



# Parental Attitudes and Knowledge Towards Childhood Vaccination

Ebeveynlerin Çocukluk Çağı Aşılarına Yönelik Bilgi ve Tutumları

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## Abstract

**Objective:** The aim of our study is to determine the knowledge levels and attitudes of parents about childhood vaccinations, their perspective on immunization services, and the rate of vaccination of their children.

**Material and Methods:** This cross-sectional study was carried out between July-October 2020 with 111 parents who applied to the pediatric outpatient clinic. Vaccine Confidence Scale (VCS) was used to evaluate the benefits and harms of vaccination, and trust in healthcare providers.

**Results:** Of the participants' children, 95.5% (n= 106) were regularly vaccinated with childhood vaccinations and 21.8% (n= 24) had their children vaccinated with at least one self-paid vaccine. Self-paid vaccination coverage rates of the children of low-income and low-educated parents were significantly lower (p< 0.05). 23.4% (n= 26) reported that they were in contact with anti-vaxxers within their community. The VCS score of the parents who thought that the vaccine was necessary and who did not support anti-vaccination movement were found to be significantly higher (p< 0.05). Parents that had contact with anti-vaxxers within their community had a lower total VCS (p= 0.005).

**Conclusion:** Although most parents have their children vaccinated with routine childhood vaccines and had confidence in vaccination, not all of these parents thought that the vaccine was necessary. Health professionals should accurately inform families to demonstrate the necessity of vaccination and maintain vaccination rates and protect public health.

**Keywords:** Vaccine, vaccine confidence scale, vaccine refusal, immunization

## Öz

**Giriş:** Bu çalışmada ebeveynlerin çocukluk çağı aşıları hakkında bilgi düzeylerinin, bağışıklama hizmetlerine karşı bakış açılarının, aşı yaptırmaya konusundaki çekincelerinin değerlendirilmesi ve çocukların aşılanma oranlarının belirlenmesi amaçlandı.

**Gereç ve Yöntemler:** Çalışma Temmuz 2020-Ekim 2020 tarihleri arasında çocuk sağlığı ve hastalıkları polikliniğine başvuran 111 ebeveyn anket yapılarak gerçekleştirildi. Aşılar karşı yarar, zarar ve güven algısını değerlendirmek için Aşı Güvenilirlik Ölçeği (AGÖ) kullanıldı.

**Bulgular:** Katılımcıların %95.5'inin çocuklarına (n= 106) düzenli olarak çocukluk aşılarını yaptırdığı ve %21.8 (n= 24)'ünün çocuklarına en az bir tane ücretli aşı yaptırdığı saptandı. Düşük gelirli ve düşük eğitim düzeyine sahip olan anne-babaların çocuklarının ücretli aşı yaptırmaya oranları daha düşük bulundu (p< 0.05). Ebeveynlerin %23.4'ü çevrelerinde aşı karşıtı görüşe sahip bireyler olduğunu bildirdi. Aşının gerekli olduğunu düşünen ve aşı karşıtı hareketi desteklemeyen ebeveynlerin AGÖ puanı anlamlı olarak yüksek bulundu (p< 0.05). Çevresinde aşı karşıtı olanların toplam güvenilirlik puanının daha düşük olduğu görüldü (p= 0.005).

**Sonuç:** Ebeveynlerin çoğu, çocuklarını rutin çocukluk aşıları ile aşılatmasına ve aşıya güvenmesine rağmen, bu ebeveynlerin tamamı aşının gerekli olduğunu düşünmüyordu. Sağlık profesyonelleri aşıya olan güveni artırmak, aşı oranlarını korumak ve halk sağlığını korumak için aileleri doğru bir şekilde bilgilendirmelidir.

**Anahtar Kelimeler:** Aşı, aşı güvenilirlik ölçeği, aşı reddi, bağışıklama

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## Introduction

Vaccines are one of the most important components of primary health care practices that protect the health of the public. Vaccination programs aim to prevent deaths or permanent sequelae caused by vaccine-preventable infectious diseases. For vaccination programs to become effective and to gain herd immunity, the vaccination rate in the community should be 80-95% (1). It is important not only for the protection of vaccinated individuals but also indirectly for the protection of unvaccinated people (2). Vaccination or non-vaccination of individuals concerns the health of all individuals in the community.

