ANATOL J FAMILY MED

Original Article

The Anatolian Journal of Family Medicine

DOI: 10.5505/anatoljfm.2022.55477
Anatol J Family Med 2022;5(2):110–116

Frequency of Human Papillomavirus Vaccination and Knowledge Levels of Women between 15 and 49 Years: A Cross-sectional Study

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ABSTRACT

Objectives: This study aimed to determine the frequency of vaccination with the human papillomavirus (HPV) vaccine among women aged 15–49 years and their knowledge levels.

Methods: This cross-sectional study was conducted on female patients aged 15–49 years who applied to a rural state hospital, family medicine outpatient clinic, between December 15, 2019, and March 1, 2020. A questionnaire about HPV vaccination was filled out through a face-to-face interview. Patients who did not agree to participate in the study, who had a hysterectomy, and those diagnosed with cervical malignancy or premalignancy were excluded.

Results: The mean age of 409 female participants was 30.0±9.1 years. None of the women who participated in this study had the HPV vaccine. The number of those who heard about the HPV vaccine was 164 (40.1%). After brief information about the HPV vaccine, 269 (65.8%) participants wanted to have the HPV vaccine.

Conclusion: It was determined that the frequency of HPV vaccination and the knowledge levels about the HPV vaccine are low.

Keywords: Papillomaviridae, papillomavirus vaccines, uterine cervical neoplasms

Please cite this article as: Kızmaz M, Ay ME, Döner E, Gökgöz Durmaz F, Kumtepe Kurt B. Frequency of Human Papillomavirus Vaccination and Knowledge Levels of Women between 15 and 49 Years: A Cross-sectional Study. Anatol J Family Med 2022;5(2):110–116.

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Received Date: 08.07.2021
Accepted Date: 23.08.2022
Published online: 31.08.2022

Anatolian Journal of Family Medicine - Available online at www.anatoljfm.org

INTRODUCTION

Cervical cancer ranks ninth among women in Turkey and fourth among cancers seen in all women worldwide, and the age-standardized cancer rate for Turkey is 4.3 per hundred thousand.[1] Its most important feature is that it is preventable cancer.[2] Cervical cancer is most associated with the human papillomavirus (HPV) among various risk factors. While the risk of developing squamous cell carcinoma of the cervix is low in women not infected with HPV, this risk increases 250–400 times in those infected.

The prevalence of HPV among women worldwide is 5.7%–33.6%.[3] In Turkey, HPV prevalence has been reported to be 2%–27% in women with normal cytology.[4] Today, three types of vaccines are produced to protect against HPV infection, and there are two types in Turkey. The use of the quadrivalent HPV 6/11/16/18 vaccine was approved for children and adolescents aged

9–15 years and women aged 16–26 years, respectively, to prevent HPV-related cervical cancers, high-grade cervical dysplasia and precancerous cervical lesions, high-grade precancerous vulvar dysplasia, and common genital warts. Then, the age range was taken up to 45 years.[5,6] Ideally, people should be vaccinated before they have ever been infected with HPV. However, even if infected with HPV, vaccination will protect from other types.[5]

It is estimated that approximately 15% of girls and 4% of boys were vaccinated with the full vaccine course, with 20% and 5%, respectively, receiving at least one dose in 2019.[3] Although more than half (55%) of countries worldwide have introduced the HPV vaccine in the national program, 70% of girls worldwide still live in countries with no HPV vaccine program due to different population sizes. The HPV vaccine is not included in the routine vaccination calendar of the Ministry of Health in Turkey and is made upon the person's request for a fee.[4–6] For this reason, how much the HPV vaccine is known by the public and the attitudes toward the HPV vaccine being determined are important. Studies on the HPV vaccine were generally conducted with students studying in health-related departments or those living in city centers in Turkey.

This study aimed to determine the frequency of vaccination with HPV vaccine among women aged 15–49 years and their levels of knowledge.

METHOD

This cross-sectional study was conducted on female patients aged 15–49 years who applied to Gemerek State Hospital, Sivas, Turkey, family medicine outpatient clinic, between December 15, 2019, and March 1, 2020. All 507 female patients aged 15–49 years were included in the study.

