

The relationship between attitudes of parents towards childhood vaccines and vaccine confidence: a cross-sectional study in Turkish Society

La relación entre las actitudes de los padres hacia las vacunas infantiles y la confianza en las vacunas: un estudio transversal en la sociedad turca

Eda Cangöl¹ , Seda Cangöl Sögüt¹ , İlknur Dolu² 

1. Department of Midwifery, Faculty of Health Sciences, Çanakkale Onsekiz Mart University, Turkey

2. Department of Nursing, Faculty of Health Sciences, Bartın University, Turkey

Corresponding author

Eda Cangöl

E-mail: edacangol@comu.edu.tr

Received: 4 - XII - 2024

Accepted: 3 - I - 2025

doi: 10.3306/AJHS.2025.40.03.20

Abstract

Introduction and objectives: This study examines the relationship between parents' attitudes towards childhood vaccines and vaccine confidence during the coronavirus pandemic in Turkish society.

Material and methods: This cross-sectional study was conducted by using an online form with 1.031 parents in Turkish society. This cross-sectional study was conducted between 10 November and 10 December 2020 by using an online form with 1.031 parents in Turkish society. Snowball sampling was applied. Parents were recruited through social media tools and websites such as WhatsApp, Instagram, Twitter, and Facebook.

Results: It was found that 86.8% of the parents had their children vaccinated in the vaccination schedule. There was a strong correlation between the Vaccination Confidence Scale and the Parent Attitudes about Childhood Vaccines Scale ($r = .610$; $p \leq 0.001$).

Conclusions: It was predicted that the study results could be beneficial for health professionals working in primary health care as well as social workers working on this subject.

Key words: Vaccination, Vaccine confidence, Parental attitudes, Childhood vaccines, Society.

Resumen

Introducción y objetivos: Este estudio examina la relación entre las actitudes de los padres hacia las vacunas infantiles y la confianza en las vacunas durante la pandemia de coronavirus en la sociedad turca.

Materiales y métodos: Este estudio transversal se realizó mediante un formulario en línea con 1.031 padres de la sociedad turca. Este estudio transversal se realizó entre el 10 de noviembre y el 10 de diciembre de 2020 mediante el uso de un formulario en línea con 1.031 padres de la sociedad turca. Se aplicó muestreo de bola de nieve. Los padres fueron reclutados a través de herramientas de redes sociales y sitios web como WhatsApp, Instagram, Twitter y Facebook.

Resultados: Se encontró que el 86,8% de los padres vacunaron a sus hijos en el calendario de vacunación. Hubo una fuerte correlación entre la Escala de Confianza en la Vacunación y la Escala de Actitudes de los Padres sobre las Vacunas Infantiles ($r = 0,610$; $p \leq 0,001$).

Conclusiones: Se predijo que los resultados del estudio podrían ser beneficiosos para los profesionales de la salud que trabajan en la atención primaria de salud, así como para los trabajadores sociales que trabajan en este tema.

Palabras clave: Vacunación, Confianza en las vacunas, Actitudes de los padres, Vacunas infantiles, Sociedad.

Cite as: Cangöl E, Sögüt Cangöl Seda, Dolu I. The relationship between attitudes of parents towards childhood vaccines and vaccine confidence: a cross-sectional study in Turkish Society. *Academic Journal of Health Sciences* 2025;40 (3): 20-28 doi: 10.3306/AJHS.2025.40.03.20

Introduction

The primary purpose of health services is to ensure that people continue to live healthy and prevent diseases. One of the most important public health practices in maintaining health and preventing communicable diseases is immunization studies. The immune response caused by the administration of antigen to the body against a microorganism is called immunization, and the process applied to obtain this response is called vaccination^{1,2}. Despite being recognized as one of the most successful public health measures, vaccination is perceived as unsafe and unnecessary by an increasing number of parents³. The issue of vaccine rejection has been debated around the world for many years, and has recently become more and more on the agenda. The efficacy, safety, necessity, and importance of vaccines are some of the main topics discussed. Vaccination is very important for children to grow and develop in a healthy way. In recent years, reservations expressed by families for different reasons may affect vaccine acceptance⁴. Parents' ignorance of vaccine rejection is one of the most important reasons for this^{2,5}. Studies emphasize that informing families by healthcare professionals is the most reliable source and increases vaccination rates^{4,6}.

The return on investment of childhood vaccination programs is quite high⁴. Thanks to the Expanded Immunization Program implemented by the World Health Organization (WHO) since 1974, deaths of millions of people have been prevented by administering diphtheria, whooping cough, measles, polio, tetanus and tuberculosis vaccines^{3,7-9}. The vaccination rate in Turkey was 98% in 2016, whereas this rate decreased to 96% in 2017. While measles was seen in 84 children in 2017 across the country, it reached 716 in 2018 and 2.905 in 2019. According to the data of the Ministry of Health in Turkey in April 2018, the number of families who reject vaccines has exceeded 20,000^{10,11}. The World Health Organization has gathered the factors that prevent vaccination under three main headings. These factors are: contextual effect; individual and group effects; and vaccines and vaccination effects¹². Some of these include not trusting the vaccine content; side effects of the vaccine; family's perception of the disease; not getting enough information about vaccines; religious reasons; and the pharmaceutical industry¹³.

