



Turkish mothers' knowledge and attitude about HPV vaccine

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ABSTRACT

Background: The study aimed to evaluate the knowledge and attitude of Turkish mothers about cervix cancer, HPV infection and vaccination.

Methods: This cross-sectional study was conducted the mothers with children aged under 18 years who applied pediatric outpatient clinic. Research data were collected using a face-to-face survey includes sociodemographic characteristics of patients and mothers' knowledge level and attitude about the vaccination for HPV and cervical cancer.

Results: The rate of mothers who stated that they knew the causes of cervical cancer was 30.3%. Of the 71.5% mothers did not know whether there was a vaccine that protects against cervical cancer. Of the mothers who stated to have heard about the HPV vaccine, 39.2% said that the HPV vaccine is received at 9 years and above, 35.7% said that it could be given to both genders, and 75% knew that the vaccine is not reimbursed. Educational status ($p < 0.001$), working as a healthcare worker ($p < 0.001$) and the level of income ($p < 0.001$), were significantly correlated with the awareness of the causes of cervical cancer in a positive direction. None of the participants vaccinated their child, 91.5% ask for information about HPV and 67.3% stated that they might consider vaccination.

Conclusions: The development of vaccines against HPV has significantly changed the approach used in the treatment of cervical cancer. Healthcare professionals have a great responsibility to inform the public about the HPV vaccine.

Practice implications: Healthcare providers can use the results of this study to identify parents at risk for vaccine hesitancy and initiate individualized education to promote on-time childhood vaccination.

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Introduction

Cervical cancer is the fourth most common type of tumor and the fourth leading cause of death from cancer in women. Cervical cancer was diagnosed for the first time in 569,847 (3.2%) women worldwide in 2018, and 311,365 (3.3%) of them died due to related factors (Bray et al., 2018). Human papillomavirus (HPV) is a sexually transmitted infection and the most common cause of cervical cancer. It also causes genital warts, anal, and penile cancers (Bruni et al., 2019; De Martel et al., 2017; Walboomers et al., 1999).

HPV vaccines are cost-effective and have a safe protective effect against cancers that may result from HPV infection (Jit et al., 2014; Ralaidovy et al., 2018). Previous studies have shown that it is important and beneficial to vaccinate not only women but also men to reduce the incidence of HPV infection (Coşkuner et al., 2014). Currently, there are

three vaccines approved for both girls and boys: bivalent, quadrivalent, and nonavalent.

These vaccines have been licensed for use in girls and boys aged 9 and 26 between 2007 and 2017 in Turkey (Dursun Senger et al., 2009; Oz et al., 2018). However, contrary to the situation in many countries, they are yet to be included in the national immunization program. Instead, they are considered optional vaccines. Therefore, families who would like to get their children vaccinated have to buy the vaccine. Families should have sufficient information about HPV infection and HPV vaccines in order to protect the children and adolescents, which are considered the target groups, from this precancerous factor. In this context, the objective of this study is to evaluate the knowledge and attitude of mothers who applied to the University of Health Sciences (SBU) Samsun Training and Research Hospital Pediatric Health and Diseases Outpatient Clinic for their children about vaccination for HPV.

Material & method

This study was designed as a community-based cross-sectional study. The study protocol was approved by the University of Health

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Sciences (SBU) Samsun Training and Research Hospital Clinical Research Ethics Committee. The population of the study comprised the mothers who applied to the University of Health Sciences (SBU) Samsun Training and Research Hospital Pediatric Health and Diseases Outpatient Clinic, a tertiary referral center in Turkey, during the period from January 15th, 2022 to March 1st, 2022, for their children. The mothers with children aged under 18 years who agreed to participate in the study constituted the study sample. A written informed consent form was obtained from the study participants.

Research data were collected using a survey that is administered face-to-face. The survey, which consisted of 28 questions, was developed by the authors of this study based on the literature review (Della Polla et al., 2020; Harrison et al., 2021). A pilot study was conducted with 15 participants to assess the efficiency of the survey. Participants completed the survey approximately in 10 min and no problem occurred during the administration of the survey. The sample size was calculated as 384 within a 95% confidence interval (CI), with $Z\alpha = 1.96$, a predicted acceptable margin of error of $d = 0.05$, and 50% estimated knowledge of HPV.

