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Hesitations of mothers with asthmatic children about COVID-19 vaccine

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**Abstract**

In pediatric patients, parental beliefs and concerns also come to the fore in the administration of the vaccine. In this study, we aimed to compare the beliefs and concerns of mothers of asthmatic children with the Coronavirus Disease 2019 (COVID-19) vaccination. The study included 143 asthmatic children (7-18 years old) and their mothers who admitted to the pediatric immunology and allergy outpatient clinic between June and August 2021. Mothers' age, job, education level, COVID-19 vaccination status, and concerns for mothers and their children were collected as sources of information. Mothers were invited to fill out a questionnaire adapted from the 'Beliefs about Medicines Prescribed to Your Child Questionnaire' (BMQ). Among 143 mothers who participated in the study, 106 had been vaccinated and 37 had not. In our study, 49.1% of mothers who had received COVID-19 vaccination did not plan to have their children vaccinated, while 93.7% of mothers who had not received COVID-19 vaccination did not plan to have their children vaccinated. Vaccinated mothers had higher necessity scores, whereas non-vaccinated mothers had higher anxiety scores regarding the COVID-19 vaccination. Reasons for hesitancy were determined as being afraid of the side effects, waiting for a local vaccine to be developed, and concerns about infertility. When the COVID-19 information sources were evaluated, 61% were television, 28% were social media, and 5% were doctors. Parents' beliefs and concerns about necessity were associated with the vaccination rates of children. Although asthmatic children and their families are among the most at risk patient groups in terms of respiratory diseases, there was a distant stance against vaccination even among the parents of this clinical group. It is thought that the media should be used more actively and health care professionals should be more effective as a sources of information regarding vaccination.

Keywords: Asthma, COVID-19 vaccine, information sources, parents' beliefs

Introduction

In the COVID-19 pandemic, most children infected with COVID-19 had mild symptoms and lower mortality than adults, except for children with chronic illness. For this reason, the United States Centres for Disease Control and Prevention (CDC) and the Turkish Ministry of Health have recommended that children and those with chronic diseases be vaccinated with the COVID-19 vaccine [1,2]. Parents' beliefs and concerns also figure prominently in vaccine administration in pediatric patients [3]. It has been observed that COVID-19 may cause more mortality, especially among chronic diseases (congenital

heart disease, diabetes, neurological diseases, chronic lung disease) [3-5].

Asthma is the most common chronic disease of childhood and viral infections cause asthma increased hospitalisation rates. COVID-19, like influenza, frequently affects the lungs and can present higher risks for asthmatic patients [6-8]. The COVID-19 hospitalization rate for those aged 12-17 was 51.3 per 100,000, while the rate for H1N1 in the same age group in 2009 was 23.9 per 100,000 [9]. Therefore, influenza vaccination is recommended for asthmatic children and similar recommendations are anticipated to be useful for COVID-19 vaccination [9-11].

CITATION

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Following the vaccine recommendation from the United States Centers for Disease Control and Prevention (CDC), the Turkish Ministry of Health also advised that children over the age of 12 receive the COVID-19 vaccine [2,12]. According to the CDC, it was reported that 30% of children aged 5-11 years and 60.1% of children aged 12-18 years were fully vaccinated, respectively [13]. In our country, there is no epidemiological data on pediatric COVID patients and their vaccination. Therefore, more studies on COVID and vaccination are needed in our country.

In a study from Türkiye, it was reported that 39.5% of families in the 16-18 age group wanted to be vaccinated, while 26.1% of families in the 11-15 age group wanted to be vaccinated [14]. Families are more concerned about the necessity of treatment especially in young children [15-17]. Studies show that communication between health professionals and parents, providing accurate information and trust is one of the most effective methods to overcome vaccine hesitancy [18]. The reason for this is that there is information overload on platforms such as social media, which is the most frequently used source of information by families, and this contributes to hesitation or opposition to vaccination.

In this study, our aim was to investigate the beliefs and concerns of mothers of asthmatic children about COVID-19 vaccination.

Material and Methods

This study involved 143 asthmatic children aged 7 to 18, along with their mothers, who visited the pediatric immunology and allergy outpatient clinic at a tertiary hospital between June and August 2021. This study was approved by the Ethics Committee of Kütahya Health Science University Faculty of Medicine

with the decision numbered 2020/15-03 and dated 21.10.2020. It was conducted accordance with principles of the Declaration of Helsinki. Data collected from the mothers included age, occupation, educational background, COVID-19 vaccination status, concerns regarding COVID-19 for both themselves and their children, and their sources of information. The mothers completed a questionnaire modified from the ‘Beliefs about Medicines Questionnaire (BMQ)’. Responses to parent questionnaires were indicated as the degree of agreement with each statement on a 5-point Likert-type scale, ranging from strongly disagree to strongly agree. Responses were scored from 1 to 5 where 1= strongly disagree and 5= strongly agree, with some items scored in reverse order. The items in both child and parent versions were grouped into two domains as “concerns” and “necessity”. Mean of the scores obtained for the individual items within each domain was calculated to give a scale score (range:1–5). Scores were interpreted as a continuous scale, with higher scores indicating stronger beliefs in the concepts represented by the scale. The responses were analyzed based on necessity and concern subscores. A higher score in the concern subcategory reflects increased worry, whereas a higher score in the necessity subcategory indicates a stronger belief in the necessity of the medication [15,16].