For example, in anti-vaccine discourses, the relation of mercury in the vaccine with autism has been put forward, and such a relationship has not been shown in many scientific studies. Vaccines that have been applied in the world for about twenty years and in our country for the last ten years to reduce vaccine rejection do not contain mercury. However, the hesitation of the parents about this still continues^{1,14,15}. Anti-vaccination actions play a role in terms of lowering vaccine acceptance rates and increasing vaccine-preventable disease outbreaks and epidemics³. The reoccurrence

of vaccine-preventable outbreaks, including measles and pertussis, can be given as an evidence¹⁶. For this reason, the World Health Organization has included vaccine rejection among the ten global problems it determined for 2019¹⁷. In the world, the primary problem in vaccination in underdeveloped countries is related to the inadequacy of the necessary technical infrastructure and the number of healthcare personnel below the need, while in developed and developing countries, it is related to the fact that parents are not informed about the vaccines adequately and accurately and that the necessity of vaccination is not explained. Among the reasons why children are not fully vaccinated on time are the socioeconomic structure of the family, the education level of the parents, the number of children, the distance to the health institution, insufficient or wrong information, lack of trust in vaccines, and the risk of vaccines to cause immunosuppressive diseases^{18,19}.

There is frequent public distrust among parents against the vaccine. It is an undeniable fact that midwives and nurses, as health professionals, have important responsibilities in informing the public about vaccines and the importance of vaccination. In the fight against vaccine rejection, it is inevitable to carry out scientific studies in order to increase social trust in vaccination and to offer solutions in the light of these researches. In the literature review, studies on this subject are very limited. The coronavirus pandemic is also an important process to raise awareness on this issue. Therefore, the study was conducted to determine the relationship between the attitudes of parents towards childhood vaccines and vaccine confidence during the coronavirus pandemic in Turkish society.

Materials and methods

Design, Data Collection and Sample

This cross-sectional study was conducted between 10 November and 10 December 2020 by using an online form with 1.031 parents in Turkish society. Snowball sampling was applied. Parents were recruited through social media tools and websites such as WhatsApp, Instagram, Twitter, and Facebook. A participation link with an informed consent were shared with participants to invite participants to study.

Inclusion criteria in the study

Having at least one child

Measurements

Data collection tools

The data of the study were collected using the "Parent Information Form", "Vaccination Confidence Scale" and "Parent Attitudes about Childhood Vaccines Scale" prepared by the researchers by scanning the literature.

The Parent Information Form, consists of 15 questions which are related to parents' socio-demographic characteristics, such as gender, age, educational status, income perception, employment status, and their opinions about childhood vaccinations, the decision to have childhood vaccinations, the effect of the COVID-19 pandemic on childhood vaccination, and the decision to have a possible coronavirus vaccine⁷.

The Vaccination Confidence Scale (VCS): This 8-item scale, which was developed by Gilkey et al.²⁰ with 0.77 coefficient alpha, was adapted to the Turkish language by Özdemir and Kadioğlu²¹. The scale items are scored between 0 (strongly disagree) and 10 (strongly agree) and consist of three subscales: benefits of vaccination, harms of vaccination, and trust in healthcare providers. The total score that can be obtained from the scale varies between 0-80: 0-40 is obtained from the 'benefits of vaccination' subscale, whereas 0-20 is obtained from the 'harms of vaccination' subscale and 0-20 from the 'trust in healthcare providers' subscale. A high score is interpreted as a high perception of vaccine trust. The Cronbach alpha coefficient of the Turkish form of the scale was 0.70, and it was, a similar way, 0.69 in this study. The low coefficient alphas can be explained by the low number of items in the scale²⁰.

The Parent Attitudes about Childhood Vaccines Scale (PACV): The scale, which was developed by Opel et al.²²⁻²⁴ and whose validity and reliability were studied, was adapted to Turkish by Bulun and Acuner²⁵. The answers to the scale questions, which consist of 15 questions in total, include three different response formats. Three questions are closed-ended (Yes/No/I don't know), 10 questions are the 5-item Likert type (Strongly Agree/Agree/Not Sure/Disagree/Strongly Disagree), and two questions are the scoring type (from 0 to 10). While scoring the scale items, the hesitant responses were scored as 2, the unstable responses were scored as 1, and the unhesitant responses were scored as 0, and the scores from each item were added without any weighting to determine the total score. In the scale, there is a simple linear transformation table that can be used according to the situation where the answers given to the first two questions are "Yes", "No" or "Don't know" and where there can be one or two missing data in the last 13 questions. The lowest score that can be obtained from the scale is 0, whereas the highest score is 100. High scores in the scale indicate vaccine hesitancy. The Cronbach alpha score was calculated as 0.74 for the original scale, 0.84 for the Turkish version. The Cronbach alpha score calculated for the whole scale in this study was 0.85.

Ethical considerations

This study was approved by the Scientific Research Council of Bartın University (Reference number: 2020-SBB-0213 / Date: 5 November 2020). Participation in the study was on a voluntary basis. Electronic informed

consent was presented on the first page of the online forms. On the first page of the survey, the participants were electronically asked whether they were willing to participate and informed that they could withdraw from the survey at any time.

Statistical analysis

The values of Skewness and Kurtosis were examined in order to test the compliance of the study data to normal distribution. Descriptive statistics were given in terms of number, percentage and standard deviation. Chi-square test was used for the comparison of categorical variables, ANOVA for data conforming to normal distribution in group comparisons, and Mann-Whitney U analysis for data not compatible with normal distribution. Pearson's correlation was used to evaluate the relationship between the Vaccine Confidence Scale and its subscales, and the Parent Attitudes About Childhood Vaccines Scale and its subscales. Since all the questions were mandatory in the prepared survey, there is no missing data in the data. SPSS 22.0 was used for analysis, and $p \leq 0.05$ was accepted as the level of significance.

Results

The characteristics of the parents regarding their socio-demographic characteristics are given in **table I**. 86.13% of the participants were mother parents and the mean age was 37.41 (\pm 9.08), whereas the average age of the fathers was 44.62 (\pm 9.96). 52.96% of the parents do not work, 39.57% have university or higher education, 41.9% have two children, and 60.8% defined their income as equal to their expenses.

