

# Knowledge, attitudes, and practices towards human papillomavirus (HPV) and HPV vaccination among male nurses

Furkan Sağtaş RN, Nurse<sup>1</sup> | Melike Yalçın Gürsoy PhD, Assistant Professor<sup>2</sup> 

<sup>1</sup>Istanbul University Cerrahpasa Medical Faculty Hospital, Istanbul, Turkey

<sup>2</sup>Health Sciences Faculty, Nursing Department, Çanakkale Onsekiz Mart University, Çanakkale, Turkey

## Correspondence

Asst. Prof. Melike Yalçın Gürsoy, Çanakkale Onsekiz Mart University, Health Sciences Faculty, Nursing Department, Çanakkale, Turkey.

Email: [myalcin@comu.edu.tr](mailto:myalcin@comu.edu.tr)

## Funding information

N/A

## Abstract

**Aim:** This study aimed to determine the knowledge, attitudes, and practices of male nurses towards human papillomavirus (HPV) and HPV vaccination and to examine whether knowledge about the HPV vaccine affects attitudes and beliefs about HPV vaccines.

**Background:** HPV is responsible for  $\approx 5\%$  of all cancers worldwide. Therefore, vaccination against HPV is recommended to prevent HPV infections and HPV-related cancers in men and women.

**Methods:** The study group included 383 male nurses who were asked to complete online questionnaires. The data were collected using the following tools: a sociodemographical characteristics form, the Human Papillomavirus Knowledge Scale (HPVKS), and The Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS).

**Results:** It was determined that the general HPV knowledge of the male nurses participating in the study was at a moderate level, but their knowledge of HPV screening test, HPV vaccination, and current HPV vaccination programmes were at a low level. Male nurses' HPV vaccination rates were relatively low, and most of them did not intend to be vaccinated. In addition, CHIAS Attitudes and Beliefs scores of the male nurses were at an average level and HPV knowledge affected the attitudes and beliefs of the nurses.

**Conclusion:** These results demonstrate an opportunity to improve information and awareness about HPV and vaccines by nursing education.

## KEYWORDS

attitudes, beliefs, HPV vaccine, human papillomavirus, knowledge, male nurses

## Summary statement

What is already known about the topic?

- Although HPV vaccination is recommended to prevent HPV infections and HPV-related cancers in men and women, vaccination rates are far behind the target, especially for men.

This study was prepared based on the findings of Furkan Sağtaş's master thesis study titled "Knowledge, Attitudes and Beliefs of Male Nurses about HPV Vaccine" (Çanakkale: Çanakkale Onsekiz Mart University, 2023)

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**What this paper adds?**

- Findings showed that male nurses' HPV vaccination rates were relatively low.
- Male nurses' knowledge about HPV and HPV vaccine was not sufficient.
- HPV knowledge affected the attitudes and beliefs of these male nurses.

**The implications of this paper:**

- Nurses need to be aware of the HPV vaccine during their undergraduate education.

## 1 | INTRODUCTION

Human papillomavirus (HPV) is a common sexually transmitted infection globally (Harder et al., 2018). HPV infection is recognized as one of the major causes of infection-related cancers in both women and men, and ≈5% of all cancers worldwide are attributed to HPV (Serrano et al., 2018). HPV significantly impacts men's health as the cause of clinical manifestations ranging from genital warts to various cancers of the anogenital and aerodigestive systems (Canepa et al., 2013). Therefore, vaccination against HPV is recommended to prevent HPV infections and HPV-related diseases, including some cancers. The Advisory Committee on Immunization Practices recommends that boys and girls aged 11–12 (can be given from age 9) receive routine HPV vaccination (Meites et al., 2019). Worldwide, HPV vaccine is included in the National Immunization Program in 100 countries, including the United States, the United Kingdom, Germany, Australia, Belgium, Sweden, and New Zealand (WHO, 2020). In Turkey, although bivalent and quadrivalent HPV vaccines are available, they are not included in the National Immunization Program (Akalin, 2022). Therefore, the World Health Organization targets an HPV vaccine coverage of ≥90% worldwide (WHO, 2022). Many studies have shown a significant decrease in the prevalence of HPV infection and related cancers in many countries since the start of HPV vaccination programs (Drolet et al., 2019; Harder et al., 2018; Patel et al., 2018). However, vaccination coverage is not at the desired level in many countries and Turkey (Fontenot et al., 2014; Grandahl & Nevés, 2021; Holman et al., 2014; Thomas et al., 2018; Yalçın Gürsoy & Sağtaş, 2023). In a systematic review conducted in Turkey, HPV vaccination rates were reported to vary between 0.3% and 6.0% (Özdemir et al., 2020). In addition, the fact that the HPV vaccine is not included in Turkey's National Immunization Program may cause low HPV vaccination rates (Yalçın Gürsoy & Sağtaş, 2023).

