

Determination of Women's Belief Levels Regarding Human Papillomavirus Infection and Vaccination, and Their Vaccine Hesitancy

Kadınların Human Papilloma Virüsü Enfeksiyonu ve Aşısına İlişkin İnanç Düzeylerinin ve Aşı Olmaya Yönelik Tereddütlerinin Belirlenmesi

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ABSTRACT

To determine women's belief levels regarding Human Papillomavirus (HPV) infection and vaccination, as well as their vaccine hesitancy. The study is a cross-sectional research design. The sample comprised 504 women who met the inclusion criteria. Data collection was conducted through face-to-face interviews between April 10, 2023, and July 10, 2023. The Introductory Information Form, the Health Belief Model Scale for Human Papillomavirus and its Vaccination, and the Vaccine Hesitancy Scale were utilized to gather data. The average age of the women in the study was 34.82 ± 7.857 years. Of the participants, 57.2% did not want to receive the HPV vaccine for themselves, 56% did not want it for their daughters, and 79.8% did not want it for their sons. None of the women had received the HPV vaccine, and 83.3% had not previously received information about HPV infection and vaccination. The mean scores for the Health Belief Model Scale regarding HPV infection and vaccination were as follows: benefit perception, 7.12 ± 2.330 ; susceptibility perception, 12.76 ± 2.499 ; seriousness perception, 4.39 ± 1.374 ; and obstacle perception, 9.95 ± 2.733 . The average total score for the Vaccine Hesitancy Scale was 32.03 ± 7.598 , with the lack of confidence score averaging 24.92 ± 6.924 and the risk score averaging 7.11 ± 1.416 . The women's knowledge levels regarding HPV infection and vaccination are low. While their perception of susceptibility related to HPV infection and vaccination is high, their perceptions of the benefits, seriousness, and obstacles are low. The women exhibit moderate levels of hesitation and lack of confidence towards the HPV vaccine, and their perception of the vaccine's risk is high.

Keywords: Human Papillomavirus Viruses, Papillomavirus Vaccines, Vaccination Hesitancy

ÖZ

Kadınların Human Papillomavirus enfeksiyonu ve aşısına ilişkin inanç düzeylerini ve aşıya karşı tereddütlerini belirlemektir. Araştırma kesitsel araştırma türündedir. Araştırmanın örneklemini, dâhil edilme kriterlerini karşılayan 504 kadın oluşturmuştur. Veriler 10.04.2023-10.07.2023 tarihleri arasında yüz yüze görüşme yöntemiyle toplanmıştır. Verilerin toplanmasında Tanıtıcı Bilgi Formu, Human Papilloma Virüsü ve Aşılanmasına İlişkin Sağlık İnanç Modeli Ölçeği ve Aşı Tereddüdü Ölçeği kullanılmıştır. Kadınların ortalama yaşı $34,82 \pm 7,857$ olup %57,2'si kendisi için, %56'sı kız çocuğu için, %79,8'i oğlu için HPV aşısı yaptırmak istememektedir. Kadınların hiçbiri HPV aşısı yaptırmamıştır ve %83,3'ü daha önce HPV enfeksiyonu ve aşısı hakkında bilgi almamıştır. HPV enfeksiyonu ve aşı yarar algısı puan ortalaması $7,12 \pm 2,330$, duyarlılık algısı puan ortalaması $12,76 \pm 2,499$, ciddiyet algısı puan ortalaması $4,39 \pm 1,374$ ve engel algısı puan ortalaması $9,95 \pm 2,733$ 'tür. Aşı Tereddüdü Ölçeği toplam puan ortalaması $32,03 \pm 7,598$, güven eksikliği puan ortalaması $24,92 \pm 6,924$, risk puan ortalaması ise $7,11 \pm 1,416$ 'dır. Kadınların HPV enfeksiyonu ve aşısına ilişkin bilgi düzeyleri düşük, HPV enfeksiyonu ve aşısına ilişkin sağlık inançları duyarlılık algısı yüksek, yarar, ciddiyet ve engel algıları ise düşüktür. Kadınların HPV aşısına ilişkin tereddütleri ve güvensizlikleri orta düzeyde, aşının riskleri olduğu düşüncesi ise yüksek düzeydedir.

