

# An intervention study to increase knowledge of cervical cancer, HPV and HPV vaccines among family health workers

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## ABSTRACT

**Objective:** The aim of this study was to assess the knowledge and attitudes of family health workers about cervical cancer, HPV infection and HPV vaccines, and to evaluate the impact of an educational intervention on these conditions.

**Methods:** This was an educational intervention study. Data were collected on the knowledge levels and attitudes of family health workers in Samsun province about cervical cancer, HPV infection and HPV vaccines through a pretest-posttest intervention. Data were collected using a structured questionnaire and participants received a two-hour training session. After the training, the effectiveness of the educational intervention was assessed by applying the questionnaire again.

**Results:** Before the educational intervention, only 57.9% reported having adequate knowledge about HPV. After the educational intervention, a statistically significant increase in knowledge about HPV and HPV vaccines was observed. It was also observed that the educational intervention had a positive effect on participants' tendency to seek HPV vaccination for themselves and their children. It was observed that the level of knowledge of family health workers about HPV screening and risk factors was relatively high, but there were deficiencies in HPV vaccines.

**Conclusion:** This study found that family health workers had inadequate knowledge about cervical cancer, HPV and HPV vaccines, and that the educational intervention was effective in increasing family health workers' knowledge about HPV and vaccines.

**Keywords:** primary nursing care, education, cancer of cervix, HPV vaccines

## Introduction

Cervical cancer is a highly prevalent cancer among women and a major cause of mortality and morbidity worldwide. It is the fourth most

common malignancy in women worldwide.<sup>[1]</sup> According to the Turkey Health Statistics Yearbook - 2022, cervical cancer ranks tenth among female cancers in Turkey.<sup>[2]</sup> Human papillomavirus (HPV) infection is known to be an important causative

factor.<sup>[1]</sup> HPV is a small virus containing a double-stranded, non-enveloped DNA genome.<sup>[3]</sup> Other factors such as smoking, immunosuppression, poor sexual health and lack of participation in screening are also known.<sup>[4]</sup>

HPV causes many infections, particularly anogenital infections. While low-risk HPV types cause condyloma, high-risk types can cause cancers of the vagina, vulva, cervix, penis, anus, head and neck.<sup>[5]</sup> HPV infection is most common in sexually active women in their 20s. More than 140 types of HPV have been identified. Of the identified HPV types, 40 are known to be sexually transmitted. The two types with the highest risk of cervical cancer are the HPV16 and HPV18 subtypes. The HPV6 and HPV11 subtypes are mostly responsible for genital warts.<sup>[6]</sup> Because the infection is often destroyed by the human immune system, it is silent and asymptomatic. However, if chronic infections are not properly recognized and treated, disease progression and differentiation may become inevitable.<sup>[7]</sup> The time from HPV infection to cervical cancer is usually 10-20 years or more, so there is ample time for screening and early detection.<sup>[1]</sup> HPV vaccines effectively reduce the risk of cervical cancer. Despite the availability of effective screening programs and vaccines to control HPV infection, the high incidence of cervical cancer and HPV infection in women is a cause for concern.<sup>[3]</sup>

HPV vaccination is primary prevention against infection and related diseases, and HPV screening is secondary prevention against HPV.<sup>[7]</sup> There are three types of vaccine (2-valent, 4-valent and 9-valent) with proven safety and efficacy against HPV. All three types of HPV vaccine are available in Turkey, but the vaccine is not covered by general health insurance. There is also no national vaccination program.<sup>[5]</sup>

Low individual awareness and lack of knowledge about the vaccine, some negative beliefs (myths)

related to the fact that the vaccine is related to the reproductive system, communication problems during counselling about sexual problems, and economic reasons negatively affect HPV vaccination.<sup>[8]</sup> As prevention and early diagnosis methods are very effective and there is enough time for diagnosis, it is important to recommend these methods to people. It is known that the level of knowledge and attitudes of people who are offered screening and vaccination influence their participation in these recommendations.<sup>[9]</sup> For a vaccination that is not covered by general health insurance and is not included in a national vaccination program, the knowledge and attitudes of health professionals, especially primary health care workers, on this issue become important. The aim of this study is to determine and increase the knowledge of primary health care workers about HPV vaccines and to raise awareness in order to positively change vaccination behavior in the future.