The survey (Mother's Knowledge and Attitudes about Vaccination for HPV) consists of two sections. The first section includes questions about the sociodemographic characteristics of the patients (age, educational status, level of income, occupation, employment status, number of children they have, number of children in adolescence age, number of people living at home) and the second section assesses mothers' knowledge level and attitude about the vaccination for HPV and cervical cancer [smear test, familial cervical cancer history, the causes of cervical cancer, protection from cervical cancer, vaccine(s) that protect against cervical cancer, HPV infection, HPV vaccine, gender(s) that can get HPV vaccine, the age range(s) to get the HPV vaccine, whether HPV vaccine is reimbursed within the scope of Turkey's national immunization program].

Statistical analysis

The research data were analyzed using SPSS 21 (Statistical Package for Social Sciences for Windows, version 21.0, IBM Corp., Armonk, NY, U.S., 2012) software package. Excel (Microsoft Excel, Microsoft Corporation, Redmond, WA, U.S., 2019, retrieved from <https://office.microsoft.com/excel>) software was used to generate the charts. The Kolmogorov-Smirnov test was used to determine whether the data conformed to the normal distribution. Descriptive statistics were expressed as mean \pm standard deviation values in the case of continuous variables determined to conform to the normal distribution and as median with minimum and maximum values in the case of continuous variables determined not to conform to the normal distribution. Categorical variables were expressed as frequencies (n) and percentages (%). The Mann-Whitney *U* test and the Kruskal-Wallis test were used to compare the data determined not to conform to the normal distribution. Pearson's chi-squared test was used to compare the categorical data. Multivariate logistic regression (Forward LR) was used to determine the factors that affect mothers' knowledge levels. The results were presented along with Odds Ratio (OR) values within 95% CI. Probability (*p*) values of <0.05 were deemed to indicate statistical significance.

Results

Of the 358 mothers who applied to the outpatient clinic, where this study was conducted, 330 (92.1%) mothers who had children under the age of 18 and agreed to participate in the study constituted the study sample. The mean age of the study sample was calculated as 36.1 (min.19-max.65) years. In terms of sociodemographic characteristics, 23.3% (77) of the participants were elementary school graduates, 58.2% (192) were housewives, 13.9% (46) were healthcare workers, 6% (19) were unemployed, and 15.8% (52) were earning more income

than their expenses, 36.1% (119) were earning less income than their expenses. The mean number of children they had was 2 (min.1-max.5). The rate of mothers whose children were in the adolescent age group was 42.4% (139). The mean number of people living at home was 4.03 (min.2-max.10). The rates of mothers who stated to have been visiting an obstetrician annually for control purposes, who were aware of the smear test, and who had the smear test were 38.8% (128), 75.8% (250), and 49.1% (162), respectively (Table 1).

Additionally, the rate of mothers who stated that they knew the causes of cervical cancer was 30.6% (101). Of these mothers, 74.3% (75) cited infection as the cause of cervical cancer, followed by a virus

Table 1
Characteristics of respondents (*n* = 330).

Characteristics	Categories	n (%)
Education	Primary school	77(23.3)
	Secondary school	47 (14.2)
	High school	90 (27.3)
	University	116(35.2)
Occupation	Healthcare worker	46 (13.9)
	Education worker	28 (8.5)
	Housewife	192 (58.2)
	Others	64 (19.4)
Employment status	No	212 (64.2)
	Yes	118 (35.8)
Economic status	Less than income	116 (32.1)
	Equal to income	172 (52.1)
	More than income	52 (15.8)
Number of children	1	105 (31.8)
	2	126 (38.2)
	>3	99 (30.0)
	Child of in adolescent	Yes
Hearing Smear	No	190 (57.6)
	Yes	250 (75.8)
Have you had a smear test?	No	80 (24.2)
	Yes	162 (49.1)
Annually control by obstetrician	No	168 (50.9)
	Yes	128 (38.8)
Do you know reason of servical cancer?	No	202 (61.2)
	Yes	101 (30.6)
Is it possible to prevent cervical cancer?	No	229 (69.4)
	Yes	210 (63.7)
	I don't know	59 (17.8)
Is there a vaccine for servical cancer?	No	61 (18.5)
	Yes	94 (28.5)
Do you hear HPV?	No	236 (71.5)
	Yes	116 (35.2)
Would you like to get your children vaccinated against HPV?	No	214 (64.8)
	Yes	222 (67.3)
Do you hear HPV Vaccination?	No	108 (32.7)
	Yes	222 (67.3)
Who gets the HPV vaccine?	No	112 (33.9)
	Yes	218 (66.1)
Is HPV vaccine paid?	Girl	72 (21.8)
	Girl & Boy	40 (12.1)
What age group is HPV vaccine administered to?	Yes	81 (24.5)
	No	31 (9.4)
	<1	6 (1.8)
	1–5	4 (1.2)
I don't know	5–9	6(1.8)
	>9	42 (12.8)
	I don't know	54 (16.4)