The differences between the Vaccine Confidence Scale and its subscales, and the PACV scale scores according to some socio-demographic characteristics of the parents are given in **table II**. Statistical differences were found between the age groups of the participants in terms of the Vaccine Confidence Scale ($F = 3.515$; $p = 0.015$), benefits subscale ($F = 5.675$; $p = 0.001$) and PACV scores ($F = 7.371$; $p = <0.001$). According to the Post-hoc analysis, this difference is due to the fact that the scores obtained by the parents under the age of 29 from the Vaccine Confidence Scale are lower than those of the 30-39 and 50-and-older age groups and that the scores obtained by the parents under the age of 29 from the benefits subscale were lower than those of all the other age groups. On the other hand, the PACV score of the participants aged 29 and under is higher than all other age groups, and the PACV score of the 30-39 age group is lower than the 40-49 age group. A statistical difference was found in terms of number of children parents have, Vaccine Confidence Scale ($F = 5.520$; $p = 0.004$), benefits subscale ($F = 7.251$; $p = 0.001$), trust subscale ($F = 0.772$; $p = 0.023$) and PACV scores ($F = 8.594$; $p = <0.001$). According to the Post-hoc analysis, the reason for the

difference was that the scores of the parents with three children and more from the benefits subscale were lower than those with one or two children and that

the trust subscale and the Vaccine Confidence Scale scores of the same group were lower than those with 2 children.

Table I: Socio-demographic Characteristics of the Parents.

Variables	Parents -1.031		Mother -888		Father -143		Statistics	
	Number	%	Number	%	Number	%	X ²	p
Age Group								
29 and younger	198	19.2	187	21.1	11	7.7	78.525	<.001
30-39	347	33.7	317	35.7	30	21		
40-49	353	34.2	300	33.8	53	37.1		
50 and older	133	12.9	84	9.5	49	34.3		
Mean (±SD). Min.-Max.	38.41 (±9.53). 18-70		37.41 (±9.08). 18-70		44.62 (±9.96). 21-69			
Employment Status							19.319	<.001
Unemployed	546	52.96	509	57.3	37	25.9		
Healthcare worker / Healthcare graduate	187	18.14	176	19.8	11	7.7		
Not a health worker	298	28.9	203	22.9	95	66.4		
Education status							27.119	<.001
Elementary school or literate	401	38.89	336	37.8	65	45.5		
High School	222	21.53	188	21.2	34	23.8		
University or higher	408	39.57	364	41.0	44	30.8		
Number of Children							8.96	0.011
One	340	33.0	296	33.3	44	30.8		
Two	432	41.9	383	43.1	49	34.3		
Three and more	259	25.1	209	23.5	50.0	35.0		
Mean (±SD). Min.-Max.	2.04 (±1.04). 1-9		2.01 (±0.99). 1-9		2.26 (±1.28). 1-9			
Economic condition							1.817	<.001
Income less than expenses	232	22.5	205	23.1	27	18.9		
Income equal to expenses	627	60.8	539	60.7	88	61.5		
Income more than expenses	172	16.7	144	16.2	28	19.6		

X²: Pearson Chi-Square Test; SD: Standard deviation

Table II: Comparison of the Average Scores of the Parents from the PACV and Vaccine Confidence Scale According to Their Socio-demographic Characteristics.

Variables	Parents		Benefits of Vaccination	Harms of Vaccination	Trust in Healthcare Providers	Vaccination Confidence Scale	PACV
	Number	%	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)
Age Group							
29 and younger	198	19.2	27.96 (±10.25)	8.60 (±4.85)	15.27 (±5.09)	51.83 (±13.00)	32.68 (22.62)
30-39	347	33.7	30.85 (±8.13)	8.07 (±4.68)	15.89 (±4.29)	54.82 (±11.39)	24.94 (19.87)
40-49	353	34.2	30.01 (±8.04)	8.39 (±4.38)	15.26 (±4.28)	53.65 (±10.60)	28.80 (20.00)
50 and older	133	12.9	31.06 (±7.58)	8.44 (±3.74)	15.57 (±3.83)	55.08 (±10.06)	24.79 (18.39)
F / p value			5.675 / 0.001	.674 / 0.568	1.467 / 0.222	3.515 / 0.015	7.371 / <0.001
Post hoc LCD			(a) < (b); (a) < (c); (a) < (d)			(a) < (b); (a) < (d)	(a) > (b); (a) > (c); (a) > (d); (b) < (c)
Employment Status							
Unemployed	546	52.96	30.01 (8.58)	8.32 (4.46)	15.53 (4.40)	53.86 (11.25)	28.61 (20.90)
Healthcare worker / Healthcare graduate	187	18.14	30.49 (8.77)	7.99 (4.60)	15.78 (4.44)	54.25 (11.86)	26.66 (20.59)
Not a health worker	298	28.9	29.80 (8.34)	8.56 (4.50)	15.33 (4.37)	53.68 (11.21)	26.79 (19.62)
F / p value			.381 / 0.683	.917 / 0.400	.607 / 0.545	.148 / 0.862	1.084 / .339
Education status							
Elementary school or literate	401	38.89	29.94 (±8.30)	8.37 (±4.25)	15.30 (±4.35)	53.61 (±11.18)	28.60 (±19.68)
High School	222	21.53	29.63 (±9.16)	8.14 (±4.69)	15.65 (±4.76)	53.42 (±11.84)	27.27 (±21.70)
University or higher	408	39.57	30.35 (±8.43)	8.39 (±4.64)	15.65 (±4.24)	54.39 (±11.22)	27.13 (±20.59)
F / p value			0.558 / 0.572	.248 / 0.780	.808 / 0.446	.716 / 0.489	.597 / 0.551
Number of Children							
One	340	33	29.96 (±9.29)	8.02 (±4.56)	15.56 (±4.62)	53.53 (11.81)	26.09 (20.88)
Two	432	41.9	31.02 (±7.75)	8.26 (±4.61)	15.85 (±4.16)	55.13 (10.44)	26.30 (19.31)
Three and more	259	25.1	28.49 (±8.57)	8.85 (±4.20)	14.90 (±4.45)	52.24 (11.94)	32.26 (21.24)
F / p value			7.251 / 0.001	2.637 / 0.072	0.772 / 0.023	5.520 / 0.004	8.594 / <0.001
Post hoc LCD			(a) > (c); (b) > (c)		(b) > (c)	(b) > (c)	(a) < (b); (a) < (c)
Economic condition							
Income less than expenses	232	22.5	29.37 (±8.67)	8.35 (±4.34)	15.38 (±4.65)	53.09 (±12.52)	30.16 (20.20)
Income equal to expenses	627	60.8	30.03 (±8.46)	8.35 (±4.59)	15.50 (±4.33)	53.89 (±11.15)	27.34 (20.31)
Income more than expenses	172	16.7	30.94 (±8.62)	8.20 (±4.40)	15.75 (±4.30)	54.90 (±10.25)	25.87 (21.29)
F / p value			1.683 / 0.186	.079 / 0.924	.359 / 0.699	1.247 / 0.288	2.468 / 0.085

