Original Article

Parents' Fear of COVID-19 and Attitudes Towards Childhood Vaccines: A Cross-Sectional Study

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Abstract
Background: The COVID-19 pandemic has caused parents to fear for their children's health. Little is known about parents' attitudes and willingness to administer childhood immunizations during the pandemic.
Aim: This study aimed to examine the relationship between parents' fear of COVID-19 and their attitudes toward childhood vaccines during the pandemic.
Methodology: The sample of this web-based, cross-sectional, and relational study was 281 parents. The STROBE checklist was used in this study. Data were collected via the survey link between January and April 2021.
Results: It was determined that 81.1% of the parents were mothers and 51.6% were between the ages of 31-40. The mean score of the parents on the COVID-19 fear scale is 21.93±6.35, which is slightly above the medium level. While the total mean score of the scale of parental attitudes towards childhood vaccinations was 33.77±16.60, it was found below the medium level, and the vaccine safety sub-dimension was 21.98±5.23, which was found to be high. It showed that parents had concerns about childhood vaccinations. A significant correlation was found between parents' fear of COVID-19 and their concerns about vaccine safety ($p<0.05$).
Conclusions: It has been determined that parents have fears of COVID-19 and concerns about routine childhood vaccinations during the pandemic process. It was concluded that there is a negative relationship between these two conditions, that is, fear of COVID-19 raises concerns about the safety of childhood vaccine administration.

Keywords: childhood immunization; fear of COVID-19; vaccine hesitancy; vaccine refusal

Introduction

The coronavirus disease (COVID-19) has negatively affected the world in many ways (Bogoch et al., 2020) and was declared a Pandemic by WHO (WHO, 2020). Epidemics and pandemics cause trauma, increased anxiety, and fear (Karabulak & Kaya, 2021; Laskawiec et al., 2022; Villarreal-Zegarra et al., 2021). During the pandemic process, some restrictions and conditions in social life and the curfew on certain days and hours negatively affected the psychology of parents and children. Parents have concerns, and fears about their child's health (Karabulak & Kaya, 2021; Mazza et al., 2020).

Vaccination practices are one of the most important practices as a preventive measure in child health practices as well as in the

prevention of epidemic diseases. The most important effect of vaccines has been to prevent morbidity and mortality from infectious diseases affecting children. The spread of infectious diseases in society is prevented through vaccination (Rodrigues & Plotkin, 2020). It is known that thanks to vaccination, most children are protected from vaccine-preventable epidemics and disabilities. Cases that result in permanent disability and death are very common in unvaccinated children (Wang et al., 2022). Childhood vaccination rates among vaccination programs in Turkey are quite high (Gur, 2019). Children in Turkey are routinely vaccinated within the scope of National Immunization. Vaccines included in this program; Hepatitis B, BCG, oral polio vaccine, pentavalent vaccine (DTaP, IPV, Haemophilus influenza type b), measles-mumps-rubella, varicella and hepatitis A vaccines (Eryurt & Yalcin, 2022). According to the health statistics yearbook published by the Ministry of Health in 2018, in the international comparison of Five Combination Vaccines, Turkey is 98%, upper-income countries 95%, upper-middle-income countries 94%, the WHO European Region 94%, the Worldwide vaccination rate was determined as 86% (Republic of Turkey Ministry of Health, 2019). According to meta-analysis results in recent times, a significant decline in pediatric vaccination uptake due to the COVID-19 pandemic has been documented (Wang et al., 2022).

Although vaccination rates have increased, the concept of 'vaccine rejection' emerged in the world in the 1990s and in Turkey in the 2000s. As a result of the smallpox epidemic in England in 1853, the foundations of the concept of vaccine rejection were laid due to mandatory vaccination. The Vaccine Hesitancy Working Group was formed by WHO in 2012 and the concepts of vaccine refusal and vaccine hesitancy were defined. Vaccine refusal is defined as not having any vaccination, and refusal or delay in getting the vaccine despite receiving the vaccine is called vaccination hesitancy (Ilter & Demir, 2021; WHO, 2020). In the literature, it has been stated that the reasons for parents' refusal or refusal to be vaccinated are lack of knowledge, religious beliefs, philosophical reasons, insufficient support from health institutions, side effects of vaccines, and safety concerns (McKee & Bohannon, 2016; Nurmi & Harman, 2022; Suran, 2022). In a study conducted in Turkey, it was determined that the willingness of parents to have a possible COVID-19 vaccine for their children is low. And the only feature that influenced their willingness to have their children vaccinated against COVID-19 was that they were healthcare workers (Yilmaz & Sahin, 2021). There are not many studies on parents' attitudes and willingness to give childhood vaccines during the pandemic.

