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Seasonal Influenza Vaccination on Children During COVID-19 Pandemic: Addressing Knowledge, Attitudes, and Practices of Pediatricians and Pediatric Nurses

COVID-19 Pandemisi Sırasında Çocuklarda Mevsimsel İnfluenza Aşılaması: Pediyatri Hekim ve Hemşirelerinin Bilgi, Tutum ve Uygulamaları

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Abstract

Objective: Influenza is a viral infection that causes pandemics just like the COVID-19 infection and has similar clinical features, making differential diagnosis difficult. Although influenza epidemics can be prevented by vaccination, hesitancy about vaccination is the biggest obstacle to preventing influenza epidemics. This study aimed to evaluate pediatricians' and nurses' knowledge, attitudes, and practices regarding seasonal influenza vaccination in children during the COVID-19 pandemic and investigate the underlying causes of vaccine hesitancy against influenza vaccination.

Material and Methods: This cross-sectional study was conducted between February and April 2021. The study sampling consisted 76 pediatricians and 63 pediatric nurses who volunteered to participate in the study. Data were collected through survey questionnaires prepared by the researchers. Descriptive statistics and Chi-square test were used for data analysis.

Results: In this sample, 52.6% of the pediatricians and 23.8% of the nurses believed that children should be vaccinated against influenza during the COVID-19 pandemic. Although 73.7% of the pediatricians and 33.3% of the pediatric nurses advised pediatric patients to get vaccinated against influenza, they did not get their children vaccinated. The hesitancy reasons included worrying about their children getting infected with COVID-19 in healthcare institutions, distrust in the efficacy of the influenza vaccine, worrying about the possible side effects, influenza vaccines

Öz

Giriş: İnfluenza, COVID-19 enfeksiyonu gibi pandemilere neden olan ve benzer klinik özelliklere sahip olması nedeniyle ayırıcı tanıda zorlanılan viral bir enfeksiyondur. İnfluenza salgınları aşılama ile önlenebilir olsa da aşılamaya ilişkin kararsızlık influenza salgınlarının önlenmesindeki en büyük engeldir. Bu çalışmanın amacı, çocuk hekimlerinin ve hemşirelerinin COVID-19 pandemisi sırasında çocuklarda mevsimsel influenza aşısı ile ilgili bilgi, tutum ve uygulamalarını değerlendirmek ve influenza aşısına karşı aşı tereddütünün altında yatan nedenleri araştırmaktır.

Gereç ve Yöntemler: Kesitsel tipteki bu çalışma Şubat-Nisan 2021 tarihleri arasında gerçekleştirildi. Araştırma örneklemini çalışmaya katılmaya gönüllü 76 çocuk hekimi ve çocuk bölümünde çalışan 63 hemşire oluşturdu. Veriler, araştırmacılar tarafından hazırlanan anketler aracılığıyla toplandı. Verilerin analizinde tanımlayıcı istatistikler ve ki-kare testi kullanıldı.

Bulgular: Bu örneklemde çocuk hekimlerinin %52.6'sı ve hemşirelerin %23.8'i COVID-19 pandemisi sırasında influenzaya karşı çocukların aşılanması gerektiğini bildirdi. Çocuk hekimlerinin %73.7'si ve hemşirelerin %33.3'ü çocuk hastalara influenza aşılamasını tavsiye etmesine rağmen, kendi çocuklarına aşı yaptırmadıkları belirlendi. Hekim ve hemşirelerin aşı kararsızlığı nedenlerinin sağlık kuruluşlarında çocuklarına COVID-19 bulaşacağından endişe etme, aşının etkinliğine güvenmeme, olası yan etkiler, influenza aşılarının ulusal aşı takviminde yer almaması, influenzanın yüksek riskli bir hastalık olmadığına inanma, aşı ile ilgili bilgi eksikliği,

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not being included in the national vaccination program, believing that influenza is not a high-risk disease, lack of information about the vaccine, thinking that that influenza vaccine contains harmful substances, and not having time because of busy work schedule.

Conclusion: In-service training on influenza vaccination should be organized among pediatricians and nurses to eliminate vaccine-related hesitations. Policy recommendations for the inclusion of influenza vaccines in the national vaccination program are important in terms of preventing influenza-related diseases in children and vaccine hesitations seen by healthcare professionals.

Keywords: Influenza vaccine, vaccine hesitancy, nurse, pediatrician

aşının zararlı maddeler içerdiğini düşünme ve yoğun çalışma temposunda zaman bulamama olarak sıralandığı belirlendi.