The World Health Organization (WHO) defines vaccine hesitancy as a “delay in acceptance or refusal of vaccines, although vaccine services are available.” Vaccine hesitant individuals may accept all vaccines but may remain concerned about them, refuse or delay some vaccines, or refuse all vaccines, which is referred to as ‘vaccine refusal’ (3). In 2019, the WHO declared vaccine hesitation as one of the ten biggest threats to global health, following the re-emergence of previously eradicated diseases, such as measles, in some countries due to inadequate vaccination rates (4). Similar to worldwide rates, the number of people who refuse vaccines is increasing in Turkey (5). Over time, the rise in vaccine-hesitant individuals may cause an increase in the frequency of vaccine-preventable diseases and may negatively affect public health. In 2016, the WHO reported 5273 measles cases in Europe, and this number had already increased to 88.692 in 2018 (6,7). In 2013-2017, 63% of global measles cases were due to failure of the vaccine program and programmatically preventable (8).

To prevent vaccination refusal, parental vaccine hesitancy should be addressed. For this reason, it is necessary to review the factors affecting vaccination practices, evaluate individuals’ attitudes towards vaccination, and direct them correctly for vaccination programs. The aim of this study was to determine the knowledge levels and attitudes of parents about childhood vaccinations, factors affecting vaccination, their perspective on immunization services, and the rate of vaccination for their children.

## Materials and Methods

This cross-sectional descriptive study was carried out between 01.07.2020-31.10.2020 with 111 parents who applied to State Hospital with pediatric outpatients. A total of 111 parents participated in the study. A total of 135 parents were invited to the study. Participation in the study was voluntary, and 19 parents did not participate in the study due to reasons such as lack of time and unwillingness. Five questionnaires were deemed invalid due to missing data. The questionnaire applied to the parents participating in the study was prepared by the researchers based on scientific articles related to the

hypothesis of the research. The questionnaire consisted of 50 questions in total; 11 questions were on sociodemographic data, and 39 questions were on the knowledge levels and attitudes of parents about childhood vaccinations. The vaccine confidence scale (VCS) was used to evaluate the benefits and harms of vaccination and trust in healthcare providers (9). The VCS is an 8-item scale that is validated and reliable for Turkish society (10). Permission for the use of the Turkish version of VCS in the study was obtained from İrem Özdemir. The items are scored from ‘0’ (strongly disagree) to ‘10’ (strongly agree). The total score on the scale ranges from 0 to 80. The scale consists of three items that include the benefits of the vaccine (the first four items), the harms of the vaccine (items 5 and 6, reverse coded), and the trust in healthcare providers (items 7 and 8). Higher scores indicate more positive beliefs about vaccination.

Ethics committee approval for the study (protocol number E-25403353-050.99-77335) was obtained from the ethics committee. The Statistical Package for Social Sciences (SPSS) version 18.0 0 program was used for statistical analysis. Descriptive statistics of the data were given as the mean  $\pm$  standard deviation for normally distributed data or the median (minimum-maximum or interquartile range) for non-normally distributed data. Categorical variables are shown as numbers and percentages. Pearson’s Chi-square test was used to evaluate relationships between categorical variables. The Mann-Whitney U test was used to compare continuous non-normally distributed values between groups. A value of  $p < 0.05$  was considered statistically significant.

## Results

In total, 111 parents were included in the study. Of the participants, 87.4% ( $n = 97$ ) were mothers and 12.6% ( $n = 14$ ) were fathers. The sociodemographic characteristics of the parents are shown in Table 1.

Of the participants’ children, 95.5% ( $n = 106$ ) were regularly vaccinated with childhood vaccinations. Of the participants, 20.7% ( $n = 23$ ) lacked knowledge about the routine childhood vaccines recommended by the Ministry of Health of Turkey. While parents were mostly aware of chickenpox (66.7%) and measles (69.4%) vaccines, the least aware vaccines were conjugated pneumococcal (28.8%) and tuberculosis (19%) vaccines. Of the parents, 95.5% stated that they received information about the vaccine from doctors and 38.7% from the television, radio, newspapers, and the internet, in addition to health care providers.