Results

Regarding the mothers who participated in the study, 74.1% were vaccinated and 25.9% were not vaccinated. Epidemiologically, the age and sex of asthmatic children and the age of their mothers were not statistically different (Table 1). No significant difference was found between those who considered vaccination and those who did not consider vaccination in terms of maternal education level (p=0.682) and occupation (p=0.483).

Table 1. COVID-19 vaccination and demographic characteristics of the group

		Vaccinated mothers n=106	Unvaccinated mothers n=37	p value
Age of children		12.2±3.1	12.3±4.5	0.90
Gender	Male (%-n)	73.2 (60)	26.8 (22)	0.85
	Female (%-n)	75.4 (46)	24.6 (15)	
Age of mother		38.96±5.6	37.5±5.7	0.16

In our study, 49.1% of mothers who had received COVID-19 vaccination did not plan to have their children vaccinated, while 93.7% of mothers who had not received COVID-19 vaccination did not plan to have their children vaccinated (Table 2). In

contrast to the unvaccinated mothers, who had greater anxiety ratings (3.4±0.6 and 2.9±0.8, p=0.001), the vaccinated mothers had higher necessity sub-scores (3.08±0.67 and 2.36±0.63, p=0.001) (Table 3).

Table 2. COVID-19 vaccination status of mothers and asthma patients

	To be vaccinated % (n)	Not be vaccinated % (n)	Undecided % (n)	P value
Vaccinated mothers	50.9 (54)	14.2 (15)	34.9 (37)	0.001
Unvaccinated mothers	2.7 (1)	64.9 (24)	32.4 (12)	
Total	38.5 (55)	27.3 (39)	34.3 (49)	

Table 3. Beliefs of mothers of patients with asthma about COVID-19 vaccine

	Necessity (Score / ±SD)		Concern (Score / ±SD)		P value
Vaccinated mothers	3.08	±0.67	2.90	±0.81	0.001
Unvaccinated mothers	2.36	±0.63	3.43	±0.62	0.001

The main reasons whythe mothers were hesitant to get vaccinated were found to be fear of adverse effects, waiting for the local vaccine to be released, and being concerned about the consequences of infertility.

In our study, when the COVID-19 information sources of the families were evaluated; 61% television, 28% social media, 5% doctors and %1 nurses. No difference was found between the vaccinated and unvaccinated in terms of information sources (p=0.436).

Discussion

In our study, the necessity scores of mothers of asthmatic children about the COVID-19 vaccine were found to be higher in vaccinated mothers, while the concern scores were higher among the unvaccinated mothers. Therefore, the concerns of families who did not receive vaccination should be clarified by physicians on the issues that they are concerned about.

In the study on the beliefs of families of patients with asthma about medications conducted in Türkiye, it was reported that the necessity and concern scores of families about asthma medications were 2.2 and 3.3, respectively [16]. It has been shown in studies that low parental vaccine confidence—lower perceived benefits and higher perceived harms—predicts refusal/delay and lower MMR/varicella/flu coverage [17]. However, studies have shown that hesitation increases with lower efficacy, higher risk of serious side effects, EUA (versus full approval), foreign origin (especially China) and political (versus CDC/WHO) approvals [18]. In the study conducted for COVID-19 vaccination in adults in 2021, it was reported that vaccination in our country was 66% acceptance and 31% hesitation [19]. In a study in children from Türkiye, it was found that 18.3% of parents did not have COVID-19 vaccination, 53.4% had COVID-19 disease, and 24.1% were hesitant about childhood vaccines [20]. In another study from Türkiye, the stress factor was found to be higher in mothers who did not vaccinate, and the rate of self-vaccination was higher in mothers who vaccinated their children [21].