Anahtar Kelimeler: Aşı Tereddüdü, Human Papillomavirus, Papillomavirus Aşısı

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INTRODUCTION

Cervical cancer is the fourth most common type of cancer among women in the worldwide.¹ Approximately 90% of cervical cancer cases occur in low- and middle-income countries. The primary reason for this is that, although cervical cancer is preventable, women in these countries often lack access to vaccination and screening programs. The main cause of cervical cancer is Human Papillomavirus (HPV), which is the most common sexually transmitted infection globally among sexually active men and women.^{2,3}

HPV infections cause significant morbidity and mortality by leading to the development of warts and various cancers, including anal, vaginal, vulvar, penile, oropharyngeal, and particularly cervical cancer.⁴ Although the high-risk HPV types are 6, 11, 16, and 18, the HPV vaccine can be administered between the ages of nine and 45.³ In high-income countries with current HPV vaccines and screening programs, cervical cancer incidence and mortality have halved over the last 30 years.⁵ Prophylactic HPV vaccines currently administered are reported to be over 90% effective in preventing anogenital HPV infections and precancerous lesions in randomized clinical trials and significantly reduce the risk of invasive cervical cancer. In particular, vaccinating women at an early age further enhances this risk reduction.⁶⁻⁸

The HPV vaccine is not included in the mandatory vaccination schedule in many countries and is often administered optionally

and for a fee. This indicates that HPV vaccination is performed on a voluntary basis. Particularly, women who lack sufficient knowledge about HPV infection may not develop adequate awareness of the disease and may fail to recognize the importance of the vaccine, which is crucial for protecting against the disease.⁹ The inclusion of 'Vaccine Hesitancy' in the World Health Organization's (WHO) list of '10 Threats to Global Health in 2019' highlights the significance of the prevalence of anti-vaccine views.¹⁰ Since 2010, anti-vaccine views have become increasingly widespread in Turkey, leading to a rise in the number of families who refuse vaccination. Studies on vaccine rejection report that the most important reasons are a lack of knowledge, distrust in vaccines, and concerns about side effects.¹¹⁻¹³

Unlike other types of cancer, cervical cancer is highly preventable through screening and vaccination, yet it remains a global and serious health problem with a high mortality rate, particularly among women. Its incidence is decreasing only in developed countries where screening and vaccination are accessible. Prevention is the most effective strategy to achieve significant reductions in the mortality and morbidity rates associated with cervical cancer.

The aim of this study; is to determine women's belief levels regarding Human Papillomavirus infection (HPV) and its vaccine and their hesitation towards the vaccine.

MATERIALS AND METHODS

Type of study

The study is a cross-sectional research type.

Population and sample of the study

The study population consisted of women who visited the outpatient clinics of a public hospital in Anatolia for any health issue. The number of women applying to the hospital in

2022 is 622,689. Accordingly, in the formula for determining the number of samples in groups whose universe is known ($n=N.t^2.p.q/d^2.(N-1)+t^2.p.q$); $t=1.96$; $p=0.50$, $q=0.50$; $d=0.05$, the number of women to be included in the sample group was determined to be at least 384. 504 women who met the inclusion criteria and voluntarily accepted to

participate in the study participated in this study.

Inclusion criteria in the study;

- Be woman
- Being literate
- Being between the ages of 18-45
- Having children

Data collection

The data for the study were collected through face-to-face interviews conducted between April 10, 2023, and July 10, 2023. Women were informed about the study and their informed consent was obtained. The forms were administered to women individually, with attention to the principles of personal information protection.

Data collection tools

Data were collected with the "Introductory Information Form", "Health Belief Model Scale for Human Papillomavirus and its Vaccination" and "Scale of Vaccine Hesitancy".