## Material and Method

### Study design and setting

This is an educational intervention study with a matched samples design. A pretest-posttest design was used to evaluate the effectiveness of the training.

### Study population and sample

The study population consisted of 422 family health workers working in 449 family health units in family health centers in Samsun province. It was planned to include the entire study population in the study. Therefore, no sampling was done. However, those who could not be present at their workplaces or who refused to participate in the study during the data collection and training process were excluded from the study. As a result, a total of 393 family health workers were included in the study.

### **Ethical consent**

This study was conducted in accordance with the tenets of the Declaration of Helsinki on ethical behavior in human research. Before the start of the study, the study protocol was approved by the Ethics Committee for Clinical Research of Samsun University on 15.02.23 with the number SÜKAEK-2023 3/5.

### **Data collection instruments**

A structured self-administered questionnaire was used to assess the level of knowledge of family health workers about cervical cancer, HPV infection and HPV vaccines.<sup>[1-5,7,8]</sup> The final version of the questionnaire was developed in consultation with family medicine specialists, public health specialists and experts in cancer screening and infectious diseases working in Samsun Provincial Health Directorate.

### **The questionnaire has two main parts**

**Sociodemographic characteristics:** This section asked about the participants' age, gender, educational status, years of professional and family health center experience, and whether they had a son or daughter. Information was collected on their level of knowledge about HPV infection and vaccines, their HPV vaccination status, and their decision to have their children vaccinated against HPV.

**Assessment of knowledge and attitudes:** In this section, 29 true or false choice questions were designed to assess participants' basic knowledge of cervical cancer epidemiology, risk factors, symptoms and prevention strategies, including HPV vaccination.

The questionnaire was pilot tested on a small sample of family health workers (n = 20) to ensure clarity, comprehensibility and content validity. As there were no changes that needed to be made

to the feedback received during the pilot testing phase, the pilot test sample was also included in the study.

### **Training intervention**

A comprehensive face-to-face training intervention was delivered to family health workers on cervical cancer, HPV infection and HPV vaccination. The training intervention consisted of a two-hour training session delivered by family medicine specialists, public health specialists and cancer screening and infectious disease experts from the provincial health directorate. The training sessions were scheduled for a total of 8 hours in one day. Those who agreed to participate in the study were divided into three separate days, and one-day training was given to three separate groups by the same trainers to ensure that primary health care services were not disrupted and to ensure standardization of the training intervention.

The content of the training session included

- Epidemiology of cervical cancer, including global and local burden,
- Symptoms and early diagnosis of cervical cancer
- HPV types and the role of HPV in cervical cancer
- Prevention strategies, including HPV vaccination and cervical cancer screening,
- Misconceptions about HPV vaccines are explained.

### **Statistical analysis**

IBM SPSS version 26.0 was used for data analysis. Data on demographic characteristics, knowledge and attitudes about cervical cancer, HPV and HPV vaccine were presented using descriptive statistics with numbers, percentages and arithmetic means. To assess the effectiveness of the educational intervention, differences between the pre-test and post-test were evaluated using a dependent

groups t-test. In statistical analyses, values below  $p < 0.05$  were considered significant.

### Results

The study was carried out with 393 family health workers. Of the participants, 348 (95.9%) were female and 314 (86.5%) were married. The mean age of the participants was  $39.93 \pm 6.95$  years. The average professional experience was  $18.34 \pm 7.36$  years and the average experience as a family health worker was  $10.24 \pm 4.83$  years. The number of those with a daughter was 233 (64.2%) and the number of those with a daughter was who were considering HPV vaccination is 159 (68.2%). The number of those with a son was is 241 (66.4%) and the number of those with a son was who are considering HPV vaccination is 116 (48.1%). The number of those who feel they have sufficient knowledge about HPV and HPV vaccines is 210 (57.9%). The number of family health workers who had received HPV vaccination was only 11 (3.0%). Data on demographic characteristics are shown in Table 1.