Public health professionals, especially nurses, are in a unique position to address the growing need for education about HPV and the benefits of HPV vaccines, as they have a primary role in patient education, particularly in helping patients understand the risks and benefits of preventive treatment options (Lee et al., 2018). However, studies conducted in the world and in Turkey have emphasized that nurses' knowledge about HPV and vaccines is insufficient (Karasu et al., 2019; Patel et al., 2017; Sherman et al., 2020), and vaccination rates are low (Balcezak et al., 2022; Karasu et al., 2019; Özdemir

et al., 2020). Given the increasing trends in HPV-related cancer cases, it is important to understand HPV vaccine coverage and attitudes and beliefs, especially among nurses who provide immunizations and educate patients about vaccinations, in order to adopt effective measures to increase HPV vaccination rates. It is seen in the literature that studies mostly focus on female nurses (Gol & Erkin, 2016; Yanikkerem & Koker, 2014). Therefore, this study aimed to determine male nurses' knowledge, attitudes, and beliefs about HPV and the HPV vaccine and also to examine whether knowledge about the HPV vaccine affects attitudes and beliefs about HPV vaccines.

## 2 | METHODS

### 2.1 | Study design

This is a cross-sectional study.

### 2.2 | Sample

We included 383 male nurses >18 years who are working in Turkey. The sample size was determined by taking the 95% confidence interval,  $p = 0.05$ , and  $d = 0.05$ , in the calculation using epi info 7.2. The data were collected online and anonymously. The online questionnaires were shared on social media, including Facebook, Telegram, and WhatsApp, between February and August 2022. Participants were asked to share the study link with their peers. The research was conducted, and 383 male nurses who were 18 years of age or older and had 1 year or more professional experience were included in the study. Those who did not meet the inclusion criteria were excluded from the study.

### 2.3 | Measurements

An online questionnaire was used to collect data. The first section of the questionnaire included questions about the participants' descriptive and HPV vaccine-related characteristics; the second section included the Human Papilloma Virus Knowledge Scale (HPVKS); and the third section included the Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS).

**TABLE 1** Participant characteristics (n = 383).

Variables	Mean ± SD	Min-max	
Age	28.84 ± 4.88	20–50	
Work experience	5.99 ± 4.57	1–31	
		n	%
Age	≤26	134	35.0
	26–35	207	54.0
	36+	42	11.0
Residential area	Urban area	348	90.9
	Rural area	35	9.1
	District	52	13.6
	Village	14	3.7
Marital status	Single	225	58.7
	Married	137	35.8
	Divorced	21	5.5
Sexual preference	Heterosexual	371	96.9
	Bisexual	8	2.1
	Homosexual	4	1.0
Education level	High school	277	72.3
	Associate degree	26	6.8
	Master's degree	74	19.3
	Doctorate	6	1.6
Working time (years)	≤5 years	212	58.9
	6–10 years	95	26.4
	11+ years	53	14.7
Institution of employment (n = 360)	Public hospital	172	48.5
	Foundation hospital	40	11.3
	University hospital	123	34.6
	Family health centre	20	5.6
Service that is the nurse worked in (n = 355)	Internal units	179	50.4
	Surgical units	44	12.4
	Operating room	39	11.0
	Policlinic	70	19.7
	Emergency	23	6.5
Perception of income	Income < expenses	131	34.2
	Income = expenses	178	46.5
	Income > expenses++	74	19.3
Smoking	Yes	173	45.2
	No	210	54.8
Alcohol consumption	Yes	105	27.4
	No	278	72.6
Regular physical activity	Yes	163	42.6
	No	220	57.4
Presence of chronic disease	Yes	66	17.2
	No	317	82.8
Having heard of HPV vaccine	Yes	237	61.4
	No	110	28.7
	Not sure	38	9.9

