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Human Papillomavirus Vaccination in Male University Students in Turkey: Coverage Rate, Barriers, and Associated Factors

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Abstract

The human papillomavirus (HPV) vaccine is one of the most effective public health measures for preventing HPV-related cancers and other diseases. However, vaccination coverage is not at the desired level, especially among men. In this context, we aimed to determine HPV vaccination rates, barriers, and some related demographic and personal factors among male university students in Turkey. We shared an online questionnaire prepared by the authors in line with the relevant literature on social media platforms and included 1723 male university students in this cross-sectional study. Only 4.9% of the students stated that they were vaccinated against HPV, and the most important obstacle to vaccination was not knowing when to be vaccinated (49.5%). Additionally, marital status, sexual orientation, chronic diseases, family history of cervical cancer, and having heard of HPV were significant predictors of HPV vaccination.

Keywords HPV · HPV Vaccine · Male Students

Introduction

The human papillomavirus (HPV) is an extremely common sexually transmitted virus worldwide (Schmeler & Sturgis, 2016; Newman et al., 2013). It is estimated that more than 100 HPV types exist, of which at least 14 cause cancer, and approximately 5% of all cancers worldwide can be attributed to HPV (Roden & Stern, 2018).

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HPV causes cervical, anogenital, oropharyngeal, and penile cancers (Prue et al., 2018). Thus, the prevention of HPV infection is also important for men. A systematic review examining the prevalence of genital HPV in men over 18 years of age reported a high HPV prevalence (–1–14%) in all geographical regions (Smith et al., 2011). Therefore, HPV vaccines are recommended as highly effective and reliable preventive measures against HPV-related cancers and diseases (Grandahl & Nevéus, 2021). The Advisory Committee on Immunization Practices recommends routine HPV vaccination for boys and girls aged 11–12 years (can be given from the age of 9 years) (Meites et al., 2019). With the introduction of HPV vaccination programs, there has been a significant reduction in the incidence of specific HPV infections in several countries. Furthermore, a meta-analysis demonstrated that HPV vaccination significantly affects the incidence of HPV infection and related diseases (Drolet et al., 2015). Therefore, the World Health Organization aims to achieve HPV vaccine coverage of ≥90% worldwide (WHO, 2022). However, vaccination coverage is not at the desired level in several countries because of unawareness of the need, economic reasons, concerns about its side effects, and the belief that the vaccine is for women (Fontenot et al., 2014; Grandahl & Nevéus, 2021; Holman et al., 2014; Thomas et al., 2018).

Given the increasing trend in HPV-related cancers, understanding the HPV vaccine coverage of young adult men is an important component in developing effective interventions to increase HPV vaccination rates. Although there are studies conducted in Turkey focusing mainly on female students (Koç, 2015; Kayı et al., 2020) and some dealing with mixed genders (Cinar et al., 2019; Oz et al., 2018; Rathfisch et al., 2015), our search did not reveal a study on HPV vaccination behaviors that focused solely on male students. This study aimed to determine HPV vaccination rates, barriers, and vaccination-related factors among male university students.

Methods

Design, Data Collection, and Sample

The cross-sectional study population comprised 3,958,037 male students enrolled in higher education programs in Turkey. Using Epi info 7.2 software, the required sample size was estimated as 1067, taking a 50% expected proportion, a 3% margin of error, and a 95% confidence interval (CI). An online questionnaire was prepared by the authors and shared on Facebook, Telegram, and WhatsApp between February 5, 2022 and April 30, 2022. Additionally, snowball sampling was used to ask participants to share the study link with their peers. The research was conducted with 1723 male students aged over 18 years who were enrolled in a formal undergraduate or associate degree program in Turkey.

Measurements

The study questionnaire was developed by the authors in line with the literature (Fontenot et al., 2014; Fuller & Hinyard, 2017; Grandahl & Nevéus, 2021; Holman et

al., 2014; Kasymova, 2020) and comprised of two parts: questions on health-related features and questions on HPV and HPV vaccines.