Patients who did not agree to participate in the study, who had a hysterectomy, and those diagnosed with cervical malignancy or premalignancy were excluded. Of the patients, 91 (17.9%) did not agree to participate in the study, 1 (0.2%) had a hysterectomy, 2 (0.4%) were diagnosed with cervical malignancy, and 4 (0.8%) were diagnosed with premalignancy, and therefore they were excluded. The remaining 409 (80.7%) patients were included in the study.

Based on the data obtained from the preliminary study conducted to calculate the sample size, a sample size of 409, with $\beta = 95$ power, $\alpha = 0.05$ margin of error, and $d = 0.22$ effect size, was sufficient (G*Power program was used).

The questionnaire, which was conducted in the study, consisted of 22 questions. In this questionnaire, 8 questions were about demographic characteristics, 8 questions were about HPV and HPV vaccination, 3 questions examined their medical history, 2 questions were about their own family physician, and 1 question was about smoking status. Cronbach's alpha value of the questionnaire was 76.3. Examining the sociodemographic variables in the questionnaire, participants' job was categorized as housewives, officers, artisans, and others. The number of people in the family and the age of participants were evaluated. Marital status was categorized as married, single, and widow. By inquiring about their educational status, they were classified as not able to read, literate, primary school, middle school, high school, and university. Monthly income status was categorized as 1000 Turkish Liras (TL) and below, 1001TL–3000TL, 3001TL–5000TL, and 5001TL and above. The family type was asked and categorized as the nuclear family and extended family. The residency was asked for and categorized as village, district, and city center. It was evaluated whether the patients were diagnosed with a chronic illness and the name of the disease if they have, evaluated if they have been ever pregnant, evaluated about their smoking status, and evaluated whether they knew their own family physician and whether they have been examined by the family physician in the last year. Moreover, whether the participants had the HPV vaccine or not and their knowledge of HPV and its vaccine were evaluated.

All data were analyzed using the SPSS 21.0 statistical package program. Descriptive data were expressed as frequency, percentage, mean, standard deviation, median [interquartile range]. Skewness and kurtosis values, the Kolmogorov–Smirnov test, the Shapiro–Wilk test, and histograms were used to test the normality of the data set. The skewness and kurtosis values between -2 and +2 were considered normal distribution. The Chi-squared test was used between categorical variable groups. A value of $p<0.05$ was considered statistically significant.

RESULTS

The mean age of 409 female participants was 30.0±9.1 years. Of the participants, 107 (26.2%) actively smoked with a median of 10.0 [10.5] cigarettes per day. The mean number of people living in the house was 4.3±1.4. Their mean body mass index was 23.4±3.5 kg/m^2. The sociodemographic characteristics of the participants are summarized in Table 1.

None of the participants had received the HPV vaccine. The number of those who heard about the HPV vaccine was 164 (40.1%). The knowledge of the participants about HPV and vaccine is summarized in Table 2.

Table 1. Sociodemographic characteristics of the participants

	n (%)
Marital status	
Married	189 (46.2)
Single	209 (51.1)
Widow	11 (2.7)
Profession	
Housewife	76 (18.6)
Officer	150 (36.6)
Artisan	11 (2.7)
Other	172 (42.1)
Education level	
Not able to read	3 (0.7)
Literate	6 (1.5)
Primary school	20 (4.9)
Middle School	30 (7.3)
High school	118 (28.9)
University	232 (56.7)
Monthly income	
1000 TL and below	60 (14.7)
1001-3000 TL	153 (37.4)
3001-5000 TL	112 (27.4)
5001 TL and above	84 (20.5)
Family type	
Nuclear family	319 (78.0)
Extended family	90 (22.0)
Living place	
Village	50 (12.2)
District	108 (26.4)
City	251 (61.4)
Chronic illness	
Yes	64 (15.6)
No	345 (84.4)
Current disease	
Heart diseases	3 (4.7)
Diabetes	11 (17.2)
Hypertension	8 (12.5)
Thyroid diseases	17 (26.6)
Other	25 (39.0)
Smoking	
Yes	107 (26.2)
No	302 (73.8)
Do you know your family physician?	
Yes	332 (81.2)
No	77 (18.8)
Have you been examined by your family physician in the last year?	
Yes	229 (56.0)
No	180 (44.0)

TL: Turkish liras.

