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Examination of the Relationship between Parents' Attitudes and Beliefs about Human Papillomavirus Vaccine and Health Literacy

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Abstract

Objective: This study was conducted to examine the relationship between the attitudes and beliefs of parents about Human papillomavirus vaccine and their health literacy.

Methods: The sample of this descriptive and cross-sectional study consisted of 599 parents who volunteered to participate in the study and had access to our survey sent from the parent whatsapp groups of a secondary school located in rural areas in the central region of Türkiye. A Descriptive Information Form, the Carolina HPV Vaccination Attitudes and Beliefs Scale, and Turkey Health Literacy Scale-32 were used to collect research data.

Results: The mean age of 56.8% (n: 340) of the parents was ≥ 45 years, 68.4% (n:410) were women, 49.6% (n:297) had primary education, 92.0% (n:551) did not have a history of cervical cancer in their mothers, 89.8% (n:538) did not have a history of cervical cancer in their family, 92.2% (n:552) had not had their children vaccinated against HPV. Also, 28.4% (n= 170) of the participants had received information about the HPV vaccine from health personnel. It was determined that the risk of not having the child vaccinated was 1.320 times higher in participants with an equal income and expenses than in those whose income was higher than their expenses and that it was 4.514 times higher in participants with no family history of cervical cancer than in those with a history of this cancer type.

Conclusion: In the study, it was concluded that those whose income was equal to their expenses and those who did not have a family history of cervical cancer had a higher risk of not having their child vaccinated and that the high level of health literacy of the parents positively affected their attitudes and beliefs about human papilloma virus vaccination. As the parents' level of health literacy increased, the rate of getting their children vaccinated against HPV increased significantly. Considering this situation, it is thought that knowledge of vaccines can be increased, attitudes and beliefs can be improved, and vaccination rates can be increased by targeting health literacy in the interventions to be implemented.

Keywords: Human papillomavirus, vaccine, parent, attitude, belief, health literacy

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INTRODUCTION

Human papillomavirus (HPV) is one of the most common and often sexually transmitted infections (1). While there are over 200 HPV types, HPV 16 and 18 are the most common oncogenic types. HPV types 31, 33, 45, 52, and 58 are less prevalent. HPV types 6 and 11 are responsible for 90% of anogenital warts (2). Genital HPV infections are important because they cause cancer-precancerous lesions. Each type has a different risk for developing cancer. For example, while the risk for developing cervical cancer in a woman infected with HPV type 6 is 4 times higher, this risk can increase up to 282 times in women infected with HPV type 16 (3). The biggest cause of cervical cancer is HPV (4). Nine out of ten cervical cancer cases develop from HPV (5, 6). Cervical cancer is the fourth most common cancer among women globally and ranks eighth place in Turkey (7, 8). While approximately 570.000 new cervical cancer cases are seen worldwide every year, more than half of these result in death (8,9).

HPV vaccines are highly effective in preventing infection with the HPV types that they target. Many studies have shown that HPV vaccines are safe and effective (10, 11). Besides, HPV vaccines protect against new HPV infections but do not treat existing ones or diseases (12). There are 3 types of HPV vaccines, namely, Gardasil, Gardasil 9, and Cervarix, which have been approved by the Food and Drug Administration (FDA) to prevent HPV infection. Gardasil, a quadrivalent vaccine, was approved in 2006. It targets HPV types 6, 11, 16, and 18. The bivalent vaccine Cervarix, which was approved in 2009, protects against HPV types 16 and 18. Gardasil 9, which was approved in 2014, targets HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58 and is recommended for girls and boys aged 9-26 (13). All of these vaccines were licensed in Turkey in 2007 and 2017, Gardasil 9 vaccine can be ordered from pharmacies in Turkey. According to the currently adopted approach, HPV vaccines should be given before individuals become sexually active. Although the age to get the HPV vaccine varies according to the vaccination program of each country, the recommended age range for vaccination in Turkey is often 9-26 (13). Recent data suggest that protection against targeted HPV genotypes lasts at least 10 years with Gardasil, 9 years with Cervarix, and 6 years with Gardasil 9 (14). As of 2019, one hundred countries around the world included the HPV vaccine in their national vaccination programs (World Health Organization, 2020). In Türkiye, the HPV vaccine is not included in the national immunization program and can be administered in health institutions if individuals obtain the vaccine themselves (13, 15).

Parents' adequate and evidence-based

knowledge of HPV infection and vaccines, their awareness about the developments on the subject, and attitudes and beliefs about vaccination are important in that they are in a decision-making position for the vaccination of their children both in childhood and adolescence. The fact that the HPV vaccine is not included in the National Immunization Program in Türkiye further increases the meaning and importance of the issue. Health literacy (HL), on the other hand, comes to the fore as it is effective in the level of parents' vaccination knowledge (16). Therefore, in the current study, we aimed to examine the relationship between parents' attitudes and beliefs about the HPV vaccine and HL levels.

METHODS

Study design and Participants

A cross-sectional and descriptive design was used in the study. The survey link created via Google forms was sent to the parents via the school whatsapp groups between May 15, 2021 and May 30, 2021.

Inclusion Criteria for Research

- Volunteering to participate in the study,
- Having a daughter between the ages of 10-18,
- Ability to read and write and
- Accessing the survey sent via whatsapp.

Sample Size Calculation

The population of the study consisted of parents (832 people) of students in a secondary school located in a rural area in the central region of Türkiye. The sample size was calculated by doing a power analysis, and it was determined as 537 people, based on an error level of α=0.005 and a power value of 99.9%. We aimed to contact the maximum number of people that could be reached within the specified date range and completed the study with 599 parents (n: 599).

Data Collection Tools

The Descriptive Information Form: This form was prepared by the researchers in light of the literature. It consists of a total of 15 questions about the socio-demographic characteristics of the participants, the presence of cervical cancer in the mother and family, mothers' status of having their daughters vaccinated against HPV, and the status of obtaining information about HPV (3, 4, 11, 19, 21, 24, and 25).

The Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS): This scale was developed by McRee et al. in 2010 to evaluate the attitudes and beliefs of parents with adolescent children about HPV vaccination. The scale consists of 16 items and 4 sub-dimensions. 1. Harms sub-dimension: it consists of 6 items and covers the perceived potential harms of the vaccine, including health problems, and girls' status of being sexually active. 2. Perceived barriers sub-dimension: it consists of 5 items and covers

perceived barriers to HPV vaccination, including access to a healthcare provider and its cost. 3. Effectiveness sub-dimension: it consists of 2 items and covers the perceived effectiveness of the HPV vaccine in protecting against genital warts and cervical cancer. 4. Uncertainty sub-dimension: it consists of 3 items and is used to evaluate the availability of enough information about the HPV vaccine and the perception of vaccination norms of society. The item order of the original scale and that of the scale used in this study are the same. The harms sub-dimension includes items 1, 2, 3, 4, 5, and 6 and has a 4-point Likert-type scale (1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree). 2. The barriers sub-dimension contains items 7, 8, 9, 10, and 11 and has a 3-point Likert-type scale (1 = not difficult at all, 2 = somewhat difficult, 3 = very difficult). The effectiveness sub-dimension contains items 12 and 13 and has a 4-point Likert-type scale (1=very little effective, 2=moderately effective, 3=very effective, 4=highly effective). The uncertainty sub-dimension includes items 14, 15, and 16 and has a 4-point Likert-type scale (1=strongly disagree, 2=somewhat disagree, 3= somewhat agree, 4=strongly agree). On the original scale, the possible range for all subscale scores is between 1.0 and 4.0. The acceptable Cronbach's alpha values for the sub-dimensions are as follows: harms, α=0.69; perceived barriers, α=0.69; effectiveness, α= 0.61; uncertainty, α=0.66. A high score on the scale indicates high levels of HPV attitudes and beliefs. According to the literature, the scale does not have a cutoff score (17, 18).

Turkish Health Literacy Scale-32 (THLS-32): This scale, which was developed by Okyay et al., is used to evaluate health literacy in individuals who are literate and over the age of 15. It is based on the conceptual framework developed by the European Health Literacy Research Consortium. The scale consists of two health-related sub-dimensions, namely, “healthcare” and “disease prevention and health promotion” and four processes of obtaining information about health-related decision-making and practices (access, understand, appraise, and apply). Cronbach's alpha value for the overall scale is 0.93, and 0.88 for the "healthcare" sub-dimension, and 0.86 for the "disease protection and health promotion" sub-dimension. Each item is graded as 1=very difficult, 2=difficult, 3=easy, 4=very easy, and 5=I don't know. During the calculation of the score, the codes should be re-coded as 1-4, 4-1. To facilitate the calculation process, the total score was standardized with the help of the formula "Index=(arithmetic mean-1) x [50/3]" to obtain values between 0-50. A score of 0 on the scale indicates the lowest level of health literacy, while a score of 50 indicates the highest level. The level of HL can also be interpreted

categorically as follows: inadequate: (0-25 points); problematic-limited (>25-33 points); adequate: (>33-42 points); excellent (>42-50 points) (19, 20).

Procedures

The data were collected by sending the survey link to the parents who volunteered to participate in the research and met the participation criteria, via the school parent whatsapp groups.

Ethics of the Study

At the outset, written approval of the Non-Invasive Clinical Research Ethics Committee of Cukurova University Faculty of Medicine (number: 111/114; date: 21.05.2021) was obtained. After obtaining the necessary institutional permissions, the questionnaire link was sent to the school parent WhatsApp groups. In addition, before the survey was initiated, participants' consent was obtained via an online connection. During the study, the principles of the Declaration of Helsinki were followed.

Statistical Analysis

Statistical analyses were conducted on the SPSS (IBM SPSS Statistics 24) statistical software package. Frequency tables and descriptive statistics were used to interpret the findings. Non-parametric methods were used for the measurement values that did not show a normal distribution. Accordingly, the "Mann-Whitney U" test (Z-table value) was used to compare the measurement values of two independent groups, and the "Kruskal-Wallis H" test (χ2-table value) was used to compare the measurement values of three or more independent groups. The Bonferroni correction method was employed for paired comparisons of variables with a significant difference in three or more groups. The Spearman correlation coefficient was used to examine the relationship between measurement values that did not have a normal distribution. The Binary-Logistic regression model was used to determine the factors affecting not having the child vaccinated. P <0.05 was accepted as the statistical significance value.

RESULTS

The mean age of the parents was 45.17±6.62 (years), and 340 (56.8%) of them were in the ≥45 age group. Also, 410 (68.4%) of them were female, 258 (43.1%) were born in a province, and the longest place of residence of 364 participants (60.8%) was a province. It was determined that 297 of the parents (49.6%) had primary education, 343 (57.3%) were employed, and 352 (58.8%) had equal income and expenses. In addition, the mothers of 551 (92.0%) of the participants did not have a history of cervical cancer, 538 (89.8%) of them did not have a family history of cervical cancer, 552 (92.2%) had not had their children get the HPV vaccine, 305 (50.9%) had not received information about the HPV vaccine, and 170 (28.4%) had received information about the vaccine from

health personnel.

Cronbach's alpha was found as 0.971 for the THLS-32 and 0.717 for the CHIAS. It was determined that parents' responses to the scales were generally quite reliable (Table 1).

A statistically significant difference was found between the scores of the participants on the overall CHIAS and harms and effectiveness sub-dimensions according to age groups and gender (Z=-3.527, p<0.001; Z=-3.572, p<0.001; Z=-2.239, p=0.025; Z=-2.890, p=0.004; Z=-3.542, p<0.001; Z=-2.031; p=0.042, respectively). The scores of female participants and those who were aged <45 from the total CHIAS and harms and effectiveness sub-dimensions were significantly higher than the scores of those in the ≥45 age group (Table 2)

There was a statistically significant difference between the scores of the participants on the total CHIAS and harms, perceived barriers, effectiveness, and uncertainty sub-dimensions according to the place of birth ($\chi2$=31.75, p=0.000; $\chi2$=49.318, p=0.000; $\chi2$=23.490, p=0.000; $\chi2$=16.075, p=0.000; $\chi2$=30.050, p=0.000, respectively). The difference was significant between those who were born in a province and those born in a district or village (Table 2).

