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Attitudes of Parents with Vaccine Hesitancy and Refusal After COVID-19

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ABSTRACT
Objective: Vaccine hesitancy is a delay in vaccine acceptance despite the presence of vaccine service or rejection of specific vaccines. This study was conducted to determine the attitudes of parents with vaccine hesitancy and vaccine rejection toward vaccine after COVID-19 and the affecting factors. **Materials and Methods:** The present cross sectional study was conducted with 147 parents, who were contacted through vaccine-related health records, had not gotten their children vaccinated or refused to complete the vaccination of their children during the COVID-19 pandemic in 2019 and 2020. Data were collected using the Descriptive Characteristics Questionnaire and the Vaccine Hesitancy Scale. **Results:** Of the parents, 71.4% stated that they had made the decision of not getting their children vaccinated after one vaccine or a few vaccines. In the study, attitudes toward vaccine had changed positively in 23.8% of the parents after COVID-19. It was determined that the parents' being mother or father, educational status and number of children significantly affected the Vaccine Hesitancy Scale score ($p<0.05$). **Conclusion:** Vaccine hesitancy was higher among: parents with higher level of education, parents with fewer children and parents had experienced hesitancy for their children after a few vaccines.
Keywords: Child, COVID-19, Parent, Immunization, Vaccine Hesitancy.

COVID-19 Sonrası Aşı Tereddütü ve Reddi Olan Ebeveynlerin Tutumları

ÖZ
Amaç: Aşı tereddütü, aşı hizmetinin varlığına veya belirli aşıların reddedilmesine rağmen aşının kabulünde gecikmedir. Bu araştırma, aşı tereddütü olan ve aşıyı reddeden ebeveynlerin COVID-19 sonrası aşıya yönelik tutumlarını ve etkileyen faktörleri belirlemek amacıyla yapıldı. **Gereç ve Yöntem:** Bu kesitsel araştırma, 2019 ve 2020 yıllarında yaşanan COVID-19 salgını sırasında aşıyla ilgili sağlık kayıtları aracılığıyla iletişime geçilen, çocuklarına aşı yaptırmayan veya çocuklarının aşılarını tamamlamayı reddeden 147 ebeveyn ile yürütülmüştür. Veriler Tanımlayıcı Özellikler Anket Formu ve Aşı Tereddütü Ölçeği kullanılarak toplanmıştır. **Bulgular:** Ebeveynlerin %71.4'ü bir ya da birkaç aşıdan sonra çocuklarına aşı yaptırmama kararı aldıklarını ifade ettiler. Araştırmada, ebeveynlerin %23.8'inin COVID-19 sonrasında aşıya yönelik tutumları olumlu yönde değişti. Ebeveynlerin anne veya baba olmasının, eğitim durumunun ve çocuk sayısının Aşı Tereddüt Ölçeği puanını anlamlı düzeyde etkilediği belirlenmiştir ($p<0.05$). **Sonuç:** Aşı tereddütü şu kişilerde daha yüksekti: eğitim düzeyi daha yüksek olan ebeveynler, daha az çocuğu olan ebeveynlerde ve birkaç aşıdan sonra çocuklarına karşı tereddüt yaşayan ebeveynlerde.
Anahtar Kelimeler: Çocuk, COVID-19, Ebeveyn, Bağışıklama, Aşı Reddi.

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INTRODUCTION

Proven by several scientific research, immunization is an effective tool for protecting public health and preventing diseases and one of the most important inventions of the 20th century (Spencer, Pawlowski, & Thomas, 2017). Vaccines reduce the prevalence of diseases. However, every unvaccinated individual poses a risk for most newborns, infants and young children who are not vaccinated, have not reached the vaccination age or who have not completed the vaccine calendar to contact active ingredients during the early period (Dubé, Vivion, & MacDonald, 2015). It has been reported by the World Health Organization (WHO) that an estimated 25 million children under the age of one are not basic vaccinated, and the number of children whose vaccinations are not completed in 2021 has increased by five million compared to 2019. WHO defines vaccine hesitancy as "delay in accepting or rejecting vaccines despite the availability of vaccine services"(WHO, 2014). Vaccine hesitancy has been highlighted as a broader concept including vaccine rejection (Larson et al., 2015). Additionally, in 2019 WHO pointed at vaccine rejection as one of the ten threats against global health (WHO, 2019). Due to the diffusion of antivaccine movements worldwide, WHO established the Vaccine Hesitancy Working Group in 2012.