In particular, parents had COVID-19 fears and concerns for their children during the pandemic. Anticipating that the health check and immunization program of children will be affected, it was desired to evaluate the attitudes of parents towards childhood vaccinations.

The study aims to examine parents' attitudes towards childhood vaccines due to fear of COVID-19 during the pandemic process.

Methodology

Design and sample: The study was web-based cross-sectional and relational. The STROBE checklist was used for this study. In the study, a survey was created in Google Forms and the link was distributed through different Facebook and Instagram parent groups. The calculation was made using the Qualtrics^{XM} program according to the sample calculation of the unknown universe. According to this formula, the ideal sample size was determined as at least 271 (in the calculation, 90% confidence interval, the *p*-value was taken as 0.05 for significance level) (Qualtrics, 2022). The sample of this study was 281 parents with children. The latest update date of the routinely applied vaccination calendar in Turkey has been taken into account. According to this date, parents with children aged 0-7 were included in the study. Thus, a sample group with similar vaccines was formed. Inclusion criteria for the study; being a parent with a child between the ages of 0-7, agreeing to participate in the research, being able to use a computer or tablet, and being Turkish. Online informed consent

was obtained from parents. During the informed consent process, the participants were informed about the purpose of the study, the length of the survey, the purpose for which the data would be used, and the contact information of the principal investigator.

Data Collection: Before starting the data collection phase, a pilot study was conducted with a group of 5 parents to determine the usability of the questionnaire. Pilot study data were not included in the sampling. Data were collected via the Google Documents website between January and April 2021. In this period when data collection took place, the effects of the COVID-19 pandemic continued in Turkey as well as in the rest of the world. The survey link was shared on the parent blog pages (5 blog pages) on social media (Facebook, Instagram). Responses were imported into IBM SPSS Statistics Version 26 and checked one by one to avoid possible duplicate entries from the same user. Only completed questionnaires were analysed. Surveys terminated early (24 participants) were not included in the analysis.

Child and parent introductory form: The form included characteristic questions such as gender, age, educational status, occupation, economic status, and the number of children. In addition, there are questions such as which special vaccines are given to the child, where the primary health care service is received, and where the child can follow the information about the care (Cevik et al., 2020; Cunningham et al., 2019; Opel et al., 2011).

The Parent Attitudes about Childhood Vaccines Scale (PACV): The scale was developed by Opel et al. In the original study of the scale (approximately), it was studied with parents who have children in the 0-12 age group. It had 15 questions and 3 sub-dimensions. These dimensions were behavior, attitude, safety, and effectiveness. Items 1 and 2 in the Behavior dimension of the scale, 3,4,5,6,11,12,13,14,15 in the attitude dimension. There were 7,8,9,10 items in the safety effectiveness dimension. While evaluating the scale, 2 points were given for hesitant answers, 1 point for "I don't know or I'm not sure" and 0 points for non-hesitating answers. While two questions (1 and 2) in which the answer "I don't know" are excluded as missing data are scored, 2 points were given to the hesitant answer and 0 points to the unhesitating answer. The total raw score is calculated by simply adding the score of each question. It had Cronbach's alpha coefficients ranging from 0.74 to 0.80 (Opel et al., 2011). A Turkish validity and reliability study was conducted with a group of parents with children between the ages of 0-5, by Cevik et al. Cronbach's alpha values of behavior, attitude, safety effectiveness, and total score of the scale were found as 0.26, 0.75, 0.56, and 0.67 (respectively) (Cevik et al., 2020). In this study, Cronbach's alpha values of behavior, attitude, safety effectiveness, and total score of the scale were found to be 0.51, 0.83, 0.49, and 0.80 (respectively).

