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Allergic Children's Parents' Hesitancy About COVID-19 Vaccination

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ABSTRACT

Objective: With the approval of the use of COVID-19 vaccines for children, their administration has started in many countries. However, families have some hesitations about vaccinating their children with the COVID-19 vaccines. The aim of this study was to determine the COVID-19 vaccination rates in allergic children aged 12-19 years and to evaluate contributing factors to vaccine hesitation.

Materials and Methods: This cross sectional study was carried out in a Pediatric Allergy Department of a university-affiliated hospital between 15th December 2021 and 15th February 2022. Parents of allergic children who agreed to participate in this study constituted the study population (n=261).

Results: Of the 261 children with allergic diseases, 137 (52.4%) had two doses of the COVID-19 vaccine, and 89.3% of the mothers and 92.3% of the fathers had at least two doses of the COVID-19 vaccine. Among children who were not vaccinated (n=124), the leading reason was the novelty of the vaccine, and the second reason was the side effects. The perceived stress scale score of the parents in the vaccinated group was significantly ($p < 0.05$) higher than in the unvaccinated group.

Conclusion: Although there is an effective and safe vaccine for children during the pandemic, vaccination rates are not yet at the desired level.

Keywords: COVID-19 vaccine, child, allergic disease, vaccine hesitation

INTRODUCTION

The Food and Drug Administration (FDA) expanded Pfizer-BioNTech COVID-19 vaccine's emergency use authorization for it to be used between 12 -15 years of age on May 2021 (1). In Turkey, Pfizer-Biontech COVID-19 vaccination began for subjects age 15 years and above on the 18th of August 2021, and those from 12 years old on the 5th of September 2021, regardless of whether they had a chronic disease or not. But it was seen since then that the desire to be vaccinated was not sufficiently high in Turkey among children.

Vaccine hesitancy may mostly be due to misinformation via social media (2), the novelty of the new vaccine, safety concerns, and the necessity of the vaccine for the children and these are also contributing factors for COVID-19 vaccine hesitation for children (3-5). The healthcare system and clinicians are the most trustworthy sources to help patients to decide whether to accept the COVID-19 vaccines (6,7).

It is known that children and adolescents usually demonstrate fewer and milder symptoms of SARS-CoV-2 infection compared to adults, and are less likely to experience severe COVID-19 (8). However children under the age of five years have a higher risk of other diseases with clinical presentations that overlap with COVID-19, such as pneumonia and other viral infections, which may lead to misclassification (9). A hyperinflammatory syndrome, referred to as multisystem inflammatory syndrome in children (MIS-C), although rare, has been reported to occur worldwide and complicate recovery from COVID-19 (10).

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COVID-19 vaccines are safe and effective in reducing the disease burden in children. Vaccinating children decreases COVID-19 transmission between children, from children to adults, and among those clinically vulnerable, and may help to reduce the need for mitigation measures in schools (11).

In different studies, it remains unclear if patients with allergic rhinitis (AR) and/or asthma are susceptible to COVID-19 infection, and the severity and mortality (12). However, people with moderate-to-severe or uncontrolled asthma are more likely to be hospitalized from COVID-19 (13,14).

The aim of this study was to determine the COVID-19 vaccination rates among children aged 12-18 years with allergic diseases and also to reveal the factors contributing to vaccine hesitation.

MATERIALS and METHODS

Study Design and Participants

This cross-sectional study was carried out among parents of children (aged 12-18 years) with allergic diseases who were followed at the Pediatric Allergy Department of a university-affiliated hospital. Parents of children without allergic diseases, those who did not speak Turkish, and those who did not want to participate in the study were not included in the study. A questionnaire was carried out either face-to-face or online, for which the survey link was delivered to the parents through social networks (WhatsApp). In the calculations made with the Minitab 18 program using the results of a similar study conducted in our country, it was determined that at least 242 subject should be included in the study with a 5% type I error and 80% power.

Data Collection

The study participants were selected by the voluntary response sampling method. The response collection time interval was determined as 15th December 2021 - 15th February 2022. At the beginning of the study, a pilot study was conducted among 20 participants.

The questionnaire consisted of 15 questions about the sociodemographic characteristics of the child and the parents, type of the allergic disease of the child, history of having two doses of COVID-19 vaccination of the child and parents, the reasons for having or not having the COVID-19 vaccine administered to the child, and the Perceived Stress Scale (PSS) of the parent who attended the study. Responders who vaccinated their children with COVID-19 vaccine responded to the question asking the reason for accepting the COVID-19 vaccine for their children. Responders who did not vaccinate their children with the COVID-19 vaccine responded to the question asking the reason for refusing COVID-19 vaccine for their children (Table I).

