Parental Vaccine Hesitancy in Early Childhood: A Cross-Sectional Study from Türkiye Using the WHO-SAGE Scale

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Posted Date: 18 November 2025

doi: 10.20944/preprints202511.1280.v1

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 doi:10.20944/preprints202511.1280.v1

Article

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Abstract

Background: Vaccine hesitancy has been increasing significantly in our country and around the world in recent years, especially following the COVID-19 pandemic. This study aims to investigate the attitudes of parents of children in early childhood (0-5 years old) towards vaccines and, in parallel, to examine the reasons for vaccine hesitancy. **Material and Method:** The sociodemographic characteristics of the parents with children under 5 years of age who visited our outpatient clinic were assessed, and they were asked to complete the vaccine hesitancy scale and the Vaccine Hesitancy Survey Questions (VHSQ), prepared by the World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization (SAGE). **Results:** Of the 500 parents who participated in the study, 403 were included in the study after completing the forms in their entirety**.** In our study**,** the WHO/SAGE Vaccine Hesitancy Scale (VHS) mean score was found to be 23.27 ± 11.74. The mean lack of confidence score according to the scale was 14.97 ± 9.82. The mean risk factor score according to the scale was determined to be 8.38 ± 3.75. There was a significant correlation between vaccine hesitancy scores and education level, income level, and number of children. **Conclusions:** Our findings indicate that vaccine hesitancy is at a moderate level; and it is necessary to increase parents' confidence in vaccines; strengthen information sources; and provide scientific explanations for fears of side effects. Strategies such as education; providing information; and enhancing communication with healthcare personnel can be recommended

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1. Introduction

Most infectious diseases were fatal for many years until antibiotics were discovered. With the discovery and widespread use of vaccines, vaccine-preventable diseases have been brought under control, and deaths due to these diseases have begun to be prevented. Thanks to vaccines, many diseases such as smallpox have been eradicated; diseases with fatal complications such as measles, diphtheria, and tetanus have been brought under control. In recent years, trust in vaccines has been decreasing worldwide, and in our country, and vaccine hesitancy has been increasing [1,2]. In 2018, there was an increase in measles cases in Europe, highlighting the consequences of inadequate vaccination coverage. This trend has been exacerbated by long-standing vaccine hesitancy. Parental attitudes towards childhood vaccinations are changing, influenced by ethical, religious, and safety concerns, and vaccine hesitancy has increased significantly since the COVID-19 pandemic [3,4].

Due to misinformation, anti-vaccine campaigns and posts on social media platforms, vaccine hesitancy has become a major global health issue. In particular, reliance on social media platforms for vaccine-related information has been associated with higher vaccine hesitancy during the COVID-19 era. This has become evident with the spread of misinformation and conspiracy theories

 doi:10.20944/preprints202511.1280.v1

portraying COVID-19 vaccines as harmful during the pandemic. Similar patterns have been observed for other types of vaccines, including those for polio, measles, mumps and rubella, and diphtheria-tetanus-pertussis vaccines [5,6].

In a meta-analysis aimed to determine the worldwide prevalence of routine vaccine hesitancy among parents of children aged 0–6 years, the cumulative prevalence of parental vaccine hesitancy was found to be 21.1%. When the prevalence of vaccine hesitancy was stratified by WHO region, significant differences were observed, ranging from 13.3% in the Region of the Americas to 27.9% in the Eastern Mediterranean Region [7].

According to a study published in 2020 that examined the perceived importance, safety, and effectiveness of vaccines, low rates of confidence were detected in countries such as Afghanistan, Indonesia, Pakistan, the Philippines, Nigeria, and South Korea, and the same study also stated the rate of those who believe that vaccines are important, safe, and effective in Türkiye was 22.1% [8].

The aim of the study was to evaluate the attitudes of parents of children in early childhood (0-5 years old) towards vaccines and, in parallel, to investigate the reasons for vaccine hesitancy.

2. Material-Method

2.1. Study Design and Population

This cross-sectional study was conducted at the Department of Pediatrics, Prof. Dr. Cemil Taşcıoğlu City Hospital, University of Health Sciences, Istanbul, Türkiye, between April 15 and June 15, 2025. The study population comprised parents of children aged 0–5 years who visited the pediatric outpatient clinic during the study period.