The effort of keeping children healthy is a great source of concern for parents. This concern causes their decisions about their children's healthcare to be affected by several factors (Allan & Harden, 2014). Although parents support vaccines in general, concerns about vaccine safety and serious side effects are among the main reasons why childhood vaccines are delayed or rejected even in western societies (Dubé et al., 2015; Smith et al., 2011; Williams, 2014; Yaqub, Castle-Clarke, Sevdalis, & Chataway, 2014). Lack of knowledge of parents about situations that do not prevent vaccination is an important factor. In a study, parents reported that they should not have any signs of illness (fever, diarrhea, flu, womiting, problems in teething, etc.) in order to vaccinate their children (Burghouts et al., 2017). Most studies suggest that there is a lack of information among parents about vaccine risks (Gardner, Davies, McAteer, & Michie, 2010; Raithatha, Holland, Gerrard, & Harvey, 2003). This lack of information affects 'nonspecific' fears related to the side effects (Smailbegovic, Laing, & Bedford, 2003) and there is a lack of awareness regarding the risks of not being vaccinated (Gardner et al., 2010). Among the other commonly reported reasons of vaccine rejection are the number of vaccines and the perception that they may overdo the immune system(Hilton, Petticrew, & Hunt, 2006). Some parents believe that alternative medicine will be adequate instead of vaccines (Zuzak, Zuzak-Siegrist, Rist, Staubli, & Simoes-Wüst, 2008). Owing to the success of vaccines, most parents do not make contact with children suffering from diseases preventable by vaccines any longer. Therefore, some parents have a hesitancy about the necessity for their children to be vaccinated against rare diseases (Janko, 2012).

The coronavirus disease 2019 (COVID-19) pandemic has caused a rising number of cases and mortality rates and a strain on healthcare systems around the world. The ongoing public health crisis from COVID-19 has had devastating effects in every country. It has caused significant morbidity and mortality rates, adverse psychological consequences and increased socioeconomic losses in human lives, in addition to disrupting the hard-won progress achieved over the past decade to improve vaccination rates. These consequences of the COVID-19 pandemic have made it even more important to understand the factors that contribute to antivaccine attitudes or parental refusal of vaccination (Olusanya, Bednarczyk, Davis, & Shaban-Nejad, 2021). Growing rate of parents who choose to delay or reject vaccines recommended for their children is an increasing problem which causes the reemergence of diseases preventable by vaccines. The literature has a great number of studies aiming to determine vaccine hesitancy in parents however, there are few studies on the effects of the pandemic. In order to identify effective interventions to reduce vaccine hesitancy, it is noteworthy to know the characteristics of this group, what factors drive them to develop antivaccine attitudes and how the COVID-19 pandemic has affected the current situation. The present study was conducted to determine the attitudes of parents with vaccine hesitancy and vaccine rejection toward vaccine after COVID-19 and the affecting factors.

MATERIALS AND METHODS

Design and population of the study

The present descriptive cross sectional study was conducted in a province with the highest child population in southeastern Turkey between September 2021 and February 2022 during the COVID-19 pandemic to determine the characteristics of parents with vaccine hesitancy and what drives them to develop antivaccine attitudes. The sample size for the study was found to be 142 individuals at 0.09 effect size, 0.01 significance level and 99% power using the GPOWER 3.1.0 statistics program. The parents with vaccine hesitancy were determined from the medical institution where vaccine-related records were kept in 2019 and 2020. Considering the number of districts of the parents who did not complete their children's vaccines (vaccine hesitancy) and who did not get their children vaccinated (vaccine rejection), the number of individuals from each district to be included in the study was determined. The number of individuals to be chosen from the districts was determined via the stratified sampling method and whom to include via the simple random sampling method. In the study, 322 parents were interviewed and 172 parents could not be reached due to false phone numbers. Three

parents did not agree to take part in the study and as a result, the analyses were performed with 147 parents.