Sonuç: Çocuk hekim ve hemşireleri arasında aşıya bağlı tereddütleri gidermek için influenza aşılamasına yönelik hizmet içi eğitimler düzenlenmelidir. İnfluenza aşılarının ulusal aşı takvimine dahil edilmesine yönelik politika önerileri, çocuklarda influenza ilişkili hastalıkların ve sağlık profesyonellerince görülen aşı tereddütlerinin önlenmesi açısından önemlidir.

Anahtar Kelimeler: İnfluenza aşısı, aşı kararsızlığı, hemşire, çocuk hekimi

Introduction

Children, who may not be fully able to take and implement protective measures against influenza, are at risk of both contracting and transmitting the disease. Influenza-related acute lower respiratory tract infections are one of the important causes of hospitalizations and mortality in children, and most of these deaths occur in developing countries, especially in children under the age of five (1,2). In developing countries, the rate of influenza-associated hospitalizations has been estimated to be three times higher than that in developed countries (2).

During the ongoing coronavirus disease 2019 (COVID-19) pandemic, which has affected the whole world, including Türkiye, children have been considered as one of the crucial factors that contribute to the speed of viral transmission (3). With the onset of the influenza season, the number of patients presenting to hospitals with flu-like complaints is likely to increase gradually, and the management of patients with influenza is expected to be further complicated by the ongoing COVID-19 pandemic (4). Although various measures of infection control, including wearing masks, social distancing, maintaining hygiene, and suspended in-person education (schools), have been implemented during this pandemic, people are gradually returning to normalcy with the lifting of lockdown. Notably, the resumption of in-person education makes it imperative for adults and children to take preventive measures against the outbreaks of influenza, which are likely to be widespread among children (4-6).

Vaccination has been identified as the most effective approach for preventing influenza outbreaks in children. The Centers for Disease Control and Prevention (CDC) recommends that everyone aged six months and older, including during the COVID-19 period, get a seasonal flu vaccine, with rare exceptions (6). One of the biggest obstacles to vaccination practices is vaccine hesitancy. Individuals who are hesitant about vaccination are a heterogeneous group with varying degrees of indecision about specific vaccines or vaccination in general. Individuals who are hesitant about the vaccine can accept all vaccines, but maintain their concerns about vaccines, some may refuse or delay some vaccines, but accept others; some people may refuse all vaccines (7). The World Health Organization listed vaccine hesitancy among ten global threats in 2019 (8). This situation can be considered a reaction that can be seen at the time of the introduction of all vaccines. However, the coverage of influenza vaccination, which has been proven to be safe and is currently in use, is also low (9).

The willingness for vaccination is deeply influenced especially by the mistrust of health authorities (10). Pediatric health professionals, who are at the forefront of the fight against infections, play a significant role in protecting children's health. Pediatricians and pediatric nurses, in particular, have a decisive role in raising public awareness and setting an exemplary model through their knowledge and practices. This study sought to assess the knowledge, attitudes, and practices of pediatricians and pediatric nurses regarding the vaccination of children against influenza during the COVID-19 pandemic and to investigate the underlying causes of vaccine hesitancy against influenza vaccination.

Materials and Methods

This cross-sectional study conducted between February and April 2021 was approved by the institution and ethics committee (Decision no: 2021/100). Study purpose and declaration regarding the confidentiality of the data were mentioned at the beginning of the online questionnaire, and the respondents were requested to provide their informed consent for participation.

The study population comprised a total of 210 pediatricians and pediatric nurses who worked at a tertiary pediatric hospital in a province in central Anatolia and who agreed to participate in this study. Health professionals who were on maternity leave, quarantined because of contracting COVID-19, or refused to participate in this study were excluded. The sampling of the study constituted a total of 139 pediatric healthcare professionals, 76 pediatricians, and 63 pediatric nurses who volunteered to participate in the study.

Data were collected through survey questionnaires prepared by the researchers. The questionnaires included questions regarding the ıntroductory characteristics of the pediatricians and pediatric nurses as well as their knowledge, attitudes, and practices regarding influenza vaccination. Online questionnaires were used to minimize the risk of infection due to the pandemic. The first part of the online questionnaires requested the participants to provide their consent for participating in this study. The questionnaires were shared on online groups to collect the data. Questionnaire regarding participant demographics comprised questions that inquired about the respondents' sociodemographics such as age, sex, having children, educational status, etc. Questionnaire regarding influenza-related knowledge, attitude, and practices was prepared following a standard survey method that included a literature review, an expert review, and a pilot study (11-17). The questionnaire included questions that measured the level of knowledge regarding the viral incubation period, contagious period, vaccine-induced protection duration, influenza vaccine types, priority groups for vaccination, and groups that should not be vaccinated, etc. The questions regarding their attitudes inquired whether they found influenza vaccination necessary and their opinions about influenza vaccination during the pandemic for children, etc. Furthermore, the questions regarding their practices inquired whether they advised their pediatric patients to get vaccinated against influenza and whether they got their children vaccinated, etc.