"Introductory Information Form" was prepared by the researchers. In the first part of the form, there are six questions, two of which are open-ended, containing introductory information such as "age, education level, profession, working status, economic situation, gender of children"; In the second part, "Have you had an HPV test before?", "Have you received information/training about HPV and the HPV vaccine before?", "Would you consider giving your daughter the HPV vaccine?" Nine open-ended questions include information about the Human Papillomavirus, its test, and vaccine, such as.^{3, 7, 8, 14}

"Health Belief Model Scale for Human Papillomavirus and its Vaccination" was developed and adapted to Turkish to measure health beliefs about HPV vaccination. The scale consists of four subscales and 14 items: benefit (items 1-3), obstacle (items 10-14), sensitivity (items 4-5), and seriousness (items 6-9). The scale items are four-point Likert type. It is scored between "(1) not at all" and "(4) very much". There are no reverse items

or cutoff points in the scale. The score that can be obtained from the scale is between 3-12 points for the perception of benefit, between 5-20 points for the perception of an obstacle, between 2-8 points for sensitivity, and between 4-16 points for the perception of seriousness. As subscale scores increase, perceptions also increase. Cronbach alpha values of the subscales vary between 0.71-0.78.¹⁵ The Cronbach alpha values of the subscales of this study are 0.88, 0.71, 0.72, 0.73, respectively.

"Vaccine Hesitancy Scale" was developed to measure vaccine hesitancy and was adapted to Turkish. The scale consists of two subscales and nine items: lack of trust (items 1,2,3,4,5,6,7) and risks (items 8,9). The scale is in a five-point Likert style and consists of options ranging from (1) strongly disagree to (5) strongly agree. The ingredients cover all vaccines and can be applied to the general population. The score obtained from the scale and its sub-dimensions is obtained by summing the scores obtained from the relevant items, and an increase in the score indicates that the hesitancy towards vaccines is decreasing. The lowest score that can be obtained from the scale is nine and the highest score is 45. The scale does not have a cut-off point or inverse item. The internal consistency coefficients obtained for the dimensions of the scale are 0.89 for lack of trust, 0.89 for risks, and 0.87 for the entire scale. The coefficients for additional dimensions are 0.63 and 0.87.¹⁶ The total Cronbach alpha values of the subscales and the scale of this study are 0.94, respectively; are 0.98 and 0.90.

Data analysis

The data obtained from the study were evaluated on the computer using the SPSS 27.0 program. Descriptive statistical methods (frequency, percentage, mean, and standard deviation) were used to evaluate the data. Since parametric test assumptions were met, independent sample t test, analysis of variance for more than two independent groups, correlation analysis were applied to determine the difference between the averages of two independent groups, and the error level was taken as 0.05.

Ethical considerations

To conduct the study, ethics committee approval was obtained from the Non-Interventional Clinical Research Ethics Committee of a university (Date: February 22, 2023; Decision No: 2023-02/11). Written permission to conduct the study was obtained from the hospital (Date: March 10, 2023; Reference Number: E-91742806-799-211090697). Before starting the study, women were informed about the study and their consent was obtained, and Helsinki principles

were followed at every stage of the research. Permission was obtained from the authors for the scales used in the study.

Limitations of the study

One limitation of this study is that it exclusively involved women with children and did not include men. As a result, the findings may not be applicable to men or to women without children. Despite this limitation, the study's results are considered reliable and generalizable due to the adequate sample size.

RESULTS AND DISCUSSION

Of the women participating in the study, 47% were between 38 and 44 years old, with an average age of 34.82 ± 7.857 years. Additionally, 32.9% of the women were primary school graduates, 74.8% were unemployed, 61.9% described their economic status as middle-level, and 55.7% had both daughters and sons (Table 1).