F: Analysis of variance; SD: Standard deviation; PACV: The Parent Attitudes about Childhood Vaccines Scale.

Table III: Parents' Attitudes towards Vaccines.

Variables	Parents (1.031)		Mother (888)		Father (143)		Statistics	
	Number	%	Number	%	Number	%	X ²	p
Do you find it necessary to vaccinate your child?								
Yes	861	83.51	740	83.3	121	84.6	0.154	0.926
No	71	6.89	62	7	9	6.3		
I am indecisive	99	9.6	86	9.7	13	9.1		
Have your child had all the vaccinations recommended by the Ministry of Health?								
Yes	895	86.81	774	87.2	121	84.6	2.366	0.506
S/he missed some vaccinations	73	7.08	63	7.1	10	7		
No, never	22	2.13	19	2.1	3	2.1		
I don't know/ I don't remember	41	3.98	32	3.6	9	6.3		
Has there been any change in your decision to vaccinate your child during the coronavirus pandemic?								
Yes	163	15.81	140	15.8	23	16.1	0.009	0.923
No	868	84.19	748	84.2	120	83.9		
Would you like to get the possible coronavirus vaccine?								
Yes	396	38.41	323	36.4	73	51	11.897	0.003
No	162	15.71	141	15.9	21	14.7		
I am indecisive	473	45.88	424	47.7	49	34.3		

X²: Pearson Chi-Square Test**Table IV:** Parents' Attitudes towards Vaccines and the comparison of PACV and Vaccine Confidence Scale Scores (N=1.031).

	Mother n (%) or Mean Rank	Father n (%) or Mean Rank	Statistics U	p
Vaccination Confidence Scale	888 (86.13)	143 (13.87)		
Benefits of Vaccination	518.8	498.64	61009.500	0.452
Harms of Vaccination	521.24	483.48	58842.000	0.158
Trust in healthcare providers	507.58	568.27	56017.000	0.023
PACV	524.81	461.29	55668.000	0.017
PACV	511.37	544.76	59379.000	0.212
Parents who do not consider it necessary or hesitate to vaccinate their child				
Vaccination Confidence Scale	148 (16.7)	22 (15.4)		
Benefits of Vaccination	87.11	74.66	1389.500	0.268
Harms of Vaccination	87.31	73.3	1359.500	0.212
Trust in healthcare providers	84.92	89.39	1542.500	0.690
PACV	87.52	71.89	1328.500	0.163
PACV	83.15	101.3	1280.500	0.106
Parents who do not have all the Ministry of Health vaccinations for their children, missed some vaccinations or have no knowledge				
Vaccination Confidence Scale	114 (12.8)	22 (15.4)		
Benefits of Vaccination	69.08	65.5	1188.000	0.696
Harms of Vaccination	69.5	63.3	1139.500	0.498
Trust in healthcare providers	67.26	74.91	1113.000	0.403
PACV	69.32	64.23	1160.000	0.577
PACV	68.75	67.18	1225.000	0.864
Parents who have a change in their decision to vaccinate your child during the coronavirus pandemic				
Vaccination Confidence Scale	748 (84.2)	120 (83.9)		
Benefits of Vaccination	85.44	61.07	1128.500	0.022
Harms of Vaccination	86.63	53.85	962.500	0.002
Trust in healthcare providers	80.43	91.59	1389.500	0.292
PACV	84.49	66.83	1261.000	0.095
PACV	78.69	102.17	1146.000	0.027
Parents who are indecisive or unwilling to get a possible coronavirus vaccine				
Vaccination Confidence Scale	565 (63.6)	70 (49.0)		
Benefits of Vaccination	319.79	303.51	18761.000	0.483
Harms of Vaccination	322.04	285.36	17490.500	0.114
Trust in healthcare providers	310.76	376.44	15684.000	0.005
PACV	322.93	278.2	16989.000	0.053
PACV	310.4	379.33	15482.000	0.003

U= Mann-Whitney U; PACV: The Parent Attitudes about Childhood Vaccines Scale

Table III presents the parents' views on vaccines. 83.51% of the participants thought that it was necessary to vaccinate their children, 86.81% had their children vaccinated in the vaccination schedule, 84.19% stated that the COVID-19 pandemic did not change the decision to vaccinate their child, and 38.41% would have possible coronavirus vaccination. Probable coronavirus vaccination decisions are statistically more common in fathers compared to mothers ($X^2 = 11.897$; $p = 0.003$). Although there is not seen **table III**, the most common reasons for parents not having their children vaccinated or being indecisive are: "I believe vaccines have serious side effects." (18.2%); "I believe that vaccines can be harmful to my child." (14.8%); and "Some scientists' negative opinions and public statements about the vaccine." (14.0%).