The data were analyzed using IBM SPSS Statistics V 25.0 (IBM Corp., Armonk, NY, USA) statistical software suite. Descriptive statistics were presented as number (n) and percentages (%) values. The relation between categorical variables was evaluated using the chi-square test (χ^2). Significance level was considered as $p< 0.05$.

Table 1. Introductory characteristics of the pediatricians and pediatric nurses (n= 139)

Characteristics	Number (n)	Percentage (%)
Age		
22-30	49	35.2
31-39	61	43.9
≥40 years	29	20.9
Sex		
Female	113	81.3
Male	26	18.7
Marital status		
Single	36	25.9
Married	103	74.1
Educational status		
Doctorate	26	18.7
Master's degree	48	34.5
Bachelor's degree	65	46.8
Profession		
Pediatrician	76	54.7
Nurse	63	45.3
With or without children		
No children	35	25.2
Have children	104	74.8
Presence of chronic diseases		
Yes	29	20.9
No	110	79.1
Previous vaccination against influenza		
Yes	77	55.4
No	62	44.6

Results

Of all health professionals who participated in the study, 43.9% were aged between 31 and 39 years, and 81.3% were females. Of the participants, 54.7% were pediatricians and 45.3% were nurses; 46.8% had a bachelor's degree, 34.5% had a master's degree, 18.7% had a doctoral degree; 74.8% had children. One-fifth of the pediatricians and pediatric nurses had chronic diseases, and 55.4% of them had previously been vaccinated against influenza (Table 1).

In this sample, 43.4% of the pediatricians and 39.7% of the pediatric nurses knew that the incubation period of influenza was between one and four days; there was no statistical difference between them ($p> 0.05$). Furthermore, 55.3% of the pediatricians and 57.1% of the pediatric nurses knew that the contagious period of influenza was between five and 10 days ($p> 0.05$); 51.3% of the pediatricians and 49.2% of the nurses knew that the vaccine would start protecting within two weeks of vaccination, which would last till one year ($p> 0.05$). In addition, 67.1% of the pediatricians and 82.5% of the pediatric nurses were unaware of the types of influenza vaccines available ($p> 0.05$). It was found that 65.8% of the pediatricians and 73% of the pediatric nurses knew that inactivated vaccines were administered to health professionals. A greater proportion of the pediatricians knew which groups should avoid receiving the inactivated vaccine. In this sample, 94.7% of the pediatricians and 77.8% of the pediatric nurses knew that vaccination should be repeated every year ($p< 0.05$) (Table 2).

This study showed that 56.6% of the pediatricians and 27% of the pediatric nurses considered influenza vaccination necessary; the difference between them was statistically significant ($p< 0.05$). Furthermore, 61.8% of the pediatricians and 34.9% of the pediatric nurses thought that people should get influenza vaccination during the pandemic, and the difference was statistically significant ($p< 0.05$). When the pe-

Table 2. Knowledge levels of the pediatricians and pediatric nurses regarding influenza vaccination

Characteristics	Pediatricians (n= 76)		Pediatric nurses (n= 63)		χ^2	p
	n	%	n	%		
Incubation period of influenza (days)						
1-4	33	43.4	25	39.7	5.672	0.225
5-7	22	28.9	25	39.7		
5-10	4	5.3	3	4.7		
7-10	10	13.2	2	3.2		
7-14	7	9.2	8	12.7		
Contagious period of influenza (days)						
1-4	24	31.5	20	31.8	0.140	0.932
5-10	42	55.3	36	57.1		
10-15	10	13.2	7	11.1		
Protective period of vaccines						
Starts on the same day and lasts a lifetime	2	2.6	1	1.6	0.279	0.964
Starts within an average of one week and protects for one year	16	21.1	14	22.2		
Starts within an average of 1-3 days and protects for one year	19	25.0	17	27.0		
Starts within an average of two weeks and protects for one year	39	51.3	31	49.2		
Knowledge regarding the types of influenza vaccine						
Yes	25	32.9	11	17.5	3.509	0.061
No	51	67.1	52	82.5		
Knowledge regarding the type of influenza vaccine administered to health professionals						
Inactivated vaccine	50	65.8	46	73.0	0.538	0.463
No answer	26	34.2	17	27.0		
Who should not take inactivated vaccines*						
Children aged <6 months	33	43.4	35	55.6	2.030	0.154
Individuals with life-threatening diseases, severe allergy to influenza vaccines or vaccine components, or egg allergies	65	85.5	44	69.8	4.123	0.042
People with a history of Guillain-Barre Syndrome	29	38.2	22	34.9	0.047	0.828
Individuals with suppressed immunity	18	23.7	21	33.3	1.147	0.284
Pregnant women	6	7.9	29	46.0	24.607	0.000
Whether the influenza vaccine should be repeated every year						
Yes	72	94.7	49	77.8	7.348	0.007
No	4	5.3	14	22.2		