Table 1. Descriptive Characteristics of Women (n=504)

Descriptive characteristics	n (%)
Age	$\bar{x} \pm SD$ (min-max)
	34.82±7.857 (19-44)
18-24 age	99 (19.7)
25-30 age	10 (2.0)
31-37 age	158 (31.3)
38-44 age	237 (47.0)
Education level	
Primary school	166 (32.9)
Middle school	149 (29.6)
High school	87 (17.3)
Junior college	26 (5.2)
University	76 (15.1)
Working status	
Yes	127 (25.2)
No	377 (74.8)
Economical situation	
Bad	32 (6.3)
Middle	312 (61.9)
Good	160 (31.7)
Child's gender	
Only female	137 (27.2)
Only male	86 (17.1)
Both female and male	281 (55.7)

n: number, %: percentage, \bar{x} : mean, *SD*: standard deviation, *min-max*: minimum-maximum value

All of the women participating in the study stated that they had not received the HPV vaccine. In addition, 66.1% of women reported that they had not undergone an HPV test, 16.1% had a family history of cancer, 83.3% had not received information about

HPV infection and the vaccine previously, and 50.4% believed that cervical cancer was preventable. Furthermore, 57.2% indicated that they did not want to receive the HPV vaccine themselves, 56% did not want their daughter to receive the HPV vaccine, and 79.8% did not want their son to receive the HPV vaccine (Table 2).

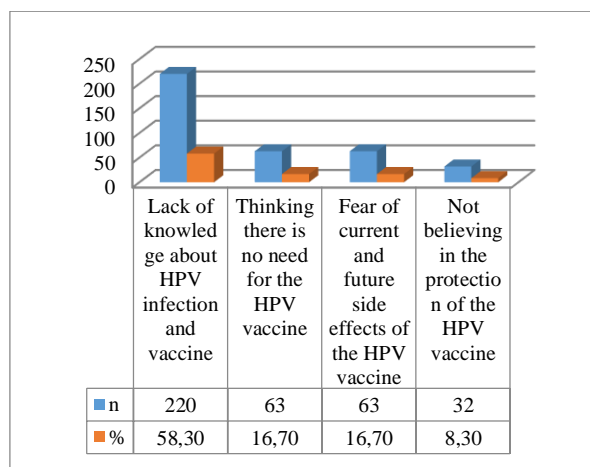
Table 2. Characteristics of Women Regarding HPV (n=504)

Characteristics of HPV	n (%)
HPV test status	
Yes	171 (33.9)
No	333 (66.1)
HPV vaccination status	
Yes	0 (0.0)
No	504 (100.0)
Having a family history of cancer	
Yes	81 (16.1)
No	423 (83.9)
Status of obtaining information about HPV infection and vaccine	
Yes	84 (16.7)
No	420 (83.3)
Is cervical cancer a preventable disease?	
Yes	250 (49.6)
No	0 (0.0)
I don't know	254 (50.4)
The situation of wanting to get the HPV vaccine yourself	
Yes	50 (9.9)
No	288 (57.2)
I'm undecided	166 (32.9)
Wanting to have your daughter vaccinated against HPV	
Yes	82 (16.2)
No	282 (56.0)
I'm undecided	140 (27.8)
Wanting to have your son vaccinated against HPV	
Yes	0 (0.0)
No	402 (79.8)
I'm undecided	102 (20.2)

**n*: number, %: percentage

Among the women participating in the study, the primary reason for refusing HPV vaccination for themselves and their children was a lack of knowledge about HPV infection and vaccine (58.3%). Other reasons included believing that the HPV vaccine is unnecessary (16.7%), fearing current and future side effects of the vaccine (16.7%), and not believing in the effectiveness of the HPV vaccine (8.3%) (Graphic1).

Graphic 1. Reasons for Women Refusing to Have HPV Vaccination for Themselves and Their Children (n=378)



*378 out of 504 women answered this question. †n: number, %: percentage

Among the subscales of the Health Belief Model Scale for Human Papillomavirus and its Vaccination, the average benefit perception score of the women participating in the study was 7.12±2.330, the average sensitivity perception score was 12.76±2.499, the average seriousness perception score was 4.39±1.374, and the average obstacle perception score was 9.95±2.733 (Table 3).