Data collection tools

The study data were acquired using the Descriptive Characteristics Questionnaire and the Vaccine Hesitancy Scale-short form. The Descriptive Characteristics Questionnaire has 24 questions and two sections. The first section includes questions about children and their parents (such as age, gender, parents' educational status, number of children) and the second section includes questions about vaccine hesitancy. In the study, the data were collected via phone calls since the study coincided with the pandemic. In the study, the sample was determined and then the parents with vaccine hesitancy were interviewed through their phone numbers in their health records in the medical institution. All interviews were conducted by the same researcher. The researcher explained the significance and purpose of the study and addressed the questions in the survey after obtaining necessary permissions. The data collection process took 10 to 15 minutes.

The Vaccine Hesitancy Scale-Short Form: Kılıcarslan et al. developed the scale in 2020. The scale has three subscales and 12 items as vaccine benefit and protective value (subscale A, four items), antivaccine (subscale B, 5 items) and solutions to not being vaccinated (subscale C, three items). Since section A includes items in favor of vaccine, which are "Strongly disagree"-one point and "Strongly agree"- five points, it is graded reversely. The lowest and highest possible scores obtainable from the scale are 12 and 60, respectively. As the score increases, antivaccine increases. The Cronbach's alpha reliability coefficient of the scale was 0.855. The scale language is Turkish (Goktug Kılıncarslan, Sarıgül, Toraman, Melih Sahin, & Göktuğ Kılınçarslan, 2020).

Statistical analysis

The data were analyzed via the IBM SPSS V25. Normal distribution was examined via kurtosis and skewness values. Descriptive data were evaluated via number, percentage, mean and standard deviation. In analysis of the data, the independent sample t test, Mann-Whitney U test and Kruskal-Wallis analysis were used. For post-hoc analysis, the Bonferroni correction Mann-Whitney U test was used. The significance level was set at $p<0.050$.

Ethical approval

Prior to the study, the researcher obtained written permission from the Harran University Ethics Committee (Date: 24.05.2021, Approval no: 10), and the Provincial Department of Health. Prior to the study, the researcher informed the parents and received their oral consent.

RESULTS

Introductory characteristics of the parents

Of the participants, 51% (n=75) were father, 56.5% (n=83) were aged 30 to 39 years and 96.6% (n=142) were married. 60.5% of the parents indicated their income to be middle. 42.9% of the parents had four and more children. Of the mothers, 29.3% (n=43) were primary school graduate and of the fathers, 29.3% (n=43) were university graduate. Examining the employment status, 90.5% of the mothers were not employed and 51% (n=75) of the fathers were freelancer. Of the children who were not vaccinated, 57.8% (n=85) were male, 41.5% (n=61) were aged one year to three years, 55.1% (n=81) were aged three to six years and 3.4% (n=5) were aged six to twelve years. When the parents were asked whether they had any health condition preventing them from getting their children vaccinated or not, 2.7% (n=4) stated that they had allergy, 4.8% (n=7) had undergone a surgery, 5.4% (n=8) were diagnosed with cancer, 0.7% had had eclampsia and 1.4% had had a seizure.

The mean total vaccine hesitancy scale and subscale scores

The mean total Vaccine Hesitancy Scale score was 44.11±11.03 (20-60), the mean subscale A score was 13.51±4.93 (4-20), the mean subscale B was 20.39±5.12 (7-25) and the mean subscale C score was 10.20±2.27 (4-15).

Of the parents, 96.6% had vaccine hesitancy and 3.4% had never gotten their children vaccinated/had vaccine rejection. Of the parents who did not complete their children's vaccination, 71.4% (n=105) had made the decision of not getting their children vaccinated after one vaccine or a few vaccines. The decision of not getting their children vaccinated was made by both parents at the level of 39.5%. Examining the reasons for parents not to get their children vaccinated, the highest rate was not trusting the vaccine content at the level of 12.9% (n=19), which was followed by negligence at the level of 17% (n=25). Of the parents, 23.8% stated that their attitudes toward vaccine had changed after the COVID-19 pandemic and 23.1% stated that they understood the importance of vaccines in preventing illnesses.