*Multiple responses were given.

diatricians and pediatric nurses were inquired about the priority groups for vaccination, 56.6% of the pediatricians and 38.1% of the pediatric nurses mentioned health professionals, whereas 52.6% of the pediatricians and 31.7% of the pediatric nurses mentioned individuals aged >65 years ($p< 0.05$). There was a significant difference in the percentage of pediatricians and pediatric nurses who considered pregnant women as a priority group for vaccination. According to these results, this percentage was higher in pediatricians ($p= 0.029$) than in pediatric nurses. According to 22.4% of the pediatricians and 11.1% of the pediatric nurses, children ranked third in priority ranking.

It was further noted that 36.8% of the pediatricians reported having taken the current year's influenza vaccine, whereas 63.2% did not; 11.1% of the nurses reported having been vaccinated against influenza, whereas 88.9% were not ($p< 0.05$). When inquired about the reason for being vaccinated, respondents in both groups mostly answered that they considered themselves a risk group. They reported having been vaccinated to prevent confusion between COVID-19 symptoms and

Table 3. Attitudes and practices of pediatricians and pediatric nurses regarding influenza vaccination

Characteristics	Pediatricians		Pediatric nurses		χ^2	p
	n	%	n	%		
Believing that influenza vaccination is necessary						
Yes	43	56.6	17	27.0	12.598	0.002
No	12	15.8	14	22.2		
I am hesitant	21	27.6	32	50.8		
Thoughts on whether people get influenza vaccines during the pandemic						
Yes	47	61.8	22	34.9	10.664	0.005
No	12	15.8	13	20.6		
I am hesitant	17	22.4	28	44.5		
Opinion on the priority groups for vaccination*						
Health professionals	43	56.6	24	38.1	4.713	0.030
Children	17	22.4	7	11.1	2.319	0.128
Women aged 15-49 years	3	3.9	6	9.5	0.299	0.163
Public employees	1	1.3	1	1.6	1.000	0.703
Individuals aged >65 years	40	52.6	20	31.7	6.125	0.013
Pregnant women	12	15.8	2	3.2	4.739	0.029
Patients with chronic illness	1	1.3	1	1.6	1.000	0.703
Status of vaccination against influenza during the current year						
Yes	28	36.8	7	11.1	10.778	0.001
No	48	63.2	56	88.9		
Reason for getting vaccinated						
Health professionals constitute a risk group	17	60.7	6	85.7	2.280	0.131
To avoid confusion with COVID-19 symptoms	11	39.3	1	14.3		
Reason for not getting vaccinated						
I have previously been infected	8	16.7	11	19.6	26.019	<0.001
Vaccines have side effects	7	14.6	13	23.2		
Vaccine is not included in the national vaccination program	10	20.8	2	3.6		
Influenza is not a high-risk disease	8	16.7	11	19.6		
I do not think it is safe	5	10.4	5	8.9		
Inadequate information about the vaccine	0	0.0	12	21.5		
I think it contains harmful substances	1	2.1	1	1.8		
I did not get a chance because of busy work schedule	9	18.7	1	1.8		

*Multiple responses were given.

influenza symptoms (p> 0.05). The reasons mentioned for not getting vaccinated were as follows: influenza vaccine not being part of the national vaccination program, its side effects, belief that it is not safe, previous infection with the virus, belief that influenza is not a high-risk disease, inadequate information about the vaccine, thinking vaccine contains harmful substances, and not having time for getting vaccinated because of busy work schedule (p< 0.001; Table 3).