The Fear of COVID-19 Scale (FCV-19S): This scale was developed by Ahorsu et al. The scale had one dimension and seven items. Each statement on the scale has a Likert-type rating ranging from 1 to 5 from "strongly disagree" to "strongly agree". The scale score indicates the COVID-19 fear level. A minimum of 7 points and a maximum of 35 points can be obtained. A high score indicates a high level of fear. The Cronbach's alpha internal consistency coefficient was 0.82 (Ahorsu et al., 2020). The Turkish validity and reliability of the scale were done by Bakioglu et al. The Cronbach's alpha value of the Turkish version of it was 0.88 (Bakioglu et al., 2021). In this study, Cronbach's alpha was found to be 0.88.

Data Analysis: IBM SPSS Statistics Verison 26 was used for analysis. In the analysis of the data, the number percent distribution was used to describe the demographic characteristics, and descriptive statistics were made for the mean scores. Kolmogorov-Smirnov normality test was performed for normal distribution. Since the data were not normally distributed, Mann Whitney U, Kruskal Wallis test was used. In addition, Pearson correlation analysis was used. The significance level was determined as 0.05.

Ethical Considerations: This study was conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the non-interventional ethics committee of a state university (date, December 25, 2020; number, 2020/138). The Ministry of Health approval was obtained (2020-12-

13T15_03_47). Also, informed consent was obtained from the parents.

Results

It was determined that 81.1% of the parents are female, 51.6% are between the ages of 31-40, 53.7% have a bachelor's degree, and 65.9% working. It was found that 0.6 of them had an income equal to their expenses, 32% were health workers, 56.9% had only one child, 53.4% received primary health care for their children from family health centers, and 56.2% of them obtained information about the care of the child through a doctor (Table 1).

It was found that there was a significant difference between the genders of the parents and the mean score of the COVID-19 fear scale (p<0.05), and the mean scores of the male parents were higher than the mean scores of the female parents. It was determined that there was a significant difference between the educational status of the parents and the mean score on the fear of COVID-19 scale (p<0.05). It was determined that the average scores of the parents who were high school graduates were lower than the average scores of the parents who had a master's degree. It was determined that there was a significant difference between the working status of the parents and the mean score of the COVID-19 fear scale (p<0.05), and the mean scores of working parents were higher than the mean scores of non-working parents (Table 1).

It was found that there was a significant difference between the age of the parents and the mean score of the parental attitudes scale about childhood vaccinations (p<0.05), and the mean scores of the parents in the 20-30 age range were higher than the mean scores of the parents in the 31-40 age range. It was determined that there was a significant difference between the working status of the parents and the mean score of the parental attitudes scale about childhood vaccinations (p<0.05). It was found that the mean scores of working parents were lower than the mean scores of non-working parents. It was found that there was a significant difference between the place where parents accessed information about their children's care and the mean score of the PACV scale (p<0.05). It was determined that the average scores of the parents who received information about the care of the child from their neighbors/relatives were higher than the average scores of the parents who obtained the information from social media (Table 1).

The mean FCV-19S score of the parents was 21.93±6.35. The mean PACV score of the parents was 33.77±16.60, the mean score of the behavioral dimension was 1.42±3.36, the mean score of the attitude dimension was 10.41±12.93, and the safety-efficacy dimension was 21.8±5.23 (Table 2).

According to the results of the correlation analysis, it was determined that there was no significant correlation between the fear of COVID-19 scale and the scale of parental attitudes about childhood vaccinations and the sub-dimensions of behavior and attitude (p>0.05). However, a negative and significant correlation was found between the fear of the COVID-19 scale and the safety sub-dimension of the parental attitudes about the childhood vaccinations scale (p<0.001) (Table 3).