It was found that 55% of the parents ( $n = 61$ ) were informed about self-paid vaccines that are not routinely administered by the Ministry of Health, and 21.8% ( $n = 24$ ) had their children vaccinated with at least one self-paid vaccine. The rotavirus vaccine was the most frequently administered. Only 10% ( $n = 11$ ) of the parents were informed about the human papilloma-

**Table 1.** Sociodemographic characteristics of parents

	n (%)
Gender	
Female	97 (87.4)
Male	14 (12.6)
Age (years)	
<20	2 (1.8)
20-29	28 (25.7)
30-39	49 (45)
>40	30 (27.5)
Educational level	
Primary education	26 (24.1)
Secondary education	22 (20.4)
High school	39 (36.1)
University	21 (18.5)
Occupation	
Housewife	67 (60.4)
Teacher	9 (8.1)
Healthcare provider	5 (4.5)
Government official	4 (3.6)
Worker	3 (2.7)
Farmer	3 (2.7)
Chauffeur	3 (2.7)
Other	6 (5.4)
Employment type	
Unemployed	73 (66.4)
Employed	37 (33.6)
Number of children	
1	23 (20.9)
2	50 (45.5)
3	31 (28.2)
≥4	6 (5.5)
Living place	
District	54 (49.5)
City	39 (35.8)
Village	16 (14.7)

virus (HPV) vaccine. Eighty-eight parents answered the question about their reason for not receiving self-paid vaccination; 67.1% of the parents reported that they were not informed about self-paid vaccinations, 28.4% reported that those vaccines were not necessary, and 16% reported financial insufficiency. Parents living in rural areas had less information about self-paid vaccines when compared to parents living in urban areas ( $p=0.001$ ). Self-paid vaccination coverage rates of the children of low-income and low-educated parents were significantly lower ( $p<0.001$  and  $p=0.003$ , respectively).

Five (5.5%) of 111 parents reported that they did not get their children vaccinated regularly with routine childhood vaccinations. Two of the parents stated the reason for refusal as insufficient information about vaccines, and one of them stated the reason for refusal as the notion that vaccines were ineffective. One parent gave the pandemic as a reason for refusal and one reported that vaccines were useless and had side effects, such as autism.

The most frequently reported fear by the parents about vaccination was side effects (35.7%), and the most curious issue was the vaccine's contents (20.9%). Of the parents, 45.9% stated that vaccines had side effects; the most commonly reported vaccine-related side effects were fever (47.7%) and allergies (19%). The most common reason for delaying vaccines (69.1%) was fever and infectious disease.

Of the parents participating in the study, 81.1% ( $n=90$ ) thought that childhood vaccinations were necessary. The most common reason reported for the necessity of the vaccines was that "The vaccine protects against pathogens and prevents infectious disease." Based on the belief of the necessity of the vaccines, parents' age, educational status, or monthly income level did not differ significantly ( $p=0.084$ ,  $p=0.770$ ,  $p=0.580$ , respectively). Of the parents, 58.2% stated that they agree that children who have not been vaccinated risk the health of other children.

Of the parents, 23.4% ( $n=26$ ) reported that they were in contact with anti-vaxxers within their community. Only 7.3% ( $n=8$ ) of the parents stated that they support anti-vaxxers, and 19.1% ( $n=21$ ) were indecisive. A majority of 73.6% ( $n=81$ ) were against the anti-vaxxers. The difference between parents who supported the anti-vaxxers and those who did not are given in Table 2.

Of the parents, 43.6% ( $n=48$ ) stated that they were vaccinated after the age of 18, and the most commonly received vaccines were tetanus and influenza vaccines. When parents were asked whether they would like to be vaccinated with the coronavirus vaccine, 32.4% ( $n=36$ ) stated that they would not be vaccinated even if they could.

The median (IQR) VCS score of the parents was 64 (56-74), and the items of the scores are shown in Table 3. The VCS score (total score, benefit score, harm score, trust score) of the parents who thought that the vaccine was necessary was found to be significantly higher than the parents who thought the vaccine was unnecessary ( $p<0.001$ ,  $p<0.001$ ,  $p=0.002$ ,  $p<0.001$ , respectively). The VCS score (total score, benefit score, harm score, trust score) of the parents who did not support anti-vaccination movement was found to be significantly higher ( $p<0.0001$ ,  $p<0.0001$ ,  $p=0.01$ ,  $p=0.01$ ). Parents that had contact with anti-vaxxers within their community had a lower total VCS ( $p=0.005$ ). There was no difference between employment status, place of living, education level, monthly income and total scores ( $p=0.933$ ,  $p=0.140$ ,  $p=0.220$ ,  $p=0.194$  respectively). Among the two questions that constituted the trust subscale score, the participants gave lower scores to the question "in general, medical professionals in charge of vaccinations have my child's best interest at heart" than the question "I have a good relationship with my child's health care provider."