Inclusion criteria: - Primary caregivers of children under 5 years of age who presented to the pediatric outpatient clinic - Primary responsibility for the child's care - Willingness to participate voluntarily in the study - Child had no diagnosed neurological and/or psychiatric disorders.

Exclusion criteria: - Caregivers of children aged 5–18 years - Individuals who were not the primary caregiver responsible for the child's care - Unwillingness to participate in the study - Child had a diagnosed neurological and/or psychiatric disorder.

2.2. Sample Size Calculation

The sample size was determined using the usual method for determining a population proportion, with an expected vaccine hesitancy prevalence of 22%, a margin of error of ±5%, and a 95% confidence level [8]. The determined minimum sample size was 263 people. The desired sample size was modified to 292 individuals to accommodate a projected 10% non-response rate. Consequently, our final sample of 403 participants surpassed the minimal requisite sample size and afforded sufficient statistical power for the study's aims.

2.3. Ethical Statement

Ethical approval was obtained from the hospital's Non-Interventional Ethics Committee (Approval No: 133, dated April 14, 2025). The study adhered to the principles outlined in the Declaration of Helsinki. Before recruitment, all participants were informed of the study's objectives, methodologies, the voluntary nature of their participation, and the right to withdraw at any moment without repercussions. Written informed consent was obtained from all participants after they had the opportunity to ask questions about the study.

2.4. Data Collection

A total of 500 parents of children aged 0–5 years who visited the pediatric outpatient clinic were invited to participate. Of these, 403 parents completed the survey. The survey was administered using a face-to-face interview method. Each interview lasted approximately 15–20 minutes.

 doi:10.20944/preprints202511.1280.v1

2.5. Data Collection Tools

The data collection tool consisted of three parts:

2.5.1. Sociodemographic Questionnaire

Included variables such as parent age, sex, education level, income level, number of children, and child's age and gender. Considering that the minimum wage in our country for the period of January 2025 was 22,105 Turkish lira (TL), the hunger line was 25,000 TL, and the poverty line was 75,000 TL, the income level was scaled. According to a 5-point Likert scale, those with an income of less than 22,005 TL were considered as low, 22,005-25,000 TL as low-moderate, 25,001-50,000 TL as moderate, 50,001-75,000 TL as moderate-high, and 75,001 TL and above were considered as the high-income group.

2.5.2. WHO-SAGE Vaccine Hesitancy Scale (VHS)

A 10-item Likert-type scale, validated in Turkish. Items 1–4, and 6–8 relate to 'lack of confidence' and items 5, 9, and 10 to 'risk factors'. Scores range from 10 to 50, with higher scores indicating greater hesitancy. Items 5, 9, and 10 were reverse-scored. The vaccine hesitancy scale questions were prepared according to the 5-point Likert method, and participants were asked to respond as follows: Strongly disagree (1), Disagree (2), Neither agree nor disagree (3), Agree (4), Strongly agree (5).

In a study conducted by the SAGE Vaccine Hesitancy Working Group, the Cronbach alpha values of the seven-item questionnaire measuring 'lack of confidence' and the three-item questionnaire measuring 'risks' were found to be 0.92 and 0.64, respectively. Scale scores range from 10 to 50, and there is no cut-off value [9–11]. In the Turkish validity and reliability studies, seven items (VHS-1-4,6-8) were grouped as 'lack of confidence' and three items (VHS-5,9,10) as 'risk factors'. The Cronbach alpha value of the total items of the scale was 0.85. The Cronbach alpha value of Factor 1, 'lack of confidence', was 0.88. The Cronbach alpha value of Factor 2, 'risks', was 0.46. [12–14].

2.5.3. Vaccine Hesitancy Survey Questionnaire (VHSQ)

This tool consists of questions developed by WHO-SAGE that cover contextual, individual, and group, and vaccine/vaccination-specific influences. Most items were dichotomous (Yes/No), and some included open-ended components [9–11].