The mean score of the women participating in the study on the Vaccine Hesitancy Scale was 32.03±7.598. The mean score for lack of confidence in the subscales was 24.92±6.924, and the mean score for perceived risks was 7.11±1.416 (Table 3).

Table 3. Health Belief Model Scale for Human Papillomavirus and Its Vaccination and Vaccine Hesitancy Scale and Subscales Score Averages (N=504)

Subdimensions	$\bar{x}\pm SD$	min-max
Perception of benefit	7.12±2.330	3-12
Perception of sensitivity	12.76±2.499	8-17
Perception of seriousness	4.39±1.374	2-8
Perception of obstacle	9.95±2.733	5-16
Lack of confidence	24.92±6.924	13-34
Risks	7.11±1.416	5-10
Total	32.03±7.598	18-42

* \bar{x} : mean, SD: standard deviation, min-max: minimum-maximum value

The difference between the benefit perception mean score and the Vaccine Hesitancy Scale mean score, as measured by the sub-dimensions of the Health Belief Model Scale on HPV Infection and Vaccination among the women participating in the study, was positive and moderate ($r=0.417$; $p<0.001$). There was also a positive, low-level relationship ($r=0.285$; $p<0.001$) between the sensitivity perception mean score and the Vaccine Hesitancy Scale mean score, and a positive, moderate relationship ($r=0.302$; $p<0.001$) between the seriousness perception mean score and the Vaccine Hesitancy Scale mean score (Table 4).

Table 4. The Relationship between the Sub-Dimensions of the Health Belief Model Scale For Human Papillomavirus and Its Vaccination and the Mean Score of the Vaccine Hesitancy Scale (N=504)

Scales	Benefit	Sensitivity	Seriousness	Obstacle	Vaccine hesitancy	
Benefit	R	-	0.590	0.302	0.176	0.417
	P	-	<.001	<.001	<.001	<.001
Sensitivity	R	0.590	-	0.782	0.315	0.285
	P	<.001	-	<.001	<.001	<.001
Seriousness	R	0.533	0.782	-	0.510	0.302
	P	<.001	<.001	-	<.001	<.001
Obstacle	R	0.176	0.315	0.510	-	-0.008
	P	<.001	<.001	<.001	-	0.866
Vaccine hesitancy	R	0.417	0.285	0.302	-0.008	-
	P	<.001	<.001	<.001	0.866	-

*r: pearson correlation coefficient, p: statistical significance

In the study conducted to determine women's belief levels regarding Human Papillomavirus infection and vaccine, as well as their hesitation towards the vaccine, the average age of the participants was 34.82 ± 7.857 . Other studies have reported that the average age ranges from 22 to 55 years and varies depending on the sample groups, such as mothers, university students, and healthcare workers.^{7, 17-20}

In this study, a higher proportion of women were found to be primary school graduates and unemployed. It is hypothesized that these factors may negatively impact women's knowledge about HPV infection and HPV vaccine. Both education level and employment status are important factors that influence individuals' knowledge and cultural status.^{19, 21, 22} Both in this study and in other research, it was found that women were reluctant to receive the HPV vaccine and undergo HPV testing, often due to insufficient information. The majority also expressed reluctance for their children to receive the HPV vaccine.^{18, 19}

The first reason why women participating in the research refuse to have HPV vaccination for themselves and their children is the lack of knowledge about HPV infection and vaccine, with 58.3%. Al Alavi et al. (2023) reported that women and men do not find the HPV vaccine safe (62%), believe that it has side effects (71.5%), and do not believe in its protection (84.6%).²³ In other studies, the level of knowledge is also quite low. Although nursing students and healthcare professionals have a higher level of knowledge about HPV infection and the vaccine compared to women in the general population, the number of individuals who have vaccinated themselves or their children with the HPV vaccine remains low.^{7, 20, 24} These findings indicate that varying results occur across different segments of society due to a lack of information. Although the HPV vaccine is included in the national vaccination schedules and administered free of charge in some countries, vaccination rates are not reaching the desired levels.^{25, 26}