In our study, there was no difference between the educational level of mothers who were vaccinated and those who were not vaccinated. Although it is thought that the approach of families to vaccination is directly proportional to the level of education, studies have shown that there are different approaches between countries. In the survey conducted in Eritrea, it was found that 92% of the children of mothers with secondary or higher education and 78% of the children of mothers with no education were fully vaccinated. In studies from Nigeria and Ethiopia,

it was observed that children of educated mothers were more likely to be fully vaccinated [22]. The reason why there was no difference in education between the vaccinated and unvaccinated mothers in our study was that our study was single-centre and patients with similar socioeconomic level were admitted because it was a public hospital. In our country, detailed multi-centre studies on vaccine hesitancy and education level are needed.

In our study, the most common reasons for vaccine hesitancy were found to be fear of side effects, expectation of local vaccine and infertility. In studies conducted on COVID-19 vaccine preferences, the vaccine causes concerns in families because of its effective properties and FDA Emergency Use Authorisation [18,23]. In the study from Türkiye, it was reported that 49.7% of the participants would have themselves and 38.4% of the participants would have their children vaccinated against COVID-19 if a vaccine was developed for COVID-19 [24]. In addition, the willingness to have the COVID-19 vaccine was found to be associated with the gender, occupation, anxiety level, having a child, and the willingness of the child to be vaccinated. In the study from our country, it was reported that 35.7% of the parents considered getting the COVID-19 vaccine themselves and the most common reasons for vaccine refusal were that the vaccine originated from foreign and the content of the vaccine was untrusted [25]. Prejudice against foreign vaccines was believed to stem from a variety of factors, including ignorance, mistrust of the vaccine's ingredients, and religious beliefs.

In our study, we found that 50.4% of asthmatic children had received COVID-19 vaccine and 38.5% of the mothers of asthmatic children considered having their children vaccinated. In a study conducted in United States with families who refused vaccines, it was found that 4.4% were due to religious reasons, 8.1% due to concerns about side effects and risks, and 10.5% because they believed that vaccines provided little benefit [26].

In our study, it was detected that the source of information for COVID-19 vaccine was mostly television and social media. The healthcare professionals were relatively low in comparison to the media. In a study performed in Greece on vaccination beliefs, it was found that although 93% of teachers thought that vaccines provided protection, 69.7% of them were fully vaccinated. It was reported that 47.4% of these teachers received information about vaccination from the family physician, and the others stated that they lacked information about the side effects of vaccines [27]. Although there is no difference in the ways of obtaining information, it is not known how accurate the information obtained is due to the different sources of information obtained by those who have been vaccinated and

those who have not been vaccinated. Therefore, it is thought that healthcare professionals in our country, especially family physicians and pediatricians in charge of vaccination, should be more active to inform about vaccination.

To prevent anti-vaccination sentiments, vaccine hesitancy and its causes should be thoroughly investigated. While vaccine refusal cases around the world have been increasing rapidly in recent years, the number of families refusing vaccination in our country, which was 5,091 in 2015, rose to more than 12,000 in 2016 and more than 23,000 in 2017 [28]. For this reason, the Turkish Republic's Ministry of Health has established the 'Vaccination Portal' digital platform and aims to provide families with a source of accurate and reliable information [12]. It is thought that the use of communication tools and social media in raising public awareness with the results of scientific studies on vaccination and its effects will benefit the necessity of vaccination and reduce concerns. In addition, pediatricians and family physicians have a greater role in informing the public correctly about vaccination.

The results of the study have to be interpreted with some limitations. First, the cross-sectional nature of the study prevents to the detection the cause and affect relations. Second, we could not use a specific instrument for the COVID-19 vaccine hesitancy. However, it is one of the few studies which was performed about vaccine hesitancy with a clinical group during the pandemic.

Conclusion

Parents' beliefs and concerns about the necessity of vaccination were related to the vaccination rates of children. Even families of children with chronic diseases such as asthma have a distant stance against vaccination. For this reason, it is very important that parents are informed by their physicians about new vaccines such as COVID-19 vaccine, especially during pandemics when anti-vaccination is intensely discussed. It is important for public health that the programmes of the media and social media programs on this subject are monitored for accuracy.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

This study was performed with the ethical approval of Kütahya Health Science University Clinical Researches Ethics Committee (Date: 21.10.2020 and decision number: 2020/15-03).