In all, 52.6% of the pediatricians and 23.8% of the pediatric nurses believed that children should be vaccinated against influenza during the COVID-19 pandemic; 21.1% of the pediatricians and 44.5% of the nurses were hesitant (p= 0.001). Moreover, 73.7% of the pediatricians and 33.3% of the nurses advised pediatric patients and their relatives to get vaccinated against influenza (p< 0.001). Pediatricians recommended vaccination because of the following reasons: First, they considered influenza vaccines safe and believed that these vaccines rarely caused serious problems; second, they believed that vaccination prevented confusion between influenza and COVID-19 symptoms; and finally, they believed that it also protected against complications due to COVID-19. On the

Table 4. Attitudes and practices of pediatricians and pediatric nurses regarding the vaccination of children against influenza

Characteristics	Pediatricians		Pediatric nurses		χ^2	p
	n	%	n	%		
Whether children should get influenza vaccines during the COVID-19 pandemic						
Yes	40	52.6	15	23.8	13.539	0.001
No	20	26.3	20	31.7		
I am hesitant	16	21.1	28	44.5		
Advising pediatric patients and their relatives to be vaccinated against influenza						
Yes	56	73.7	21	33.3	22.698	<0.001
No	20	26.3	42	66.7		
Reason for recommending vaccination						
I think it protects against the complications of COVID-19.	8	14.3	4	19.0	3.925	0.141
Influenza vaccines are safe and rarely cause serious problems.	30	53.6	6	28.6		
To prevent confusion between influenza and COVID-19 symptoms.	18	32.1	11	52.4		
Reason for not recommending vaccination*						
Wearing masks during the pandemic reduces influenza transmission.	12	60.0	15	35.7	0.950	0.330
I do not think influenza is a high-risk disease.	4	20.0	15	35.7	8.530	0.003
I think the protective period is short.	2	10.0	16	38.1	13.881	0.000
I think getting vaccinated every year overloads the immune system.	2	10.0	16	38.1	13.881	0.000
Status of vaccinating their children against influenza**						
Yes	2	3.7	0	0.0	2.439	0.501
No	51	96.3	51	100.0		
Reason for not getting their own children vaccinated**						
I am worried about the possible side effects.	6	11.8	3	5.9	14.740	0.039
I am worried about my children contracting COVID-19 in the hospital setting.	20	39.2	18	35.3		
Because influenza vaccines are not in the national vaccination schedule.	3	5.9	4	7.8		
I do not think influenza is a high-risk disease.	3	5.9	4	7.8		
I do not think there is sufficient information about the vaccine.	1	2.0	6	11.8		
I think there are harmful substances in influenza vaccines for children.	2	3.9	7	13.7		
I distrust the efficacy of influenza vaccines.	9	17.6	9	17.7		
I did not get a chance because of busy work schedule.	7	13.7	0	0.0		
Opinions on the obstacles in society to influenza vaccination in children*						
Antivaccine posts on social media	46	60.5	24	38.1	6.933	0.008
Religious beliefs	6	7.9	6	9.5	1.000	0.617
Lack of scientific evidence for vaccine efficacy	11	14.5	23	36.5	7.898	0.005
Distrust	41	53.9	41	65.1	1.765	0.184
Side effects	22	28.9	15	23.8	0.240	0.624
Lack of information	51	67.1	46	73.0	0.325	0.569

*Multiple responses were given.
** Health professionals with children responded.

other hand, nurses mentioned the reasons for recommending vaccination in the following order: Influenza vaccines could prevent confusion between influenza and COVID-19 symptoms, influenza vaccines are safe and very rarely cause serious problems, and they also protect against complications due to COVID-19. Both groups mentioned the reasons for not recommending vaccination in the following order: Wearing masks during the pandemic minimized the risk of influenza infection ($p> 0.05$), they did not consider influenza as a high-risk disease, they believed that the duration of protection is short, and they believed that annual vaccination overloads the immune system ($p< 0.05$).

In this sample, 96.3% of the pediatricians and all of the pediatric nurses who had children, did not get their children vaccinated against influenza during the current year because of the following reasons: they were afraid that their children could get infected with COVID-19 in the hospital setting, they did not trust in the efficacy of the influenza vaccines, they were apprehensive of the possible side effects, vaccination was not included in the national vaccination program, they did not consider influenza as a high-risk disease, they believed that the information on vaccines was insufficient, they believed that the vaccines contained harmful substances, and they did not have the time because of busy work schedule ($p= 0.039$). When inquired about their thoughts regarding the obstacles in the society to getting children vaccinated against influenza, the majority of the pediatricians mentioned antivaccine posts on social media whereas the majority of the nurses highlighted inadequate scientific evidence for the efficacy of such vaccines ($p< 0.05$). The other factors were listed as distrust, side effects, lack of information about influenza vaccine, and religious beliefs ($p> 0.05$; Table 4).

Discussion

To increase the health level of a society, people living in the same society should support each other with a sense of mutual responsibility and solidarity. Failure to treat a person or not to protect him/herself from diseases cannot be considered as the problem of that person alone and cannot be overlooked. In this context, one of the most important public health practices carried out for the maintenance of health and the prevention of infectious diseases is vaccination studies (18). This study aimed to assess pediatric health professionals' knowledge, attitudes, and practices and investigate the underlying causes of vaccine hesitancy against influenza vaccination in children during the COVID-19 pandemic. The findings obtained from the research were discussed in the light of the literature.