Table 1 Comparison of Parents' Characteristics and Mean Scores of the FCV-19S with the PACV

Variable			FCV-19S	PACV
	n	%	X±SD	X±SD
Sex				
Female	228	81.1	21.41±6.10	34.34±16.55
Male	53	18.9	24.15±6.97	31.32±16.71

p			0.005*	0.175
Age				
20-30 years (a)	117	41.6	21.20±6.01	35.88±15.41
31-40 years (b)	145	51.6	22.55±6.39	32.40±17.51
41 year above(c)	19	6.8	21.63±7.81	31.26±15.84
p			0.248	0.025* a>b**
Education				
The first school (a)	26	9.3	21.76±6.03	36.15±13.34
High school (b)	58	20.6	20.32±6.11	36.12±14.97
Bachelor (c)	151	53.7	21.96±6.71	33.01±17.14
Graduate (d)	46	16.4	23.95±5.09	31.95±18.36
p			0.035* b<d***	0.034* a=b=c=d
Working status				
Yes	188	65.9	22.71±6.32	31.86±16.05
No	93	33.1	20.35±6.16	37.63±17.09
p			0.003*	0.002*
Profession				
Worker /officer	136	48.4	22.04±6.54	34.98±16.16
Health worker	90	32.0	23.00±5.83	30.88±16.79
Not profession	55	19.6	19.54±6.23	37.10±16.50
p			0.009*	0.003*
Number of children				
1	160	56.9	22.28±6.22	33.54±15.63
2	97	34.5	21.51±6.41	31.90±16.17
3 and above	24	8.5	21.25±7.10	42.87±21.72
p			0.475	0.058
Child's healthcare resource				
Family health center	150	53.4	21.87±6.39	33.26±16.05
Hospital	47	16.7	21.80±5.75	36.48±19.28
Private hospital	59	21.0	22.44±6.61	35.11±17.23
Private doctor	25	8.9	21.32±6.87	28.60±11.66
p			0.929	0.377

Childcare information resource				
Doctor (a)	158	56.2	21.85±6.52	33.70±16.04
Social media (b)	75	26.7	21.84±6.42	30.14±13.65
Book/journal (d)	32	11.4	23.09±6.14	38.15±23.33
Neighbor/ relative (c)	16	5.7	20.81±4.77	42.75±14.53
p			0.597	0.025*
Total	281	100.0		

*p<0.05, **P value obtained as a result of Bonferroni correction p<0.016, ***P value obtained as a result of Bonferroni correction p<0.008, ****Post hoc Tukey's-b test result

Table 2 Mean Scores of Parents on the FCV-19S and the PACV

Scale	X±SD	Med (Min-Max)	Cronbach Alpha
FCV-19S	21.93±6.35	22.00 (8-35)	0.88
PACV	33.77±16.60	30.00 (0-93)	0.80
Behavior dimension	1.42±3.36	0.00 (0-13)	0.51
Attitude dimension	10.41±12.93	7.00 (0-60)	0.83
Safety Effectiveness dimension	21.98±5.23	23.00 (0-27)	0.49

X: Mean, SD: Standard Deviation, Med: Median, Min: Minimum, Max: Maximum

Table 3 Correlations Between the Mean Scores of the FCV-19S and the PACV and its Sub-dimensions

Scales	PACV	Behavior sub-dimension	Attitude sub-dimension	Safety effectiveness sub-dimension
FCV-19S	r: -0.034 p=0.565	r: 0.046 p=0.444	r: 0.007 p=0.901	r: -0.160 p=0.007

r: Pearson correlation analysis

Discussion

COVID-19 causes fear, anxiety, and anxiety in humans (Ahorsu et al., 2020). In this study, the mean COVID-19 fear score of the parents was 21.93±6.35, which indicates that it is above the moderate level. The PACV scale, which evaluates the attitudes of the parents in childhood vaccination practices, was used, and the average score of the parents from this scale is 33.77±16.60, indicating that they exhibit a very good level of attitude and behavior. The sub-dimensions of the scale measure behavior, security (anxiety), and attitude. The average

scores of the parents in the sub-dimensions of behavior and attitude are quite low, which shows that they have positive attitudes and good behavior toward childhood vaccination applications. The safety sub-dimension includes statements that show parents' concerns and hesitations about vaccination practices. In this study, the mean score of the security sub-dimension was 21.98±5.23, which is a high score. This shows that parents have high concerns about vaccination practices.