(Continues)

**TABLE 1** (Continued)

Variables	Mean ± SD	Min-max	
Received the HPV vaccine	Yes	19	5.0
	No	364	95.0
Intending to receive HPV vaccination	Yes	45	11.7
	No	212	55.4
	Not sure	126	32.9

Abbreviation: HPV, human papillomavirus.

The first section of the questionnaire required participants to enter details such as age, location, marital status, sexual orientation, education level, working time (years), the institution of employment, the unit of work, income status, alcohol use, smoking, presence of chronic disease, regular physical activity, whether they had heard about the HPV vaccine, received it, or planning to get it.

### 2.3.1 | Human Papilloma Virus Knowledge Scale (HPVKS)

Demir and Özdemir (2023) evaluated the validity and reliability of the scale developed by Waller et al. (2013) in Turkey. The 35-item scale has three subdimensions consisting of 29 items and one independent subdimension consisting of six items. Each item on the HPVKS has “Yes,” “No,” and “I don't know” answer options. Each correct answer was evaluated as 1 point, and incorrect answers and answers marked as I do not know were evaluated as 0 points. The scores range from 0 to 35. Higher scores indicate higher knowledge patterns about HPV, HPV screening reverses, and the HPV vaccine. The Cronbach alpha coefficient of the scale is stated as 0.96. In this study, the Cronbach's alpha value of the HPVKS was found to be 0.939.

### 2.3.2 | Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS)

The validity and reliability of the scale developed by McRee et al. (2010) in Turkey were assessed by Sunar and Kahyaoglu Süt (2019). The scale, which includes 14 questions in total, consists of four subdimensions: harms, barriers, effects, and uncertainty. The first subdimension “Harms” has a 4-point Likert scale (*strongly disagree, somewhat disagree, somewhat agree, and strongly agree*). The second subdimension, “Barriers,” has a 3-point Likert scale (*not hard at all, somewhat hard, very hard*). The third subdimension “Effects” has a 4-point Likert scale (*slightly effective, moderately, very effective, extremely effective*). The fourth subdimension “Uncertainty” has a 4-point Likert scale (*strongly disagree, somewhat disagree, somewhat agree, and strongly agree*). Scoring is based on a mean of each sub-scale. The Cronbach alpha coefficient of the scale is stated as 0.62. In this study, the Cronbach's alpha value of the scale was found to be 0.896.

**TABLE 2** Distribution of Human Papillomavirus Knowledge Scale (HPVKS) and Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) scores.

	Min	Max	Mean	±SD	Skewness	Kurtosis
General HPV knowledge	0.00	15.00	9.27	4.56	-1.011	-0.268
HPV testing knowledge	0.00	6.00	2.27	1.65	0.127	-0.945
HPV vaccination knowledge	0.00	5.00	2.54	2.00	-0.104	-1.573
HPV vaccine availability	0.00	5.00	1.10	1.22	0.655	-0.945
Total HPV knowledge	0.00	29.00	15.19	8.32	-0.589	-0.854
Perceived harm	1.00	4.00	2.09	0.68	0.472	-0.382
Barriers	1.00	3.00	1.99	0.51	-0.278	-0.050
Effects	1.00	4.00	2.55	0.74	0.341	-0.402
Uncertainty	1.00	4.00	2.14	0.77	0.198	-0.549
The Carolina HPV Immunization Attitudes	1.00	3.71	2.13	0.52	0.290	0.444

Abbreviation: HPV, human papillomavirus.