According to the analysis of the responses to the questions measuring the level of knowledge of the seasonal influenza vaccine, the questions with the highest rates of correct answers in both groups were those about the frequency of vaccination and priority groups for vaccination: Respondents mostly answered that vaccination should be repeated every year and that the risk group comprised health professionals and individuals aged >65 years. In a study conducted by Sökel Kant and Önal in 2016, questions with the highest rates of correct answers were those about risk groups, viral transmission mode, and vaccination frequency, and the correct answers were that individuals aged >65 years constituted a risk group for vaccination, influenza was transmitted through the respiratory route, and health professionals required vaccination every year (12).

Health professionals without any clinical symptoms can carry the virus and transmit it to patients (13). Vaccination of health professionals against influenza is considered a health- and cost-effective approach to reducing both labor loss and contagion load among individuals visiting healthcare centers (14). In the present study, 61.8% of the pediatricians and 34.9% of the pediatric nurses stated that people should get vaccinated against influenza during the pandemic, whereas only 36.8% of the pediatricians and 11.1% of the pediatric nurses reported having been vaccinated against influenza during the current year. Previous meta-analyses evaluating the rates of influenza vaccination among health professionals have reported a rate of 2.1%-92% (15-17). In these meta-analyses, the studies with high vaccination rates have been conducted in countries where influenza vaccination is mandated by the state for health professionals. In Türkiye, vaccination rate has been reported to be 4.3% by Sarı, Temoçin, and Köse (2017), 18.4% by Karadağ Öncel et al. (2015), and willingness to be vaccinated rate has been reported as 42.3% by Gürbüz et al. (2013) (13,19,20). These findings indicate that vaccination rates are low in Türkiye because influenza vaccination is not included in the national vaccination program. A relevant review performed by Dini et al. (2018) has emphasized the importance of education in vaccination but stressed that vaccination should be mandatory for professionals serving high-risk groups (21).

Several reasons were noted on why the pediatricians and nurses did not take vaccines including that influenza vaccination was not included in the national vaccination program, it had side effects, they did not find it safe, they had previously been infected, they did not think that influenza was a high-risk disease, they thought that there was lack of information about the vaccine, vaccine contained harmful substances, and they did not have the opportunity to get vaccinated because of busy working schedule. Sarı, Temoçin, and Köse (2017) have found the following reasons why health professionals do not take the influenza vaccine: believing that vaccination is not necessary, preferring other preventive methods, and fearing the possible side effects (13). Kul and Korkmaz (2020) have reported that health professionals do not want to get the influenza vaccine primarily because they do not believe that the vaccination is necessary and they prefer other preventive methods (22). Gözükara and Sançar (2019) have stated the belief that vaccination is not necessary or useful is the reason why health professionals do not get vaccinated (23). These findings are similar to those of this study.

In the current study, half of the pediatricians and nearly one-quarter of the pediatric nurses believe that children should be vaccinated against influenza during COVID-19. The continued implementation of nonpharmacological measures

as well as travel restrictions and border closures because of the pandemic might have had an impact on influenza transmission by restricting the circulation of viruses into the country. However, the nonpharmacological measures and travel restrictions vary across countries, and the removal of these restrictions may lead to the recirculation of influenza and severe acute respiratory syndrome coronavirus. This places a burden on the vulnerable populations and the healthcare system, thereby leading to an increased spread of influenza (24). Therefore, public awareness regarding vaccination must be raised to reduce influenza outbreaks and protect children's health.

More than two-thirds of the pediatricians and one-third of the pediatric nurses advised the patients and their relatives to be vaccinated against influenza. They did so because they believed that vaccines are safe and prevent confusion between influenza and COVID-19 symptoms. COVID-19 causes symptoms are similar to those of influenza (25). Vaccination can reduce the prevalence of influenza and also improve similar symptoms (26). Reducing the need for influenza-related hospitalizations may be significant for resource management during the pandemic. In their study on COVID-19 and influenza coinfections, Özaras et al. (2020) have recommended vaccination against influenza. Influenza vaccines are safe for young children (27). A systematic review of 19 cohort and 11 case-control studies on influenza vaccination in children aged between three and 16 years has concluded that live influenza vaccines can reduce influenza (moderate certainty evidence) and flu-like diseases (low certainty evidence) during a single flu season (28). Another systematic review and meta-analysis on this topic have emphasized that vaccination is effective in reducing influenza-related hospitalizations in children and should be promoted (29). Maltezou et al. (2019) argue that vaccination should be mandatory in vaccine-preventable diseases with high morbidity and mortality (30).