A statistically significant difference was found in terms of scores obtained from the THLS-32, total CHIAS, and harms, perceived barriers, and uncertainty sub-dimensions according to the longest place of residence ($\chi2$=14.652, p=0.001; $\chi2$=30.328, p=0.000; $\chi2$=48.184, p=0.000; $\chi2$=12.765, p=0.002; $\chi2$=10.265, p=0.006, respectively). The score of the participants who lived in a province or district on the THLS-32 was significantly higher than the score of those who lived in a village. The score of those who lived in a province on the total CHIAS and the harms sub-dimension was significantly higher than the score of those living in a district or village (Table 2).

The scores of the participants on the overall CHIAS and harms, effectiveness, and uncertainty sub-dimensions yielded a statistically significant difference according to education level ($\chi2$=44.182, p=0.000; $\chi2$=59.706, p=0.000; $\chi2$=8.877, p=0.012; $\chi2$=26.579, p=0.000, respectively). The significant difference was observed between participants who had primary school education and those who had high school and university or higher education (Table 2).

There was a statistically significant difference in terms of THLS-32 scores, total CHIAS score, and harms and uncertainty sub-dimension scores according to employment status (Z=-1.976, p=0.048; Z=-5.484, p=0.000; Z=-1.976, p=0.048; Z=-4.093, p=0.000, respectively). The scores of those who had a job on the THLS-32, total CHIAS, and harms and uncertainty sub-dimensions were significantly higher than the scores of those

who did not (Table 2).

Statistically significant differences were found in terms of THLS-32 scores, total CHIAS scores, and harms sub-dimension scores according to income status ($\chi 2$=17.271, p=0.000; $\chi 2$=14.464, p=0.001; $\chi 2$=16.018, p=0.000, respectively). The scores of the participants who had equal income and expenses and those who had more income than their expenses on the THLS-32, total CHIAS, and harms sub-dimension were significantly higher than the scores of those whose income was less than their expenses (Table 2).

A statistically significant difference was observed between participants' scores on the perceived barriers sub-dimension of the CHIAS according to the status of having a cervical cancer history in their mothers and family (Z=-2.914, p=0.004; Z=-3.646, p=0.000, respectively). The scores of the participants who had a cervical cancer history in their mothers and family on the perceived barriers sub-dimension of the CHIAS were significantly higher than the scores of those whose mothers did not have a history of cervical cancer (Table 3).

There was a statistically significant difference between the scores of the participants on the THLS-32 and the perceived barriers, effectiveness, and uncertainty sub-dimensions of the CHIAS according to the status of having the child get the HPV vaccine (Z=-2.338, p=0.019; Z=-3.492, p=0.000; Z= -3.492, p=0.000; Z=-2.737, p=0.006, respectively). The scores of the participants who had their children get the HPV vaccine on the THLS-32 and the perceived barriers, effectiveness, and uncertainty sub-dimensions of the CHIAS were significantly higher than the scores of those who did not (Table 3).

A statistically significant difference was found between the scores of the participants on the total CHIAS and harms, perceived barriers, effectiveness, and uncertainty sub-dimensions according to the status of having received information about the HPV vaccine (Z=-5.323, p=0.000; Z=-6.513, p=0.000; Z= -2.069, p=0.039; Z=-4.597, p=0.000; Z=-3.598, p=0.000, respectively). The scores of those who had received information about the HPV vaccine on the total CHIAS and harms, perceived barriers, effectiveness, and uncertainty sub-dimensions were significantly higher than the scores of those who did not (Table 3).

It was determined that the answers given by the participants to the scales were generally at a very reliable level (Table 4).

A positive, very weak, and statistically significant relationship was found between the scores of the participants from the THLS-32 and the harms sub-dimension of the CHIAS (r=0.128; p=0.002). A positive, weak, and statistically significant relationship was found between the scores of the participants from the THLS-32 and the perceived barriers sub-

dimension of the CHIAS (r=0.435; p=0.000). A negative, very weak, and statistically significant relationship was found between the scores obtained from the THLS-32 and the effectiveness sub-dimension of the CHIAS (r=-0.128; p=0.002). It was determined that as the THLS-32 score increased, positive attitudes toward the harms and perceived barriers of the CHIAS increased, as well, while positive attitudes toward the effectiveness decreased. A positive, weak, and statistically significant relationship was found between the overall CHIAS score and the THLS-32 score (r=0.250; p=0.000). As the THLS-32 score increased, the overall CHIAS score increased, as well. Likewise, as the THLS-32 score decreased, the overall CHIAS score decreased, too (Table 5).

Table 1. Distribution of the findings regarding the scores of the parents on the Carolina HPV Immunization Attitudes with Beliefs Scale and the Turkish Health Literacy Scale-32(n=599)

		Mean	SD	Median	Min	Max
THLS-32		34.41	9.69	34.4	4.4	50.0
CHIAS	*Harms*	3.19	0.64	3.3	1.2	4.0
	Perceived barriers	1.97	0.55	2.0	1.0	3.0
	Effectiveness	2.46	0.70	2.5	1.0	4.0
	Uncertainty	2.12	0.69	2.0	1.0	4.0
	Total	2.59	0.38	2.6	1.3	3.5

***THLS-32:** Turkey Health Literacy Scale – 32, **CHIAS:** Carolina HPV Vaccination Attitudes and Beliefs Scale, **S.D:** Standart Deviation**, Min:** Minimum, **Max:** Maximum

Table 2. Comparison of Parents' Scores from the Turkish Health Literacy Scale-32and the Carolina HPV Immunization Attitudes with Beliefs Scale According to Their Socio-demographic Findings

