Original Article

The Relationship Between Mothers' Attitudes and Beliefs Regarding the Human Papillomavirus Vaccine and Their Levels of Knowledge About Cervical Cancer and Fear of Cancer

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Abstract
Background and Objectives: Globally, cervical cancer is the most common cancer caused by the human papillomavirus. This study was conducted to determine the relationship between mothers' attitudes and beliefs regarding the HPV vaccine, and their knowledge of and fear surrounding cervical cancer.
Materials and Methods: This is a descriptive study. It was conducted between January and December 2025. The sample consisted of 304 mothers. Data were collected using demographic information forms and the following scales: the Cervical Cancer Knowledge Scale, the Carolina HPV Immunization Attitudes and Beliefs Scale and the Fear of Cancer Scale. Independent simple t-tests, ANOVA and Pearson correlation analyses were applied to evaluate the study data. The necessary permissions were obtained from the ethics committee, the institution and the participants in order to carry out the study.
Results: While no significant relationship was found between participants' mean scores on the Cervical Cancer Knowledge Scale and the mean scores on the harms, barriers, and effects subscales of the Carolina HPV Immunization Attitudes and Beliefs Scale ($p>0.05$), a significant relationship was found between participants' mean scores on the uncertainty subscale ($p< 0.05$). No significant relationship was found between the mean scores on the Fear of Cancer Scale and the subscales of the Carolina HPV Immunization Attitudes and Beliefs Scale ($p>0.05$).
Conclusions: It is crucial to raise parents' awareness of cervical cancer, human papillomavirus and the human papillomavirus vaccine. Furthermore, interventional studies are recommended to reduce fear of cancer, and the study should be repeated with a larger sample that includes fathers.

Keywords: Cervical Cancer, Human Papillomavirus, Human Papillomavirus Vaccine, Fear of Cancer

Introduction

Cervical cancer is a significant public health issue. It is the eighth most common cancer worldwide and the ninth leading cause of cancer-related deaths (WHO, 2024). The highest incidence and mortality rates are found in low- and middle-income countries. This situation reflects significant inequalities stemming from a lack of access to national human papillomavirus (HPV) vaccination programmes, cervical screening services and treatment, and social and economic factors (WHO, 2022).

Globally, cervical cancer is the most common cancer caused by HPV (Alti & Gol, 2022). HPV-related diseases can be prevented through prophylactic vaccination, primary prevention, and regular screening (Grandahl

et al., 2018; Bruni et al., 2016; WHO, 2022). The HPV vaccine is administered worldwide as part of vaccination programmes, primarily targeting young girls (Grandahl, 2018; Bruni, 2016). However, it is not included in Turkey's national immunisation schedule (Koc et al., 2022).

Parents play a significant role in the decision-making process regarding the HPV vaccine for children (Alti & Gol, 2022). Positive parental beliefs and attitudes are key predictors of HPV vaccination. Studies indicate that parents who perceive the HPV vaccine to be highly beneficial and effective in protecting against serious illness are more likely to have their children vaccinated (Grandahl et al., 2018; Madhivanan et al., 2014; Underwood et al., 2016).. Therefore, it is crucial to understand parents' attitudes and beliefs regarding the HPV vaccine.

In particular, it is necessary to identify the factors preventing them from having their children vaccinated. Reasons why parents do not wish to have their children vaccinated include concerns about the vaccine's side effects, worries about long-term storage and a lack of sufficient information about the HPV vaccine (Grandahl, 2018; Ogilvie, 2010), as well as fear of developing cervical cancer.

Studies conducted in various contexts indicate that parents' knowledge of HPV and the HPV vaccine is generally low (Grandahl et al., 2018; Assoumou, 2015; Wen, 2014). Studies of vaccination programmes in developed countries have reported low to moderate levels of HPV knowledge and awareness, and although willingness to be vaccinated is high, vaccination rates (26–55%) do not reach the desired level (Giambi, 2014; Dodd, 2014). A study by Saylam and colleagues found that only 16.6% of participants were aware of HPV, while 68% had never heard of the HPV vaccine (Saylam, 2016).

A lack of sufficient knowledge about cervical cancer and HPV among women may influence their fear of developing cancer. One study indicated that individuals are concerned about receiving a negative result from an HPV test and therefore avoid getting tested (Hendry, 2012). As studies on HPV in Turkey are limited, determining knowledge and attitudes regarding HPV infection and the HPV vaccine is believed to contribute to the existing literature on the subject. Furthermore, individuals' fear of developing cancer may prevent them from engaging in certain behaviours. The fear of cancer is a significant public health issue that needs to be addressed in areas such as early diagnosis and screening, and access to healthcare services. Therefore, it is important to assess the level of cancer-related fear within the population.