When the level of knowledge about HPV infection and HPV vaccines was analysed, 210 participants reported that they had sufficient knowledge. Only 11 of the family health workers had received the HPV vaccine. Of those with girls, 68.2% would consider HPV vaccination for their daughters and 48.1% of those with boys would consider HPV vaccination for their sons. After the training, there was a statistically significant increase in the assessment of knowledge about HPV, attitudes towards vaccination, and attitudes towards HPV vaccination for children of both sexes. Data on levels of knowledge and attitudes about HPV infection and vaccines and the effect of the training on these levels of knowledge and attitudes are shown in Table 2.

When analyzing the responses to the information questions about cervical cancer, HPV infection

**Table 1.** Demographic characteristics and HPV knowledge and attitudes

	n	%
Gender		
Female	348	95.9
Male	15	4.1
Marital status		
Married	314	86.5
Single	29	8.0
Widowed / Divorced	20	5.5
Knowledge of HPV infection and vaccines		
I have enough information	210	57.9
I don't have enough information	153	42.1
HPV vaccination status		
Yes	11	3.0
No	352	97.0
Thinking about getting vaccinated against HPV		
I'm thinking of getting vaccinated.	207	57.0
I don't plan on getting vaccinated.	145	39.9
I am vaccinated	11	3.0
Having a daughter		
I have	233	64.2
I don't have	130	35.8
Having a son		
I have	241	66.4
I don't have	122	33.6
Would you consider HPV vaccination for your daughter?		
I'll get my daughter vaccinated against HPV	159	68.2
I won't give my daughter the HPV vaccine	17	7.3
Undecided	57	24.5
Would you consider HPV vaccination for your son?		
I'll get my son vaccinated against HPV	116	48.1
I won't give my son the HPV vaccine	37	15.4
Undecided	88	36.5

and HPV vaccines, the propositions 'HPV vaccine is recommended 3 doses between the ages of 9-14 years and 2 doses after the age of 15' with 26 (7.2%), 'All existing HPV vaccines protect against both warts and cancer' with 68 (18.7%) and 'HPV

**Table 2.** Effect of educational intervention on HPV knowledge and attitudes

	Before training		After training		t	p
	n	%	n	%		
Level of knowledge about HPV						
I have enough information	210	57.9	314	86.5	10.078	<0.001
I don't have enough information	153	42.1	49	13.5		
Thinking about getting vaccinated against HPV						
I'm thinking of getting vaccinated.	207	57.0	283	78.0	9.066	<0.001
I don't plan on getting vaccinated.	145	39.9	69	19.0		
I am vaccinated	11	3.0	11	3.0		
Would you consider HPV vaccination for your daughter?						
I'll get my daughter vaccinated against HPV	159	68.2	195	83.7	5.941	<0.001
I won't give my daughter the HPV vaccine	17	7.3	8	3.4		
Undecided	57	24.5	30	12.9		
Would you consider HPV vaccination for your son?						
I'll get my son vaccinated against HPV	116	48.1	174	72.2	7.246	<0.001
I won't give my son the HPV vaccine	37	15.4	19	7.9		
Undecided	88	36.5	48	19.9		

vaccine should be repeated every 5 years' with 71 (19.6%) are the propositions with the lowest percentage of correct responses by family health workers. When the propositions with the highest percentage of correct answers before the training were examined, the propositions 'HPV DNA and smear test is carried out as part of the cervical cancer screening program in our country' with 350 (96.4%), 'Polygamy is a risk factor for HPV infection' with 334 (92.0%) and 'HPV DNA/smear test should only be carried out in women with complaints' with 332 (91.5%) were the propositions with the highest percentage of correct answers by family health workers. The responses given by the family health workers and the effect of the educational intervention on the responses given are shown in Table 3.