**TABLE 3** Distribution of male nurses' answers to questions in the HPV Knowledge Scale ( $n = 383$ ).

Questions	Answers					
	Correct		Wrong		Does not know	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>General HPV knowledge</b>						
1. HPV can cause cervical cancer (TRUE)	265	69.2	25	6.5	93	24.3
2. A person could have HPV for many years without knowing it (TRUE)	276	72.1	25	6.5	82	21.4
3. Having many sexual partners increases the risk of getting HPV (TRUE)	315	82.2	10	2.6	58	15.1
4. HPV is very rare (FALSE)	199	52.0	63	16.4	121	31.6
5. HPV can be passed on during sexual inter course (TRUE)	317	82.8	7	1.8	59	15.4
6. HPV always has visible signs or symptoms (FALSE)	222	58.0	53	13.8	108	28.2
7. Using condoms reduces the risk of getting HPV (TRUE)	306	79.9	28	7.3	49	12.8
8. HPV can cause HIV/AIDS (FALSE)	156	40.7	110	28.7	117	30.5
9. HPV can be passed on by genital skin-to-skin contact (TRUE)	273	71.3	37	9.7	73	19.1
10. Men cannot get HPV (FALSE)	306	79.9	9	2.3	68	17.8
11. Having sex at an early age increases the risk of getting HPV (TRUE)	163	42.6	107	27.9	113	29.5
12. There are many types of HPV (TRUE)	193	50.4	17	4.4	173	45.2
13. HPV can cause genital warts (TRUE)	292	76.2	9	2.3	82	21.4
14. HPV can be cured with antibiotics (FALSE)	183	47.8	46	12.0	154	40.2
15. Most sexually active people will get HPV at some point in their lives (TRUE)	65	17.0	184	48.0	134	35.0
16. HPV usually does not need any treatment (TRUE)	21	5.5	253	66.1	109	28.5
<b>HPV testing knowledge questions</b>						
17. If a woman tests positive for HPV she will definitely get cervical cancer (FALSE)	249	65.0	21	5.5	113	29.5
18. An HPV test can be done at the same time as a smear test (TRUE)	173	45.2	28	7.3	182	47.5
19. An HPV test can tell how long you have had an HPV infection (FALSE)	125	32.6	49	12.8	209	54.6
20. HPV testing is used to indicate if the HPV vaccine is needed (FALSE)	155	40.5	109	28.5	119	31.1
21. When you have an HPV test, you get the results the same day (FALSE)	46	12.0	76	19.8	261	68.1
22. If an HPV test shows that a woman does not have HPV her risk of cervical cancer is low (TRUE)	123	32.1	115	30.0	145	37.9

TABLE 3 (Continued)

Questions	Answers					
	Correct		Wrong		Does not know	
	n	%	n	%	n	%
<b>HPV vaccine knowledge questions</b>						
23. Girls who have had the HPV vaccine do not need to have smear tests when they are older (FALSE)	206	53.8	24	6.3	153	39.9
24. The HPV vaccine offers protection against genital warts (TRUE)	185	48.3	45	11.7	153	39.9
25. The HPV vaccines offer protection against all sexually transmitted infections (FALSE)	177	46.2	36	9.4	170	44.4
26. Someone who has had HPV vaccine cannot develop cervical cancer (FALSE)	218	56.9	27	7.0	138	36.0
27. The HPV vaccines offer protection against most cervical cancers (TRUE)	186	48.6	48	12.5	149	38.9
28. HPV vaccines require three doses (TRUE)	96	25.1	20	5.2	267	69.7
29. The HPV vaccines are most effective if given to people who have never had sex (TRUE)	112	29.2	81	21.1	190	49.6
<b>HPV vaccine availability items</b>						
30. HPV vaccine is recommended for all females ages 11–26 years (TRUE)	169	44.1	25	6.5	189	49.3
31. HPV vaccine is licensed for women aged 30–45 years (FALSE)	25	6.5	95	24.8	263	68.7
32. Both HPV vaccines that are available (Gardasil & Cervarix) protect against both genital warts and cervical cancer (FALSE)	20	5.2	163	42.6	200	52.2
33. HPV vaccine is permitted for males aged 11–26 years (TRUE)	109	28.5	19	5.0	255	66.6

Abbreviation: HPV, human papillomavirus.