**Table 2.** The difference between parents who supported the anti-vaxxers and those who did not

Total number of participants (n)	Anti-vaxxers supporters n (%) 29 (26.4%)	Disagree with anti- vaxxers or indecisive n (%) 81 (73.6%)	p
Place of living (n= 108) District-village City	19 (65%) 10 (35%)	51 (64.5%) 28 (35.5%)	0.926
Parental educational level (n= 107) <12 years or less University	25 (89.3%) 3 (10.7%)	61 (77.2%) 18 (22.8%)	0.167
Employment type Unemployed Employed	21 (74.4%) 8 (27.6%)	51 (63.7%) 29 (36.3%)	0.399
Question: Do you think vaccinations are necessary? (n= 110) Necessary Not necessary	13 (44.8%) 16 (55.2%)	77 (95.1%) 4 (4.9%)	<0.001
Question: Do you think vaccinations should be mandatory? (n= 108) Yes No	13 (48.1%) 14 (51.9%)	70 (86.4%) 11 (13.6%)	<0.001
Question: Unvaccinated children endanger the health of other children (n= 110) I agree I do not agree	8 (27.6%) 21 (72.4%)	56 (69.1%) 25 (30.9%)	<0.001
Vaccine confidence scale scores (n= 106) Total scores (median-IQR) Benefit scores (median-IQR) Harm scores (median-IQR)* Trust scores (median-IQR)	53 (35-64) 28 (15-36) 10 (6-15) 14 (10-19)	68 (60-75) 35 (30-40) 17 (10-20) 18 (16-20)	<0.001 <0.001 0.01 0.01

\*Reverse coded.

**Table 3.** Vaccine confidence scale scores of parents

		Median (IQR)	
Benefits (4 items)	1. Vaccines are necessary to protect the health of children.	10 (9-10)	35 (28-40)
	2. Vaccines do a good job in preventing the diseases they are intended to prevent.	9 (8-10)	
	3. Vaccines are safe.	9 (6-10)	
	4. If I do not have my child vaccinated, he/she may get a disease such as meningitis and cause other children or adults also to get the disease.	10 (5-10)	
Harm (2 items)*	1. Children receive too many vaccines.	8 (3-10)	15 (8-20)
	2. If I have my child vaccinated, he/she may have serious side effects.	8 (5-10)	
Trust (2 items)	1. In general, medical professionals in charge of vaccinations have my child's best interest at heart.	9 (6-10)	18 (14-20)
	2. I have a good relationship with my child's healthcare provider.	10 (8-10)	
Total scores			64 (56-74)

\*Reverse coded.

## Discussion

This study reveals the knowledge and attitudes of parents about childhood vaccinations during the COVID-19 epidemic, in which the importance of vaccination emerged. In this study, most of the children were regularly vaccinated with childhood vaccinations, which are routinely recommended by the Ministry of Health. Although parents' overall VCS score was high,

there were a considerable number of individuals who support the anti-vaccination movement in their social setting. Parents believing the necessity of vaccination and parents who do not support the anti-vaccination movement had higher VCS scores, demonstrating the importance of education on the necessity of vaccinations.

In our study, the rate of receiving routine childhood vaccination was found to be 95.5%. In other studies conducted in

Turkey, the childhood vaccination rate ranged between 93.8 and 97.6% (10-13). Vaccination coverage rates vary among different countries, and this rate also changes for each vaccine (14). While the vaccination coverage rate is around 70-80% in countries, such as Afghanistan, Pakistan, and India, this rate is generally over 90% in Europe and America (14).