Table 2. Knowledge of the participants about HPV and vaccine

	n (%)
Have you heard of HPV microbe?	
Yes	313 (76.5)
No	96 (23.5)
Have you heard of cervical cancer?	
Yes	362 (88.5)
No	47 (11.5)
Have you heard of the pap smear test?	
Yes	293 (71.6)
No	116 (28.4)
Is HPV contagious?	
Yes	90 (22.0)
No	119 (29.1)
I do not know	200 (48.9)
How is HPV transmitted?	
With food	3 (0.7)
By air	15 (3.7)
Sexually	221 (54.0)
By contact	21 (5.1)
With common item	26 (6.4)
No idea	123 (30.1)
What level of information do you think about HPV vaccine?	
None	207 (50.6)
Little	102 (24.9)
Average	64 (15.7)
Enough	36 (8.8)

HPV: Human papilloma virus.

Of the patients, 130 (39.2%) who knew their family physician had heard of HPV vaccine, 34 (44.2%) of those who did not know had heard of HPV vaccine (p=0.440). The knowledge about HPV and vaccine according to being familiar with the family physician is summarized in Table 3.

After a brief information about the HPV virus and its vaccine, 269 (65.8%) participants stated they wanted to be vaccinated. Of the participants, 223 (71.2%), who had heard about the HPV virus, wanted to be vaccinated after the information, while 46 (47.9%), who did not know anything about HPV virus, wanted to be vaccinated (p=0.001). Of the participants, 257 (71.0%), who had heard about cervical cancer before, wanted to be vaccinated after the information, while 12 (25.5%), who did not know anything about cervical cancer before, wanted to be vaccinated (p=0.001). Of the participants, 132 (80.5%), who had heard about the HPV vaccine, wanted to be vaccinated after the information, while 137 (55.9%), who did not know anything about HPV vaccine, wanted to be vaccinated (p=0.001). The

Table 3. Knowledge about HPV and vaccine according to being familiar with the family physician

	Being familiar with the family physician		p
	Yes (n=332)	No (n=77)	
Have you heard of the HPV microbe?			
Yes	266 (80.1)	47 (61.0)	0.001
No	66 (19.9)	30 (39.0)	
Have you heard of cervical cancer?			
Yes	302 (91.0)	60 (77.9)	0.003
No	30 (9.0)	17 (22.1)	
Have you heard of the pap smear test?			
Yes	251 (75.6)	42 (54.5)	<0.001
No	81 (24.4)	35 (45.5)	
Is HPV contagious?			
Yes	76 (22.9)	14 (18.2)	0.001
No	83 (25.0)	36 (46.7)	
I do not know	173 (52.1)	27 (35.1)	
What level of your HPV knowledge do you think is?			
None at all	170 (51.2)	37 (48.1)	0.258
Little	79 (23.8)	23 (29.8)	
Middle	50 (15.1)	14 (18.2)	
Enough	33 (9.9)	3 (3.9)	
After brief information would you like to be vaccinated?			
Yes	226 (68.1)	43 (55.8)	0.046
No	106 (31.9)	34 (44.2)	

HPV: Human papilloma virus
Data are presented as n (%).
Chi-square test.

knowledge about HPV and vaccine according to sociodemographic features is summarized in Table 4.

DISCUSSION

There is no HPV vaccination-related vaccine program and HPV vaccine registry system in Turkey. There are not enough records and resources on HPV vaccination rates. This study aimed to determine the frequency of HPV vaccination in rural and determine the knowledge level of women between the ages of 15 and 49 years about HPV and its vaccine. None of the women included in this study had the HPV vaccine before. In the HPV and related diseases Turkey report published by the HPV Information Center in 2019, it was stated "no data" in the HPV vaccination rate section.[7] According to a meta-analysis, the HPV vaccination rate is 1.4% among women of all ages worldwide and 6.1% among women aged 10–20 years.[3] While vaccination rates between the ages of 10 and 20 years are 2.7% on average in underdeveloped regions, it is 33.6% in developed regions. A nationwide study conducted in Korea in 2013 reported HPV vaccination rates of 28.7% between ages 19 and 26 years, 15.9% between ages 27 and 39 years, and 4.6% between ages 40 and 59 years.[8] In Turkey, the rate of HPV positivity varies between 1.5% and 32.1% among women with normal cervical pathology.[7,9,10] Due to these high frequencies, HPV infection should be considered more serious in Turkey, where HPV screening programs are accessible.