In this study, which examines parental attitudes towards childhood vaccination of fear of COVID-19 experienced during the pandemic process, these two parameters were compared. According to the results of the comparison, a statistically significant relationship was found between parents' fear of COVID-19 and the safety sub-dimension of childhood vaccination attitudes (p<0.05). This shows that parental fears negatively affect vaccination attitudes in the safety sub-dimension during the COVID-19 pandemic process.

In a review study, it was determined that among the reasons for rejection of the vaccine, was the concern that the vaccine would cause more harm than good and the belief that the vaccine is not safe (Dáňová et al., 2015; Joiya & Khan, 2016). In a study conducted in Turkey, believing that vaccines are not safe, not believing that vaccines are useful and necessary, and distrust are among the most common reasons for vaccine rejection (Ilter and Demir, 2021; Topçu et al., 2019). The COVID-19 pandemic has also resulted in a significant decrease in the administration rates of routine childhood vaccines (Ji et al., 2022). Piche-Renaud et al. It found that Canadian parents' fears of COVID-19 prevented them from getting childhood immunizations during the pandemic (Piché-Renaud et al., 2021). Fear of the COVID-19 pandemic has damaged health care at all levels, including childhood immunizations (Lazzerini et al., 2020). This situation can be explained by the thought that the fears of parents due to the pandemic are hesitations in the purchase of health services such as vaccination.

Limitations: The limitations of the study were the inability to collect the research data through face-to-face interviews with the parents who constituted the sample group.

Implications for Clinical Practice: In order to increase vaccination rates, parental behaviors, concerns and reasons for childhood vaccination should be determined. Parents' doubts about vaccination can be examined. In addition, wrong information can be corrected by informing parents in detail about the vaccine.

Conclusions: The results of the research show that parents are moderately afraid of COVID-19 during the pandemic process. Parental fears need to be alleviated so that routine childhood immunizations can be properly administered during the COVID-19 pandemic. For this, it is important to provide information and education with appropriate content on the importance of childhood vaccination, especially including safety and efficacy. Vaccination is an integral part of child health and has an important place in the prevention of infectious diseases. To plan and carry out educational actions on diseases for parents, it is necessary to understand in advance their attitudes and views on vaccines. Nurses and other health professionals, who monitor child and family health, have important roles in this regard. In this study, it was concluded that the COVID-19 fear levels of parents were moderate. It is seen that many factors such as gender, education level, and working status affect this fear. It is recommended that these parameters be taken into account when directing parents.

Acknowledgments: The authors would like to thank the parents for contributing in this study.

References

Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The Fear of COVID-19 Scale: Development and initial validation. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-020-00270-8

Bakioglu, F., Korkmaz, O., & Ercan, H. (2021). The fear of COVID-19 raises the level of depression, anxiety and stress through the mediating role of intolerance of uncertainty. *International Journal of Mental Health and Addiction*, *19*, 2369–2382.

https://doi.org/https://doi.org/10.1007/s11469-020-00331-y

Bogoch, I. I., Watts, A., Thomas-Bachli, A., Huber, C., Kraemer, M. U. G., & Khan, K. (2020). Pneumonia of unknown aetiology in Wuhan, China: Potential for international spread via commercial air travel. *Journal of Travel Medicine*, *27*(2), 1–3. https://doi.org/10.1093/jtm/taaa008

Cevik, C., Gunes, S., Eser, S., & Eser, E. (2020). Psychometric characteristics of Turkish version of Parental Attitudes towards Childhood Vaccines (PACV) scale. *Guncel Pediatri*, *18*(2), 153–167. https://doi.org/10.32941/pediatri.775236 (Original work published in Turkish).