One-fifth of the participants stated that they lacked knowledge about routine childhood vaccinations. This rate differed in a wide range (3.1-30) in studies conducted in Turkey (11,15). While parents were mostly aware of chickenpox and measles vaccines in our study, the most and least known vaccines differed in studies in Turkey (10-12). This variability may be due to regional differences where the studies were conducted. Approximately half of the participants in our study stated that they lacked knowledge about self-paid vaccines that are not routinely applied by the Ministry of Health of Turkey. In studies conducted in Turkey, the rate of knowledge about self-paid vaccines among parents varied between 40-70%, and the most frequently administered self-paid vaccines were rotavirus and influenza vaccines, as observed in our study (10-12,16). In studies conducted in Turkey in 2013 and 2019, HPV vaccine awareness was found to be 40% and 30%, respectively (17,18). In our study, awareness of the HPV vaccine was much lower than the rate found in other studies. In various studies in Turkey, the education level of parents, employment status/occupation, and income level were the reported factors affecting vaccination with self-paid vaccines (11,12,16). In the current study, self-paid vaccination rates were lower in low-income and low-educated parents. In addition, those living in rural areas (village/district) had less information about self-paid vaccines. This situation revealed the necessity of providing more information about vaccines in small settlements, such as the districts where our study was conducted.

Most of the participants in our study reported that they received information about vaccines from their doctors. Ciklar and Guner found that families mostly used the internet to obtain information about vaccines (11). In some studies, social media had negative effects and increased public suspicion about vaccine safety, and this situation may lead to a decrease in vaccination (5,19). Similar to our study, the source of information on vaccines was mostly healthcare professionals, which is an opportunity for families to obtain accurate information about vaccines.

Similar to the literature, the participants in our study mostly stated that vaccination was necessary (9-12) and gave the reason that "vaccines prevent diseases" and "the vaccine provides immunity against pathogens", as in other studies (11,12). These findings show that the majority of parents rely on vaccination and know the general purpose of vaccination.

In studies conducted in Turkey, the most common reason for vaccine hesitation was determined as the side effects of

the vaccines. Similarly, the biggest fear of the parents about vaccines was the side effects, and the most curious issue about vaccines was the vaccine's contents. Other reasons for vaccine hesitation found in the literature were that the contents of the vaccines were thought to be harmful, the vaccines were thought to be unnecessary, unprotective, or unsafe, distrust towards the vaccine companies, and lack of information about vaccines (20-22).

The VCS score of the participants, the majority of whom were housewife mothers, showed that their confidence and belief in vaccination was generally high, which was consistent with previous research (9,10). In one study, confidence in vaccination was lower in those with low education levels (9), but in our study, no relationship was found between VCS scores and education level, employment status, monthly income levels, and place of living. The lower scores of the VCS of the parents who did not believe in the necessity of vaccination and who agreed with the anti-vaxxers also revealed the importance of informing families about the necessity of vaccination. In a study by Çapanoğlu (23) on the refusal of childhood vaccines, it was determined that families were not informed enough about vaccination and emphasized that remaining concerns and misconceptions about vaccination should be eliminated for public health. The approaches to childhood vaccination among families can be influenced by many factors. Trust in healthcare providers and government, sources of information about vaccines, misinformation about vaccines, effects of social environment, previous experiences, and anxiety and fear about vaccines have been reported to be factors affecting vaccination in the literature (24,25). The fact that the question "in general, medical professionals in charge of vaccinations have my child's best interest at heart", which is one of the two questions that constitute the trust subscale of VCS, scored lower than the other questions, revealing the necessity of increasing trust in healthcare professionals.

The most important limitation of our study was the limited number of participants reflecting a cross-sectional period, and the sample was limited to the Sivrihisar district of Eskişehir. Therefore, the results do not represent the whole Turkish population. However, the study reflects real-life data addressing childhood vaccination rate, vaccination refusal and parenteral vaccine hesitancy. Additionally, it was conducted during the COVID-19 epidemic, in which the importance of vaccination emerged.

## Conclusion

In conclusion, although most parents have their children vaccinated with routine childhood vaccines and had confidence in vaccination, not all of these parents thought that the vaccine was necessary in our study. There were a remarkable number of parents who reported that they were in contact with anti-vaxxers within their community. Anti-vaxxer move-

ments can influence parents' decisions to vaccinate their children. It is necessary to address the concerns of parents who support the anti-vaccination movement and who think that vaccination is unnecessary to increase vaccination rates and prevent preventable diseases. Healthcare providers, the most important source of information for families, are a key element in communicating accurate information to families, resolving doubts and increasing confidence in vaccines. Healthcare professionals must be prepared to face the challenge of 'vaccine refusal/hesitation,' which is a threat to vaccination, one of the most important services that protect the health of the public.

**Ethics Committee Approval:** Ethics committee approval for the study (protocol number E-25403353-050.99-77335) was obtained from the ethics committee.

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