The Perceived Stress Scale was developed by Cohen et al (15). Consisting of 14 items in total, PSS is designed to measure how stressful some situations in a person's life are perceived. The participants evaluate each item on a 5-point Likert scale ranging from "Never (0)" to "Very often (4)". Scale scores range from 0 to 56, and there is no cut-off value. A higher score indicates the excessive perception of stress. The scale was adapted to Turkish by Eskin et al. (16).

Ethics Approval And Consent

This study was conducted in conformity with the principles of the Declaration of Helsinki and approved by the Ethics Committee of the Hospital's Clinical Research Ethics Committee (date: 06/12/2021, number: E-48670771-514.99).

Information about the study was displayed on the front page of the online survey and the front page of the questionnaire form completed by the participant face-to-face. Participants consented by checking the 'yes' button or signed under the first page in the survey.

Statistical Analysis

The SPSS 28.0 program was used in the analysis. Mean, standard deviation, median, minimum, maximum, frequency and ratio values were used as the descriptive statistics of the data. The distribution of variables was measured with the Kolmogorov-Smirnov test. The independent sample t-test and Mann-Whitney u-test were used in the analysis of quantitative independent data. The chi-square test was used in the analysis of qualitative independent data, and the Fischer test was used when the chi-square test conditions were not met.

RESULTS

A total of 382 parents received the questionnaire, 261 completed the questionnaire and agreed to participate in the study (68.3%). The sociodemographic features of the participants, childhood immunization status, and allergic

diseases of the child are shown in Table II. The perceived Stress Scale of the parent who answered the questionnaire was between 8 and 41 (23.2 ± 6.3).

Of the 261 children with allergic diseases, 137 (52.4%) had two doses of the COVID-19 vaccine while 89.3% of the mothers and 92.3% of the fathers had at least two doses of the COVID-19 vaccine.

Of the 137 children who received the COVID-19 vaccine, 76 (55.5%) stated that it was their own decision to be vaccinated, 33 (24.0%) had the vaccine at the recommendation of the Ministry of Health, and 28 (20.5%) had the vaccine at the recommendation of their doctor.

One hundred and twenty four children had not received the COVID-19 vaccine. Among this unvaccinated group, the reasons for not being vaccinating were declared as the novelty of the vaccine (37.9%), the side effects (including allergic side effects, (n=4) (25%), the vaccine is not domestic (3.8%), there may be harmful substances in the vaccine (8%), children will have mild COVID-19 illness (8%), doctor did not recommend it (4.9%), their children had already had the COVID-19 infection (1.6%), being against all the vaccines (0.8%) (Table I).

The age of the child in the vaccinated group was significantly ($p<0.05$) higher than in the unvaccinated group. Gender distribution did not differ significantly ($p>0.05$) between the vaccinated and unvaccinated group. The age of the parent who answered the questionnaire in the vaccinated group was significantly ($p<0.05$) higher than in the unvaccinated group. The rate of completion of childhood vaccines in the vaccinated and the unvaccinated group did not differ significantly ($p>0.05$) (Table III).

Types of allergic disease (asthma, urticaria, food allergy, eczema, anaphylaxis, drug allergy) did not differ among the vaccinated and unvaccinated groups ($p>0.05$). The rate of rhinitis-asthma in the vaccinated group was significantly ($p<0.05$) higher than in the unvaccinated group (Table III). The maternal and paternal education level did not differ significantly ($p>0.05$) between the vaccinated and unvaccinated groups (Table III).

The maternal COVID-19 vaccination rate was higher in the vaccinated group ($p<0.05$). The paternal COVID-19 vaccination rate was higher in the vaccinated group ($p<0.05$). The perceived Stress Scale score of the parents in the vaccinated group was significantly ($p<0.05$) higher than in the unvaccinated group (Table III).