14.3% (15), and HPV 5.7% (6). The rate of mothers who thought that protection from cervical cancer was possible was 63.7% (210). However, 71.5% (236) of the mothers did not know whether there was a vaccine that protects against cervical cancer. In addition, 33.9% (112) of the participants stated that they had heard of the HPV vaccine, nevertheless, 46.2% (52) of these mothers did not know the age range to get vaccinated. Of the mothers who stated to have heard about the HPV vaccine, 39.2% said that the HPV vaccine is received at 9 years and above, 35.7% said that it could be given to both genders, and 75% knew that the vaccine is not reimbursed. Furthermore, the rate of mothers who said that they were thinking of getting the vaccination was 67.3%. The most common reason stated by those who did not want to get vaccinated for HPV was that they did not have sufficient knowledge about the vaccination and found the vaccination unnecessary.

Among the mothers (91.5%) who stated that they would like to get information about the HPV vaccine, 72.7% (240) stated that they would like to know about the safety of, the level and duration of the protection provided by, the vaccine, and 55.2% (182) stated that they would prefer getting this information from their obstetrician. It was determined that educational status and the level of income were significantly correlated with the awareness of HPV infection and HPV vaccine in the positive direction ($p < 0.001$).

Mothers who had the least knowledge about HPV infection and HPV vaccine were housewives. Of the mother who knew about HPV infection and the HPV vaccine, 95% (44) were healthcare workers, 76.3% (98) were employed and 12.3% (16) were unemployed. There was no significant relationship between having a child in adolescence age and regularly visiting an obstetrician every year and the awareness of HPV infection and HPV vaccine ($p = 0.053$) (Table 2).

It was found that educational status and the level of income were significantly correlated with the awareness of the causes of cervical cancer in a positive direction. Of the mothers, 63.6% said that it was possible to prevent cervical cancer, however, only 28.5% (94) knew about a preventive vaccine for cervical cancer (Table 3).

The rates of mothers who stated to have never heard of the smear test and who never had it done were 24.2% (80) and 50.9% (168), respectively. It was found that working as a healthcare worker significantly correlated with the awareness of the causes of cervical cancer

in a positive direction ($p < 0.001$). Of the mothers, who stated that they would like to have their children get vaccinated, 40.6% (90) said that they would consider having both their daughter(s) and son (s) vaccinated, whereas the remaining mothers said that they would prefer having only their daughter(s) vaccinated.

Discussion

HPV infection, one of the primary causes of many malignancies is a preventable disease. In parallel, the Ministry of Health of the Republic of Turkey has licensed all three HPV vaccines for use in girls and boys aged between 9 and 26, but they are yet to be included in the national immunization program. Instead, they are considered optional vaccines. Therefore, families who would like to get their children vaccinated have to buy the vaccine.

Parents play a key role in immunization decisions (Mendes Lobao et al., 2018). However, it was found that almost 75% of the parents were unaware of cervical cancer vaccination, and 66% were unaware of the HPV vaccine in Turkey, comparable to the rate of parents with knowledge of the HPV vaccination reported seven years ago (Seven et al., 2014). The fact that awareness of the said matters has not increased over time is a matter of concern. In contrast, in Denmark for instance, 84.2% of parents knew about HPV, and the HPV vaccine is included in the national immunization program in Denmark (Della Polla et al., 2020).

In a study conducted in different regions of Indonesia, a country where the HPV vaccine is not included in the national immunization program as in Turkey, it was reported that only 15.8% of families knew about HPV (Jaspers et al., 2011). Taken together with the findings of this study, the results of the said study demonstrate that parents tend to lack awareness about vaccines that are not included in the national immunization program.