The first part of the questionnaire comprised questions on sociodemographic and health-related characteristics, including age, education level (bachelor/associate degree), study area (health/other), marital status, sexual orientation, parents' educational level, average family income, tobacco/alcohol use, regular physical activity, chronic illness, and family history of cervical cancer.

The second part of the questionnaire comprised questions regarding having heard of HPV, being vaccinated for HPV, intending to be vaccinated against HPV, encouraging factors in vaccination if vaccinated, and obstacles to vaccination if not vaccinated.

Statistical Analysis

All statistical analyses were conducted using Statistical Package for Social Sciences (version 25, SPSS Inc., Armonk, NY) for Windows. In addition to descriptive statistical methods (frequency, percentage), the chi-square test and t-test were applied to compare factors associated with HPV vaccination. The possible variables identified in the univariate comparisons ($p<0.05$) were included in the logistic regression model for the multivariate analysis. The significance threshold was set at $p<0.05$.

Ethical Consideration

The study protocol was approved by the Clinical Research Ethics Committee (No. 2022-03). In addition, information about the study was provided on the first page of the online questionnaire, and the contact information of the researchers was included for students to reach the researchers if deemed necessary. Consent was obtained via an informed consent form at the beginning of the link, and participants were allowed to proceed if they consented to participate in the study.

Results

Demographic and Health Characteristics of the Students

A total of 1723 male university students participated in the study, and the mean age of the participants was 21.7±2.2 years (18–38 years). The other demographic and health characteristics of the participants are presented in Table 1.

Characteristics of the Students Regarding HPV and HPV Vaccine

Of the students, 9.6% (n=167) reported a family history of cervical cancer (7.7% first degree and 1.9% second degree), 46.1% (n=794) had not heard of HPV, and 4.9% (n=85) stated that they had received the HPV vaccine (69.4% single dose, 28.2% two doses, and 2.4% three doses). In addition, 53.8% (n=885) of the students did not intend to receive the HPV vaccine. The most important factors that encouraged stu-

Table 1 Demographic and health characteristics of the students (n = 1723)

Variables		n	%
Age		21.7 ± 2.2 years	
Sex	Female		
	Male		
	Not disclosed		
Education level	Associate degree	158	9.2
	Bachelor degree	1565	90.8
Area of study	Health subjects	357	20.7
	Other subjects	1366	79.3
Place lived in majority of life	City	1290	74.9
	Country	335	19.4
	Village	98	5.7
Marital status	Single	1166	67.7
	Married	33	1.9
	In a relationship	524	30.4
Sexual orientation	Heterosexual	1657	96.1
	Bisexual	51	3.0
	Homosexual	15	0.9
Mother's education	Middle school and below	951	55.2
	High school and above	772	44.8
Father's education	Middle school and below	665	38.6
	High school and above	1058	61.4
Family income balance	Income = expenses	243	14.1
	Income < expenses	1097	63.7
	Income > expenses	383	22.2
Smoking	Yes	822	47.8
	No	901	52.2
Alcohol use	Yes	759	44.1
	No	964	55.9
Regular physical activity	Yes	676	39.2
	No	1047	60.8
Chronic disease	Yes	175	10.2
	No	1548	89.8

dents to be vaccinated were their research (31%, n = 45) and the recommendations of health professionals (30.3%, n = 44). Approximately half of the participants (49.5%, n = 1511) stated that they were unaware that they should be vaccinated (Table 2).

HPV Vaccination Rates of the Students and some Related Factors

In the univariate analyses, there was a statistically significant difference between the student's vaccination status and marital status, sexual orientation, presence of chronic disease, family history of cervical cancer, and having heard of HPV (Table 3).