This study found that 96.3% of the pediatricians and all of the pediatric nurses who had children did not get their children vaccinated against influenza. They mentioned various reasons for this, which included worrying about their children getting infected in healthcare institutions, worrying about the possible side effects, influenza vaccines not being included in the national vaccination program, believing that influenza was not a high-risk disease, believing that the information about the vaccine was limited, and believing that that influenza vaccine contained harmful substances. The reasons for vaccine hesitancy are complicated, but the most common reason for vaccine hesitancy among healthcare professionals is seen to be insufficient and lacking information about the safety of the vaccine (31,32). In-service training programs must be organized to eliminate the health professionals' hesitations regarding vaccination.

Although the majority of the pediatricians highlighted antivaccine posts on social media as the obstacles to getting children vaccinated, the majority of the nurses indicated the lack of scientific evidence for the efficacy of vaccines in society. Other obstacles included distrust, possible side effects, and insufficient information. The number of people opposing vaccination has been increasing in Türkiye, similar to the global situation. Since 2010, there has been an increasing refusal of vaccination in Türkiye, including even the compulsory vaccines for children. Those opposing vaccination speculate that vaccines contain substances that cause diseases such as autism and that vaccine manufacturers are not reliable and are mainly motivated by commercial goals (33). Thus, health professionals in the relevant fields are considered to play a crucial role through their practices in combating the opposition to vaccination and setting examples to finally boost confidence in vaccination.

Conclusion

In this sample, half of the pediatricians and nearly one-quarter of the nurses believed that children should be against influenza during the COVID-19 pandemic. Although more than two-thirds of the pediatricians and one-third of the pediatric nurses advised pediatric patients and their relatives to get vaccinated against influenza, they did not get their own children vaccinated.

It is important for health professionals to be role models for the community and their patients and promote vaccination. Therefore, in-service training sessions on influenza vaccination must be conducted to eliminate vaccine-related hesitancy among pediatricians and pediatric nurses. Policy recommendations for the inclusion of influenza vaccines in the national vaccination program are important for preventing influenza-related diseases and hospitalizations in children. Public awareness regarding vaccination must be raised through education and various interventions to remove the barriers to vaccination as well as protect and improve children's health during the ongoing COVID-19 pandemic.