Of the participants, 34.2% do not want to have the HPV vaccine after information. This study did not investigate the reasons for not getting the HPV vaccine. However, in the literature, although the primary reason for not getting the HPV vaccine was expensiveness, reasons such as not being advised by the doctor, being ignored by the families, and avoiding possible side effects have also been shown.[11,12] In Italy, where the HPV vaccine can be applied free of charge, the rate of HPV vaccination was 69% in 2012.[13] Another possible factor is that the number of anti-vaxxers seen in Turkey has reached serious numbers for the last 10 years.[14] Media news and anti-vaxxers, who are mainly opposing

Table 4. Knowledge about HPV and vaccine according to sociodemographic features

	Have you heard of the HPV microbe?			Have you heard of cervical cancer?			Have you heard of the HPV vaccine?			After brief information would you like to be vaccinated?		
	Yes (n=313)	No (n=96)	p	Yes (n=362)	No (n=47)	p	Yes (n=164)	No (n=245)	p	Yes (n=269)	No (n=140)	p
Age groups												
<30 years (n=192)	109 (34.8)	83 (86.5)	<0.001	157 (43.4)	35 (74.5)	<0.001	59 (35.9)	133 (54.3)	<0.001	105 (39.0)	87 (62.1)	<0.001
≥30 years (n=217)	204 (65.2)	13 (13.5)		205 (56.6)	12 (25.5)		105 (64.1)	112 (45.7)		164 (61.0)	53 (37.9)	
Marital status												
Married (n=200)	190 (60.7)	10 (10.4)	<0.001	191 (52.8)	9 (19.1)	<0.001	99 (60.4)	101 (41.2)	<0.001	142 (52.8)	58 (41.4)	0.029
Single (n=209)	123 (39.3)	86 (89.6)		171 (47.2)	38 (80.9)		65 (39.6)	144 (58.8)		127 (47.2)	82 (58.6)	
Living place												
Village (n=50)	38 (12.2)	12 (12.5)	0.596	44 (12.2)	6 (12.8)	0.241	17 (10.4)	33 (13.5)	0.181	35 (13.0)	15 (10.7)	0.739
District (n=108)	79 (25.2)	29 (30.2)		91 (25.1)	17 (36.2)		51 (31.2)	57 (23.2)		72 (26.8)	36 (25.7)	
City (n=251)	196 (62.6)	55 (57.3)		227 (62.7)	24 (51.0)		96 (58.4)	155 (63.3)		162 (60.2)	89 (63.6)	
Family type												
Elementary family (n=319)	246 (78.6)	73 (76.1)	0.597	281 (77.6)	38 (80.8)	0.615	132 (80.5)	187 (76.3)	0.319	215 (79.9)	104 (74.3)	0.191
Wider family (n=90)	67 (21.4)	23 (23.9)		81 (22.4)	9 (19.2)		32 (19.5)	58 (23.7)		54 (20.1)	36 (25.7)	
Chronic illness												
Yes (n=64)	58 (18.5)	6 (6.2)	0.004	61 (16.8)	3 (6.4)	0.041	16 (9.7)	48 (19.6)	0.007	228 (84.8)	23 (22.1)	0.754
No (n=345)	255 (81.5)	90 (93.8)		301 (83.2)	44 (93.6)		148 (90.3)	197 (80.4)		41 (15.2)	117 (77.9)	
Smoking												
Yes (n=107)	79 (25.2)	28 (29.2)	0.444	83 (22.9)	24 (51.1)	<0.001	37 (22.6)	70 (28.6)	0.175	76 (28.2)	31 (22.1)	0.182
No (n=302)	234 (74.8)	68 (70.8)		279 (77.1)	23 (48.9)		127 (77.4)	175 (71.4)		193 (71.8)	109 (77.9)	
Previous pregnancy												
Yes (n=194)	187 (59.7)	7 (7.3)	<0.001	188 (51.9)	6 (12.8)	<0.001	99 (60.4)	95 (38.8)	<0.001	142m (52.8)	52 (37.1)	0.003
No (n=215)	126 (40.3)	89 (92.7)		174 (48.1)	41 (87.2)		65 (39.6)	150 (61.2)		127 (47.2)	88 (62.9)	

HPV: Human papilloma virus.