Variable (n=599)	**n**	**THLS-32**		**CHIAS**									
				Harms		*Perceived barriers*		*Effectiveness*		*Uncertainty*		**Total**	
		X̄ ± S.D.	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**
Age groups													
<45	259	34.24±10,54	33.9 [17.2]	3.29±0,64	3.3 [1.0]	2.02±0,60	2.0 [0.8]	2.54±0,69	2,5 [1,0]	2.12±0,64	2.0 [1.0]	2.65±0,39	2.7 [0.5]
≥45	340	34.54±9.01	34.9 [11.9]	3.12±0,63	3.2 [1.0]	1.93±0,51	2.0 [0.8]	2.15±0,71	2,0 [1,0]	2.13±0,72	2.0 [1.0]	2.54±0,35	2.6 [0.4]
Statistical analysis*		Z=-0.202		Z=-3.572		Z=-1.388		Z=-2.239		Z=-0.473		Z=-3.527	
Probability		p=0.840		**p=0.000**		p=0.165		**p=0.025**		p=0.636		**p=0.000**	
Gender													
Female	410	34.47±9.72	34.4 [13.8]	3.26±0,61	3,3 [0,8]	1.96±0,57	2.0 [0.8]	2.49±0,71	2.5 [1.0]	2.13±0,68	2.0 [1.0]	2.62±0,37	2.6 [0.5]
Male	189	34.29±9.67	33.9 [12.5]	3.05±0,67	3,0 [0,8]	1.98±0,51	2.0 [0.5]	2.08±0,68	2.0 [1.0]	2.10±0,72	2.0 [1.0]	2.51±0.38	2.5 [0.5]
Statistical analysis*		Z=-0.235		Z=-3.542		Z=-0.235		Z=-2.031		Z=-0.533		Z=-2.890	
Probability		p=0.814		**p=0.000**		p=0.814		**p=0.042**		p=0.594		**p=0.004**	
Place of birth													
Province[1]	258	34.85±10,31	34.4 [17.2]	3.37±0,64	3.5 [1.0]	1.86±0,62	2.0 [1.0]	2.58±0,72	3.0 [1.0]	2.28±0,66	2.5 [0.5]	2.67±0,37	2.7 [0.4]
District [2]	213	34.74±8.52	34.9 [10.8]	3.09±0,60	3.2 [0.8]	2.40±0,48	2.5 [0.3]	2.35±0,66	2.5 [1.0]	2.07±0,69	2.0 [1.0]	2.55±0,38	2.6 [0.5]
Village [3]	128	32.98±10,16	33.4 [13.9]	3.01±0,58	3.0 [0.7]	1.97±0,47	2.0 [0.5]	2.40±0,70	2.5 [1.0]	1.89±0,69	1.5 [1.4]	2.47±0,34	2.5 [0.4]
Statistical analysis*		χ^2=3.040		χ^2=49.318		χ^2=23.490		χ^2=16.075		χ^2=30.050		χ^2=31.754	
Probability		p=0.219		**p=0.000**		**p=0.000**		**p=0.000**		**p=0.000**		**p=0.000**	
Difference				**[1-2,3]**		**[2-1,3]**		**[1-2,3]**		**[1-2,3] [2-3]**		**[1-2,3] [2-3]**	
The longest place of residence	364	35.12±9.78	35.4 [15.8]	3.31±0,63	3.5 [0.8]	1.92±0,59	2.0 [0.8]	2.51±0,71	2.5 [1.0]	2.19±0,70	2.5 [0.5]	2.64±0,37	2.7 [0.4]
Province [1]	145	35.00±8.64	34.9 [11.1]	3.08±0,61	3.2 [0.8]	2.11±0,49	2.5 [0.4]	2.33±0,70	2.5 [1.0]	2.04±0,63	2.0 [1.0]	2.54±0,37	2.6 [0.5]
District [2]	90	30.58±10,15	30.7 [13.7]	2.89±0,57	2.8 [0.8]	1.93±0,46	2.0 [0.5]	2.48±0,63	2.5 [1.0]	1.96±0,73	2.0 [1.0]	2.42±0,34	2.4 [0.4]
Village [3]													
Statistical analysis*		χ^2=14.652		χ^2=48.184		χ^2=12.765		χ^2=3.234		χ^2=10.265		χ^2=30.328	
Probability		**p=0.001**		**p=0.000**		**p=0.002**		**p=0.357**		**p=0.006**		**p=0.000**	
Difference		**[1,2-3]**		**[1-2,3] [2-3]**		**[2-1,3]**				**[1-2,3]**		**[1-2,3] [2-3]**	
Level of education													
Primary school[1]	297	33.51±9.45	33.3 [12.5]	3.04±0,59	3.2 [0.8]	2.00±0,47	2.0 [0.5]	2.43±0,67	2.5 [1.0]	1.99±0,72	2.0 [1.0]	2.51±0,35	2.5 [0.5]
High school[2]	190	35.10±9.55	35.7 [15.0]	3.25±0,65	3.3 [1.0]	1.94±0,61	2.0 [0.8]	2.40±0,70	2.5 [1.0]	2.19±0,66	2.5 [0.5]	2.60±0,37	2.7 [0.5]
University or Above[3]	112	35.62±10,41	34.7 [18.9]	3.50±0,60	3.7 [0.7]	1.94±0,67	2.0 [1.3]	2.64±0,77	3.0 [1.0]	2.35±0,60	2.5 [0.5]	2.77±0,40	2.8 [0.4]
Statistical analysis*		χ^2=4.700		χ^2=59.706		χ^2=1.914		χ^2=8.877		χ^2=26.579		χ^2=44.182	
Probability		p=0.095		**p=0.000**		p=0.384		**p=0.012**		**p=0.000**		**p=0.000**	
Difference				**[1-2,3] [2-3]**				**[1,2-3]**		**[1-2,3]**		**[1-2,3] [2-3]**	
Working status													
Yes	343	34.97±10,27	36.2 [16.2]	3.30±0,63	3,5 [1,0]	1,98±0,60	2,0 [0,8]	2,50±0,69	2,5 [1,0]	2,22±0,67	2,5 [0,5]	2,65±0,37	2,7 [0,4]
No	256	33.66±8.82	33.3 [10.9]	3.05±0,61	3,2 [0,8]	1,96±0,49	2,0 [0,5]	2,42±0,72	2,5 [1,0]	1,99±0,70	2,0 [1,0]	2,49±0,36	2,5 [0,5]
Statistical analysis*		Z=-1.976		Z=-5.366		Z=-0.795		Z=-1.549		Z=-4.093		Z=-5.484	
Probability		**p=0.048**		**p=0.000**		p=0.427		p=0.121		**p=0.000**		**p=0.000**	
Level of income													
Income<expenses[1]	197	32.01±10,44	32.3 [15.0]	3.07±0,62	3.0 [0.8]	1.96±0,49	2.0 [0.5]	2.43±0,66	2.5 [1.0]	2.04±0,65	2.0 [1.0]	2.51±0,36	2.5 [0.5]
Income=expenses [2]	352	35.40±9.16	35.4 [14.1]	3.24±0,64	3.3 [0.8]	1.96±0,58	2.0 [0.8]	2.50±0,70	2.5 [1.0]	2.16±0,71	2.0 [1.0]	2.62±0,37	2.7 [0.5]
Income>expenses [3]	50	36.93±8.53	39.3 [10.8]	3.34±0,62	3.5 [0.8]	2.06±0,60	2.3 [0.6]	2.30±0,81	2,0 [1.5]	2.23±0,69	2.5 [1.1]	2.67±0,41	2.8 [0.2]
Statistical analysis*		χ^2=17.271		χ^2=16.018		χ^2=1.992		χ^2=5.449		χ^2=5.242		χ^2=14.464	
Probability		**p=0.000**		**p=0.000**		p=0.369		p=0.066		p=0.073		**p=0.000**	
Difference		**[1-2,3]**		**[1-2,3]**								**[1-2,3]**	