Furthermore, the findings of this study will provide a valuable database for examining levels of knowledge about cervical cancer among mothers, their attitudes and beliefs regarding the HPV vaccine, and their fears of cancer. The knowledge and approaches of healthcare professionals, particularly nurses, are also crucial in fostering positive health behaviours within the community. Nurses are responsible for safeguarding and promoting the health of both themselves and the individuals in their care (Satilmisoulu et al., 2018). Consequently, the study's findings will guide nurses in planning preventive healthcare services.

This study aims to determine the relationship between mothers' attitudes and beliefs regarding the human papillomavirus (HPV) vaccine, their knowledge of cervical cancer, and their fear of cancer.

Materials and methods

Population and sample: This descriptive study was conducted between January and December 2025. The study population consisted of 1,404 mothers of girls aged 10–18 who lived in the catchment area of a Family Health Centre. A sample of 304 mothers was selected using a calculation based on the known population size. Research data were collected by the researchers through face-to-face interviews. Completion of the questionnaires took approximately 10–15 minutes**.**

Data collection: The following instruments were used to collect the data: a form to collect demographic information, the Cervical Cancer Knowledge Scale, the Carolina HPV Immunization Attitudes and Beliefs Scale and the Fear of Cancer Scale .

1. Introductory Information Form: This form was created by researchers and contains 13 questions.

2. Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS): This scale was developed by McRee et al. (2010) and its reliability was assessed in Turkish by Sunar and Kahyaoulu Sut (2019). It consists of 14 items and comprises four sub-dimensions. The first factor, 'Damages', uses a 4-point Likert scale (1 = Strongly disagree, 2 = Somewhat disagree, 3 = Somewhat agree, 4 = Strongly agree) and consists of six items. The second factor, 'Barriers', uses a 3-point Likert scale (1 = Not at all difficult, 2 = Somewhat difficult, 3 = Very difficult). It comprises four items. The third factor, 'Effects', uses a 4-point Likert scale (1 = very little effect, 2 = moderate effect, 3 = significant effect, 4 = very significant effect). This factor comprises two items. The fourth factor, 'Uncertainty', is a four-point Likert scale (1 = Strongly disagree, 2 = Somewhat disagree, 3 = Somewhat agree, 4 = Strongly agree) and comprises two items. Scoring is based on the mean of each subscale. The Cronbach's alpha coefficient for the scale is reported as 0.62 (Sunar & Kahyaoulu Sut, 2019). The Cronbach's alpha value for this study was found to be 0.64.

3. Cervical Cancer Knowledge Scale (CCKS): A Turkish study was conducted by Ergoz Aksoy and Biglic in 2024 to examine the validity and reliability of the CCKS (Ergoz et al., 2024), which was developed by Haward and colleagues in 2022 (Haward et al., 2022). The scale is a 8-item, single-subdimension Likert-type measure. Items on the scale are scored between 0 and 1 point: a correct answer is awarded 1 point, while an incorrect answer or 'don't know' is scored as 0 points. Only the first item is reverse-scored. The lowest possible total score on the CCKS is 0 and the highest is 8; as the total score increases, so does the level of knowledge regarding cervical cancer. The Cronbach's alpha value for the CCKS total was previously determined to be 0.80; in this study, it was found to be 0.90.

4. Fear of Cancer Scale (FOCS): It was developed by Feng et al. (Feng et al., 2022) and the validity and reliability of the Turkish version were studied by Ozturk and Kuday (Ozturk & Kuday, 2025). The scale consists of 17 items in total, divided into two sub-dimensions: direct fear and indirect fear. Each item is rated on a 5-point Likert scale (0 = Strongly Disagree, 1 = Disagree, 2 = Undecided, 3 = Agree, 4 = Strongly Agree). The total score obtainable from the scale ranges from 0 to 68. Higher scores on the scale indicate a higher level of fear of cancer. The scale's overall Cronbach's alpha value was determined to be 0.920; in this study, it was found to be 0.73.

Statistical analysis: The data were analysed using the Statistical Package for the Social Sciences (SPSS 26.0). Skewness and kurtosis values were considered to assess conformity to a normal distribution. Descriptive statistics (frequencies, percentages and mean values) were used to evaluate the data, and independent simple t-tests, ANOVA tests and Pearson correlation analyses were performed as statistical tests. A p-value of less than 0.05 was accepted as an indicator of a statistically significant difference.

