



Perceptions of COVID-19 Vaccines from the Perspectives of Healthcare Professionals and Medical Students: The Impact of Vaccine-Related Concerns on Our Decision-Making

Sağlık Çalışanları ve Tıp Fakültesi Öğrencilerinin Gözünden COVID-19 Aşılarına İlişkin Algılar: Aşı ile İlgili Endişelerin Karar Alma Sürecimize Etkisi

¹Zeynep Bıyık¹, ²Ahmet Çizmecioglu², ³Yusuf Gül³, ³Fatma Kamacı³, ³Buğra Çalışkan³, ³Tuğçe Er³,
³Kerem Berke Uçan³, ³Demet Göçmenoğlu³, ³Eren Uzel³, ³İlayda Arkuntaş³, ³Hacer Buse Yılmaz³,
³Mustafa Uyar³, ³Ali Sina Arslantaş³, ³Yazdan Almohammad³

¹Selçuk University, Faculty of Medicine, Department of Internal Medicine, Division of Nephrology, Konya, Turkey

²Selçuk University, Faculty of Medicine, Department of Internal Medicine, Konya, Turkey

³Selçuk University, Faculty of Medicine, Konya, Turkey

Abstract

Aim: Vaccination hesitancy poses a solemn resistance to ensuring society's immunity. In our study, we aimed to investigate the level of hesitation and rejection of the Coronavirus disease of 2019 (COVID-19) vaccine and define the factors that may affect the vaccine decision-making process.

Material and Method: A survey study was conducted with the medical students, assistants and academicians of Selçuk University Faculty of Medicine. A total of 701 individuals agreed to participate in the cross-sectional study. Data were assembled from February to March 2022.

Results: 73% of the participants were students, 16% were assistants, and 11% were academicians. The majority of the participants (97.7%) had the COVID-19 vaccine. 2.3% of the participants refused to be vaccinated against COVID-19, and 37.5% of the vaccinated had concerns about the vaccine. Those with hesitant about vaccines had concerns about the side effects and safety. The most significant concern was the possibility of adverse effects other than defined (n=125). The number of participants who stated there was not enough time to confirm vaccine safety was 104 (14.8%). The number of participants who thought the vaccine was not sufficiently tested enough was 96 (13.7%). The number of participants who doubted the vaccine's safety was 91 (13%) due to the vaccine production process being swift. Eighty-five (11.7%) participants thought the vaccine might fail in new viral strains.

Conclusion: Vaccine acceptance is elevated among the academics, assistants and students of the faculty of medicine. The most crucial reason for vaccine hesitation is safety and efficacy concerns. However, these concerns have not led to robust vaccine rejection.

Keywords: COVID-19, vaccine concern, healthcare professionals, medical school students

Öz

Amaç: Aşı tereddütü, toplum bağışıklığının sağlanmasında ciddi zorluklar doğurur. Çalışmamızda, COVID-19 aşı tereddüt ve red düzeyini araştırmayı ve aşı karar verme sürecini etkileyebilecek faktörleri belirlemeyi amaçladık.

Gereç ve Yöntem: Selçuk Üniversitesi Tıp Fakültesi öğrencileri, asistanları ve öğretim üyelerini kapsayan bir anket çalışması yapıldı. Toplam 701 kişi bu kesitsel çalışmaya katılmayı kabul etti. Veriler Şubat-Mart 2022 aralığında toplandı.

Bulgular: Katılımcıların %73'ü öğrenci, %16'sı asistan ve %11'i öğretim üyesi idi. Katılımcıların çoğunluğu (%97.7) COVID-19 aşısı yaptırmıştı. Katılımcıların %2.3'ü COVID-19 aşısı olmayı reddederken, aşı yaptırmış olanların %37.5'inin aşı ile ilgili endişelere sahip olduğu tespit edildi. Aşı tereddütü yaşayanların çoğu aşıların yan etkileri ve güvenliği ile ilgili endişelere sahipti. En büyük endişe açıklanan dışında yan etki olması idi (125 kişi, %17.8). Aşının güvenliğini doğrulamak için yeterli zaman geçmediğini düşünen katılımcı sayısı 104 (%14.8) idi. Aşının yeterince fazla sayıda insan üzerinde test edilmediğini düşünen katılımcı sayısı 96 (%13.7) idi. Aşı üretim sürecinin çok acele olması nedeniyle aşının güvenilirliğinden şüphe eden katılımcı sayısı 91 (%13)di. 85 (%11.7) katılımcı aşının, yeni viral suşlara karşı etkinliğini kaybedebileceğini düşünüyordu.