*"Mann-Whitney U" test (Z-table value) was used for the comparison of measurement values of two independent groups in data not having normal distribution; "Kruskal-Wallis H" test statistics (χ2-table value) were used to compare three or more independent groups.
***THLS-32:** Turkey Health Literacy Scale – 32, **CHIAS:** Carolina HPV Vaccination Attitudes and Beliefs Scale

Table 3. Comparison of Parents' Scores from the Turkish Health Literacy Scale-32and the Carolina HPV Immunization Attitudes with Beliefs Scale According to Their Family History of Cervical Cancer and Findings of HPV/HPV Vaccine(n=599)

Variable	n	THLS-32		CHIAS									
				Harms		*Perceived barriers*		*Effectiveness*		*Uncertainty*		**Total**	
		X̄ ± S.D.	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**	**X̄ ± S.D.**	**Median [IQR]**
History of cervical cancer in the mother	48	35.35±11.45	39.6	3.28±0.62	3.5 [1.1]	2.18±0.48	2.3 [0.3]	2.51±0.85	2.8 [1.5]	2.19±0.62	2,0 [0,5]	2.70±0.38	2.7 [0.6]
	551	34.33±9.53	[15.6]	3.19±0.64	3.3 [0.8]	1.95±0.56	2.0 [0.8]	2.46±0.69	2.5 [1.0]	2.12±0.70	2,0 [1.0]	2.57±0.37	2.6 [0.4]
Yes			33.9										
No			[12.5]										
Statistical analysis*		Z=-1.287		Z=-0.998		Z=-2.914		Z=-0.212		Z=-0.806		Z=-1.658	
Probability		p=0.198		p=0.323		**p=0.004**		p=0.832		p=0.420		p=0.097	
History of cervical cancer in the family	61	35.46±10.92	39.6	3.20±0.62	3.3 [1.0]	2.19±0.44	2.3 [0.4]	2.48±0.84	2.5 [1.3]	2.19±0.63	2.0 [0.8]	2.67±0.39	2.7 [0.5]
	538	34.29±9.55	[15.9]	3.19±0.64	3.3 [0.8]	1.94±0.56	2.0 [0.8]	2.46±0.69	2.5 [1.0]	2.12±0.70	2.0 [1.0]	2.58±0.37	2.6 [0.4]
Yes			33.9										
No			[12.5]										
Statistical analysis*		Z=-1.372		Z=-0.084		Z=-3.646		Z=-0.099		Z=-0.809		Z=-1.342	
Probability		p=0.170		p=0.933		**p=0.000**		p=0.921		p=0.419		p=0.180	
Having the child get the HPV vaccine	47	37.59±7.45	39.1	3.24±0.50	3.3 [0.5]	2.23±0.46	2.3 [0.3]	2.31±0.94	2.0 [1.5]	2.38±0.54	2.5 [1.0]	2.70±0.37	2.7 [0.4]
Yes	552	34.14±9.82	[9.9]	3.19±0.65	3.3 [1.0]	1.95±0.56	2.0 [0.8]	2.47±0.68	2.5 [1.0]	2.10±0.70	2.0 [1.0]	2.58±0.38	2.6 [0.4]
No			33.9										
			[13.4]										
Statistical analysis*		Z=-2.338		Z=-0.207		Z=-3.492		Z=-2,100		Z=-2,737		Z=-1,713	
Probability		**p=0.019**		p=0.836		**p=0.000**		**p=0.036**		**p=0.006**		p=0.087	
Status of receiving information about the HPV vaccine	294	34.52±9.97	34.4	3.35±0.60	3.5 [0.8]	1.91±0.62	2.0 [1.0]	2.58±0.70	3.0 [1.0]	2.23±0.66	2.5 [0.5]	2.67±0.35	2.7 [0.4]
	305	34.31±9.43	[16.1]	3.04±0.63	3.0 [0.8]	2.02±0.47	2.5 [0.5]	2.35±0.69	2.0 [1.0]	2.02±0.71	2.0 [1.0]	2.50±0.38	2.5 [0.5]
Yes			34.4										
No			[11.9]										
Statistical analysis*		Z=-0.184		Z=-6.513		Z=-2.069		Z=-4.597		Z=-3.598		Z=-5.323	
Probability		p=0.854		**p=0.000**		**p=0.039**		**p=0.000**		**p=0.000**		**p=0.000**	

*"Mann-Whitney U" test (Z-table value) was used for the comparison of measurement values of two independent groups in data not having normal distribution.