Cunningham, R. M., Kerr, G. B., Orobio, J., Munoz, F. M., Correa, A., Villafranco, N., Monterrey, A. C., Opel, D. J., & Boom, J. A. (2019). Development of a Spanish version of the parent attitudes about childhood vaccines survey. *Human Vaccines and Immunotherapeutics*, *15*(5), 1106–1110. https://doi.org/10.1080/21645515.2019.1578599

Eryurt, M.A., & Yalcin, S.S. (2022). Zero-dose children in Turkey: regional comparison of pooled data for the period 1990 to 2018. *BMC Infect Dis,* 22, 421. https://doi.org/10.1186/s12879-022-07416-0

Gur, E. (2019). Vaccine hesitancy - vaccine refusal. *Turkish Archives of Pediatrics*, *54*(1), 1–2. https://doi.org/10.14744/turkpediatriars.2019.79990

Ilter, H., & Demir, L. S. (2021). Opinions of parents concerning childhood vaccine refusal and factors affecting vaccination in Konya. *Gulhane Medical Journal*, *63*(2), 96–103. https://doi.org/10.4274/gulhane.galenos.2020.1312

Karabulak, H., & Kaya, F. (2021). The relationship between psychological resilience and stress perception in nurses in turkey during the COVID-19 pandemic. *Journal of Nursing Research* *29*(6), e175. https://doi.org/10.1097/jnr.0000000000000454

Laskawiec, D., Grajek, M., Szlacheta, P., & Korzonek-Szlacheta, I. (2022). Post-pandemic stress disorder as an effect of the epidemiological situation related to the COVID-19 pandemic. *Healthcare (Basel, Switzerland)*, *10*(6), 975. https://doi.org/10.3390/healthcare10060975

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P. (2020). A nationwide survey of psychological distress among italian people during the covid-19 pandemic: Immediate psychological responses and associated factors. *International Journal of Environmental Research and Public Health*, *17*(9), 1-14. https://doi.org/10.3390/ijerph17093165

McKee, C., & Bohannon, K. (2016). Exploring the reasons behind parental refusal of vaccines. *The journal of pediatric pharmacology and therapeutics*, *21*(2), 104-109. https://doi.org/10.5863/1551-6776-21.2.104

Nurmi, J., & Harman, B. (2022). Why do parents refuse childhood vaccination? Reasons reported in Finland. *Scandinavian journal of public health*, *50*(4), 490-496. https://doi.org/10.1177/14034948211004323

Opel, D. J., Mangione-Smith, R., Taylor, J. A., Korfiatis, C., Wiese, C., Catz, S., & Martin, D. P. (2011). Development of a survey to identify vaccine-hesitant parents: The parent attitudes about childhood vaccines survey. *Human Vaccines*, *7*(4). https://doi.org/10.4161/hv.7.4.14120

Republic of Turkey Ministry of Health. (2019). Health Statistics Yearbook. In *General Directorate of Health Information Systems*. https://sbsgm.saglik.gov.tr/Eklenti/36164/0/siy2018en2pdf.pdf

Rodrigues, C. M. C., & Plotkin, S. A. (2020). Impact of Vaccines; Health, Economic and Social Perspectives. *Frontiers in microbiology*, *11*, 1526. https://doi.org/10.3389/fmicb.2020.01526

Suran, M. (2022). Why parents still hesitate to vaccinate their children against COVID-19. *JAMA, 327*(1), 23-25. https://doi.org/10.1001/jama.2021.21625

Wang, Z., Chen, S., & Fang, Y. (2022). Parental willingness and associated factors of pediatric vaccination in the Era of COVID-19 Pandemic: A systematic review and meta-analysis. *Vaccines*, *10*(9), 1-18. https://doi.org/10.3390/vaccines10091453

WHO. (2020). Situation Report: World Health Organization. *Coronavirus Disease 2019 (COVID-19)*, *2019*(February), 11. https://apps.who.int/iris/handle/10665/331475

Villarreal-Zegarra, D., Copez-Lonzoy, A., Vilela-Estrada, A. L., & Huarcaya-Victoria, J. (2021). Depression, post-traumatic stress, anxiety, and fear of COVID-19 in the general population and health-care workers: prevalence, relationship, and explicative model in Peru. *BMC psychiatry*, *21*(1), 455. https://doi.org/10.1186/s12888-021-03456-z

Yilmaz, M., & Sahin, M. K. (2021). Parents' willingness and attitudes concerning the COVID-19 vaccine: A cross-sectional study. *International Journal of Clinical Practice*, *75*(9), 1–11. https://doi.org/10.1111/ijcp.14364