2.6. Statistical Analysis

The SPSS program (Version 28, Chicago, SPSS Inc., USA) was used for statistical analysis and data recording. In descriptive statistics, mean ± standard deviation (SD) for parametric values, median (median), minimum (min), and maximum (max) for non-parametric values, sample size (n), and percentage (%) values for frequency analyses expressing frequency were reported. The conformity of the data to normal distribution was tested using the Kolmogorov-Smirnov test. In comparing two groups, a variety of statistical tests were employed, depending on the nature and distribution of the data under investigation. Quantitative data were analyzed using tests such as the t-test, Mann-Whitney U test, Kruskal-Wallis test, or one-way ANOVA, while qualitative data were assessed using the Chi-Square test for independent groups and the McNemar test for dependent groups. Pearson or Spearman tests were used for correlation analysis, and linear or logistic regression tests were used in modelling. For statistical significance, a p-value below 0.05 was considered statistically significant.

3. Results

Of the 403 parents of children aged 0-5 years who were administered to polyclinics and completed the survey forms, 279 were female (69.2%) and 124(30.8%) were male. The mean age was 35.6 ± 6.3 years. Of the children, 199 (49.4%) were girls and 204 (50.6%) were boys. The mean age of

 doi:10.20944/preprints202511.1280.v1

the children was 23.7 ± 19.2 months (range: 1–60 months). The parents' sociodemographic characteristics are summarized in Table 1.

The mean WHO/SAGE VHS score was 23.27 ± 11.74. The mean lack of confidence score was 14.97 ± 9.82, and the mean risk factor score was 8.38 ± 3.75 (Table 1).

Table 1. Demographics of the participants.

Demografic Variables	Categories	n	%
Parent	Mother	279	69.2
	Father	124	30.8
Income Status	Low	20	5
	Low-moderate	51	12.7
	Moderate	169	41.9
	Moderate-High	71	17.6
	High	92	22.8
School / Graduate	Illiterate	7	1.7
	Literate	25	6.2
	primary	106	26.3
	High School	94	23.8
	University	171	42.4%
Number of children	1	161	40
	2	116	28.6
	3	71	18.1
	4	35	8.5
	5+	20	4.8
Child's gender	Boy	204	50.6
	Girl	199	49.4
		Min-Max	**Median**	**M ± SD**
WHO/SAGE VHS	Lack of Confidence Point	7.0 - 35.0	11.0	14.97 ± 9.82
	Risk Factors Point	3.0 - 15.0	9.0	8.38 ± 3.75
	Total Point	10.0 - 50.0	21.0	23.27 ± 11.74
Child age (months)		1-60	17	23.7 ± 19.2

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Parent age (years)	21-51	35	35.6 ± 6.3

M: Mean SD: Standard Deviation

Vaccine hesitancy scores differed significantly across sociodemographic groups. According to the education level, it was observed that vaccine hesitancy scores were lower as the education level increased. University graduates had significantly lower vaccine hesitancy scores than those with high school education or less ($p<0.001$). Income level also showed a strong association: the low-income group had significantly higher VHS scores than all other groups ($p<0.001$), while the high-income group had significantly lower scores ($p<0.001$). Additionally, it was observed that as the number of child participants had increased, their vaccine hesitancy scores increased significantly ($p<0.001$) (Table 2).

Table 2. Comparison of vaccine hesitancy according to demographics.

Variables	Categories	N	VHS Score (Mean+SD)	P
Parent	Mother	279	23.09+11.72	0.0687*
	Father	124	24.08+12.03	
Income Status	Low	20	39.15+10.11	<0.001**
	Low-moderate	51	28.24+14.30	
	Moderate	169	23.77+11.30	
	Moderate-High	71	22.50+10.67	
	High	92	15.60+7.49	
School / Graduate	illiterate	7	40.14+8.73	<0.001**
	literate	25	36.44+20.94	
	primary	106	26.52+10.13	
	High School	94	24.03+12.69	
	University	171	18.97+8.92	
Number of children	1	161	20.11+8.62	<0.001**
	2	116	23.51+11.53	
	3	71	25.20+13.75	
	4	35	29 +13.93	
	5+	20	31.75+14.03	

*p>0.05 is not significant, Mann-Whitney U test. **Statistically significant is p<0.05. (ANOVA/Kruskal-Wallis test, post-hoc comparisons).