## Discussion

Healthcare workers play a key role in the prevention of cervical cancer and HPV infection. This study assessed the knowledge and attitudes of family health workers towards cervical cancer,

HPV infection and HPV vaccines, and examined the effect of training on these knowledge and attitudes. The results show that the training intervention significantly improved the knowledge and attitudes of family health workers towards HPV infection and HPV vaccines.

Although the fact that the majority of family health workers participating in the study were women (95.9%) led to the expectation of a high level of awareness about cervical cancer and HPV vaccination, only 57.9% of family health workers felt that they had sufficient knowledge about HPV as a result of the pre-test. The introduction of new vaccines that are not included in the national immunization program faces various barriers, both for the provider and the recipient.<sup>[10]</sup> This obstacle can be overcome, in particular, by the trust that individuals place in primary health care workers. The level of knowledge of health professionals has a direct impact on the level of trust given to patients. Healthcare professionals need to feel prepared and supported in their role of disclosing perceptions about HPV, addressing concerns, offering vaccination, and making a

**Table 3.** Effect of educational intervention on level of knowledge about cervical cancer, HPV and HPV vaccines

About cervical cancer, HPV infection and HPV vaccines	Before training		After training		p*
	Correct (%)	Incorrect (%)	Correct (%)	Incorrect (%)	
Cervical cancer is the most common cancer among women		88 (24.2)		151 (41.6)	<0.001
The most characteristic sign of cervical cancer is malodorous vaginal discharge		147 (40.5)		148 (40.8)	0.929
HPV types 16, 18 are the most common types of virus that cause cervical cancer	290 (79.9)		361 (99.4)		<0.001
HPV infection is very rare		268 (73.8)		343 (94.5)	<0.001
HPV causes infection/disease only in women		234 (64.5)		307 (84.6)	<0.001
HPV infection is most commonly sexually transmitted	312 (86.0)		353 (97.2)		<0.001
Polygamy is a risk factor for HPV infection	334 (92.0)		358 (98.6)		<0.001
HPV infection is not seen in condom users		150 (41.3)		342 (94.2)	<0.001
HPV can cause oral and anal cancer	220 (60.6)		350 (96.4)		<0.001
Everyone infected with HPV will get cancer		293 (80.7)		349 (96.1)	<0.001
HPV-DNA and Smear tests are performed as part of the cervical cancer screening program in our country	350 (96.4)		358 (98.6)		0.059
HPV-DNA / Smear testing should only be performed in women with symptoms		332 (91.5)		356 (98.1)	<0.001
There are 3 types of HPV vaccine in our country	160 (44.1)		342 (94.2)		<0.001
HPV vaccine is reimbursed in Turkey		193 (53.2)		318 (87.6)	<0.001
HPV vaccine is administered intramuscularly	229 (63.1)		349 (96.1)		<0.001
HPV vaccine is given to females only		177 (48.8)		354 (97.5)	<0.001
HPV vaccine given only to sexually active women		284 (78.2)		355 (97.8)	<0.001
HPV vaccine should be given after first sexual contact		272 (74.9)		337 (92.8)	<0.001
The earlier the HPV vaccine is given, the greater the benefit	292 (80.4)		356 (98.1)		<0.001
HPV vaccine is more effective in people who have not been exposed to HPV	209 (57.6)		320 (88.2)		<0.001
HPV vaccine is recommended 3 doses between 9 and 14 years of age and 2 doses after 15 years of age		26 (7.2)		292 (80.4)	<0.001
HPV vaccination should be repeated every 5 years		71 (19.6)		315 (86.8)	<0.001
HPV vaccine is almost 100% protective against cervical cancer caused by HPV subtypes 16-18	192 (52.9)		349 (96.1)		<0.001
The quadrivalent vaccine aims to prevent disease caused by HPV subtypes 6, 11, 16 and 18	189 (52.1)		334 (96.1)		<0.001
A person infected with one of the HPV types does not need to be vaccinated		134 (36.9)		301 (82.9)	<0.001
All available HPV vaccines protect against both warts and cancer		68 (18.7)		121 (33.3)	<0.001