Parents' views on vaccines and comparison of PACV and Vaccine Confidence Scale scores are presented in **table IV**. Perception of harms ($U = 56017.000$; $p = 0.023$) and trust ($U = 55668.000$; $p = 0.017$) were found statistically higher in mothers than fathers. There was a difference between the parents in terms of the Vaccination

Confidence Scale, benefits subscale and PACV scores in the parents who changed their decision to vaccinate their child during the coronavirus pandemic. It was statistically calculated that the perception of benefits ($U = 1128.500$; $p = 0.022$) and vaccine confidence ($U = 962.500$; $p = 0.002$) were higher in mothers compared to fathers and that mothers' attitudes towards childhood vaccinations were lower ($U = 1146.000$; $p = 0.027$). Parents who did not want to have a possible coronavirus vaccine or were indecisive were found to have a statistically higher perception of harms compared to fathers ($U = 15684.000$; $p = 0.005$), and lower PACV scores ($U = 15482.000$; $p = 0.003$).

The relationship between the parents' attitudes towards childhood vaccines and the Vaccination Confidence Scale scores is given in **table V**. The PACV scale total score was strongly correlate with the Vaccination Confidence Scale total score, the benefits subscale, and the trust subscale. At the same time, a medium correlation was found between the total score of the PACV scale and the harms subscale of the Vaccination Confidence Scale.

Table V: The Relationship between Parents' Attitudes towards Childhood Vaccines and Vaccine Confidence Scale Scores.

Variables	M	SD	1	2	2a	2b
1. Converted score PACV	27.73	20.48				
2. Vaccination Confidence Scale	53.88	11.34	-.610** [-.36- -.31]			
2a. Benefits of vaccination subscale	30.03	8.54	-.729** [-.32- -.29]	.886** [.65-.69]		
2b. Harms of vaccination subscale	8.33	4.50	.442** [-.09- .11]	.071** [-.00- .05]	-.307** [-.69- .47]	
2c. Trust in healthcare providers subscale	15.52	4.40	-.609** [-.14- .12]	.785** [-.29- .32]	.655** [1.18-1.36]	-.244** [-.31- .19]

**Pearson Correlation is significant at the 0.01 level (2-tailed); Strong correlation, between ± 0.50 and ± 1 ; Medium correlation, between ± 0.30 and ± 0.49 ; Small correlation, below $\pm .29$.

Discussion

Vaccine rejection is becoming an important public health problem by threatening the health of our children as well²⁶⁻²⁸. This study aims to examine the relationship between the attitudes of parents towards childhood vaccines and vaccine confidence during the coronavirus pandemic. The majority of the parents participating in the study were mothers. In other studies conducted with parents, mothers are also at a high rate^{7,29}. In the study, the proportion of parents who had university or higher education and who stated that their income was equal to their expenses was high. A statistically significant difference was found between the mother and father participants in terms of socio-demographic variables, and it is thought that this may be due to the difference in the number of participants in both groups.

In the study, while the age of the parents and the number of children are among the factors affecting attitudes towards

vaccines, the education level is not. In other studies, it was found that the higher the education level of the mother is, the higher the vaccination rate is^{30,31}. Kaydirak et al.⁷ found that the most important variable affecting the parents' approach to vaccination is the education level of the mother and father. In the study of Özceylan et al.⁵, vaccine rejection and hesitation were associated with high income group and high education level. The results of the studies are not similar to the study.

Almost all of the parents stated that they considered it necessary to vaccinate their children, that they had their children vaccinated in the vaccination schedule, and that the COVID-19 pandemic did not change the decision to vaccinate their child. Adisa et al.³⁰ found that the rate of those, who believed that vaccination could prevent all childhood fatal diseases, stated that the vaccine was the best for children, and that the number of those, who had

their children vaccinated, was quite high. In the study of Vasantha et al.³² it was stated that the majority of the mothers had their children vaccinated and had a positive attitude towards vaccines. In the study of Wani et al.³³, mothers believe that vaccination is important and almost all of them argue that it is important to comply with the vaccination schedule. The study results are similar.

In the study, the most common reasons the parents used for not having their children vaccinated or being indecisive were those: "I believe vaccines have serious side effects", "I believe vaccines can be harmful to my child", and "some scientists' negative opinions and public statements about the vaccine". In the study conducted by Sandhofer et al.³⁴ in Australia, fear of vaccines' side effects, suspicion of vaccine efficacy and distrust in the pharmaceutical industry were among the reasons for vaccine rejection. In another study by Chan et al.³⁵ religious beliefs were stated as the cause of vaccine rejection. In the study by Lim et al.³⁶, believing in alternative treatment, doubting the vaccine content, social media, family influence, long waiting in the clinic, and religious and personal beliefs are among the reasons for vaccine rejection. It is an indisputable fact that social media is one of the most effective factors in the increase of vaccine opposition with the widespread use of the internet recently. In recent years, the internet and social media have become a determining factor in issues that affect all areas of daily life such as health which concerns all members of society.