***THLS-32:** Turkey Health Literacy Scale – 32, **CHIAS:** Carolina HPV Vaccination Attitudes and Beliefs Scale

Table 4. Examination the Cronbach-α Coefficient of the Turkish Health Literacy Scale-32 and the Carolina HPV Immunization Attitudes with Beliefs Scale

Scale (n=599)		**Madde sayısı**	**Cronbach-α coefficient**
THLS-32		32	0.971
CHIAS	*Harms*	6	0.835
	Perceived barriers	4	0.834
	Effectiveness	2	0.784
	Uncertainty	2	0.754

***THLS-32:** Turkey Health Literacy Scale – 32, **CHIAS:** Carolina HPV Vaccination Attitudes and Beliefs Scale

Table 5. Examination of the Relationship Between the Turkish Healthy Literacy-32 Scale and the Carolina HPV Immunization Attitudes with Beliefs Scale Scores Correlation* (n=599)

	THLS-32	
	r	*p*
CHIAS		
Harms	**0.128**	**0.002**
Perceived barriers	**0.435**	**0.000**
Effectiveness	**-0.143**	**0.000**
Uncertainty	0.050	0.220
Total	**0.250**	**0.000**

*"Spearman" correlation coefficient was used to examine the relationships of two quantitative variables that do not have a normal distribution

DISCUSSION

This is the first study on the examination of the relationship between parental attitudes and beliefs about the HPV vaccine and HL. Parents play an important role in deciding whether children will get the HPV vaccine. At the individual level, the decision is based on attitudes, beliefs, knowledge, norms, socio-demographic characteristics, and cultural characteristics. However, government policies

and access to adequate health services (such as health checks and vaccination and screening programs) are other important factors affecting the decision process.

Considering that midwives have the main responsibility for immunization, they should determine parents' knowledge levels, beliefs, and attitudes towards HPV and HPV vaccine, and provide them with accurate evidence-based information. In this way, a significant contribution can be made to reducing the incidence of cervical cancer, which is one of the preventable cancers, and the resulting death rates. As a matter of fact, in our study, it was determined that most of the parents had received information about the HPV vaccine and that their primary source was the health personnel.

In a cross-sectional study conducted in Thailand, a significant relationship was found between parents' socio-demographic characteristics and their knowledge, beliefs, and acceptance of the HPV vaccine (21). Various studies on the subject have shown that parents' attitude towards the HPV vaccine is significantly correlated to socio-demographic characteristics, such as age, gender, education level, and income status, and knowledge levels (22-26). Similar to these studies, the results of our study also indicated that parents' attitudes and beliefs toward the HPV vaccine differed according to their socio-demographic characteristics and status of obtaining information. In a study conducted to evaluate the relationship between maternal HPV experiences and having children get the HPV vaccine, it was determined that children with a family history of cervical cancer were more likely to be vaccinated against HPV (27). In a cross-sectional study conducted in China on HPV knowledge and the acceptability of the HPV vaccine, getting the HPV vaccine was found to be associated with a family history of cervical cancer (28). Similar to the literature, it was found in our study that parents who had a family history of cervical cancer were more likely to have their children vaccinated against HPV than those who did not.

In a study conducted to evaluate the relationship between HPV vaccination in adolescents and parental attitudes by using the CHIAS, it was found that with each 1-point decrease on uncertainty sub-dimension of the CHIAS, the probability of getting the next vaccine dose increased by 4.9, and that a higher score on the harms sub-dimension of the CHIAS was the only significant predictor of the lower probability of completing the vaccine dose (29). In our study, it was determined that with each 1-point increase in the perceived barriers sub-dimension score of the CHIAS, the risk of not having the child vaccinated would decrease by 0.569 times and that with each 1-point increase in the uncertainty sub-dimension score, this risk would decrease by 0.473 times.

One of the main factors affecting the low level of knowledge about the HPV vaccine is the low level of HL. In a study, it was shown that there was a positive and significant relationship between knowledge of HPV vaccination and HL in young adults (30). A high level of HL enables individuals to obtain information from the right sources about vaccination and thus plays an important role in reaching herd immunity and fighting diseases (31). In another study on HPV knowledge, vaccination status, and HL in university students, a positive correlation was found between HL and HPV knowledge (32). In a cross-sectional study conducted by Faluca et al. (2022) to determine the factors affecting the acceptance of HPV vaccine among university students; It was concluded that HL level directly affects the acceptability of HPV vaccine (33).As a result of the cross-sectional study conducted by McCaffery et al. (2020) to examine the change in HL level and COVID-19 knowledge, attitude, behavior and psychosocial behaviors; It has been determined that there are significant differences in knowledge, attitudes and behaviors related to COVID-19 according to the HL level of individuals (34).In a study conducted to examine the relationship between parents' HL levels and their attitudes and behaviors towards childhood vaccines, it was determined that, unlike other studies, there was no relationship between parents' HL levels and their attitudes and behaviors towards childhood vaccines (35). A review of the literature conducted to evaluate the relationship between HL and knowledge of vaccines indicated the results of studies were not consistent and that there were both positive and negative relationships (36, 37). It is thought that the different results obtained from the studies may have originated from the different measurement tools used, the small number of studies published so far, and sample characteristics. Our study results showed that as HL levels increased, parents' attitudes and beliefs and the rate of having their children get the HPV vaccine increased significantly. The European Center for Disease Prevention and Control (ECDC) has defined the role that HL can play in relation to infectious diseases (38). Infectious diseases pose one of the most pressing problems for health systems. However, the impact of a crucial social determinant such as HL on clinical and social outcomes related to infectious diseases has not been satisfactorily investigated. Since parents have a primary role in the vaccination decision of their children and HPV vaccine is not included in the vaccination calendar of the Ministry of Health, there is a need for further research, increasing awareness and providing individuals with access to reliable information sources. Adopting readability calculators and examining readability of materials will help develop evidence-based and up-to-date content

for HPV vaccine in light of science, potentially increasing health literacy and vaccine uptake.