Sonuç: Tıp fakültesi öğretim üyesi, asistan ve öğrencilerinde aşı kabulü oldukça yüksek düzeydedir. Aşı tereddütünün en önemli nedeni, güvenlik ve etkinlik endişeleridir. Ancak bu endişeler ciddi bir aşı reddine neden olmamıştır.

Anahtar Kelimeler: COVID-19, aşı tereddütü, sağlık çalışanları, tıp fakültesi öğrencileri



INTRODUCTION

The primary purpose of health assistance and the main responsibility of health personnel is to sustain life healthy and to prevent getting sick. In this regard, vaccination is one of the most effective methods to protect and maintain health. During the pandemic, the mortality rates of the Coronavirus of 2019 (COVID-19) again emphasized the importance of an effective vaccine to stop the spread of COVID-19. In our country, the emergency use of the Coronavac vaccine was first approved by the Turkish Medicines and Medical Devices Agency on 13.01.2021. Currently, Pfizer-BioNTech, Coronavac and Turkovac vaccines are in use. In any way, vaccine hesitancy is likely to impair the effectiveness of the COVID-19 vaccine applicability.

Vaccine hesitancy is seen as a significant threat to global health. Reported COVID-19 vaccine acceptance rates differ around the world. However, a recent global report on the COVID-19 vaccine acceptance rate revealed that around 30% of respondents would refuse or hesitate to accept a COVID-19 vaccine once it was available. The Middle East ranks among the regions with the lowest vaccine acceptance rates globally.^[1]

In a study conducted in 2015, the European Center for Disease Prevention and Control of Europe aimed to detect vaccine hesitancy between healthcare professionals and their patients. They found that the most reliable source for vaccination information was healthcare professionals. In addition, the knowledge and approaches of healthcare professionals affect their vaccination practices and recommendations.^[2]

Medical students are the healthcare providers of the future who will be assigned to advise individuals who may be hesitant about vaccination. A cross-sectional study of the COVID-19 vaccine hesitancy was conducted in January 2021 among medical students at two universities in Egypt. In this study, it was seen that 35% of the students accepted the COVID-19 vaccine, whereas 46% hesitated, and 19% rejected the vaccine.^[3]

In order to achieve the high vaccination rates required for society immunity, there should be a need to understand the vaccine perception, attitude and hesitation degree of the medical school team, which will scientifically guide the society. Therefore, we aimed to survey the vaccination attitude of medical faculty students, assistants, and academics. In addition, the study simultaneously aimed to investigate the acceptance, hesitation and resistance level of the COVID-19 vaccine and to determine the barriers to vaccine acceptance and the reasons that may alter the vaccine decision of individuals.

MATERIAL AND METHOD

xxxxxxxxxxxxxxxxxxxxx students, faculty academics and assistants were included in this cross-sectional study. Our medical students distributed a vaccine hesitancy questionnaire to those who agreed to participate in the study. The questionnaire was accomplished by face-to-face interview method.

The questionnaire includes the following components: 1) Demographic data, 2) COVID-19 and vaccination experience, and 3) Vaccine Hesitancy Questionnaire. In this context, participants were asked whether they had a COVID-19 infection, if so, whether this was confirmed by a method, how many doses and which name of vaccines they had, and vaccine adverse effects experienced. Also, the following question was asked. "If you are against getting vaccinated, or if you decide to vaccinate or have hesitations even though you have been vaccinated, what are the reasons for your hesitations?" Possible reasons for hesitation were listed below the question, and the participants were asked to mark their suitable ones. Data were collected between February and March 2022. Prior to the study, ethics committee approval was obtained from xxxxxxxxxxxxxxxx(2022/32).

Statistical analysis was performed using SPSS version 22 (IBM Corporation, USA). Normally distributed data were expressed as mean±standard deviation. Differences between groups were evaluated with the t-test or the Mann-Whitney U test. A Chi-square test was used to compare categorical data. A p-value < 0.05 was considered significant.

RESULTS

Overall, 512 students (73%), 77 academicians (11%) and 112 assistants (16%) participated in this cross-sectional study. 51.5% of the participants were male, and the age range was 18 - 64. The mean age was 25.4±8.3 years. 9.7% of the participants had no chronic disease. Concerning academic ranks, 31 of the participants (4.4%) were professors, 26 were associate professors (3.7%), and 20 were assistant professors (2.9%). Participation from students was from all classes.