## 2.4 | Statistical analysis

The free trial version of SPSS Statistics (Statistical Package for Social Sciences) for Windows 25.0 was used for data analysis. Descriptive statistical methods (number, percentage, mean, standard deviation) were used in the evaluation of the data. Data with skewness and kurtosis values between  $\pm 2$  were assumed to be normally distributed. Linear regression analysis was performed to describe the relation between CHIAS and HPV Knowledge Scale subscale scores. Statistical significance was set at  $p < 0.05$ .

## 2.5 | Ethical consideration

The Clinical Research Ethics Committee approved this study (Çanakkale Onsekiz Mart University 2022/03-07). The participants provided informed consent through the informed consent form on the first page of the online questionnaire, and they could answer the questions if they agreed to participate in the study.

## 3 | RESULTS

### 3.1 | Sociodemographic characteristics

The mean age of male nurses was  $28.84 \pm 4.88$ . Of the 383 participants, 224 (58.7%) were single, and 371 (96.9%) were heterosexual.

Furthermore, 235 (61.4%) knew about the HPV vaccine, 19 (5%) had received it, and 45 (11.7%) intend to receive it in the future (Table 1).

### 3.2 | Knowledge and attitudes regarding HPV and HPV vaccine

Table 2 shows the findings graded according to HPVKS and CHIAS. The mean level of general knowledge about HPV was determined as  $15.19 \pm 8.32$  and the mean score of CHIAS was determined as  $2.13 \pm 0.52$ .

Table 3 shows the distribution of the answers given by male nurses to the questions in the HPVKS. Accordingly, it was seen that the majority of male nurses knew that HPV could be transmitted during sexual intercourse, but they did not know that three doses of the vaccine were required to be given.

Table 4 shows the distribution of the answers given by male nurses to the questions in the CHIAS. Accordingly, it was determined that the majority of male nurses believed that the HPV vaccine could cause short-term problems (fever or discomfort); however, the majority of male nurses believed that the vaccine was very effective in preventing cervical cancer.

Linear regression analysis was performed to describe the relation between CHIAS and HPV Knowledge Scale subscale scores ( $F = 79.327$ ;  $p < 0.001$ ). Accordingly, it was determined that the general HPV knowledge and that of the current HPV vaccination programme had a statistically significant effect on total CHIAS scores ( $p < 0.05$ ) (Table 5).