Limitations

This study has some limitations. First, due to the cross-sectional nature of the study, temporality and causal inferences could not be made. In this case, no definite conclusions could be drawn regarding the direction of the relationships between the different results regarding HPV and its determinants. Second, the sample was selected from a single geographic region. This may limit the generalizability of the findings and therefore these results may not reflect the relationship between the knowledge, attitudes, and behaviors of parents and health literacy across the country. Third, there may be a recall bias as the data were derived from participants' responses and not from medical records.

CONCLUSION

In conclusion, the researchers determined that nearly half of the parents had received information about the HPV vaccine and that the health personnel were the first among their sources of information. The risk of not having children vaccinated decreased among those who had received information about the HPV vaccine compared to those who had not. However, although a good number of parents had received information, only 7.8% of them had their children vaccinated against HPV. Our results point to the urgent need for education and intervention to increase awareness about the relationship between HPV and cervical cancer. Such an educational activity can encourage people and increase their desire to get the HPV vaccine even if they do not have prior knowledge about HPV. Studies should be conducted to examine the effects of this type of education on women's psychology and health-seeking behaviors, and hence the incidence of cervical cancer. It is thought that the dissemination of plain, understandable, and evidence-based scientific knowledge about HPV and HPV vaccines by public healthcare midwives will have an impact on parents' attitudes, beliefs, and awareness about HPV and HPV vaccines.

In addition to raising knowledge and awareness in increasing vaccination rates, it may be beneficial to include the HPV vaccine in the national immunization program in Turkey, as in many European countries. One of the main elements is to ensure that individuals can afford to pay for vaccinations. With the Global Vaccine Action Plan, millions of deaths can be prevented by achieving equitable access to vaccines. Turkey has a free and well-functioning vaccination program with high coverage. Including vaccination against HPV in the national immunization program for children will be consistent with the policies of the Ministry of Health for the protection of the population against vaccine-preventable diseases.

In addition, as the parents' level of HL

increased, the rate of getting their children vaccinated against HPV increased significantly. Considering this situation, it is thought that knowledge of vaccines can be increased, attitudes and beliefs can be improved, and vaccination rates can be increased by targeting HL in the interventions to be implemented.

Ethics Committee Approval: Ethics committee approval was obtained for this study from the Non-Invasive Ethics Committee of Çukurova University Faculty of Medicine (date: 21.05.2021 and issue: 111/114).

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REFERENCES

1. Usyk M, Zolnik CP, Castle PE, Porras C, Herrero R, Gradissimo A, et al. Cervicovaginal microbiome and natural history of HPV in a longitudinal study. PLoS pathogens. 2020; 16(3):e1008376.
2. deMartel C, Plummer M, Vignat J, &Franceschi S. Worldwide burden of cancer attributable to HPV by site, country and HPV type. International journal of cancer. 2017; 141(4): 664-670.
3. Erbıyık HI, &Palalıoğlu RM. HPV Infection, HPV Vaccines and Cervical Cancer Awareness: A Multi-Centric Survey Study in Istanbul, Turkey. Women & health. 2021; 61(8): 771-782.
4. Ahmed NU, Rojas P, &Degarege A. Knowledge of cervical cancer and adherence to Papsmear screening test among female university students in a multiethnic institution, USA. Journal of the National Medical Association. 2020; 112(3):300-307.
5. Centers for Disease Control and Prevention. Human papillomavirus (HPV). 2019a. Retrieved from://www.1cdc.gov/std/hpv/stdfa ct-hpv.htm.
6. Centers for Disease Control and Prevention. Human papillomavirus (HPV). 2019b. Retrieved from https ://www.cdc.gov/hpv/paren ts/cance r.html.
7. Cancer I. I. I. C. o. H. a. (2019, June 19). <Human Papilloma Virus and Related Diseases Report.pdf>. Retrieved from https://hpvcentre.net/statistics/reports/XWX .pdf.
8. Gultekin M, Ramirez PT, Broutet N, &Hutubessy R. World Health Organization call for action to eliminate cervical cancer

globally. International Journal of Gynecological Cancer. 2020; 30(4):426-427.

9. Wijayanti KE, Schütze H, MacPhail C, &Braunack-Mayer, A. Parents' knowledge, beliefs, acceptance and uptake of the HPV vaccine in members of The Association of Southeast Asian Nations (ASEAN): A systematic review of quantitative and qualitative studies. Vaccine. 2021; 39(17): 2335-2343.
10. Kjaer SK, Nygård M, Dillner J, Brooke Marshall J, Radley D, et al. 12-year follow-up on the long-term effectiveness of the quadrivalent human papilloma virus vaccine in 4 Nordic countries. Clinical Infectious Diseases. 2018; 66(3): 339-345.
11. Olagbegi B. Human Papillomavirus Vaccine Education to Improve Parental Knowledge, Awareness and Acceptance of HPV Vaccine (Doctoral dissertation, Grand Canyon University). (2020).
12. Centers for Disease Control and Prevention. HPV vaccine information for clinicians. Atlanta, GA: Author. (2016). Retrieved from https://www.cdc.gov/hpv/hcp/need-to-know.pdf.
11. Nations (ASEAN): A systematic review of quantitative and qualitative studies. Vaccine. 2021; 39(17): 2335-2343.
13. Taşar S, Yüksel EB, Sağcan D, Öncel EK, Aksay AK, &Çiftdoğan DY. Pediatristlerin Human Papilloma Virüs Aşısı Hakkındaki Bilgi veTutumları. Forbes Tıp Dergisi. 2021; 2(1):19-24.
14. Bedell SL, Goldstein LS, Goldstein AR, & Goldstein AT. Cervical cancer screening: past, present, and future. Sexual medicine reviews. 2020; 8(1): 28-37.
15. Dursun P, Senger SS, Arslan H, Kuşçu E, &Ayhan A. Human papillomavirus (HPV) prevalence and types among Turkish women at a gynecology outpatient unit. BMC infectious diseases. 2009; 9(1): 1-6.
16. Castro-Sánchez E, Chang PW, Vila-Candel R, Escobedo AA, & Holmes AH. Health literacy and infectious diseases: why does it matter? International Journal of Infectious Diseases. 2016; 43: 103-110.
17. McRee AL, Brewer NT, Reiter PL, Gottlieb SL, & Smith JS. The Carolina HPV immunization attitudes and beliefs scale (CHIAS): scale development and associations with intentions to vaccinate. Sexually transmitted diseases. 2010; 37(4): 234-239.
18. Sunar S, &Süt HK. The Turkish Validity and Reliability Study of the Carolina HPV Immunization Attitudes and Beliefs Scale. The Journal of Gynecology - Obstetrics and Neonatology 2019; 16(2), 82-88.19. HLS-EU Consortium. Comparativere port of health literacy in eight EU member states: The European Health Literacy Survey HLS-EU. 2012. Retrieved from