Ethical considerations: Permission to conduct this study was obtained from the Clinical Research Ethics Committee of Harran University (14 July 2025, Session No. 13, Decision No. 06), the Provincial Health Directorate, the authors of the scales used and the participants.

Results

Of the study participants, 54.3% were aged between 36 and 61, 80.9% had completed secondary education and below, 83.9% were unemployed, and 45.4% had a average income. 84.5% of participants stated that they had not heard of the HPV vaccine, while 80.6 percent indicated that they would like to receive education about HPV and the HPV vaccine.

All participants stated that they had not received the HPV vaccine themselves or had it administered to their daughters. 73.7% cited a lack of sufficient information about the vaccine as the reason for not receiving it (Table 1).

Examination of the mean scores for the subscales of the CHIAS among the study participants revealed the following: harms (15.52 ± 2.82); barriers (10.06 ± 1.79); effects (4.58 ± 1.52); and uncertainty (7.27 ± 0.74). The mean scores for the CCKS were 3.70 ± 2.72, while those for the FOCS were 42.19 ± 6.79.

No significant difference was found in the mean scores of the CCKS and the FOCS

according to the participants' socio-demographic characteristics ($p>0.05$). A significant difference was found in the harms, barriers and uncertainty subscales of the CHIAS according to age; in the uncertainty subscale according to educational level; in the harms and uncertainty subscales according to whether participants had heard of the HPV vaccine; and in the harms subscale according to the desire to receive education about HPV and the HPV vaccine ($p<0.05$) (Table 2).

A negative, very weakly significant correlation was found between participants' mean scores on the CCKS and the uncertainty subscale of the CHIAS ($r = -0.167$, $p = 0.003$) (Table 3).

Table 1. Socio-demographic characteristics of the participants

Variables	Number	Percentage
Age		
Ages 19-35	139	45.7
Ages 36-61	165	54.3
Educational status		
Secondary education and below	246	80.9
High School and above	58	19.1
Income status		
Good	60	19.7
Average	138	45.4
Poor	106	34.9
Employment status		
Employed	49	16.1
Unemployed	255	83.9
Hearing about the HPV		
I heard	47	15.5
I didn't hear	257	84.5
Where they heard about the HPV vaccine (n=47)		

Healthcare staff	31	66.0
Social media	16	34.0
Mother's HPV vaccination status		
Mother vaccinated	---	---
Mother not vaccinated	304	100.0
Whether they had their daughter vaccinated against HPV		
Vaccinated	---	---
Not vaccinated	304	100.0
Knowing when to get the HPV vaccine		
I don't know	247	81.3
Aged 9–12	38	12.5
Aged 13–26	16	5.3
Over 26	3	1.0
Reason(s) for not having the HPV vaccine		
I don't have enough information about the vaccine	224	73.7
I think it's unnecessary	13	4.3
There isn't enough information about the vaccine's effectiveness	22	7.2
I'm worried about the vaccine's side effects	14	4.6
It's too expensive	31	10.2
Would like to receive information about HPV and the HPV vaccine		
I want information	245	80.6
I don't want information	59	19.4

Table 2. Comparison of participants' socio-demographic characteristics with mean scores on the Cervical Cancer Knowledge Scale, the Fear of Cancer Scale and the Karolina HPV Vaccination Attitudes and Beliefs Scale

Variables	CCKS Mean ±SD	FOCS Mean ± SD	Harms Mean ± SD	Barriers Mean ± SD	Effects Mean ± SD	Uncertainty Mean ± SD
Age						
19-35	3.64±2.75	42.42±6.93	15.97±2.66	10.28±1.72	4.51±1.52	7.17±0.76
36-61	3.75±2.71	41.99±6.68	15.14±2.89	9.87±1.83	4.64±1.52	7.35±0.73
p	0.741	0.583	**0.011**	**0.045**	0.434	**0.032**
Educational status						
Secondary education and below	3.55±2.67	42.26± 6.70	15.48±2.82	10.00±1.81	4.64±1.50	7.32±0.71
High school and above	4.32±2.87	41.87±7.18	15.67±2.80	10.32±1.72	4.34±1.58	7.03±0.85
p	0.053	0.698	0.655	0.212	0.182	**0.007**
Income status						
Good	4.06± 2.57	41.73±5.83	15.93±2.40	10.21±1.70	4.56±1.49	7.13±0.76
Average	3.76±2.69	42.63±7.08	15.46±2.79	10.08±1.78	4.43±1.41	7.28±0.77
Poor	3.41±2.84	41.86±6.93	15.36±3.06	9.94±1.86	4.79±1.65	7.33±0.70
p	0.314	0.576	0.440	0.629	0.191	0.230
Employment status						
Employed	3.71± 2.83	43.55±6.00	15.53±2.81	10.16±1.73	4.32±1.54	7.16±0.74