In order to ensure herd immunity in the society, at least 67% of the individuals should be vaccinated^{37,38}. According to an online research conducted in Australia, 85.8% of the society stated that they would get the coronavirus vaccine³⁷. According to the study conducted in Poland, 74.6% of the society is of the opinion that vaccination against the coronavirus is mandatory, and only 8% says that vaccines are not safe³⁹. According to the results of online surveys in France, 26% of the society stated that they would not accept to be vaccinated if the coronavirus vaccine was developed.⁴⁰ As a result of the research conducted with the participation of 7 countries in Europe, it was seen that 73.9% of the society was willing to get the coronavirus vaccine³⁸. In a study conducted with pregnant women in Vietnam, 60.4% stated that they were willing to be vaccinated, whereas 82.6% were willing to pay for the COVID-19 vaccine. Among the reasons for refusing the vaccine, it was stated that 66.9% of pregnant women were worried about the safety of the vaccine and that 45.2% thought that the preventive effect of the vaccine was low⁴¹. In a study conducted in China, it was reported that 96.2% of individuals with depression and anxiety disorders were more willing to get the COVID-19 vaccine and to pay for the COVID-19 vaccine⁴². More than 95% of healthcare workers in Asia also stated that they were willing to get vaccinated⁴³. In the study, only 38.4% of parents

reported that they would have their children had a possible coronavirus vaccine. This situation shows that it is important to increase the acceptability of the vaccine in our country. In order to increase the sustainability and reliability of global vaccination programs, priority populations should be identified and communication, intersectoral collaboration and home care services should be increased⁴⁴. The results of the study confirm that it is important to establish national and international vaccination programs with interdisciplinary cooperation of nurses, midwives and social workers.

Immunization programs will be more successful only with the participation of nurses, midwives, doctors, social workers, the press, and local politicians, and vaccination acceptance rates in the community will increase⁴⁵. Social workers especially need to be trained to develop macro-level programs and to provide necessary collaborations with institutions in the community⁴⁶. Thus, working together with this professional group of nurses and midwives will enable the development of effective social programs to increase the trust of parents with vaccine insecurity⁴⁷. There are differences in attitudes towards harms of vaccination between parents. Mothers rely more on the vaccine and think it is beneficial. Wani et al.³³ found that the majority of mothers believed that vaccines were beneficial. In addition, the study found that mothers had more confidence in healthcare providers. It has been emphasized in different studies that healthcare workers are the most effective and reliable source of information about vaccination services and that their attitudes towards vaccines have a strong influence on the success of vaccination^{48,49}. The study results support the literature. In increasing vaccination rates, it is important to identify the reasons for vaccination hesitation and to develop specific strategies to increase the confidence. Healthcare professionals have a key role in addressing vaccine hesitation by providing advice to parents who are hesitant about vaccination acceptance.

In our study, a high degree of correlation was found between parents' attitudes towards childhood vaccines, and Vaccine Confidence Scale scores. A strong association was found between the benefits subscale and the trust subscale. These results support that healthcare providers have good communication with parents and establishing trust is one of the most effective ways to overcome hesitation about vaccination.

Conclusion

Society immunity is very important to protect the society from diseases and to improve health. Vaccine refusal and vaccine rejection have led to a decline in vaccination rates in the population. In this study, it was found that the parents considered it necessary to vaccinate their children at a very high rate and had their children vaccinated in the vaccination schedule. In addition, a

high degree of correlation was found between parents' attitudes towards childhood vaccines and Vaccination Confidence Scale scores. It is important to organize regular and continuous education programs for parents and to inform them about benefits of vaccination in order to strengthen and develop positive attitude towards vaccination during these trainings. In this context, the study results are an important resource for health professionals working in primary health care as well as social workers working on this subject.

Limitations

This study has some limitations. First, the proportion of the father parents who agreed to participate in the study was significantly lower than that of the mother parents. Secondly, only those individuals, who could fill in online forms, who were at least literate, and who had an electronic device to fill in the form, participated in the study.