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References

1. *Farias JA, Fernández A, Monteverde E, et al. Critically ill infants and children with influenza A (H1N1) in pediatric intensive care units in Argentina. Intensive Care Med 2010;36(6):1015-22.* [CrossRef]
2. *Lafond KE, Nair H, Rasooly MH, Valente F, Booy R, Rahman M, et al. Global role and burden of influenza in pediatric respiratory hospitalizations, 1982-2012: A systematic analysis. PLoS Med 2016;13(3):e1001977.* [CrossRef]
3. *Çelik, F, Yenal TH. COVID-19 and Physical Inactivity. MJSS 2020;3(2):249-59.*
4. *Aksu K. COVID-19 pandemia and influenza season. Ankara Med J 2020;(4):1115-7.* [CrossRef]
5. *Telatar TG, Üner S. Evaluating the COVID-19 pandemıc struggle in terms of national pandemic influenza preparedness plan. J Health Soc 2020:51-6.*
6. *Center for Disease Control and Prevention. Who should and who should not get a flu vaccine 2021. Available from: https://www.cdc.gov/flu/prevent/whoshouldvax.htm.*
7. *Troiano G, Nardi, A. Vaccine hesitancy in the era of COVID-19. Public Health 2021;194:245-51.* [CrossRef]
8. *The World Health Organization. Ten threats to global health in 2019. WHO 2019 Available from: https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019.*
9. *World Health Organization. Barriers of influenza vaccination intention and behavior: A systematic review of influenza vaccine hesitancy 2005-2016. World Health Organization. 2016. Available from: https://apps.who.int/iris/handle/10665/251671.*
10. *Karafillakis E, Simas C, Jarrett C, Verger P, Peretti-Watel P, Dib F, et al. HPV vaccination in a context of public mistrust and uncertainty: A systematic literature review of determinants of HPV vaccine hesitancy in Europe. Hum Vaccin Immunother 2019;15(7-8):1615-27.* [CrossRef]
11. *Kumar V. Influenza in children. Indian J Pediatr 2017;84(2):139-43.* [CrossRef]
12. *Sökel Kant S, Önal Ö. Recognition of the seasonal influenza vaccine at the adult immunization by the primary care health staff and specification of their approach in this regard. Konuralp Med J 2016;8(1):41-6.*
13. *Sarı T, Temoçin F, Köse H. Attitudes of healthcare workers towards influenza vaccine. Klimik Derg 2017;30(2):59-63.* [CrossRef]
14. *Kaygusuz S, Gül S. Influenza and vaccine. J Kırıkkale Unıv Faculty of Med 2018;20(3):329-44.* [CrossRef]
15. *Prematunge C, Corace K, McCarthy A, Nair RC, Pugsley R, Garber G. Factors influencing pandemic influenza vaccination of healthcare workers-a systematic review. Vaccine 2012;30(32):4733-43.* [CrossRef]
16. *Hofmann F, Ferracin C, Marsh G, Dumas R. Influenza vaccination of healthcare workers: A literature review of attitudes and beliefs. Infection 2006;34(3):142-7.* [CrossRef]
17. *Aguilar-Díaz Fdel C, Jiménez-Corona ME, Ponce-de-León-Rosales S. Influenza vaccine and healthcare workers. Arch Med Res 2011;42(8):652-7.* [CrossRef]
18. *Argüt N, Yetim A, Gökçay G. The factors affecting vaccination acceptance. J Child 2016;16(1):16-24.* [CrossRef]
19. *Karadağ Öncel E, Büyükcam A, Cengiz AB, Kara A, Ceyhan M, Doğan BG. The evaluation of knowledge, opinions, and attitudes of hospital staff except physicians and nurses regarding seasonal influenza vaccine. J Pediatr Inf 2015;9:68-75.* [CrossRef]
20. *Gürbüz Y, Tütüncü E, Şencan İ, Şendağ E, Callak F, Sevinç G, et al. Study on the willingness of health care workers to receive an influenza vaccination during the 2009 Influenza A (H1N1) pandemic. Pamukkale Med J 2013;6(1):12-7.* [CrossRef]
21. *Dini G, Toletone A, Sticchi L, Orsi A, Bragazzi NL, Durando P. Influenza vaccination in healthcare workers: A comprehensive critical appraisal of the literature. Hum Vaccin Immunother 2018;14(3):772-89.* [CrossRef]
22. *Kul G, Korkmaz N. The approach of health care workers to influenza vaccination. J Contemp Med 2020;10(3):421-4.* [CrossRef]
23. *Gözükara MY, Sançar B. Evaluation of influenza vaccination status and vaccination thoughts of nurses and midwives working in Mersin city hospital. FLORA 2019;24(4):343-52.* [CrossRef]
24. *WHO SAGE Seasonal Influenza Vaccination Recommendations during the COVID-19 Pandemic. 2020.*
25. *Laris-González A, Avilés-Robles M, Domínguez-Barrera C, Parra-Ortega I, Sánchez-Huerta JL, Ojeda-Diezbarroso K, et al. Influenza vs. COVID-19: Comparison of clinical characteristics and outcomes in pediatric patients in Mexico City. Front Pediatr 2021;9:676611.* [CrossRef]
26. *McCauley J, Barr IG, Nolan T, Tsai T, Rockman S, Taylor B. The importance of influenza vaccination during the COVID-19 pandemic. Influenza Other Respir Viruses 2022;16(1):3-6.* [CrossRef]
27. *Ozaras R, Cirpin R, Duran A, Duman H, Arslan O, Bakcan Y, et al. Influenza and COVID-19 coinfection: Report of six cases and review of the literature. J Med Virol 2020;92(11):2657-65.* [CrossRef]
28. *Jefferson T, Rivetti A, Di Pietrantonj C, Demicheli V. Vaccines for preventing influenza in healthy children. Cochrane Database Syst Rev 2018;2(2):CD004879.* [CrossRef]
29. *Kalligeros M, Shehadeh F, Mylona EK, Dapaah-Afriyie C, van Aalst R, Chit A, et al. Influenza vaccine effectiveness against influenza-associated hospitalization in children: A systematic review and meta-analysis. Vaccine 2020;38(14):2893-903.* [CrossRef]
30. *Maltezou HC, Theodoridou K, Ledda C, Rapisarda V, Theodoridou M. Vaccination of healthcare workers: is mandatory vaccination needed? Expert Rev Vaccines 2019;18(1):5-13.* [CrossRef]
31. *Geoghegan S, O'Callaghan KP, Offit PA. Vaccine safety: Myths and misinformation. Front Microbiol 2020;11:372.* [CrossRef]
32. *Millner VS, Eichold BH 2nd, Franks RD, Johnson GD. Influenza vaccination acceptance and refusal rates among health care personnel. South Med J 2010;103(10):993-8.* [CrossRef]
33. *Bozkurt HB. An overview of vaccine rejection and review of literature. Kafkas J Med Sci 2018; 8(1):71-6* [CrossRef]