The women participating in the study had low benefit perception scores (7.12 ± 2.330), seriousness perception scores (4.39 ± 1.374), and obstacle perception scores (9.95 ± 2.733) on the Health Belief Model subscales regarding HPV infection and vaccination, and their susceptibility perception scores (12.76 ± 2.499) were low to moderate. Additionally, the low education level of these women indicates that their perceptions of the benefits, seriousness, and obstacles related to HPV infection and vaccination are inadequate. Insufficient beliefs and attitudes of mothers towards HPV infection and vaccination also contribute to lower vaccination rates among their children.²⁷ In a study examining the health belief levels of health sciences students regarding the HPV vaccine, it was found that the seriousness perception score was higher, while the obstacle perception score was lower.¹⁴ It has also been reported that self-efficacy and subjective norms contribute to an increase in HPV vaccination behavior among university students.²⁸ Another study emphasized that younger and more knowledgeable women held more positive opinions about the HPV vaccine.²⁹ The results of these studies indicate that women with higher education levels and younger ages have greater perceptions of the seriousness and barriers related to HPV infection and vaccination. Therefore, it is important to enhance women's awareness about HPV infection and vaccines, increase their knowledge, and improve their understanding. Çitak Bilgin et al. (2022) reported that education provided to mothers about HPV infection and the vaccine significantly improved their perceptions of benefits, severity, and susceptibility related to health beliefs regarding HPV infection and vaccination, compared to the control group.³⁰

It was determined that the women participating in the study experienced moderate hesitation (32.03 ± 7.598) and lack of confidence (24.92 ± 6.924) regarding the HPV vaccine, while their concerns about the vaccine being risky were high (7.11 ± 1.416). Despite scientific evidence supporting the safety and benefits of vaccines, vaccine rejection is increasing. Reasons for vaccine

rejection include concerns about vaccine ingredients, experiences with side effects, mistrust in vaccine administration, religious beliefs, the pharmaceutical industry, media influence, and vested interests.³¹⁻³³ However, no studies describing hesitancy towards the HPV vaccine have been identified in the literature.

As the benefit perception, sensitivity, and seriousness of the women participating in the study regarding HPV infection and vaccination increase, vaccine rejection decreases. These results indicate that as women's knowledge about both HPV infection and the benefits of the vaccine improves, they become more sensitive to the

disease and the vaccine. Consequently, their serious beliefs and perceptions about cervical cancer, its causative agent, and preventive measures are likely to strengthen. Shato et al. (2023) state that parents who are hesitant about the HPV vaccine are less likely to vaccinate their children.³⁴ Children's age, gender, and parents' vaccine hesitancy were found to be significantly associated with the likelihood of receiving the HPV vaccine. There are only a limited number of studies in the literature examining the relationship between beliefs about HPV infection and the vaccine and vaccine rejection. Therefore, the results of this study are considered important for identifying gaps in scientific knowledge and literature.

CONCLUSION AND RECOMMENDATION

According to the findings of this study, women's knowledge about HPV infection and the vaccine is quite low, and a high number of women are reluctant to receive the HPV vaccine for themselves, their daughters, or their sons. The study found that while women's perception of susceptibility to HPV infection and vaccination was high, their perceptions of benefits, seriousness, and barriers were low. It was concluded that women's hesitation and lack of confidence in the HPV vaccine were at a moderate level, and their perception of the vaccine's risks was high. In line with these results, efforts should

be made to increase women's knowledge about HPV infection and the vaccine, and to raise awareness about the necessity of vaccination and its protection against cervical cancer. Additionally, the HPV vaccine should be made available to the public free of charge through national policies, and health-protective behaviors should be promoted through public service announcements about the HPV vaccine, infection, and cervical cancer. To generalize the study results to a broader population, it is recommended to conduct studies including samples of men, women, and individuals without children.

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