**TABLE 4** Distribution of male nurses' answers to questions in the CHIAS.

CHIAS subdimensions	Answers											
	Strongly disagree		Somewhat disagree		Somewhat agree		Strongly agree					
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%				
<b>Harms</b>												
1. The HPV vaccine might cause short term problems, like fever or discomfort	19	5.0	46	12.0	251	65.5	67	17.5				
2. The HPV vaccine is being pushed to make money for drug companies	199	52.0	104	27.2	71	18.5	9	2.3				
3. The HPV vaccine might cause lasting health problems	138	36.0	111	29.0	106	27.7	28	7.3				
4. If a teenage girl gets the HPV vaccine, she may be more likely to have sex.	187	48.8	109	28.5	75	19.6	12	3.1				
5. I think the HPV vaccine is unsafe.	150	39.2	139	36.3	79	20.6	15	3.9				
6. Child is too young to get a vaccine for a sexually transmitted infection like HPV.	134	35.0	95	24.8	117	30.5	37	9.7				
<b>Barriers</b>												
					<b>Not hard at all</b>	<b>Somewhat hard</b>	<b>Very hard</b>					
					<i>n</i>	%	<i>n</i>	%				
7. How hard do you think it would be to find a provider or clinic where you can afford the vaccine?					63	16.4	201	52.5	119	31.1		
8. How hard do you think it would be to find a provider or clinic that is easy to get to?					88	23.0	237	61.9	58	15.1		
9. How hard do you think it would be to find a provider or clinic that has the vaccine available?					67	17.5	259	67.6	57	14.9		
10. How hard do you think it would be to find a provider or clinic where you do not have to wait long to get an appointment.					85	22.2	251	65.5	47	12.3		
<b>Effects</b>												
					<b>Slightly effective</b>	<b>Moderately</b>	<b>Very effective</b>	<b>Extremely effective</b>				
					<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
11. How effective do you think the HPV vaccine is in preventing genital warts?					20	5.2	189	49.3	126	32.9	48	12.5
12. How effective do you think the HPV vaccine is in preventing cervical cancer?					21	23.8	129	33.7	136	35.5	27	7.0
<b>Uncertainty</b>												
					<b>Strongly disagree</b>	<b>Somewhat disagree</b>	<b>Somewhat agree</b>	<b>Strongly agree</b>				
					<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
13. The HPV vaccine is so new that I want to wait a while before deciding if my daughter should get it.					91	23.8	129	33.7	136	35.5	27	7.0
14. Other parents in my community are getting their daughters the HPV vaccine.					135	35.2	123	32.1	106	27.7	19	5.0

Abbreviations: CHIAS, Carolina HPV Immunization Attitudes and Beliefs Scale; HPV, human papillomavirus.

	Beta	Std. error	t	p value	Tolerance	VIF
Constant	2.721	0.045	59.814	<0.001		
General HPV knowledge	-0.038	0.007	-5.407	<0.001	0.381	2.625
HPV testing knowledge	0.004	0.022	0.201	0.840	0.305	3.280
HPV vaccination knowledge	-0.025	0.017	-1.444	0.150	0.324	3.091
HPV vaccine availability	-0.162	0.021	-7.767	<0.001	0.604	1.655
$F = 79.327; p = <0.001; R^2 = 0.451 DW = 1.923$						

Abbreviations: HPV, human papillomavirus; VIF, variance inflation factor.

## 4 | DISCUSSION

Increasing awareness of the HPV and vaccines is essential for improving immunization coverage (Van Zoonen et al., 2021). Nurses are in a

unique position to raise awareness about the importance, safety, and effectiveness of the HPV vaccine (Lin et al., 2022). However, more than a third (38.6%) of the male nurses in this study did not know about the HPV vaccine. This finding is consistent with what has been

**TABLE 5** Linear regression analysis showing the relation between Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) and HPV Knowledge Scale subscale scores.

reported in other studies (Gol & Erkin, 2016; Khamisy-Farah et al., 2023; Makwe & Anorlu, 2011; Nergisli et al., 2016). The reason for this may be that there is not enough awareness about HPV vaccines in undergraduate nursing education. As a matter of fact, as a result of the study conducted by Lin et al. (2022) with nursing students, inadequate education and insufficient knowledge about HPV were among the main barriers perceived by students in HPV vaccine advocacy. For this reason, it is thought that education about HPV vaccine should be given more place in nursing undergraduate education. Another reason for male nurses' lack of knowledge about HPV vaccines may be due to the widespread view that "HPV affects women more than men" (Liddon et al., 2010). As a matter of fact, in a study conducted in Turkey, it was reported that the HPV knowledge scores of female nurses were significantly higher than male nurses ( $p \ll 0.0011$ ) (Karasu et al., 2019).

It is thought that the low awareness about the HPV vaccine is linked to the low rates of HPV vaccination. Indeed, in this study, it was determined that only 5% of male nurses had received HPV vaccination and 11.7% planned to have it in the future. As a result of a recent study in Israel, it was reported that 15.4% of male and female nurses had received HPV vaccination. In another study in Turkey, it was reported that 4% of male nurses and 5.6% of female nurses received the HPV vaccine (Karasu et al., 2019). Despite the evidence for the safety and efficacy of HPV vaccination in preventing HPV-related cancers, HPV vaccination rates in Turkey are quite low for both male and female nurses. For this reason, it has been emphasized in the studies in the literature that well-structured formal training programmes for nurses are of vital importance in increasing HPV vaccine intake (Brewer et al., 2021; Osaghae et al., 2022).