Table I: Vaccination status and reasons for vaccination or non-vaccination of the participants

		n	%
Did mother have 2 doses of the COVID-19 vaccine?	No	28	10.7
	Yes	233	89.3
Did father have 2 doses of the COVID-19 vaccine?	No	20	7.7
	Yes	241	92.3
Did your child have 2 doses of the COVID-19 vaccine?	No	124	47.6
	Yes	137	52.4
If your child has received the COVID-19 vaccine (n=137)	Our own decision	76	55.5
	Ministry of Health recommended	33	24.0
	Doctor recommended	28	20.5
If your child has not received the COVID-19 Vaccine (n=124)	Novelty of the vaccine	47	37.9
	Side effects	31	25.0
	Foreign vaccine	17	13.8
	There are harmful substances	10	8.0
	Children will have mild illness	10	8.0
	Our doctor did not recommend it	6	4.9
	Already had COVID-19	2	1.6
	I am against all the vaccines	1	0.8

Table II: Sociodemographic features of the participants and PSS levels of the parent.

		Min-Max	Median	Mean±ss/n-%	
Age of the child		12-18	15.0	14.4±2.2	
Gender of the child	Male			126	48.3
	Female			135	51.7
Who answered the survey	Mother			211	80.8
	Father			50	19.2
Did your child complete the childhood immunization program of the Ministry of Health?	No			4	1.5
	Yes			257	98.5
Child's allergic disease	Asthma			146	55.9
	Urticaria			72	27.6
	Food allergy			14	5.4
	Eczema			13	5.0
	Rhinitis+Asthma			6	2.3
	Anaphylaxis			6	2.3
	Drug allergy			4	1.5
Mother's education	Primary School			128	49.0
	Middle School			33	12.6
	High School			76	29.1
	University			24	9.2
Mother's profession	Most mistress			203	77.3
	Public			19	7.4
	Private sector			39	15.2
Father's education	Primary School			105	40.2
	Middle School			55	21.1
	High School			72	27.6
	University			29	11.1
Father's profession	Not working			47	18.0
	Public			27	10.3
	Private sector			187	71.6
Perceived Stress Scale		8.0-41.0	24.0	23.2 ±6.3	

DISCUSSION

In our study, the rate of getting the COVID-19 vaccine among children aged 12-18 years with allergic diseases was 52.4%. It was found that the rate of vaccination in children increases with age, and the rate of having their children vaccinated is higher if the parents themselves have been vaccinated against COVID-19. It was seen that as the PSS level of the parents increases, the rate of getting their children vaccinated against COVID-19 also increases.

According to the results of our study, the novelty of COVID-19 vaccine was the leading factor among families refusing vaccination for their children, like some other studies (17,18). Although most of the children (98.5%) that participated in our study had completed the childhood immunization program of the Ministry of Health, barely half of them (52.4%) were vaccinated against COVID-19. It may show that parents do not have much hesitation about childhood vaccines that have been used for many years, but have some concerns about this new vaccine.

Table III: Factors affecting vaccination status of children

		Did not have the COVID-19 vaccine (-)			Had the COVID-19 vaccine (+)			P	
		Mean±ss/n-%		Median	Mean±ss/n-%		Median		
Age of the child		13.9± 1.9		14.0	15.0±1.9		15.0	***0.000***	m
Gender of the child	Male	59	47.6		67	48.9		0.831	X^2
	Female	65	52.4		70	51.1			
Parent who answered the questionnaire	Mother	98	79.0		113	82.5		0.479	X^2
	Father	26	21.0		24	17.5			
Age of the parent answering the questionnaire		40.8±6.7		41	43.6±6.2		44.0	***0.000***	m
Did your child have childhood vaccines?	No	4	3.2		0	0.0		0.050	X^2
	Yes	120	96.8		137	100.0			
Child's allergic disease	Asthma	72	58.1		74	54.0		0.510	X^2
	Urticaria	34	27.4		38	27.7		0.954	X^2
	Food allergy	7	5.6		7	5.1		0.848	X^2
	Eczema	6	4.8		7	5.1		0.920	X^2
	Rhinitis+Asthma	0	0.0		6	4.4		***0.018***	X^2
	Anaphylaxis	4	3.2		2	1.5		0.342	X^2
	Drug allergy	1	0.8		3	2.2		0.624	X^2
Mother's education	Primary S	66	53.2		62	45.3		0.210	X^2
	Middle S	17	13.7		16	11.7			
	High S	34	27.4		42	30.7			
	University	7	5.6		17	12.4			
Father's education	Primary S	53	42.7		52	38.0		0.852	X^2
	Middle S	24	19.4		31	22.6			
	High	34	27.4		38	27.7			
	University	13	10.5		16	11.7			
Did mother have the COVID-19 vaccine	No	23	18.5		5	3.6		***0.000***	X^2
	Yes	101	81.5		132	96.4			
Did father have the COVID-19 vaccine	No	17	13.7		3	2.2		***0.000***	X^2
	Yes	107	86.3		134	97.8			
Perceived Stress Scale of the parent		21.4	5.9	22.0	24.9	6.2	26.0	***0.000***	m

[m] Mann-Whitney u test / [X^2] Chi-square test (Fischer test)

The second reason about vaccine refusal was the side effects of the vaccine. The probability of exposure to known and unknown side effects of this new vaccine makes families feel unsafe and 8% of the parents did not vaccinate their children because they believed there were harmful substances in the vaccine. Although the studies and health authorities confirm that COVID-19 vaccines are safe (1), families may think that the vaccine is unsafe by considering these factors.