Factors affecting the attitude toward vaccine

Table 2 demonstrates a comparison of the mean total Vaccine Hesitancy Scale and subscale scores according to specific characteristics of the parents and children (Table 2). There was a significant difference between the mean total Vaccine Hesitancy Scale and all subscale scores of the parents ($p<0.05$). As a result of the analysis, it was determined that the scores of the mothers (47.69±9.51) were higher than the scores of the fathers (40.68±11.35) at a statistically significant level ($t=4.066$, $p<0.01$). According to the number of children, it was determined that there was a difference only between the vaccine benefit and protective value subscale A ($X^2_{KW}=8.850$, $p<0.05$). In an advanced analysis conducted, it was determined that the difference was caused by parents who had four and more children and those who had two children and between the parents who had four children and those who had one child (Table 2).

According to maternal education, it was determined that there was a significant difference between the mean total antivaccine scale score (X^2_{KW} =14.761, p<0.05) and the mean A and B subscale scores ($X^2_{KW=}$18.334, p<0.003; X^2_{KW}=12.250, p<0.32). There was no significant difference between the total Vaccine Hesitancy Scale and subscale scores of the parents according to their age ($X^2_{KW=}$5.321, p=0.150), marital status (U=406.500, p=0.872) and income status ($X^2_{KW=}$ 1.462 p=0.227).

Table 1. Characteristics of the parents related to vaccine hesitancy (n=147) *.

Variable	n	%
Time of the decision of not getting the child vaccinated		
Prepregnancy	24	16.3
During pregnancy	14	9.5
After the child is born	4	2.7
After one vaccine or a few vaccines	105	71.4
Vaccine status		
I got him/her have the first dose of Hepatitis B vaccination	41	27.9
I got him/her vaccinated at one month	12	8.2
I got him/her vaccinated at six months	18	12.2
I got him/her vaccinated at twelve months	14	9.5
I got him/her vaccinated at 18 months	33	10.2
I have never gotten him/her vaccinated	5	3.4
I haven't gotten him/her have live vaccines	7	4.8
Who made the decision of not getting the child vaccinated?		
Mother	37	25.2
Father	31	21.1
Family elders	1	0.7
Mother and father	58	39.5
What causes you to have vaccine hesitancy?		
I believe that vaccines are dangerous	8	5.4
I don't believe that vaccines will be useful	12	8.2
I don't trust vaccine content	19	12.9
The problems experienced by the people around have prevented me from having vaccines	4	2.7
Because my partner and other family elders do not want it	2	1.4
I wasn't vaccinated as a child	2	1.4
I was affected by negative news related to vaccines on media	1	0.7
Negligence	25	17.0
It wasn't recommended due to my child's disease	21	14.3
I believe that vaccines are dangerous and I don't believe that they are useful. I don't trust vaccine content. People around me experience problems after vaccines	18	19.1
Others	25	17.0
Have you or a relative of yours had suffered from a contagious disease? (Yes)	58	39.5
Have you lost a relative to a contagious disease? (Yes)	9	6.1
Has your child been diagnosed with a disease preventable by vaccines? (Yes)	5	3.4
Has your attitude toward vaccines changed after the COVID-19 pandemic? (Yes)	35	23.8
Was the mother vaccinated during pregnancy? (Yes)	100	68.0
How has your attitude toward vaccines changed during the COVID-19 pandemic?		
I have decided to get my child fully vaccinated	1	0.7
I have understood the importance of vaccines in preventing diseases	34	23.1

* The parents gave more than one answers to specific questions. In specific questions, some parents did not answer.

Table 2. A comparison of the mean total vaccine hesitancy scale score and subscale scores according to the characteristics of the parents and children (n=147) *.

