Human Papillomavirus-Knowledge Scale, SD: Standard deviation

Table 3. Comparison of HPV knowledge scale scores by academic year

Academic year	General HPV knowledge (mean ± SD)*	HPV test knowledge (mean ± SD)**	HPV vaccination knowledge (mean ± SD)*	HPV vaccine availability (mean ± SD)**	total HPV-KS score (mean ± SD)*
1st year	8.94±3.66^{a}	1.82±1.64^{a}	3.71±1.96^{ab}	1.03±1.11^{a}	15.50±6.95^{a}
2nd year	9.35±2.66^{a}	2.10±1.83^{a}	2.95±2.19^{a}	1.05±1.00^{a}	15.45±6.23^{a}
3rd year	12.26±1.41^{b}	2.61±1.43^{ab}	5.06±1.55^{b}	2.06±0.81^{b}	22.00±3.60^{b}
4th year	12.66±1.53^{b}	3.31±1.23^{bc}	5.46±1.04^{b}	2.06±0.80^{b}	23.49±2.63^{b}
5th year	13.10±1.43^{b}	3.45±1.41^{bc}	5.60±1.09^{b}	2.35±0.87^{b}	24.50±3.21^{bc}
6th Year	13.79±1.26^{b}	4.08±1.60^{c}	5.76±1.08^{b}	1.97±1.00^{b}	25.61±3.61^{c}

Different superscript letters ($^{a, b, c}$) indicate statistically significant differences between academic years. Groups that share the same letter are not significantly different from each other ($P < 0.05$; *Games-Howell or **Tukey post hoc tests).
HPV: Human papillomavirus, SD: Standard deviation, KS: Knowledge scale

Table 4. Perceived stigma and social attitudes toward HPV infection

Item statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
If I tested positive for HPV, I would feel contaminated	13.2% (n = 29)	15.9% (n = 35)	21.8% (n = 48)	30.9% (n = 68)	18.2% (n = 40)
Being HPV positive would be shameful for me	15.0% (n = 33)	23.6% (n = 52)	21.8% (n = 48)	25.9% (n = 57)	13.6% (n = 30)
I would feel guilty if I tested positive for HPV	10.9% (n = 24)	22.7% (n = 50)	19.5% (n = 43)	32.3% (n =71)	14.5% (n = 32)
Being diagnosed with HPV would lower my self-esteem	11.8% (n = 26)	14.5% (n = 32)	22.3% (n = 49)	35.9% (n = 79)	15.5% (n = 34)
If I had an HPV infection, I would be worried about having a relationship	1.8% (n = 4)	2.7% (n = 6)	10.0% (n = 22)	44.5% (n = 98)	40.9% (n = 90)
A person diagnosed with HPV is seen as sexually irresponsible	6.8% (n = 15)	32.7% (n = 72)	25.9% (n = 57)	25.5% (n = 56)	9.1% (n = 20)
Most people would avoid romantic relationships with someone who is HPV positive	0.5% (n = 1)	6.4% (n = 14)	16.8% (n = 37)	53.6% (n = 118)	22.7% (n = 50)
I would avoid a relationship with someone who has HPV	0.5% (n = 1)	4.5% (n = 10)	17.3% (n = 38)	37.3% (n = 82)	40.0% (n = 88)
A person with HPV is socially stigmatized	6.4% (n = 14)	22.3% (n = 49)	27.3% (n = 60)	31.4% (n = 69)	12.3% (n = 27)
I would not mind being friends with someone who has HPV	1.8% (n = 4)	5.9% (n = 13)	18.2% (n = 40)	35.0% (n = 77)	38.6% (n = 85)
Doctors and nurses treat people with HPV differently	27.3% (n = 60)	30.5% (n = 67)	19.5% (n = 43)	14.5% (n = 32)	8.2% (n = 18)
Undergoing testing for HPV might lead people to question my sexual history	15.5% (n = 34)	21.4% (n = 47)	15.9% (n = 35)	33.6% (n = 74)	13.6% (n = 30)
A diagnosis of HPV would reduce my chances of having a good marriage in the future	12.7% (n = 28)	23.6% (n = 52)	28.6% (n = 63)	23.6% (n = 52)	11.4% (n = 25)
People assume that those who get vaccinated for HPV are sexually active	20.9% (n = 46)	22.3% (n = 49)	11.8% (n = 26)	34.1% (n = 75)	10.9% (n = 24)
I would hesitate to tell my doctor if I tested positive for HPV	64.5% (n = 142)	22.7% (n = 50)	6.8% (n = 15)	3.6% (n = 8)	2.3% (n = 5)