Logistic regression analysis included significant factors ($p < 0.05$) identified in the previous multivariate analysis. These were marital status, sexual orientation, presence of chronic disease, history of cervical cancer in the family, and having heard of HPV. Accordingly, participants in a relationship were 1.9 times more vaccinated than those who were married (95% CI, 1.1–3.1), those with a chronic disease were two

Table 2 Characteristics of the students regarding HPV and HPV vaccine (n = 1723)

Variables		n	%
History of cervical cancer in the family	Yes, first degree	133	7.7
	Yes, second degree	32	1.9
	No	1158	90.4
Having heard of HPV (n = 1723)	Yes	681	39.5
	No	794	46.1
	Not sure	244	14.4
Received the HPV vaccine (n = 1723)	Yes	85	4.9
	No	1638	95.1
HPV vaccine dose (n = 85)	one dose	59	69.4
	two doses	24	28.2
	three doses	2	2.4
Intending to receive HPV vaccination (n = 1646)	Yes	172	10.4
	No	885	53.8
	Not sure	589	35.8
Factors that encourage vaccination (n = 145)[a]	Perceiving to be in the risk group	36	24.8
	As a result of their research	45	31
	Television-Internet	20	13.8
	Healthcare professional's advice	44	30.3
Barriers to vaccination (n = 3058)[a]	Lack of knowledge	1511	49.5
	Thinking the vaccine is for women	176	5.8
	Thinking the vaccine is not safe	274	9.0
	Economic reasons	352	11.5
	Worrying of the vaccine side effects	538	17.6
	Thinking the vaccine is unnecessary	167	5.5
	Religious/cultural beliefs	40	1.3
	Fear of vaccine side effects	400	13.1

[a]Multiple choice

Abbreviations:

HPV, human papillomavirus

times more vaccinated than those without a chronic disease (95% CI, 1.1–3.7), those with a family history of cervical cancer were 2.7 times more vaccinated than those without such a history (95% Cl, 1.5–4.9%), and those having heard of HPV were 38.3 times more vaccinated than those who did not hear of HPV (95% Cl, 5.2-279.4) (Table 4).

Discussion

Increasing awareness of HPV vaccines is important for improving immunization coverage (Van Zoonen et al., 2021). Approximately half (46.1%) of the male university students in this study had not heard of HPV. In international studies, the rate of hearing of HPV among male students was higher (Catalano et al., 2017; Coccino et al., 2020; Hunter & Weinstein 2015). Another study conducted in Turkey stated that 66.5% of the students had not heard of HPV (Oz et al., 2018). It is noteworthy that the rate of hearing about HPV varies according to the country and cultural group. This

Table 3 Factors associated with HPV vaccination (n = 1723)

Variables		Vaccinated		Unvaccinated		t/ χ^2	p
		n	%	n	%		
Age		22.16 ± 2.5		21.67 ± 2.2		1.925	0.054*
Education level	Associate degree	11	7.0	147	93.0	1.527	0.217**
	Bachelor degree	74	4.7	1491	95.3		
Area of study	Health subjects	21	5.9	336	94.1	0.865	0.352**
	Other subjects	64	4.7	1302	95.3		
Place lived in majority of life	City	68	5.3	1222	94.7	2.211	0.331**
	Country	15	4.5	320	95.5		
	Village	2	2.0	96	98.0		
Marital status	Single	45	3.9	1121	96.1	**9.142**	**0.010****
	Married	3	9.1	30	90.9		
	In a relationship	37	7.1	487	92.9		
Sexual orientation	Heterosexual	77	4.6	1580	95.4	**7.621**	**0.022****
	Bisexual	6	11.8	45	88.2		
	Homosexual	2	13.3	13	86.7		
Mother's education	Middle school and below	42	4.4	909	95.6	1.209	0.162**
	High school and above	43	5.6	729	94.4		
Father's education	Middle school and below	25	3.8	640	96.2	3.182	0.074**
	High school and above	60	5.7	998	94.3		
Family income balance	Income = expenses	56	5.1	1041	94.9	0.920	0.631**
	Income < expenses	9	3.7	234	96.3		
	Income > expenses	20	5.2	363	94.8		
Smoking	Yes	41	5.0	781	95.0	0.037	0.848**
	No	43	4.8	858	95.2		
Alcohol use	Yes	31	4.1	728	95.9	0.149	0.149**
	No	54	5.6	910	94.4		
Regular physical activity	Yes	34	5.0	642	95.0	0.022	0.882**
	No	51	4.9	996	95.1		
Chronic disease	Yes	20	11.4	155	88.6	**17.522**	**< 0.001****
	No	65	4.2	1483	95.8		
History of cervical cancer in the family	Yes	21	12.6	146	87.4	**23.025**	**< 0.001****
	No	64	4.1	1492	95.9		
Having heard of HPV	Yes	79	11.6	602	88.4	**106.965**	**< 0.001****
	No	6	0.8	788	99.2		
	Not sure	-	-	248	100		