http://ec.europa.eu/chafea/documents/news/Comparative_report_on_health_literacy_in_eight_EU_member_state.

20. Okyay P, Abacigil F. Turkey Health Literacy Scale-32 (TSOY-32). Okyay P, Abacigil F, Editors. Turkish Health Literacy Scales Reliability and Validity Study. Retrieved from https://acikders.ankara.edu.tr/pluginfile.php/114974/mod_resource/content/1/Sa%C4%9Fl%C4%B1k%20Okur%20Yazarl%C4%B1%C4%9F%C4%B1%20%C3%96l%C3%A7ekleri.pdf.
21. Grandahl M, ChunPaek S, Grisurapong S, Sherer P, Tyden T, & Lundberg P. Parents' knowledge, beliefs, and acceptance of the HPV vaccination in relation to their socio-demographics and religious beliefs: A cross-sectional study in Thailand. PloSone. 2018; 13(2): e0193054.
22. Islam JY, Khatun F, Alam A, Sultana F, Bhuiyan A, Alam N, et al. Knowledge of cervical cancer and HPV vaccine in Bangladeshi women: a population based, cross-sectional study. BMC women's health. 2018; 18(1): 1-13.
23. Jaspers L, Budiningsih S, Wolterbeek R, Henderson FC, & Peters AAW. Parental acceptance of human papillomavirus (HPV) vaccination in Indonesia: a cross-sectional study. Vaccine. 2011; 29(44): 7785-7793.
24. Juntasopeepun P, & Thana K. Parental acceptance of HPV vaccines in Chiang Mai, Thailand. International Journal of Gynecology & Obstetrics. 2018; 142(3): 343-348.
25. Sopian MM, Shaaban J, Yusoff SSM, & Mohamad WMZW. Knowledge, decision-making and acceptance of human papilloma virus vaccination among parents of primary school students in Kota Bharu, Kelantan, Malaysia. Asian Pacific journal of cancer prevention: APJCP. 2018; 19(6):1509.
26. Victory M, Do TQN, Kuo YF, & Rodriguez AM. Parental knowledge gaps and barriers for children receiving human papilloma virus vaccine in the Rio Grande Valley of Texas. Human vaccines &immune therapeutics. 2019; 15(7-8): 1678-1687.
27. Biederman E, Donahue K, Sturm L, Champion V, &Zimet G. The association between maternal human papilloma virus (HPV) experiences and HPV vaccination of their children. Human Vaccines &Immuno therapeutics. 2021; 17(4): 1000-1005.
28. He J, & He L. Knowledge of HPV and acceptability of HPV vaccine among women in western China: a cross-sectional survey. BMC women's health. 2018; 18(1): 1-8.
29. VanWormer JJ, Bendixsen CG, Vickers ER, Stokley S, McNeil MM, Gee J, et al. Association between parent attitudes and receipt of human papilloma virus vaccine in adolescents. BMC Public Health. 2017;

17(1): 1-7.

30. Ren LL, Wang YM, Wu ZQ, Xiang ZC, Guo L, Xu T, et al. Identification of a novel coronavirus causing severe pneumonia in human: a descriptive study. Chinese medical journal. 2020; 133(09).1015-1024.
31. Lorini C, Santomauro F, Donzellini M, Capecchi L, Bechini A, Boccalini S, et al. Health literacy and vaccination: A systematic review. Human Vaccines &Immuno therapeutics. 2018;14(2):478-88.
32. Kitur H, Horowitz AM, Beck K, &Wang MQ. HPV Knowledge, Vaccine Status and Health Literacy Among University Students. Journal of Cancer Education. 2021; 1-8.
33. Fallucca A, Immordino P, Riggio L, Casuccio A, Vitale F, &Restivo, V. Acceptability of HPV Vaccination in Young Students by Exploring Health Belief Model and Health Literacy. Vaccines. 2022; 10(7): 998.
34. McCaffery K, Dodd R, Cvejic E, Ayre J, Batcup C, et al. Healthliteracy and disparities in COVID-19–related knowledge, attitudes, beliefs and behaviours in Australia. Public health research&practice.2020; 30(4).
35. Ertuğrul B, & Albayrak S. The Relationship of Parents' Health Literacy Level with Attitudes and Behaviors Towards Childhood Vaccines. Journal of Hacettepe University Faculty of Nursing. 2019; 8(2): 186-195.
36. Johri M, Subramanian SV, Sylvestre MP, Dudeja S, Chandra D, Koné GK, et al. Association between maternal health literacy and child vaccination in India: a cross-sectional study. J Epidemiol Community Health. 2015; 69(9): 849-857.
37. Veldwijk J, van der Heide I, Rademakers J, Schuit AJ, de Wit GA, Uiters E, et al. Preferences for vaccination: does health literacy make a difference? Medical Decision Making. 2015; 35(8): 948-958.
38. D'Eath M, Barry MM, Sixsmith J. Rapid evidence review of interventions for improving health literacy. Stockholm: European Centre for Disease Prevention and Control. 2012.