References

1. Gür E. Vaccine hesitancy- vaccine refusal. *Turk Pediatri Ars.* 2019;54(1):1-2. Doi: 10.14744/TurkPediatriArs.2019.79990
2. Yüksel GH, Topuzoğlu A. Factors affecting anti-vaccination. *ESTUDAM Journal of Public Health.* 2019; 4(2): 244-258. <https://doi.org/10.35232/estudamhsd.525983>
3. Dubé E, Vivion M, MacDonald NE. Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: Influence, impact and implications. *Expert Review Of Vaccines.* 2015;14(1): (2015) 99–117. <https://doi.org/10.1586/14760584.2015.964212>
4. Argüt N, Yetim A, Gökçay G. The Factors Affecting Vaccination Acceptance. *J Child.* 2016; 16(1-2): 16-24. Doi: 10.5222/j.child.2016.016
5. Özçeylan G, Toprak D, Esen ES. Vaccine rejection and hesitation in Turkey. *Hum Vaccin Immunother.* 2020;16(5):1034-1039. <https://doi.org/10.1080/21645515.2020.1717182>
6. Karafillakis E, Dinca I, Apfel F, Cecconi S, Würz A, Takacs J et al. Vaccine hesitancy among healthcare workers in Europe: A qualitative study. *Vaccine.* 2016;34(41):5013-5020. doi: 10.1016 / j.vaccine.2016.08.029
7. Kaydirak MM, Gumusay M, Gulec Y, Sahin NH. Parental Opinions and Approaches about Childhood Vaccinations: Are Anti-vaccination Approaches and Indecisiveness Parental Rights? *J Community Health Nurs.* 2020;37(4):222-232. <https://doi.org/10.1080/07370016.2020.1809860>
8. Orhon FŞ. An Overview of the Extended Immunization Program. *Osmangazi Medical Journal.* (2020) 6-14 Doi: 10.20515/otd.681563
9. World Health Organisation. European Region loses ground in effort to eliminate measles. (2019) <https://www.euro.who.int/en/media-centre/sections/press-releases/2019/european-region-loses-ground-in-effort-to-eliminate-measles> [Date of access 12.11.2020].
10. Ministry of Health Health Statistics Yearbook 2019 Newsletter. (2019) <https://dosyamerkez.saglik.gov.tr/Eklenti/39024,haber-bulteni-2019pdf.pdf?0> [Date of access 12.11.2020].
11. Ministry of Health. General Directorate of Health Information Systems. Health Statistics Yearbook (2017) Newsletter. 2018 https://www.ttb.org.tr/halk_sagligi/2018/04/13/saglik-bakanligini-asilama-konusunda-goreve-davet-ediyoruz/ [Date of access 12.11.2020].
12. World Health Organisation. The SAGE Vaccine Hesitancy Working Group. What Influences Vaccine Acceptance: A Model of Determinants of Vaccine Hesitancy. (2013) https://www.who.int/immunization/sage/meetings/2013/april/1_Model_analyze_driversofvaccineConfidence_22_March.pdf [Date of access 12.11.2020].
13. Çapanoğlu E. Ethical concerns or the rejection of childhood vaccination in view of healthcare professionals and parents, professionals and parents, a qualitative study. [Master Thesis]. Acıbadem Mehmet Ali Aydınlar University Institute of Health Sciences (2018).
14. Spencer JP, Pawlowski Trondsen RH, Thomas S. Vaccine Adverse Events: Separating Myth from Reality. *Am Fam Physician.* 2017;95(12):786-794.
15. Taylor LE, Swerdfeger AL, Eslick GD. Vaccines are not associated with autism: an evidence-based meta-analysis of case-control and cohort studies. *Vaccine.* 2014;32(29):3623-3629. doi: 10.1016 / j.vaccine.2014.04.085
16. Gowda C, Dempsey AF. The rise (and fall?) of parental vaccine hesitancy. *Hum Vaccin Immunother.* 2013; 9(8):1755-1762. Doi: 10.4161/hv.25085
17. World Health Organisation. Ten threats to global health in 2019. 2019 <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019> [Date of access 11.11.2020].
18. Kader C. Anti-Vaccination: Vaccine hesitancy and refusal. *ESTUDAM Public Health Journal.* 4(3) 2019 377-388. <https://doi.org/10.35232/estudamhsd.590304>
19. Kürtüncü M, Alkan İ, Bahadır Ö, Arslan N. The knowledge levels of mothers about the vaccination status of children living in a rural area of Zonguldak. *Ejovoc Electronic Journal of Vocational Colleges.* 2017;7(1):8-17. <https://www.researchgate.net/publication/337569852>

Acknowledgments

The authors are grateful to all participants who agreed to participate voluntarily in this study.

Declaration of Interest Statement

The authors declare no conflicts of interests.

Funding

This study received no funding.

Ethical considerations

This study was approved by the Scientific Research Council of Bartın University (Reference number: 2020-SBB-0213 / Date: 5 November 2020). Participation in the study was on a voluntary basis. Electronic informed consent was presented on the first page of the online forms. On the first page of the survey, the participants were electronically asked whether they were willing to participate and informed that they could withdraw from the survey at any time.