In this study, we found that male nurses have an average attitude towards the HPV vaccine according to their CHIAS scores. In studies conducted with school health nurses and public health nurses, it was stated that nurses generally have positive attitudes towards the HPV vaccines (Rhodes et al., 2017; Rosen et al., 2015). The reason for the average attitudes of male nurses in this study may be their average level of knowledge about HPV vaccines and their low level of knowledge about current HPV vaccine programs.

Another important finding of this study was that knowledge of HPV and the current HPV vaccination programme had a statistically significant effect on HPV immunization attitudes and beliefs ( $p < 0.05$ ). It has been reported in the literature that more information about HPV and the vaccines can be an important precursor for more positive attitudes towards the HPV vaccines (Rosen et al., 2015). Furthermore, studies conducted in South India (Shetty et al., 2019), Canada (Duval et al., 2009), Switzerland (Grandahl et al., 2014), and Turkey (Karasu et al., 2019) have reported a relationship between HPV knowledge scores and attitudes towards HPV vaccination. It is necessary to focus on improving the attitudes of male nurses towards HPV vaccine by increasing their knowledge. Health education based on evidence-based information can eliminate nurses' lack of knowledge and their uncertainty about the vaccine. In a study conducted in

Turkey, it was reported that the training given to nurses was effective in increasing nurses' knowledge about HPV vaccine (Yanikkerem & Koker, 2014).

#### 4.1 | Strengths and limitations

To the best of our knowledge, this study is one of the few studies to determine the knowledge, attitudes, and beliefs of male nurses about HPV and HPV vaccine in Turkey. In addition, it has been reported in the literature that while collecting data online, participants can access additional resources such as the internet that they can use to search for information, and this may result in misinterpretation of HPV knowledge scores (Patel et al., 2017). Cross-sectional studies, by their nature, do not provide an opportunity to examine nurses' attitudes towards the HPV vaccine in depth. Therefore, in the future, researchers may conduct mixed-method studies that include a qualitative research design on the subject.

### 5 | CONCLUSION

This study revealed that the knowledge of male nurses about HPV and HPV vaccine was not adequate. The majority of male nurses had not received the HPV vaccine, and the majority did not plan to be vaccinated in the future. Male nurses' attitudes towards HPV vaccine were moderate, and their lack of knowledge affected their attitudes and beliefs. These results show that more information and awareness about HPV and vaccines should be gained in nursing education. Considering that having knowledge about HPV and its vaccines positively affects attitudes towards HPV vaccines, it is thought that effective education in nursing undergraduate and postgraduate education will increase the rates of HPV vaccination as well as the knowledge level of nurses. In-service training programmes can be effective in increasing the awareness of nurses about the subject.

#### AUTHORSHIP STATEMENT

*Conception and design:* Furkan Sağtaş and Melike Yalçın Gürsoy. *Material preparation, data collection, and analysis:* Furkan Sağtaş and Melike Yalçın Gürsoy. The manuscript was written by Furkan Sağtaş and Melike Yalçın Gürsoy.

#### ACKNOWLEDGMENTS

The authors thank all the nurses who participated in this study.

#### CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

The study was approved by the Clinical Research Ethics Committee of a University (2022/03-07).

## CONSENT TO PARTICIPATE

Informed consent was obtained from the participants via the informed consent form on the first page of the online questionnaire, and they could answer the questions if they agreed to participate in the study.

## ORCID

Melike Yalçın Gürsoy  <https://orcid.org/0000-0002-2246-264X>

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**How to cite this article:** Sağtaş, F., & Gürsoy, M. Y. (2024). Knowledge, attitudes, and practices towards human papillomavirus (HPV) and HPV vaccination among male nurses. *International Journal of Nursing Practice*, 30(4), e13228. <https://doi.org/10.1111/ijn.13228>