Unemployed	3.70± 2.71	41.92±6.91	15.52±2.82	10.04±1.81	4.63±1.51	7.29±0.75
p	0.977	0.126	0.984	0.669	0.194	0.264
Hearing of the HPV vaccine						
I heard	4.25±2.83	41.63±7.03	16.29±2.42	10.29±1.78	4.46±1.65	7.04±0.85
I didn't hear	3.60±2.70	42.29± 6.75	15.38±2.86	10.01±1.79	4.60±1.50	7.31±0.72
p	0.132	0.545	**0.040**	0.329	0.566	**0.022**
I would like to receive information about HPV and the HPV vaccine						
Yes	3.61±3.71	41.99±6.57	15.34±2.90	10.11±1.79	4.60±1.49	7.31±0.70
No	4.08±2.79	43.00±7.62	16.27±2.29	9.84±1.81	4.49±1.65	7.10±0.88
p	0.233	0.309	**0.010**	0.307	0.599	0.050

Table 3. Correlations between participants' scores on the Karolina HPV Vaccination Attitudes and Beliefs Scale, the Cervical Cancer Knowledge Scale and the Fear of Cancer Scale, and their sub-dimensions

Scales	**The Karolina HPV Vaccination Attitudes and Beliefs Scale**			
	Harms	**Barriers**	**Effects**	**Uncertainty**
Cervical Cancer Knowledge Scale	r=.007 p=.902	r= .101 p= .080	r= -.084 p= .146	r= - .167 **p= .003**
Fear of Cancer Scale	r= .102 p= .075	r= .002 p= .969	r= .052 p=.366	r=-.018 p=.254

Discussion

In the study, more than half of the mothers (84.5%) stated that they had not heard of the HPV vaccine, and all of them reported that they had not received it. These findings are supported by the literature (Altinel Acoulu et al., 2019; Altun, 2023; Alti & Gol, 2022). Another study reported that 61.4% of participants had heard of the HPV vaccine (Sautas, 2023). The fact that most mothers in this study had not heard of the HPV vaccine and none had received it reflects cultural characteristics. Due to the cultural characteristics of the society in which they live, these topics are considered private and individuals feel embarrassed when discussing them.

In this study, the majority of mothers stated that they had not vaccinated their children against HPV because they lacked sufficient information about the vaccine (73.7%), considered it too expensive (10.2%), lacked information about its efficacy (7.2%), were afraid of its side effects (4.6%) or considered it unnecessary (4.3%). According to the literature, the biggest barrier to receiving the HPV vaccine is a lack of information (Satilmisoulu et al., 2018).

A study has identified factors hindering the uptake of the HPV vaccine. These include the cost of the vaccine, its potential side effects, concerns about vaccine safety and negative news coverage of vaccines in general (Taebi, 2019). Furthermore, the study found that the average score of mothers on the CCKS was low (3.75 ± 3.09).

Anothr study in the literature have indicated that individuals' knowledge of cervical cancer (Amer et al., 2026) and the HPV vaccine (Turker & Catak, 2022; Alti & Gol, 2022; Gokcay et al.) is insufficient. These findings support the results of our study. Furthermore, these findings may suggest that information about women's cancers is not openly shared due to societal cultural characteristics. This study found that more than half of mothers (80.6%) wanted information about HPV and the HPV vaccine.

It is crucial to inform parents of adolescent girls about the vaccine. As the HPV vaccine is believed to be more effective in the 10–18 age group, educating parents about the vaccine and its importance will encourage their daughters to get vaccinated (Sunar & Sut, 2019). Consequently, the willingness of more than half of women to receive education emerges as a facilitating factor in the planning of future initiatives.

Parents' beliefs regarding the HPV vaccine significantly influence their decisions to have their adolescent daughters vaccinated (McRee et al., 2010; Marshall et al., 2019; Newman et al., 2018). In this study, average levels of scores were found for the 'harm' subscale (15.52 ± 2.82) and 'effects' subscale (4.58 ± 1.52), whilst high levels of scores were found for the 'barriers' subscale (10.06 ± 1.79) and 'uncertainty' subscale (7.27 ± 0.74).