*t-test

**chi-square analysis Abbreviations: HPV, human papillomavirus

suggests that cultural norms and traditions play a decisive role in vaccine acceptance (Grandahl & Nevéus, 2021). In addition, the fact that the HPV vaccine is not included in Turkey's National Immunization Program may cause students to have low awareness and knowledge of HPV. However, prior knowledge of HPV is accepted as the first step toward vaccination (Cooper et al., 2018). This study determined that those

Table 4 Logistic regression analysis studying variables associated with students' HPV vaccination status (n = 1723)

	B	SE	Wald	p	Exp(B)	95% CI	
						Lower	**Upper**
Marital status (ref. cat.: Married, n = 33)			7.147	0.028			
Single (n = 1166)	0.403	0.683	0.349	0.555	1.497	0.393	5.706
In a relationship (n = 524)	0.658	0.246	7.128	**0.008**	1.931	1.191	3.130
Chronic disease (ref. cat.: Present, n = 175) Absent (n = 1548)	0.735	0.295	6.198	**0.013**	2.086	1.169	3.722
History of cervical cancer in the family (ref. cat.: Present, n = 167) Absent (n = 1556)	1.006	0.299	11.362	**0.001**	2.736	1.524	4.912
Having heard of HPV (ref. cat.: Yes, n = 680)			53.576	< **0.001**			
No (n = 794)	2.791	0.429	42.258	< **0.001**	0.061	0.026	0.142
Not sure (n = 249)	3.648	1.013	12.966	< **0.001**	0.026	0.004	0.190
Constant	-3.057	0.518	34.758	< 0.001	0.047		

Dependent variable: Getting vaccinated for HPV Abbreviations: SE, standard error of the mean; CI, confidence interval; HPV, human papillomavirus

who heard about HPV were vaccinated 38.3 times (95% Cl, 5.2-279.4) more. However, the vaccination rates are very low.

Only 4.9% of the students received the HPV vaccine (69.4% single dose, 28.2% two doses, and 2.4% three doses). Studies have reported vaccination rates of 50% in male students in the United States (Lee et al., 2018), 26.7% in Italy (Cocchio et al., 2020), and 11.8% in California (Ratanasiripong, 2015). As a result of the study by Balcezak et al. in 2021, obtained from the studies carried out in the last 10 years, HPV vaccination rates were significantly low, and the prevalence ranged between 0.3% and 42.3% for 1–2 doses and between 1.5% and 50.0% for three doses. However, the immunization rates in the men in our study were higher than those reported in other studies conducted in Turkey (Cinar et al., 2019; Durusoy et al., 2010; Oz et al., 2018). Therefore, there is an urgent need for effective interventions to increase vaccination rates. School-based interventions and those developed with stakeholders (students, parents, and healthcare professionals) have been suggested (Balcezak et al., 2021; Grandahl & Nevéus, 2021). In the United States, HPV vaccine interventions comprising the use of materials such as posters and social media posts promoting HPV vaccination on a major university campus and provider recommendation for HPV vaccination to university health care students resulted in a 75% increase in vaccination (Gerend et al., 2020). Additionally, these interventions may effectively change the ideas of students who do not intend to receive the HPV vaccine. Ultimately, nearly half (51.4%) of the students participating in the study did not intend to receive the HPV vaccine. In one meta-analysis, HPV vaccine acceptability was reported as 50.4 out of 100 points (Newman et al., 2013). In another study conducted in Turkey, 25.8% of men reported that they would consider vaccination (Rathfisch et al., 2015). This indicates that hesitation toward is vaccination significantly high.