While our study asks mothers about HPV vaccine, it is also important to inform young people who are the target group. Recently study in China with 5000 participants, less than a third of the respondents had heard of HPV infection and HPV vaccine, but the desire to be vaccinated was high among those who were not vaccinated (Hu et al., 2021). In Italy, 9988 university students of aged 18–25, were included in the

Table 2
Relationship between demographic findings and awareness of cervical cancer.

	n %		Awareness of Cervical Cancer				value	p
			Yes		No			
			n	%	n	%		
Education						40.933	0.001	
Primary school	77	23.3	7	7.0	70	30.4		
Secondary school	47	14.2	2	2.0	45	19.5		
High school	90	27.3	20	20.0	70	30.4		
University	116	35.2	70	70.0	46	20.0		
Economic status							15.161	0.001
Less than income	106	32.1	12	12.0	94	40.9		
Equal to income	172	52.1	62	62.0	110	47.8		
More than income	52	15.8	26	26.0	26	11.3		
Occupation							41.865	0.001
Healthcare worker	46	13.9	32	32.0	14	6.1		
Education worker	28	8.5	12	12.0	16	7.0		
House wife	192	58.2	22	22.0	170	73.9		
Others	64	19.4	34	34.0	30	13.0		
Child of adolescent							7.125	0.008
Yes	190	57.6	42	42.0	148	64.3		
No	140	42.4	58	58.0	92	35.7		
Employment status							36.618	0.001
Yes	119	36.1	70	70.0	49	21.3		
No	211	63.9	30	30.0	181	78.6		
Annually control by obstetrician							3.798	0.051
Yes	128	38.8	50	50.0	78	33.9		
No	202	61.2	50	50.0	152	66.1		

Table 3
Relationship between demographic findings and awareness of HPV.

	n %		Awareness of HPV				Value	p
			Yes		No			
			n	%	n	%		
Education							51.898	0.001
Primary school	77	23.3	4	3.4	73	34.6		
Secondary school	47	14.2	5	4.2	42	19.6		
High school	90	27.3	28	24.1	62	27.3		
University	116	35.2	80	69.0	36	16.8		
Economic status							24.790	0.001
Less than income	106	32.1	12	10.3	94	43.9		
Equal to income	172	52.1	70	60.3	102	47.7		
More than income	52	15.8	34	29.3	18	8.4		
Occupation							76.768	0.001
Healthcare worker	46	13.9	44	37.9	2	0.9		
Education worker	28	8.5	14	12.1	14	6.5		
House wife	192	58.2	18	15.5	174	81.3		
Others	64	19.4	40	34.5	24	11.2		
Child of adolescent							3.167	0.075
Yes	190	57.6	56	48.3	134	62.6		
No	140	42.4	60	51.7	80	37.4		
Employment status							68.122	0.001
Yes	119	36.1	90	77.6	29	13.1		
No	211	63.9	26	22.4	185	86.9		
Annually control by obstetrician							3.391	0.066
Yes	128	38.8	56	48.3	72	33.6		
No	202	61.2	60	51.7	142	66.4		

survey; HPV and vaccine awareness were 83.3% and 69.9%, respectively (Cocchio et al., 2020). Yılmaz et al. in Turkey, it was found that young adults do not have sufficient knowledge about HPV and HPV vaccine (33%) and the rate of getting HPV vaccine is very low (1%) (Yılmaz et al., 2021). The knowledge level of young people need to be increased in the decision-making processes regarding their own health services. The success rate of protection from HPV infection and cervical cancer will increase by informing not only parents but also young people about HPV vaccine and creating their awareness.

Knowledge of HPV-induced cervical cancer may be influenced by a range of socioeconomic, demographic, and behavioral variables (Bermedo-Carrasco et al., 2015). As a matter of fact, the findings of this study indicated that knowledge of HPV-induced cervical cancer was significantly correlated with a higher degree of educational status and monthly level of income and working as a healthcare professional in a positive direction. These findings are in line with the relevant findings reported in several other studies conducted in various geographies, such as Brazil and Syria (Al saad et al., 2012; Santos et al., 2020).

Although a quarter of the mothers investigated within the scope of this study had never heard of the Papanicolaou (Pap) smear test, which is included in the cervical cancer screening program, and half of them never had a Pap smear test before, approximately 40% of the mothers stated that they visit an obstetrician for routine control every year. In contrast, the rates of mothers who have had a Pap smear once a year and at least once in their lives have been reported in the literature as 72.6% and 87%, respectively (Lima et al., 2013; Santos et al., 2020). It is critical that screening programs becomes more accessible in Turkey. To this end, it would be beneficial for women to be reminded of such screening programs by their obstetrician and family physician during follow-up visits. There was no significant relationship between having a child in adolescence age and regularly visiting an obstetrician every year and the awareness of HPV infection and HPV vaccine.