301 (42.9%) participants stated that they had COVID-19 infection, 300 (42.8%) did not, and 100 (14.3%) individuals were not sure whether they had COVID-19 infection. The rates of COVID-19 infection were determined as 60.7% for assistants, 59.7% for academicians and 36.3% for students.

Table 1. Demographics of participants and their COVID-19 experiences

		n	Ratio (%)
Age	18-25	504	71.9
	26-40	137	19.5
	41-64	60	8.6
Gender	Female	340	48.5
	Male	361	51.5
Career	Student	512	73
	Assistant	112	16
	Academician	77	11
Chronic Disease	None	636	90.7
	Diabetes Mellitus	10	1.4
	Hypertension	9	1.3
	Cardiovascular Disease	7	1
	Other	39	5.6
Have you had a COVID-19 infection?	Experienced	300	42.8
	Not experienced	301	42.9
	Not sure	100	14.3
Have you ever had a COVID test?	Yes, a positive result	232	33.1
	Yes, negative result	161	23
	I had no tested	308	43.9

While 2.3% (16) of the participants refused to be vaccinated against COVID-19, 38.9% (273) had hesitations about vaccination. Four hundred twenty-eight participants (61.1%) had no hesitation about vaccination. Most of the participants were vaccinated in 2 or 3 rappel doses. The number of individuals who were vaccinated with one dose was 8 (1.1%), two doses of vaccine were 247 (35.2%), three doses of vaccine were 241 (34.4%), four doses of vaccine were 147 (21%) and five doses of vaccine were 42 (6%). The most preferred vaccine brands were Pfizer-Biontech (46.6%) and Sinovac+Pfizer-Biontech (38.8%). (Figure 1). After vaccination, 379 participants (55.3%) reported mild side effects, 19 participants (2.7%) reported moderate side effects, and 287 participants (41.8%) stated no experience of any side effects.

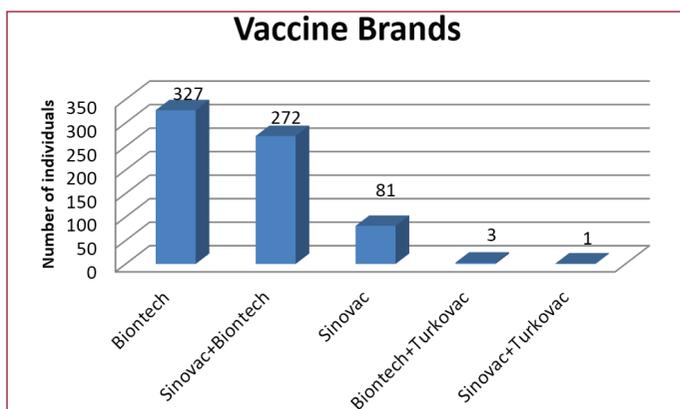


Figure 1. Preferred vaccine brands of the study. The significant factor contributing to the limited representation of the Turkovac Vaccine is primarily attributed to its unavailability during the implementation phase at the time of the research.

The side effects specific to vaccines were the following. While 65 (80%) individuals who received only the Sinovac vaccine did not develop any side effects, mild side effects were reported in 16 (19.8%). No participants vaccinated with Sinovac reported solemn side effects. While 133 (40.7%) individuals who received only the Pfizer-Biontech vaccine did not develop any side effects, mild side effects were reported in 183 (56%). Ten (3.1%) participants reported severe side effects. While 84 (30.9%) of the people who received the Sinovac+Biontech vaccine did not develop any side effects, mild side effects were reported in 179 (65.8%). Again, 9 (3.3%) participants reported severe adverse events. The prevalence of mild and severe adverse events reported was significantly higher in those who received the Biontech-Pfizer vaccine ($p < 0.001$). (Table 2)

	No side effect	Mild side effects	Severe side effects	p value
Per vaccine type				
Sinovac, n (%)	65 (80)	16(19.8)	0	
Biontech, n (%)	133 (40.7)	183 (56)	10 (3.1)	
Sinovac + Biontech, n (%)	84 (33.9)	179 (65.8)	9 (3.3)	<0.001
Biontech + Turkovac, n (%)	2 (66.6)	1 (33.3)	0	
Sinovac + Turkovac, n (%)	1 (100)	0	0	
Per gender				
Female	135 (39.7)	194 (57.1)	11 (3.2)	0,285
Male	168 (46.5)	184 (51.2)	8 (2.2)	

Despite observing higher rates of adverse effects in female compared to male, statistical significance was not attained ($p=0.285$). While 57.1% of women reported mild and 3.2% complained of severe side effects, these rates were 51.2% and 2.2% in men, respectively (Table 2)