Another study found the following subscale scores for the CHIAS: harm (13.8 ± 3.37), barriers (8.53 ± 1.97), effects (4.61 ± 1.30) and uncertainty (4.42 ± 1.21) (Yurtcu et al., 2019). Another study found that the mean scores for the KHATIO sub-dimensions of 'harm', 'barriers', 'effects' and 'uncertainty' were '14.20 ± 3.46', '8.36 ± 2.41', '4.76 ± 1.56' and '4.75 ± 1.17', respectively (Alti & Gol, 2022). In Gokcay's study, the mean scores for the CHIAS sub-dimensions were found to be 13.56 ± 4.78 for harms, 8.63 ± 2.213 for barriers, and 6.03 ± 4.26 for both effects and uncertainty (Gokcay et al., 2024). Mothers' attitudes and beliefs regarding HPV vaccination influence the decision to have the vaccine administered. The study's findings are significant in that they demonstrate the need to improve these attitudes and beliefs positively.

Fear of cancer has been linked to significant public health issues (Vrinten, 2017). This study found that the mean scores on the mothers' FOCS were high (42.19 ± 6.79).

Perceptions are important in determining whether individuals will engage in early detection behaviours. The fear experienced by individuals has been cited as a factor that inhibits such behaviours, and in some cases it can play a dual role in their occurrence (Ersin et al., 2018).

This study found that a mother's age, her awareness of the HPV vaccine, and her desire to obtain information about HPV and the HPV vaccine influenced the 'harms' subscale of the Carolina HPV Vaccination Attitudes and Beliefs Scale. Furthermore, the study found that mothers aged 36–61, those with a low level of education, and those who had not heard of the HPV vaccine had significantly higher scores on the uncertainty subscale of the scale. The findings of this study therefore highlight the need for initiatives to raise awareness among mothers of cervical cancer, its prevention, HPV and the HPV vaccine.

Furthermore, the significantly higher levels of perceived barriers reported by mothers aged 19–35 in the study may be related to how individuals perceive their own health. This is because, in the community where the study was conducted, the inability to openly discuss these topics, coupled with women's tendency not to prioritise their own health due to their responsibilities, supports these findings.

This study found that there is a significant difference in the uncertainty subscales of the CHIAS among mothers who have heard of the HPV vaccine, as expected. The first and most important step in health education is raising awareness and bringing about behavioural change through education; this is because there is a relationship between knowledge and behaviour whereby imparting knowledge can change attitudes, which can then lead to behavioural change (Ghalavandi et al., 2021).

This study found a negative, very weakly significant association between mothers' mean scores on the cervical cancer knowledge scale and the CHIAS uncertainty subscale. It can be concluded that as mothers' knowledge of cervical cancer increases, their uncertainty regarding HPV vaccination attitudes and beliefs decreases. No studies examining the relationship between mean scores on the CCKS and the FOCS and CHIAS were found in the literature.

In studies by Gokcay et al., a very weak negative correlation was found between individuals' knowledge of HPV and their overall attitude towards the HPV vaccine, as well as the subdimensions of harm, barriers, and uncertainty.

This study found no significant relationship between the mean FOCS score and the mean subdimension scores of the CHIAS. Cancer fear is defined as a multidimensional construct that hinders women's participation in early diagnosis and screening programmes (Consedine et al., 2004; Vrinten et al., 2017). These results suggest that mothers are not sufficiently aware of issues such as cancer, HPV and the HPV vaccine.

Limitations of the study: The study was conducted exclusively among mothers. As the HPV vaccine is also available for boys, this means that the study only involved mothers of girls, which is a significant limitation.

Conclusions and recommendations: A review of the findings of this study and the relevant literature reveals that individuals have insufficient awareness of cervical cancer and the HPV vaccine, and wish to obtain more information about them. It is therefore crucial to expand and ensure the continuity of awareness-raising initiatives. Furthermore, there is a clear need to implement initiatives that improve mothers' access to healthcare services. When planning health education programmes, it would therefore be beneficial to consider the factors that hinder individuals' attitudes, as well as their cultural characteristics.

A significant difference was found between the mean scores of the CCKS and the Uncertainty Subscale of the CHIAS ($r = -0.167$, $p = 0.003$). No studies examining the relationship between the mean scores of the CCKS and the FOCS, or between the

mean scores of the CCKS and the CHIAS, have been identified in the literature. In this respect, the results of our study are significant. Reproducing the study with larger samples and including fathers would contribute to the literature.

Furthermore, the study's findings highlight the need for targeted interventions to identify parents' information needs, improve their attitudes towards the HPV vaccine and increase vaccination rates.

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