Contextual effects were examined, 27.8% (n=112) of parents stated that they were hesitant about vaccinating their children, and the rate of those who refused at least one of the recommended vaccines

 doi:10.20944/preprints202511.1280.v1

(private and free vaccines) for their children was found to be 20.6%. Of the parents, 11.4% (n=46) stated that they were hesitant about all free vaccines, and the most mistrusted vaccine among the free vaccines was the Mumps-Measles-Rubella (MMR) vaccine (76.6%). A total of 21.5% of parents (n=87) stated that the vaccine they did not trust the most was the mRNA-containing COVID vaccine and that they were hesitant about the vaccine due to its side effects.

Majority of participants (57.6%) stated that the news they heard/read in the media/social media did not affect their decision to vaccinate their child. Furthermore, 60.5% of the participants stated that they trust the government's vaccination policy. Of the participants, 57.6% stated that they knew someone who did not get vaccinated due to religious or cultural reasons, and 82.9% stated that they did not agree with this view. 18.9% of participants reported refusing the vaccine because they thought the vaccine would contain pork or other animal ingredients, and no statistical significance was found between male and female participants ($p>0.05$). Furthermore, a child's gender was found to influence vaccination decisions more in men than in women ($p<0.05$) (Table 3).

Table 3. WHO/SAGE Vaccine Hesitancy Survey Questions.

Contextual effects	**Yes/ n(%)**	**No / n(%)**
Have you heard/read news in the media/social media that made you reconsider your decision to vaccinate your child?	171(42.4)	232(57.6)
Do you share vaccination-related information on your social media networks?	137(34)	266(66)
Do you believe reports in the media of parents claiming to have lost their child to a vaccine-preventable disease?	191(47.4)	212(52.6)
Does this affect your decision to vaccinate your child?	162(40.2)	241(59.8)
Do leaders in our society (religious, political, teachers, and health care workers) support vaccines for infants and children?	330(81.9)	73(18.1)
Does a celebrity's opposition to a particular vaccine raise concerns about your child's vaccination?	149(37)	254(63)
Has the imam of your neighborhood and/or district mosque opposed vaccination?	84(20.8)	319(79.2)
Did you follow this advice?	62(15.9)	329(84.1)
Do you remember any events in the past that would have prevented you from getting vaccinated for yourself or your children?	87(21.6)	316(78.4)
Has your community refused to accept certain vaccines in the past?	149(37)	254(63)
Do you think they are risking their own health or the health of their children if they don't get vaccinated?	310(76.9)	93(23.1)
Does whether your child is a boy or a girl affect your decision to vaccinate?	21(5.2)	382(94.8)
Would you refuse a vaccine for you/your child if the person administering the vaccine was male/female or of a different ethnicity/religion than you?	76(18.9)	327(81.1)
Do you believe or trust that your government is making decisions in your best interest regarding the provision of vaccines?	244(60.5)	159(39.5)

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Have you ever disagreed with the vaccine choice or vaccination advice provided by your government?	159(39.5)	244(60.5)
Did the distance and timing of the health center, the time required to reach the center or wait at the center, and/or the cost of transportation to the center prevent your child from being vaccinated?	81(20.1)	322(79.9)
Do you believe that vaccine manufacturers care about your health?	214(53.1)	189(46.9)
Do you think governments are being pressured by lobbies or industry to recommend certain vaccines?	239(59.3)	164(40.7)

Differences according to gender were noted in vaccine hesitancy trends. Regarding media and social Influences, the rate of media and social media news stories influencing vaccination decisions was found to be significantly lower in men than in women. Furthermore, men were significantly more likely than women to have access to healthcare and to avoid vaccination for reasons such as availability of health centers, distance, or cost ($p<0.05$).

Individual and group effects were examined, 28.5% of the participants stated that they or a relative had experienced a bad reaction to the vaccine, and this situation negatively affected 25.3% of their vaccination decisions. Additionally, 36.2% stated that they did not think they received enough information about vaccines and their safety, and 81.1% stated that they wanted to obtain more information about vaccines from the Family Health Center. No statistical significance was found between male and female participants. (Table 4).