**Table 3.** Continued

About cervical cancer, HPV infection and HPV vaccines	Before training		After training		p*
	Correct (%)	Incorrect (%)	Correct (%)	Incorrect (%)	
HPV vaccine also protects against other sexually transmitted diseases		191 (52.6)		207 (57.0)	0.198
HPV-DNA / Smear test not required before HPV vaccination	125 (34.4)		293 (80.7)		<0.001
Continue cervical cancer screening after HPV vaccination	319 (87.9)		355 (97.8)		<0.001

shared decision with their patients.<sup>[11]</sup> However, both in this study and in the literature, healthcare professionals were found to have insufficient knowledge about HPV.<sup>[12-15]</sup> Although the study is consistent with the literature in this regard, it was felt that more training should be organized for healthcare professionals on this topic.

Participants had a relatively high level of knowledge about HPV screening and risk factors. The correct response rate to the statement "HPV-DNA and Smear tests are performed as part of the cervical cancer screening program in our country" was 96.4%, while the correct response rate to the statement "Polygamy is a risk factor for HPV infection" was 92.0%. This shows that there is greater awareness of screening programs and risk factors. The interpretation is that this awareness is due to the fact that HPV screening is a secondary prevention method that has been used in the daily practice of family health centers for a longer time, but HPV vaccination, which is primary prevention, has gained importance especially in the recent period and has not yet reached a sufficient level of awareness.

In the pre-test, it was observed that family health workers lacked knowledge about HPV vaccines in many sub-dimensions, especially the number of vaccine doses. After the training intervention, a statistically significant increase in participants' knowledge of HPV infection and vaccines was

observed. This suggests that the educational intervention was effective. In the literature, there are results showing that educational interventions for healthcare professionals increase the level of knowledge about HPV and HPV vaccines and the tendency to recommend vaccination.<sup>[10,11,16,17]</sup> Although many studies have shown that educational interventions are significantly effective in changing people's knowledge and attitudes, it is noteworthy that the level of knowledge about vaccination was found to be insufficient in the pre-test phase in this study. It was assessed that there is still no effective educational planning and implementation on this issue at the national level.

Another important finding of the study is that after the educational intervention, participants reported that it would positively change their tendency to vaccinate both themselves and their children. The fact that increases in knowledge and awareness lead to changes in attitudes and behavior is also supported by the literature.<sup>[16-18]</sup> It has been suggested that people who change their behavior towards vaccination for both themselves and their children will be more effective in terms of removing hesitancy, providing information and reassurance, recommending and persuading vaccination.

As the research data was collected using a data tool with selective response options such as true

/ false / undecided, the high probability of success of the responses given is a limitation. Although the research covered the whole province, the fact that it was conducted in a single province limits its generalizability to the whole country. Another limitation is that the long-term effects of the training intervention cannot be evaluated.

In conclusion, the educational intervention was found to be effective in increasing primary health care workers' knowledge about HPV and vaccines. Future research should focus on examining the long-term effects of these trainings and how they are reflected in HPV vaccination rates. It is recommended that regular training programs be implemented to keep family health workers' knowledge and attitudes about HPV up to date.

### Ethical approval

This study has been approved by the Ethics Committee for Clinical Research of Samsun University (approval date 15.02.2023, number SÜKA EK-2023 3/5). Written informed consent was obtained from the participants.

### Author contribution

The authors declare contribution to the paper as follows: Study conception and design: BY, İMY, EÖ; data collection: BY, EÖ; analysis and interpretation of results: BY, İMY; draft manuscript preparation: BY, İMY, EÖ, MAO. All authors reviewed the results and approved the final version of the article.

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### Conflict of interest

The authors declare that there is no conflict of interest.

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