Variable	Total	Benefit and protective value	Antivaccination	Solutions to not being vaccinated
Parent	**M±SD**	**M±SD**	**M±SD**	**M±SD**
Mother (n=72)	47.69±9.51	15.01±4.65	21.79±4.18	10.88±1.87
Father (n=75)	40.68±11.35	12.08±4.80	19.05±5.59	9.54±2.44
t p	4.066 <0.01	3.758 <0.01	3.370 <0.01	3.750 <0.01
Parent's age				
Under 20 years (n=2)	41.01±21.21	13.02±8.48	17.01±8.48	11.01±4.24
21-29 years (n=42)	43.09±11.74	13.47±4.90	19.71±5.60	9.90±2.31
30-39 years (n=83)	45.68±10.54	14.08±501	21.02±4.82	10.57±2.08
Over 40 years (n=20)	40.05±10.13	11.30±4.11	19.55±4.97	9.20±2.56
X^2_{KW} p	5.321 0.150	5.160 0.160	2.833 0.418	6.543 0.088
Marital status				
Married (n=142)	44.16±11.01	13.49±4.90	20.46±5.14	10.20±2.25
Single (n=5)	43.00±12.58	14.00±6.22	18.83±4.79	10.16±3.06
U p	406.500 0.872	384.500 0.704	300.500 0.220	410.500 0.900
Income status				
Bad (n=37)	40.67±11.15	12.02±5.16	19.13±5.16	9.51±2.50
Middle (n=89)	44.84±11.14	13.84±4.91	20.64±5.21	10.35±2.23
Good (n=21)	47.09±9.24	14.76±4.18	21.57±4.38	10.76±1.78
X^2_{KW} p	1.462 0.227	0.457 0.499	1.267 0.260	2.474 0.116
Number of children				
1 child (n=20)[a]	45.25±10.42	13.70±5.01[a]	20.85±4.46	10.70±2.07
2 children (n=41)[b]	47.82±9.52	15.48±4.11[b]	21.65±4.52	10.68±1.86
3 children (n=23)[c]	39.34±12.41	12.04±5.28[c]	18.17±5.94	9.13±2.56
4 children and more (n=63)[d]	43.07±11.00	12.71±4.98[d]	20.23±5.19	10.12±2.37
X^2_{KW} p	7.466 0.058	8.850 0.031 b>d>c=a	0.4533 0.209	6.433 0.092
Gender of the child				
Female	45.32±10.30	13.67±4.60	21.30±4.82	10.33±2.23
Male	43.23±11.51	13.40±5.19	19.72±5.25	10.10±2.30
t p	1.154 0.251	0.335 0.738	1.858 0.065	0.611 0.542
1-3 years (n=61)	42.78±11.36	13.21±4.89	19.60±5.33	9.96±2.30
3-6 years (n=81)	45.16±10.79	13.77±5.02	20.98±4.93	10.39±2.28
6-12 years (n=5)	43.40±11.14	13.00±4.63	20.40±5.17	10.00±1.87
X^2_{KW} p	1.297 0.255	0.439 0.507	2.899 0.089	1.003 0.317

Table 2 (Continued). A comparison of the mean total vaccine hesitancy scale score and subscale scores according to the characteristics of the parents and children (n=147) *.

Variable	Total	Benefit and protective value	Antivaccination	Solutions to not being vaccinated
Educational background of the mother				
Literate (n=9)[b]	43.00±12.75	13.22±5.35	20.11±4.80	9.66±3.67
Primary school (n=43)[c]	41.23±11.12	12.30±4.92	19.11±5.33	9.81±2.29
Secondary school (n=20)[d]	44.30±10.49	13.75±4.82	20.40±4.93	10.15±2.18
High school (n=17)[e]	48.35±10.49	15.76±5.12	21.70±4.45	10.88±1.65
University (n=27)[f]	50.51±5.28	16.18±3.19	23.18±2.70	11.14±0.76
X^2_{KW} p	14.761 0.011 f>a	18.334 0.003 f>a, f>c,e>a	12.250 0.032 f>c	9.620 0.087
Educational background of the father				
Nonliterate (n=31)[a]	30.80±7.19	8.40±2.88	15.00±5.95	7.40±1.81
Literate (n=9)[b]	38.88±12.53	11.55±4.58	17.88±6.79	9.44±1.74
Primary school (n=43)[c]	41.15±11.76	12.00±5.27	19.27±5.48	9.87±2.53
Secondary school (n=20)[d]	42.26±11.81	12.66±4.85	19.93±5.55	9.66±2.66
High school (n=17)[e]	47.03±9.97	14.70±4.81	21.48±4.37	10.85±2.28
University (n=27)[f]	48.48±7.98	15.53±4.11	22.04±3.67	10.90±1.39
X^2_{KW} p	17.082 0.004 f>a	18.387 0.002 f>c	10.038 0.074	15.096 0.010 f>a