Table 4. WHO/SAGE Vaccine Hesitancy Survey Questions.

Individual and Group Effects	**Yes / n(%)**	**No / n(%)**
Have you ever refused any vaccinations for your child?	112(27.8)	291(72.2)
Have you or someone you know had a bad reaction to a vaccine?	115(28.5)	288(71.5)
Has this made you reconsider getting vaccinated?	102(25.3)	301(74.7)
Do you know a child who has a serious illness / disability because they were not vaccinated?	81(20.1)	322(79.9)
Have you heard of anyone becoming disabled after being vaccinated?	87(21.6)	316(78.4)
Has this incident made you reconsider your decision to vaccinate yourself/your child?	82(20.3)	321(79.7)
Would past experiences of pain from vaccinations prevent you or your child from getting vaccinated?	106(26.3)	297(73.7)
Do you think vaccines overload the immune system?	107(26.6)	296(73.4)
Do you think your child should gain immunity by getting sick than by getting vaccinated?	107(26.6)	296(73.4)
Do you believe your child should start taking these only when they are over a year old?	116(28.8)	287(71.2)
Do you believe that babies are vaccinated when they are very young?	151(37.5)	252(62.5)

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Do you feel like you know what vaccinations you need for yourself or your children?	212(52.6)	191(47.4)
Would door-to-door vaccinators or mass vaccination campaigns provide you with enough information to allay your concerns about vaccination?	233(57.8)	170(42.2)
Do you feel you have received enough information about vaccines and their safety?	146(36.2)	257(63.8)
Do you want to get more information about vaccination at the health center?	327(81.1)	76(18.9)
Do you think some vaccines are more important than others?	109(27)	294(73)
Have you ever felt like health professionals, the government, or local officials were pressuring you into a vaccination decision that you didn't fully support?	182(45.2)	221(54.8)
Does having the same provider/company/person do all of your baby's vaccinations make you more likely to accept them?	135(33.5)	268(66.5)
Do you think vaccines are still necessary even if the disease is no longer common?	281(69.7)	122(30.3)
Do you think most parents, like you, vaccinate their children with all the recommended vaccines?	253(62.8)	150(37.2)
Do mothers/fathers in our society/your circle of friends vaccinate their children?	310(76.9)	93(23.1)
Do you vaccinate your child?	320(79.4)	83(20.6)
Do you believe that if you vaccinate your child, others will be protected too?	304(75.4)	99(24.6)
Are you concerned that some mothers in our community are delaying or refusing vaccinations, putting your baby at risk for these diseases, such as whooping cough?	288(71.5)	115(28.5)

Regarding knowledge and awareness, men had a more positive view than women in terms of door-to-door or mass vaccination campaigns to alleviate concerns and provide sufficient information. Regarding vaccine acceptance and implementation, men had a lower rate of having friends who vaccinated their children compared to women, and their own rate of vaccinating their own children was also significantly lower ($p<0.05$).

Concerning vaccine-specific attitudes, 56.3% of participants expressed worries regarding approval processes of new vaccines. Table 5 shows risk perception and acceptance rates for several vaccines, showing that the meningococcal vaccine has the highest acceptance rate at 77.2%, while the rotavirus vaccine has the lowest at 62.8%. No significant differences in genders were detected ($p>0.05$).

Male participants exhibited significantly decreased risk perception for HPV, diarrheal illness, and COVID-19, resulting in proportionally reduced acceptance rates for HPV, rotavirus, and COVID-19 vaccines ($p<0.05$).

Table 5. WHO/SAGE Vaccine Hesitancy Survey Questions.

Vaccine/Vaccination/Special issues (directly related to vaccines or vaccination)	**Yes/n(%)**	**No/n(%)**
When a new vaccine is about to be introduced or announced, do you prefer to wait and see what other people do?	288(71.5)	115(28.5)