HPV: Human papillomavirus

Discussion

This study explored medical students' knowledge, attitudes, and perceived stigma related to HPV and HPV vaccination. This approach highlights how medical education, personal experience, and sociocultural context intersect to shape perceptions of HPV-related behaviors. The findings revealed that despite high levels of awareness, stigma remains prevalent and may influence vaccine hesitancy. Knowledge scores increased with academic year, and higher knowledge was associated with lower stigma. These results suggest that factual knowledge alone may be insufficient to combat stigma, emphasizing the need for early, value-sensitive education. Additionally, cost was reported as the most frequently cited barrier to vaccination, underscoring the need for improved accessibility. Importantly, unlike previous research, our study assessed the relationship between HPV knowledge, stigma, and sexual experience**,** offering a more comprehensive view of the behavioral factors influencing vaccine acceptance.

In this context, personal sexual history emerged as a significant factor influencing vaccination behavior, with participants who had prior sexual experience being significantly more likely to have received the HPV vaccine. This likely reflects a greater perceived vulnerability to infection after sexual debut-a trend supported by prior research showing that sexual experience often motivates vaccine-seeking behavior.[23,24] However, despite this association, the overall vaccination rate in our sample remained low (19.1%), echoing global evidence that vaccine uptake among medical students is often suboptimal.[25,26] These findings emphasize the importance of initiating vaccination before sexual activity and developing preventive strategies that go beyond knowledge, including reducing vaccine costs, addressing stigma, and enhancing accessibility.[8,17,25]

HPV-related awareness was consistently high across recent studies conducted in Türkiye; however, vaccination rates remained low. While prior studies reported HPV vaccine uptake rates of 3.5% and 7.5%, our study found a notably

higher rate of 19.1%, which may reflect regional or institutional differences in access, education, or vaccine promotion strategies.[27-29] Despite this difference, the most frequently cited obstacle to vaccination was cost (40.9%), which aligns with both national and international findings that financial burden is a significant deterrent to vaccination[7,15,17,27,30] In a recent systematic review by Zheng et al.[7], more than two-thirds of studies (9/13) reported that the cost of vaccines was a concern in both developed and developing countries. Reflecting this concern, nearly two-thirds of our participants (65%) indicated a willingness to be vaccinated if the vaccine were provided free of charge or covered by their health insurance, underscoring the pivotal role of affordability in vaccination decisions. In many contexts, the lack of insurance coverage for the HPV vaccine has also been identified as a structural barrier that limits equitable access.[16,31]

Concerns about adverse effects have been consistently identified in the literature as one of the leading causes of HPV vaccine hesitancy.[7,8,16] Although such fears are widespread in the general population, only 11.4% of participants in our study expressed concerns about vaccine safety in general, and just 7.7% specifically cited side effects or safety concerns as a direct barrier to receiving the HPV vaccine. This relatively low proportion is likely influenced by participants' medical education, which provides more reliable and evidence-based information, thereby reducing susceptibility to misinformation and vaccine-related anxiety.

Our findings revealed that although overall HPV knowledge scores did not significantly differ by gender, female students scored significantly higher than male students in the "HPV Testing Knowledge" domain, which includes items related to the function, timing, and interpretation of HPV testing procedures. This discrepancy may be partly attributed to the fact that HPV screening guidelines and cervical cancer prevention efforts predominantly target women, resulting in greater exposure to such information among female students. Previous studies have shown that women are more likely to receive information on HPV testing during gynecological visits or through public health campaigns, which may further contribute to this gender-based knowledge gap.[21,32,33] Our findings revealed a significant increase in HPV knowledge with academic year, particularly among 5th and 6th year students. This aligns with recent studies reporting higher HPV awareness among senior medical students, likely due to greater clinical exposure and structured curriculum content.[25,26] Targeted educational interventions have been shown to improve HPV knowledge, especially in earlier academic years, where baseline understanding tends to be lower.[23] These results highlight the need to introduce comprehensive HPV education earlier in medical training to reduce knowledge gaps and support preventive health efforts.