Data are presented as n(%).

Chi-squared test.

childhood vaccination, negatively affect all vaccinations.[15]

While 76.5% of women included in the study heard about the HPV virus, 40.1% heard about the HPV vaccine. Of the participants, 88.5% heard about cervical cancer. It has been shown that people familiar with their family physicians heard about the HPV virus and cervical cancer significantly more than those who are not. However, among those who have heard of the HPV vaccine before, there is no significant difference between those who know their family physicians and those who do not, and it is much lower than the frequency of hearing about cervical cancer and the HPV virus. These data can be interpreted that family physicians provide less information about the HPV vaccine than cervical cancer and the HPV virus. In a study conducted in Turkey, it was found that only 59.5% of family physicians recommended the HPV vaccine to their patients.[16] After a short briefing, 65.8% of the participants answered yes to the question, "Would you like to get HPV vaccine?" In a meta-analysis examining families' knowledge and attitudes toward the HPV vaccine, in 17 of 53 studies, it was found that there was a relationship between vaccination and physician recommendation.[17] While 68.1% of the participants familiar with their family physicians wanted to be vaccinated after being informed, 55.8% of those not familiar with their family physicians wanted to be vaccinated. This study found that being familiar with their family physicians was associated with accepting the HPV vaccine. Although the participants with chronic diseases heard more about the HPV virus, vaccine, and cervical cancer, there was no significant difference between them and the other participants in their desire for HPV vaccination. In a study, older adults with chronic diseases scored lower in practicing health literacy than other older adults,[18] which was associated with difficulty following the recommendations given, getting the recommended vaccine, abandoning dangerous habits, and using health-related information for their wounds. Acting more diligently and decisively when advising women with chronic diseases about the HPV vaccine would help.

The relationship between cervical cancer and smoking has been known since 1977.[19] Although it is not fully understood at what stages (HPV persistence, ongoing HPV infection progression to precancerous and/or invasion) cervical carcinogenesis is affected by smoking, the association between smoking and HPV increases the risk of cervical cancer.[20] Alam et al. showed that benzo[a]pyrene, which is detected in women's cervical mucus and an important carcinogen in tobacco smoke, increases the persistence of HPV among women.[21] According to these data, it becomes more important for smokers to learn about cervical cancer and HPV and be vaccinated with the HPV vaccine. However, of the smokers, 22.4% in this study did not even hear about cervical cancer. Reaching and informing this population can incentivize smoking cessation and HPV vaccination.

This study has some limitations. First, the study is a single-center study. More reliable information will be provided by multicenter studies throughout Turkey. Another limitation of the study is that the survey was conducted by us since there is no proven validity and reliability survey on this subject.

CONCLUSION

None of the women included in this study had the HPV vaccine before. Awareness of the HPV vaccine is also low. This study showed that the knowledge about the HPV vaccine is low. Being familiar with the family physician significantly increased the frequency of hearing about the HPV virus, cervical cancer, and the Pap smear test, but it was insignificant in hearing about the HPV vaccine. It was found that being familiar with their family physicians was associated with accepting the HPV vaccine after information. The reasons for the low awareness of HPV vaccines, what should be done to increase awareness, and the frequency of HPV vaccination are potential topics for future studies.

Disclosures

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Funding: None.

Ethics Committee Approval: This study was performed with approval from the Cumhuriyet University Non-Invasive Clinical Research Ethics Committee (Approval date: December 11, 2019, and Approval number: 2019-12/13).

Authorship Contributions: Concept – M.K., E.D.; Design – M.K., B.K.K., E.D.; Supervision – M.K., F.G.D., M.E.A.; Materials – M.K., M.E.A., B.K.K., E.D.; Data collection and/or processing – M.K., B.K.K., E.D.; Analysis and/or interpretation – M.K., F.G.D., M.E.A., E.D.; Literature search – M.K., F.G.D., M.E.A.; Writing – M.K., F.G.D., M.E.A.; Critical review – M.K., F.G.D.

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