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Do you think your child is at risk for cervical cancer?	164(40.7)	239(59.3)
Do you think a vaccine (HPV) is necessary to prevent this disease?	257(63.8)	146(36.2)
Do you think your child is at risk for diarrhea?	206(51.1)	197(48.9)
Do you think a vaccine (Rotavirus) is necessary to prevent this disease?	253(62.8)	150(37.2)
Do you think your child is at risk of meningitis / meningococcal infection?	292(72.5)	111(27.5)
Do you think a vaccine is necessary to prevent this disease (Meningitis)?	311(77.2)	92(22.8)
Do you think you/your child is at risk of Covid-19 (SARS-CoV-2)?	158(39.2)	245(60.8)
Have you had yourself and/or your child vaccinated against COVID-19 during and after the pandemic?	246(61)	157(39)
Do you think new vaccines go through a good preparation or monitoring process?	176(43.7)	227(56.3)
Does your fear of the pain you will cause to yourself/your child, or the needles, make you hesitate to get vaccinated?	165(40.9)	238(59.1)
Did you experience pain after the vaccination?	252(62.5)	151(37.5)
Have you ever reconsidered getting yourself/your child vaccinated because of this negative experience?	153(40.4)	240(59.6)
Does the route of administration (oral, intramuscular) matter to you? Does it affect your decision to get vaccinated?	174(43.2)	229(56.8)
Would you allow your child to be vaccinated as part of an immunization program, such as school-based and/or mass vaccination?	255(63.3)	148(36.7)
Do you feel confident that the health center or doctor's office can give you the vaccine you need, when you need it?	293(72.7)	110(27.3)
If you were to have another baby today, would you want him or her to have all the recommended vaccinations?	300(74.4)	103(25.6)
Would the cost of a vaccine prevent you from getting vaccinated, or even if you needed it?	146(36.2)	257(63.8)
Do you think all important vaccines are covered by your health insurance/health care plan/health care provider?	119(29.5)	284(70.5)
Do you pay for additional/special vaccinations that are not included in the vaccination schedule?	266(%66)	137(34)
Has your doctor ever hesitated to give you or your child a vaccine that you wanted?	13(3.2)	390(96.8)
Did you choose your doctors based on their willingness to change or postpone the vaccination schedule according to your wishes?	40(9.9)	363(90.1)

4. Discussion

This study examined vaccine hesitancy among parents of young children in Istanbul, Türkiye.

Vaccine hesitancy scores (lack of confidence and risk factors) were negatively correlated with income and education levels, and positively correlated with the number of children.

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Similar to our study Sarıkahya et al. [15], found that the mean VHS scores of participants living in a high socioeconomic status (SES) region of Türkiye were found to be significantly lower. These findings emphasize that socioeconomic status should be taken into consideration in the process of informing parents.

Our findings contradict those of Soysal et al., who reported higher vaccine hesitancy among more educated and affluent parents in Türkiye, with a mean VHS score of 1.68 ± 0.53[16]. In contrast, vaccine hesitancy scores were significantly higher in the low-educated and low-income groups in our study. Moreover, unlike their study, we found no age-related differences in vaccine hesitancy.

Bulut et al. found that VHS scores of low-educated mothers and fathers were significantly lower than those of other groups. VHS scores were negatively correlated with parental age, age of last child vaccinated, birth order of children, and number of children [17]. Low-educated parents had significantly higher VHS scores than other groups in our study, and we observed that VHS scores increased with the number of children. These findings suggest that having multiple children may amplify parental concerns about vaccination.

In another study, it was found that as the income level of the participants increased, their knowledge levels also increased, and that there was a statistically significant difference in the knowledge scores about vaccines according to the parent who decided to vaccinate their child. It was also determined that the total attitude scores of the participants towards the vaccine showed a statistically significant difference according to their monthly income [18]. Similarly, in our study, as the monthly income level increased, the vaccine hesitancy scores were found to be significantly lower, and a more positive attitude towards vaccines was observed. This pattern shows that socioeconomic difficulties could limit access to correct vaccine information and increase hesitation.

In Karataş et al.'s study, 71.4% of parents stated that they decided not to vaccinate their children after one or more vaccinations, and 23.8% stated that their attitudes towards vaccination changed positively after COVID-19. It was determined that being a mother or father, education level, and number of children significantly affected the VHS score [19]. According to our findings, 39% of participants stated that they refused the COVID-19 vaccine, while 74.4% stated that they would complete routine childhood vaccinations for their future children. This clearly shows us that families have trust issues regarding COVID-19 vaccines.