M=Mean, SD= Standart Deviation, X^2_{KW}= Kruskal Wallis Test, U= Mann-Whitney U test, t= Independent t-test

DISCUSSION

In this study conducted to determine the attitude of parents with vaccine refusal and hesitation towards vaccination after COVID-19, it was determined that 23.8% of the parents had a positive attitude towards vaccination. Of the parents, 96.6% had vaccine hesitancy and 3.4% had never gotten their children vaccinated/had vaccine rejection. Of the parents who did not complete their children's vaccination, 71.4% had made the decision of not getting their children vaccinated after one vaccine or a few vaccines. The World Health Assembly has developed the Immunisation Agenda 2030 (IA2030) global strategy programme to ensure that individuals of all ages can benefit from the right to vaccination. In this programme, it was reported that the COVID-19 pandemic showed people the power of vaccines to fight diseases, save lives and build healthy futures (WHO, 2021).

In the present study, the parents' antivaccine scale score was higher. A study conducted by Aygün and Tartop (2020) to examine the vaccine hesitancy levels and reasons for antivaccine among parents found the vaccine hesitancy levels to be higher (Aygün & Tortop, 2020).

In the present study, the decision of parents not to get their children vaccinated was most made after one vaccine or a few vaccines. This decision was made by both parents. A study conducted by Henrikson et al. (2017) reported the highest vaccine hesitancy scores by mothers during the first months of the infant. As the child's age grew, vaccine hesitancy of the mothers decreased (Henrikson et al., 2017). The decision of one parent or a few parents not to get their children vaccinated after vaccination makes us consider the possibility of side effects after vaccination, pain experienced during vaccination and having inadequate information about vaccine benefits (Gardner et al., 2010; Raithatha et al., 2003; Smailbegovic et al., 2003). Studies conducted similarly demonstrated that the anxiety of parents for a serious side effect to be observed in the child after vaccination was among the common reasons why they did not get their children vaccinated (Dubé et al., 2019; Napolitano, D'Alessandro, & Angelillo, 2018). Therefore, in order to decrease the side effects during vaccination, it may be effective to carry out specific evidence based applications (such as using a longer needle to decrease injection area reactions (Beirne et al., 2015; Spencer et al., 2017). In the literature,

although parents have reported a variety of concerns about vaccines, one of the most common concerns is the belief that vaccines are painful for their children (Kennedy, Basket, & Sheedy, 2011). Making vaccination less painful by using nonpharmacological methods may decrease the stress level, negative approach to vaccines and thus hesitancy level in parents (Shah, Taddio, & Rieder, 2009). In addition, since the parents had made the decision of not getting their children vaccinated after one vaccine or a few vaccines at the highest rate, pregnancy and the period right after birth are to be evaluated as the best time to provide reassuring information and support to mothers regarding early childhood vaccines when medical staff and parents are already in touch.

Other factors causing the parents to have vaccine hesitancy were the belief that vaccines were not useful and might be harmful for their child, a lack of trust in vaccine content and the presence of people around who had experienced problems after vaccines. Most studies have stressed concern about vaccine safety (Dubé et al., 2019; Napolitano et al., 2018; Spencer et al., 2017). Additionally, studies have stated that vaccines are religiously wrong, there is no adequate information about vaccines and social media is ineffective in making decisions about vaccines (Aygün & Tortop, 2020). Examining the reasons for not vaccinating in detail, the actual reason in the present study and in most studies is a lack of knowledge about vaccines among parents (Dubé et al., 2019; Gardner et al., 2010; Napolitano et al., 2018). Besides a lack of information about vaccines, parents experience a problem with reaching safe information (Gardner et al., 2010). Doctors and other healthcare professionals are to inform parents who consider rejecting or delaying vaccines about vaccines and direct them to reliable information resources (CDC, 2021; Immunization Action Coalition, 2022). In addition, if a family rejects vaccination, they should be recorded and next visits should continue to discuss the benefits of vaccines. However, in this way parents may reconsider the decision of not getting vaccinated or decrease the number of vaccines delayed or not performed. Studies demonstrate that messages focusing on the dangers of not being vaccinated when giving information to parents about vaccines may be more convincing than those focusing on providing protection (Abhyankar, O'connor, & Lawton, 2008). In order to avoid looking prejudicial or causing unnecessary concerns, it is necessary to effectively and sensitively convey the risks related to both vaccination and nonvaccination (Gardner et al., 2010). Procurement of up-to-date information which have a higher level of evidence and are adapted according to individual needs to parents by healthcare professionals may prevent wrong information and beliefs related to vaccines.