Therefore, it is recommended to conduct public health campaigns for men to promote the acceptability of the HPV vaccine (Newman et al., 2013).

Understanding the role of factors affecting vaccination decisions is an important step toward increasing HPV vaccination rates (Cocchio et al., 2020). In this study, the most encouraging factors for students to be vaccinated were their investigations and health workers' advice. Students becoming aware of HPV because of their research is desirable in terms of showing that adolescents take responsibility for their health. In addition, health professionals' recommendations were the most encouraging factor for students to get vaccinated (Shin et al., 2022). However, healthcare professionals are more likely to recommend the vaccine to females than male patients (Gerend et al., 2016). Therefore, it is important to increase health care professional awareness on this issue.

Nearly half of the study participants (49.5%) cited ignorance of the need for vaccination as a barrier to vaccination. In addition, the possible side effects of the vaccine were the second most common reason (17.6%). A systematic review that supports the findings of this study found that lack of knowledge was the most critical obstacle to vaccination (Grandahl & Nevéus, 2021). In a study conducted in India, most participants (42%) stated that the vaccine's possible side effects were a significant obstacle (Belani et al., 2014). In other studies, the cost of the vaccine was found to be the most significant obstacle (Fontenot et al., 2014; Sledge, 2015). In studies conducted in Turkey, the main reasons for rejecting the vaccine were insufficient information about the vaccine and possible unknown side effects (Oz et al., 2018; Kayı et al., 2020). For male university students, providing more information about HPV infection and vaccines can help increase their desire for vaccination (Stout et al., 2020).

It is important to understand the factors associated with vaccination to increase the rate of HPV vaccination in men (Shin et al., 2022). Accordingly, those in a relationship were 1.9 times more likely to get vaccinated than married participants. As a result of the study conducted by Wilson et al. (2016), being unmarried was associated with higher vaccine intake, similar to the results of this study. This may be because unmarried students perceive themselves as a high-risk group for HPV infection. Another variable associated with HPV vaccination in this study was the presence of chronic disease. Accordingly, the results of the study showed that those with any chronic illness were two times more likely to be vaccinated. HPV vaccination seems especially important for adolescents with chronic medical conditions (Hofstetter et al., 2017). Therefore, this result is considered desirable. Another factor associated with HPV vaccination is a family history of cervical cancer. In this study, those with a family history of cervical cancer were 2.7 times more vaccinated. Our findings are consistent with those of previous research showing that individuals with a family history of cervical cancer are more likely to accept the HPV vaccine (Brown et al., 2017; Durusoy et al., 2010).

The present study included a large number of participants from seven geographical regions in Turkey, making it one of the strengths of this study. However, one weakness is that the study was conducted using an online survey rather than face-to-face interviews owing to the coronavirus disease 2019 pandemic. Our results should be interpreted in light of the general limitations of online surveys.

Conclusion

This study shows that the HPV vaccination rates of male university students are far behind those of the targeted rate. Nearly half of the participants were unaware that they should be vaccinated, which was the most important reason for these low vaccination proportions. Campus-based interventions to increase students' knowledge are effective ways to address this health problem. This study showed that those who heard about HPV were in a relationship, had chronic diseases, or had a family history of cervical cancer were more likely to be vaccinated against HPV than those who lacked the mentioned features. Future research should include testing an intervention program to improve HPV vaccination rates.

Authors Contributions All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Declarations

Conflict of Interest There are no conflicts of interest.

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Ethics The study protocol was approved by the Clinical Research Ethics Committee of Çanakkale Onsekiz Mart University (2011-KAEK-27/2022-2200006401).

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