20. Gilkey MB, Magnus BE, Reiter PL, McRee AL, Dempsey AF, Brewer NT. The Vaccination Confidence Scale: a brief measure of parents' vaccination beliefs. *Vaccine*. 2014;32(47): 6259-6265. Doi: 10.1016/j.vaccine.2014.09.007
21. Özdemir İN, Kadioğlu H. Validity and Reliability of Turkish version of Vaccination Confidence Scale for Parents. *Florence Nightingale J Nurs*. 2020; 28(1): 41-48. Doi: 10.5152/FN.JN.2020.18079
22. Opel DJ, Mangione-Smith R, Taylor JA, Korfiatis C, Wiese C, Catz S, et al. Development of a survey to identify vaccine-hesitant parents: the parent attitudes about childhood vaccines survey. *Hum Vaccin*. 2011;7(4):419-425. <https://doi.org/10.4161/hv.7.4.14120>
23. Opel DJ, Taylor JA, Mangione-Smith, R, Süleyman C, Zhao Ç, Catz S, et al. Validity and reliability of a survey to identify vaccine-hesitant parents. *Vaccine*. 2011;29(38): 6598-6605. <https://doi.org/10.1016/j.vaccine.2011.06.115>
24. Opel DJ, Taylor JA, Zhou C, Catz S, Myaing M, Mangione-Smith R. The relationship between parent attitudes about childhood vaccines survey scores and future child immunization status: a validation study. *JAMA Pediatr*. 2013;167(11):1065-1071. <https://doi.org/10.1001/jamapediatrics.2013.2483>
25. Bulun MA, Acuner D. Turkish Adaptation and Reliability and Validity Study of Parent Attitudes About Childhood Vaccines Survey, *J Pediatr Res*. 2020;7(4):323-330. Doi: 10.4274/jpr.galenos.2020.92260
26. Bertonecello C, Ferro A, Fonzo M, Zanovello S, Napoletano G, Russo F, et al. Socioeconomic Determinants in Vaccine Hesitancy and Vaccine Refusal in Italy. *Vaccines*. 2020; 8(2): 276. <https://doi.org/10.3390/vaccines8020276>
27. Rozbroj T, Lyons A, Lucke J. Vaccine-Hesitant and Vaccine-Refusing Parents' Reflections on the Way Parenthood Changed Their Attitudes to Vaccination. *J Community Health*. 2020;45(1):63-72. Doi: 10.1007/s10900-019-00723-9
28. Turkish Pharmacists Association. 6. Region Samsun Chamber of Pharmacists press release: vaccine refusal threatens our future. (2019) <https://www.samsuneczaciadasi.org.tr/haber-26475> [Date of access 25.11.2020].
29. İter H, Demir LS. Opinions of parents concerning childhood vaccine refusal and factors affecting vaccination in Konya. *Gülhane Medical Journal*. 63(2) (2021) 96-104. Doi: 10.4274/gulhane.galenos.2020.1312
30. Adisa OP, Akinleye CA, Obafisile CI, Oke OS. Childhood immunization perception and uptake among mothers of under five children attending in Osogbo, SouthWestera, Nigeria. *Research Journal of Health Science*. 2016;4(3):186. <http://dx.doi.org/10.4314/wsa.v4i3.2>
31. Mereena SR, Sujatha R., A study on knowledge and attitude regarding vaccines among mothers of under five children attending pediatric OPD in a selected Hospital at Mangalore. *IOSRJNHS*. 2014;3(5):39-46. Doi:10.9790/1959-03533946
32. Vasantha Kalyani C, Xavier Belsiyal C. Knowledge, attitude and practice of mothers of under five children regarding immunization in a selected community, Rishikesh, Uttarakhand. *International Journal of Recent Scientific Research*. 2016;7(5):11301-11305.
33. Wani RT, Dar H, Raina ZA. Knowledge, Attitude and Practices of Mothers with Children Under Five Years of Age About Vaccination, *Journal of Medical Science and Clinical Research*. 5(7) (2017) 24449-24454. Doi: <https://dx.doi.org/10.18535/jmscr/v5i7.22>
34. Sandhofer MJ, Robak O, Frank H, Kulnig J, Vaccine hesitancy in Austria : A cross-sectional survey. *Wien Klin Wochenschr*. 2017; 129(1-2):59-64. Doi: 10.1007/s00508-016-1062-1
35. Chan HK, Soelar SA, Md Ali SM, Ahmad F, Abu Hassan MR, Trends in Vaccination Refusal in Children Under 2 Years of Age in Kedah, Malaysia: A 4-Year Review From 2013 to 2016. *Asia Pac J Public Health*. 2018;30(2):137-146. <https://doi.org/10.1177/1010539517751312>
36. Lim WY, Amar-Singh HSS, Jeganathan N, Rahmat H, Mustafa NA, Yusof FM, et al. Exploring immunisation refusal by parents in the Malaysian context. *Cogertt Medicine*. 2016;3:1-8. <http://dx.doi.org/10.1080/2331205X.2016.1142410>
37. Dodd RH, Cvejic E, Bonner C, Pickles K, McCaffery KJ. COVID-19 group. Willingness to vaccinate against COVID-19 in Australia. *Lancet Infect Dis*. 2021;21(3): 318-319. Doi: 10.1016/S1473-3099(20)30559-4
38. Neumann-Böhme S, Varghese NE, Sabat I, Barros PP, Brouwer W, Exel JV, et al Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. *Eur J Health Econ*. 2020;21(7):977-982. <https://doi.org/10.1007/s10198-020-01208-6>
39. Furman F.M, Zgliczyński WS, Jankowski M, Baran T, Szumowski L, Pinkas J. The State of Vaccine Confidence in Poland: A 2019 Nationwide Cross-Sectional Survey. *Int J Environ Res Public Health*. 2020;17(12):4565. <https://doi.org/10.3390/ijerph17124565>
40. COCONEL Group. A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation, *Lancet Infect Dis*. 2020;20(7):769-770. Doi: 10.1016/S1473-3099(20)30426-6
41. Nguyen LH, Hoang MT, Nguyen LD, Ninh LT, Nguyen HTT, Nguyen AD, et al. Acceptance and willingness to pay for COVID-19 vaccines among pregnant women in Vietnam. *Trop Med Int Health*. 2021;26(10):1303-1313. <https://doi.org/10.1111/tmi.13666>
42. Hao F, Wang B, Tan W, Husain SF, McIntyre RS, Tang X, et al. Attitudes toward COVID-19 vaccination and willingness to pay: comparison of people with and without mental disorders in China. *BJPsych Open*, 2021;7(5):e146. Doi: 10.1192/bjo.2021.979
43. Chew NWS, Cheong C, Kong G, Phua K, Ngiam JN, Tan BYQ, et al. An Asia-Pacific study on healthcare workers' perceptions of, and willingness to receive, the COVID-19 vaccination. *Int J Infect Dis*. 2021;106:52-60. <https://doi.org/10.1016/j.ijid.2021.03.069>
44. Vu TS, Le MA, Huynh NTV, Truong L, Vu GT, Nguyen LH, et al. Towards efficacy and sustainability of global, regional and national COVID-19 vaccination programs, *J Glob Health*. 2021; 11:03099. Doi: 10.7189/jogh.11.03099
45. Haque A, Pant AB. Mitigating Covid-19 in the face of emerging virus variants, breakthrough infections and vaccine hesitancy. *J Autoimmun*. 2022; 127: 102792. Doi: 10.1016/j.jaut.2021.102792.
46. Sulimani-Aidan Y, Feldman G. Merging micro and macro practice: The point of view of social workers working with at-risk young adults, *Children and Youth Services Review*. 2022;129: 106174. Doi: 10.1016/j.childyouth.2021.106174
47. Miki M, Kenichiro T, Michiko B, Tomoko K. The roles and education system of public health nurses in Japan: With introduction of social workers as their collaborator, *J. Natl. Inst. Public Health*, 2022;71(1):17-26. <https://www.niph.go.jp/journal/data/71-1/202271010004.pdf>
48. Dubé E. Addressing vaccine hesitancy: the crucial role of healthcare providers, *Clin Microbiol Infect*. 2017;23(5): 279-280. <https://doi.org/10.1016/j.cmi.2016.11.007>
49. Paterson P, Meurice F, Stanberry LR, Glismann, S, Rosenthal SL, Larson HJ. Vaccine hesitancy and healthcare providers, *Vaccine*. 2016;34(52):6700-6706. <https://doi.org/10.1016/j.vaccine.2016.10.042>