Owing to the success of vaccines, most parents do not make contact with children suffering from diseases preventable by vaccines any longer (Janko, 2012). In the present study, 23.8% of the parents stated that their attitudes toward vaccine had changed positively due to COVID-19 and 23.1% stated that they understood the importance of vaccines in preventing illnesses after COVID-19 much better (Table 1). Considering the COVID-19 pandemic, most factors such as the decrease of death and illness rates after vaccination, return to normal life and decrease of lockdown measures have occurred owing to vaccines. In the present study, the status of parental characteristics to affect vaccine hesitancy was examined. Also, maternal and paternal education affected vaccine hesitancy at a statistically significant level, whereas age, marital status and income status did not. A study conducted by Aygün and Tortop (2020) did not obtain any significant difference according to the educational status of the participants and age of the parent. A study conducted by Özceylan et al. (2020) found that three out of every ten women with a higher level of education did not believe that vaccination was useful and this rate was ten times greater than the group with a lower level of education. In the past years, lower educational and socioeconomic level has decreased the possibility of accessing vaccines, which has decreased the ratio of vaccination. Vaccine hesitancy which has recently emerged has become more common among educated individuals who have no problem with vaccine access. More educated individuals with a higher level of income may have a higher rate of anxiety and thus of antivaccination due to imperfect or wrong information. At this point, the importance of raising awareness on reliable information resources related to vaccines, giving correct information and giving information at the right time comes into prominence.

In the current study, the scores of the mothers were found to be higher than the scores of the fathers at a statistically significant level. Mothers particularly support vaccine hesitancy (Napolitano et al., 2018; Smith, 2017). Today, there are various factors pushing mothers toward this condition. Mothers' lack of information about child care, as well as groups and sharings on social media are among the top reasons (Aygün & Tortop, 2020; Wheeler & Buttenheim, 2013). Doing profound research prior to deciding on a vaccine is strongly related with the intention of getting a child vaccinated (Wheeler & Buttenheim, 2013). Considering that individuals usually shape their quest according to preexisting concerns and the personalized web site algorithms selectively predict what information a user desires to see based on their past clicking behavior and search history, the internet makes a broad contribution to vaccine hesitancy.

The study determined that the parents' number of children significantly affected the Vaccine Hesitancy Scale vaccine benefit and protective value subscales. Studies have reported that parents' number of children does not affect vaccine hesitancy (Aygün & Tortop, 2020). Although the literature has different reesra.ozkan@giresun.edu.trsults between the

number of children and vaccine hesitancy rates, there is a need for individual interventions for parents with vaccine anxiety (Salmon, Dudley, Glanz, & Omer, 2015).

In the present study, it was planned to collect the data via the face-to-face method. However, the data were obtained via phone calls due to the national lockdown during the pandemic, which posed a limitation to the study. The generalizability of the present study is limited, because the data were acquired during the COVID-19 pandemic and there were many factors affecting the course of COVID-19.

CONCLUSION

In the present study, most of the parents who did not get their children vaccinated had vaccine hesitancy, made the decision of not getting their children vaccinated after one vaccine or a few vaccines, had higher antivaccine scores and some of them had positive attitudes toward vaccine after the COVID-19 pandemic. The vaccine hesitancy was higher among the parents who had a higher level of education, the mothers and the parents with fewer children and the parents had experienced hesitancy for their children after a few vaccines.

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Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

Plan, design: HK, AS, MB, FS, FB; **Material, methods and data collection:** HK, FB; **Data analysis and comments:** HK, MB, FS; **Writing and corrections:** HK, AS, MB, FS, FB.

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Ethical Approval

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