The foreign production of the vaccine was stated as the reason in 13.8% of the participants who refused to vaccinate their child, and this factor was also discussed in another study conducted in our country. In Yiğit et al's study it was seen that parents were more willing to vaccinate their children with a domestic COVID-19 vaccine than a foreign one (19). In a study from China, 64.2% of the participants reported a preference for a domestically-made over foreign-made COVID-19 vaccine (20), but

another study from India demonstrated that there is a sizable part of the population that has a higher likelihood of selecting a foreign-developed vaccine (21) which shows that this is a variable that differs from country to country.

Of the participants who were not vaccinated, 8% of the parents believed that children would have mild illness and therefore they questioned the necessity of COVID-19 vaccines for children, as mentioned in another study (5). However, it is known that as adults get COVID-19 vaccines, children make up a higher proportion of COVID-19 cases. At the beginning of the pandemic in the United States, children made up 3% of COVID-19 cases; but 1 year later the American Academy of Pediatrics stated that the proportion was 22.4% (22). As a result of loosening the restrictions and the school activities returning to normal, children will face COVID-19 more.

There were 4 cases who were not vaccinated considering that the vaccine might have an allergic side effect. As noted in the previous studies, parents of allergic children have some concerns about allergic reactions of COVID-19 vaccines (23,24). However, it is well known that the risk of having an anaphylactic reaction after COVID-19 vaccines is very rare and no fatalities are reported after COVID-19 vaccine related anaphylaxis (24). If health authorities and clinicians inform families that allergic reactions are rare after the COVID-19 vaccine, the vaccine acceptance may increase.

The vaccine acceptance was higher as the age of the child increased, like other studies (17,25). In Turkey, the rate of having at least two doses of the COVID-19 vaccine in children over 18 years old was 85.23% in March 2022. This outcome shows that as children grow up, they are treated more like adults and vaccination rates get higher.

In our study, the vaccination rate increased as the PSS level of the parents increased. This may show that having a high stress level increases vaccine demand. To understand vaccine hesitation better, we need to do more research to evaluate individual psychologies.

There are different rates of acceptance according to countries, this may be because of trust in vaccines, health systems, and governments (5). In our study, while more than half of the families who vaccinated their children stated that they made this decision themselves, 24% stated that they were vaccinated at the recommendation of the Ministry of Health, and 20% at the recommendation of their doctor. According to the CDC, it was seen that health officials and health care workers were the most trusted sources among families for COVID-19 vaccines (1). In the Homaira et al. study, the majority of the parents reported that a doctor's advice would positively impact their decision to get their child vaccinated (4). In our study, 4.9% of the families stated that their doctor did not recommend this vaccine and they did not vaccinate their children. It will really make a difference if the doctors who follow-up the patients would explain the COVID-19 vaccine's benefits and infrequency of side effects and recommend vaccination.

There are limitations of our study. Firstly, our study evaluated only children with allergic diseases and their parents, and that is why our results do not represent the whole community. Also, there were parents who did not want to participate in the study, and we cannot know their characteristics.

In conclusion, only half of the children aged 12-18 with allergic disease were vaccinated with the COVID-19 vaccine despite the availability of a proven and reliable vaccine for children during the pandemic period. Understanding the reasons for vaccine hesitation and guiding those who are hesitant about these issues will increase the vaccination rates.

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Conflict of Interest

Pınar Yılmazbaş and Deniz Özçeker declare that they have no conflict of interest.

Authorship Contributions

Concept and Design: **Pınar Yılmazbaş, Deniz Özçeker,** Data Collection and Processing: **Deniz Özçeker, Pınar Yılmazbaş,** Analysis and Interpretation: **Deniz Özçeker, Pınar Yılmazbaş,** Literature Search: **Pınar Yılmazbaş, Deniz Ozceker,** Writing: **Pınar Yılmazbaş, Deniz Özçeker.**

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