In a meta-analysis of 79 HPV-related studies by Köse et al. (Köse et al., 2014), it was stated that the average rate of vaccination for HPV among the investigated countries was 46.5% (Newman et al., 2018). In addition, it was stated in the same study that the country with the lowest rate (0.7%) of vaccination for HPV was Turkey (Newman et al., 2018), whereas the country with the highest rate (92.8%) of vaccination for HPV in girls was Denmark (Slätteid Schreiber et al., 2015). In comparison, none of the mothers included in this study had their children vaccinated against HPV. However, 67.3% stated that they would consider getting their children vaccinated, which is higher than the rate of parents (15%) who stated that they would consider getting their children vaccinated reported in Seven et al.'s study seven years ago (Seven et al., 2015).

About one-third of the mothers who stated that they would not have their children vaccinated for HPV explained their said attitude to their lack of knowledge about the HPV vaccine. Therefore, increasing the awareness of families about the HPV infection and HPV vaccine will increase their willingness to protect their children from this precancerous infection. In this context, it is promising that 91.5% of families actually would like to receive information about the HPV infection and HPV vaccine. In parallel, in a systematic review study, it has been reported that parents would like to know more about the HPV vaccine in order to make an informed decision about getting their children vaccinated for HPV (Trim et al., 2012). Doctors' recommendations were found to be a strong predictor in this regard (Oh et al., 2021). Most of the mothers included in this study stated that they would prefer getting information about the HPV infection and HPV vaccine from their obstetrician. This finding may be attributed to the fact that HPV infection especially concerns women in adulthood.

The rate of mothers who stated they would have both their boy (s) and girl (s) vaccinated was found to be 40.6%. In comparison, the rate of boys vaccinated for HPV in developed countries was reported as 40.6% (Newman et al., 2018). It was determined that the mothers included in this study were more enthusiastic about getting their

girl (s) vaccinated for HPV as compared to their boy(s). This finding may be attributed to the families' belief that HPV infection primarily affects women, which is a misbelief considering that vaccination for HPV reduces the incidence of penis, anal, head, and neck cancers. The evidence for the cost-effectiveness of getting boys vaccinated for HPV is limited and questionable (Linertova et al., 2021). Yet, vaccinating boys for HPV in addition to girls may help countries with low HPV vaccination rates to reduce the burden of HPV-related disorders.

Practice implications

Although the existence of a vaccine for HPV-related precancerous conditions is comforting for the future, the low vaccination rates are worrisome. The first condition of solving this problem would be providing the necessary education by explaining this viral infection and its effects on families and young people. Inclusion of the HPV vaccine in the national immunization program would be also beneficial. In this way, parents would not refrain from vaccinating their children for HPV due to financial concerns

Limitations of the study

This study addressed the attitudes of mothers with children aged under 18 years old in Turkey about the causes of cervical cancer, HPV infection, and HPV vaccine. The primary limitation of the study was that it was carried out as a single-center study, thus the results may not be generalized to the whole country. Further studies that will include mothers followed by pediatric and family providers may better reflect their attitudes towards the HPV vaccine.

Conclusion

>90% of cervical cancer deaths occur in low- and medium-income countries (LMICs), which have a limited capacity to initiate comprehensive national screening and pre-cancer treatment programs necessary for the prevention of cervical cancer-related deaths. The development of vaccines against HPV has significantly changed the approach used in the treatment of cervical cancer. As of 2021, 56 LMICs (41% of all LMICs) have launched national HPV vaccination campaigns. Based on the findings of this study, which revealed that mothers had limited awareness about HPV infection, it is important that Turkey also launches such a national HPV vaccination campaign in the near future. To this end, healthcare professionals have a great responsibility to inform the public about the HPV vaccine.

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Availability of data and material

N/A.

Code availability

N/A.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. The study was approved by the University of Health Sciences, Samsun Education and Research Hospital Non-Interventional Clinical Research Ethics Committee (BAEK2022/1/2).

Consent to participate

Informed consent was obtained from legal guardians to participate.

Authorship contribution

The contributions of all authors must be described in the following manner. The authors confirm contribution to the paper as follows: study conception and design: G.A., U.A.; data collection: G.A.; analysis and interpretation of results: U.A.; draft manuscript preparation: G.A., U.A. All authors reviewed the results and approved the final version of the manuscript.

Declaration of Competing Interest

The authors have declared that there is no conflict of interest.

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