A considerable proportion of participants exhibited stigmatizing beliefs or social concerns regarding HPV infection. For example, nearly half of the students agreed or strongly agreed that testing positive for HPV would evoke feelings of shame or guilt, while 51.4% believed that being diagnosed would lower their self-esteem. These findings align with previous studies indicating that HPV-related stigma may stem from its sexual transmission route, contributing to internalized guilt and fear of social judgment.[11,21,22,32]

Relational concerns were also prominent; 76.3% of participants reported that having HPV would make them worry about forming romantic relationships, and 77.3% said they would avoid being in a relationship with someone who has HPV. These high levels of interpersonal stigma underscore how infection status may influence students' social and emotional wellbeing. Moreover, 34.6% agreed that people with HPV are perceived as sexually irresponsible, and 47.2% believed others would question their sexual history if they themselves got tested. These attitudes indicate that, despite medical training, HPV continues to be viewed not solely as a medical issue but also as a reflection of moral character-mirroring broader societal narratives that link STIs with moral judgments.[8,16,25] Notably, the Ziaee et al.[21] study contributes a critical nuance: while higher knowledge about HPV is often assumed to reduce stigma, their data revealed that knowledge does not always translate to more accepting attitudes. In fact, some forms of partial knowledge-particularly in domains like transmission or recurrence-were associated with increased levels of stigma. This counterintuitive pattern highlights a critical gap in HPV education: factual knowledge alone may not suffice to reduce stigma unless accompanied by value-sensitive content that challenges moralistic assumptions.

Gender remains a complex dimension in shaping perceptions of HPV-related stigma. Interestingly, despite well-documented gender disparities in public perceptions of HPV, which often disproportionately target women with greater stigma, our findings revealed no significant difference in stigma levels between male and female students.[9,34,35] This uniformity may be attributed to participants' medical education, which likely fosters a shared biomedical framework that tempers gendered moral judgments. It is possible that exposure to standardized scientific discourse reduces the influence of sociocultural stereotypes that typically associate HPV with female promiscuity or shame. Nevertheless, the persistence of stigma across both genders in a medically educated population underscores the depth of implicit societal narratives surrounding STIs. Despite participants' medical training, the high levels of stigma observed may reflect broader sociocultural norms in Türkiye, where discussions of sexuality and STIs are often influenced by traditional values, modesty, gender expectations, and patriarchal ideologies.

These cultural dynamics may reinforce shame and secrecy around HPV, even within clinical contexts.

These entrenched beliefs are concerning because they can interfere with public health efforts to promote HPV vaccination and routine screening. Research consistently shows that stigma serves as a barrier to preventive behaviors, including vaccine uptake and early diagnosis.[21,32] The internalized shame and fear of judgment may lead individuals to avoid healthcare contact altogether, even when services are available and free. Given that the HPV vaccine has not yet been incorporated into the national immunization schedule in Türkiye, understanding medical students' perspectives is especially valuable for anticipating and guiding future public health efforts. It prepares future physicians to effectively communicate with patients and counteract misinformation or stigma once the vaccine becomes widely available. Equipping future physicians with accurate knowledge may not only influence their clinical practice but also improve the success of forthcoming public vaccination campaigns.

Therefore, combating HPV stigma requires more than medical information. It calls for value-sensitive health communication, structural interventions to ensure confidential and nonjudgmental services, and the integration of stigma-reduction modules into medical curricula. Especially in training institutions, fostering empathy and challenging moralistic narratives around STIs is crucial to shaping future healthcare professionals' attitudes and behaviors.

Study Limitations

This study has several limitations to consider. First, as data were collected from medical students at a single institution, the findings primarily reflect the perspectives of this specific academic context and may not capture variability across other institutions. Second, the reliance on self-reported data could have introduced response biases, particularly on sensitive topics such as sexual experience, stigma, and vaccination status. Third, the cross-sectional nature of the study limits causal interpretations between HPV knowledge, stigma, and vaccination behavior. Lastly, although the HPV-related stigma scale was developed based on literature and expert input, it has not undergone formal psychometric validation, which may affect its comparability to other standardized tools.

Conclusion

This study highlights the persistence of HPV-related stigma and vaccine hesitancy among medical students, despite high levels of awareness and formal education. Although overall knowledge scores were satisfactory, stigma remained prevalent, indicating that scientific training alone may be insufficient to counteract deep-rooted sociocultural narratives. The observed negative correlation between HPV knowledge and stigma further underscores the importance of integrating not only factual content but also value-based discussions into medical curricula. Cost, safety concerns, and limited access emerged as key barriers to vaccination, suggesting the need for policy-level interventions to increase vaccine availability and affordability. Ultimately, empowering future healthcare professionals with both factual knowledge and empathetic understanding may be key to breaking down HPV-related stigma and improving vaccine acceptance.

Ethics

Ethics Committee Approval: The study received approval from the Ethics Committee of Demiroğlu University (approval number: 51016662/44718, date: 26.02.2025).

Informed Consent: Written informed consent was obtained from all participants prior to data collection.

Footnotes

Authorship Contributions

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

Conflict of Interest: The authors declared that they have no conflict of interest.

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