Concerns about vaccine safety appeared as a significant theme in several studies. Sahoo et al. observed vaccine hesitancy in 9.18% of the participants. In this study, only the child's age was found to be significantly associated with vaccine hesitancy, with almost half (48.5%) of the participants being concerned about serious side effects of vaccines and one-third (30.6%) stating that newer vaccines are associated with higher risks than older vaccines. Caregivers believed that vaccines were no longer necessary for rare diseases [20]. In our study, 68.7% stated that they were concerned about vaccine side effects, 56% stated that new vaccines were not well controlled, and 30.8% believed that vaccination for rare diseases was no longer necessary.

In Dörtkardeşler et al.'s study evaluating parents' attitudes towards COVID-19 vaccines, the vaccination rate was found to be 70.3%, while parents' intention to vaccinate their children was found to be 69.0%. While 88.3% of parents stated that they were knowledgeable about COVID-19 vaccines, 89.4% of parents stated that vaccination was necessary for the COVID-19 pandemic [21]. In Yılmazbaş et al.'s study, the pandemic process was found to have positively affected people's views on vaccine hesitancy [22]. In our study, 61% of the participants stated that they were vaccinated against COVID-19, while 60.8% stated that neither they nor their children were at risk of COVID-19 infection.

In our study, 63.8% of families reported not receiving sufficient information about vaccines and vaccine safety, while 81.1% reported seeking information from the Family Health Center. In a study families reported that they mostly received vaccine information from a Family Health Center nurse or physician (84.1%) [23].

In a study by Yilmaz et al., it was found that 81.6% of the parents considered it necessary to vaccinate their children, 83.1% had their children vaccinated with all the vaccines recommended by the Ministry of Health, 76.9% had missed some of the recommended vaccines due to the side effects

 doi:10.20944/preprints202511.1280.v1

of the vaccines, and 25.7% were hesitant to vaccinate their children [24]. In our study, 79.6% of the participants stated that the Ministry of Health's vaccination calendar was necessary, 79.4% stated that they had received all the recommended vaccines, and 20.6% stated that they were hesitant about vaccination.

This study has several limitations. The cross-sectional design prevents causal inferences regarding the links between sociodemographic characteristics and vaccine hesitation; longitudinal studies are necessary to determine time-based relationships and connections. The data were gathered from a single tertiary care hospital in Istanbul, constraining the applicability of the findings to other locations in Türkiye. Additionally, all data were self-reported, therefore susceptible to social desirability bias, especially with vaccination habits and attitudes.

5. Conclusions

According to the total score average of our study, participants were generally hesitant or had negative attitudes towards vaccination. The level of trust may have been low, or the perception of risk may have been high.

In general, it could be said that there was hesitation or anxiety towards vaccination in the participant group. When the lack of confidence score was examined, it was seen that participants had serious doubts about the reliability, benefits, and accuracy of the vaccination authorities. Trust in vaccination was quite low and trust needed to be established. While the risk factor score showed a medium-high level of risk perception, when evaluated together with the total score, it was seen that there was significant hesitation towards the side effects of vaccines.

According to the results of our study, vaccine hesitancy was at a moderate level, and it was necessary to increase parents' trust in vaccination, strengthen information sources, and provide scientific explanations for their fears of side effects. Strategies such as education, providing information, and enhancing communication with healthcare personnel could be recommended.

Supplementary Materials: The article includes 5 tables related to vaccine hesitancy.

Author Contributions: Conceptualization, E.G. and B.A.; Methodology, E.G.; Software, E.G.; Validation, E.G., B.A.; Formal Analysis, E.G.; Investigation, E.G.; Resources, E.G.; Data Curation, E.G., B.A., S.K. ; Writing – Original Draft Preparation, E.G.; Writing – Review & Editing, E.G. B.A. and N.P.Y. ; Visualization, E.G.; Supervision, E.G., N.P.Y.

Funding: There is no funding in this study.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the (University of Health Sciences, Prof. Dr. Cemil Taşcıoğlu City Hospital, non-invasive research ethics committee, Number 133 and on 04.14.2025).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author due to ethical reasons.

Acknowledgments: The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: There is no conflict of interest.

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