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References

1. Frenck RW Jr, Klein NP, Kitchin N, et al. Safety, immunogenicity, and efficacy of the BNT162b2 COVID-19 vaccine in adolescents. *N Engl J Med*. 2021;385:239-50.
2. CDC COVID-19 Response Team. Coronavirus disease 2019 in children - United States, February 12-April 2, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69:422-6.
3. Conn KM, Halterman JS, Lynch K, et al. The impact of parents' medication beliefs on asthma management. *Pediatrics*. 2007;120:e521-6.
4. Tsankov BK, Allaire JM, Irvine MA, et al. Severe COVID-19 infection and pediatric comorbidities: a systematic review and meta-analysis. *Int J Infect Dis*. 2021;103:246-56.
5. Moeller A, Thanikell L, Duijts L, et al. COVID-19 in children with underlying chronic respiratory diseases: survey results from 174 centres. *ERJ Open Res*. 2020;6:00409-2020.
6. Global Initiative for Asthma. Global strategy for asthma management and prevention, 2016. https://ginaasthma.org/wp-content/uploads/2016/04/GINA-2016-main-report_tracked.pdf access date 21.04.2025.
7. Cohen HA, Blau H, Hoshen M, et al. Seasonality of asthma: a retrospective population study. *Pediatrics*. 2014;133:e923-32.
8. Boechat JL, Wandalsen GF, Kuschnir FC, et al. COVID-19 and pediatric asthma: clinical and management challenges. *Int J Environ Res Public Health*. 2021;18:1093.
9. Wallace M, Woodworth KR, Gargano JW, et al. The Advisory Committee on Immunization Practices' interim recommendation for use of Pfizer-BioNTech COVID-19 vaccine in adolescents aged 12-15 years - United States, May 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70:749-52.
10. Yüksel GH, Topuzoğlu AA. Factors affecting anti-vaccination. *ESTUDAM Public Health Journal*. 2019;4:244-58.
11. Greenhawt MJ. Influenza vaccination in asthmatic patients. *J Allergy Clin Immunol*. 2014;133:1233.e1-34.
12. Republic of Turkey Ministry of Health COVID-19 Vaccine Information Platform Online, Frequently Asked Questions. Available from: <https://covid19asi.saglik.gov.tr/EN78316/frequently-asked-questions.html?Sayfa=4> access date 21.04.2025.
13. Centers for Disease Control and Prevention (CDC). Prevention and control of seasonal influenza with vaccines: recommendations of Advisory Committee on Immunization Practices - United States, 2013-2014. *MMWR Morb Mortal Wkly Rep*. 2013;62:1-43. Erratum in: *MMWR Recomm Rep*. 2013;62:906.
14. Kuzlu Ayyıldız T, Demirci E, Kocabıyık M, et al. Parents' opinions about having their children vaccinated against COVID-19. *J Pediatr Inf*. 2022;16:e20-6.
15. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology Health*. 1999;14:1-24.
16. Yılmaz OZ, Eroglu N, Ozalp D, Yüksel H. Beliefs about medications in asthmatic children presenting to emergency department and their parents. *J Asthma*. 2012;49:282-7.
17. Gilkey MB, McRee AL, Magnus BE, et al. Vaccination confidence and parental refusal/delay of early childhood vaccines. *PLoS One*. 2016;11:e0159087.
18. Kreps S, Prasad S, Brownstein JS, et al. Factors associated with US adults' likelihood of accepting COVID-19 vaccination. *JAMA Netw Open*. 2020;3:e2025594.
19. Joshi A, Kaur M, Kaur R, et al. Predictors of COVID-19 vaccine acceptance, intention, and hesitancy: a scoping review. *Front Public Health*. 2021;9:698111.
20. Akgül E, Ergün A. The relationship between parents' attitudes towards childhood vaccines and COVID-19 vaccine. *Journal of Public Health Nursing*. 2023;5:64-75.
21. Yılmazbas P, Özceker D. Allergic children's parents' hesitancy about COVID-19 vaccination. *Asthma Allergy Immunol*. 2023;21:18-24.

22. Kibreab F, Lewycka S, Tewelde A. Impact of mother's education on full immunization of children aged 12–23 months in Eritrea: population and health survey 2010 data analysis. *BMC Public Health*. 2020;20:267.
23. Motta M. Can a COVID-19 vaccine live up to Americans' expectations? A conjoint analysis of how vaccine characteristics influence vaccination intentions. *Soc Sci Med*. 2021;113642.
24. Gül Ünlü D, Kesgin Y. Digital parenthood, vaccine hesitancy and COVID-19: determining digital parents' attitudes on COVID-19 anti-vaccination movement. *Journal of Communication Theory and Research*. 2021;56:165-84.
25. Yıldız Y, Telatar TG, Baykal MH, et al. Evaluating vaccine rejection during COVID-19 pandemic. *J DU Health Sci Inst*. 2021;11:200-5.
26. Navin CM, Wasserman JA, Ahmad M, et al. Vaccine education, reasons for refusal, and vaccination behavior. *Am J Prev Med*. 2019;56:359-67.
27. Gkentzi D, Benetatou E, Karatza A, et al. Knowledge and attitudes of school teachers on vaccination in Greece. *Infect Chemother*. 2021;53:364-7.
28. Kader Ç. Anti-vaccination: vaccine hesitancy and refusal. *ESTUDAM Public Health Journal*. 2019;4:377-88.