Many of the hesitant about vaccines had concerns about the side effects and safety of vaccines. The biggest concern was side effects other than those defined (125 individuals, 17.8%). The number of participants who thought sufficient time had not passed to confirm the vaccine's safety was 104 (14.8%). The number of participants who considered the vaccine was not tested on an adequate subject was 96 (13.7%). The number of participants who doubted the vaccine's safety was 91 (13%) due to the rapid vaccine production. 85 (11.7%) participants thought the vaccine might lose its effectiveness against new viral strains. Eighty-four (12%) people were hesitant about the vaccine because they heard that most vaccinated individuals had side effects such as general fatigue, muscle and joint pain, headache and fever. Having COVID-19 after vaccination also caused 82 people (11.7%) to be hesitant about vaccination. Other remained reasons for hesitation are shown in Table 3.

Table 3: Participants' concerns about COVID-19 vaccines

Concern	n (701)	%
Having side effects other than reported.	125	17.8
Not enough time has passed to confirm the safety of the vaccine.	104	14.8
Vaccines were not tested on large numbers of people.	96	13.7
The vaccine production process is too rushed.	91	13
The vaccine may lose efficacy against novel viral strains.	85	12.1
Most people vaccinated have side effects such as general fatigue, muscle and joint pain, headache and fever.	84	11.9
I know/heard of people infected with Covid-19 after getting vaccinated.	82	11.7
I do not want to encounter the side effects mentioned in the studies.	60	8.6
I fear that the vaccine will have irreversible and long term effects on DNA.	52	7.4
I believe immunity obtained through vaccines does not last long.	49	7
I have heard of vaccine-related deaths.	48	6.8
I am not too fond of syringes.	32	4.6
I think the vaccine itself can cause disease	29	4.1
Vaccination is not needed as the majority of infected people recover.	21	3
Because infection rates are decreasing.	19	2.7
I have an extreme allergy to certain foods or medications.	17	2.4
I have/I am still sick with coronavirus disease. Therefore, I do not need to be vaccinated.	16	2.3
I have heard that the vaccine contains aluminum or similar additives that can harm the brain.	16	2.3
The coronavirus is a conspiracy, and the vaccine is part of that.	12	1.7
I think the coronavirus epidemic is overrated. The vaccine is ineffective in preventing COVID-19 infection.	12	1.7
No vaccine is needed as most people are already infected.	11	1.6
I am pregnant / breastfeeding. I think I am not in an appropriate vaccination group.	6	0.9
I have chronic diseases and, therefore afraid of being harmed by the vaccine.	5	0.7
I don't believe in vaccines in general.	4	0.6
I do not think the virus can be transmitted.	2	0.3

Despite all these hesitations, vaccination rates were relatively high. This rate was 97.9% for academicians, 98.9% for assistants and 97.5% for students. The rates of vaccinating at least two doses were 95.9% for students, 97.9% for academicians, and 96.6% for assistants. There was no difference in age ($p=0.974$), gender ($p=0.916$), career ($p=0.668$), or existence of chronic disease ($p=0.613$) between the participants who accepted or refused the vaccine.

DISCUSSION

The concept of “vaccine hesitancy” represents delaying accepting or rejecting a vaccine even though vaccine services are available. Individuals who are hesitant about vaccination are not only considered individuals who delay or refuse vaccination. Concerns and hesitations experienced by individuals who accept vaccination are also included in the concept of vaccination hesitancy.^[4]

The present study investigated the general perception of the COVID-19 vaccine and vaccine hesitancy among academicians, assistants and students at a university hospital. Many studies have shown that the attitudes and knowledge of healthcare professionals about vaccines can affect their intention to vaccinate themselves and their children and to offer vaccines to their patients.^[5,6] Thus, the approach of healthcare professionals regarding vaccination is essential.

Our study's vaccination acceptance rate was relatively high at 97.7%. This rate was 97.9% for academicians and 98.9% for assistants. In studies on the COVID vaccine before the vaccination process, vaccine acceptance intentions were lower, and vaccine rejection/hesitation rates were high. In a study from our country evaluating attitudes and behaviors towards COVID-19 vaccination in December 2020, 52.3% of healthcare professionals in a university hospital desired to be vaccinated against COVID-19. However, it was observed that 31% of the health workers who stated they would not be vaccinated had the COVID-19 vaccine in the following days.^[7]

Similarly, in a study conducted in a university hospital at the onset of the pandemic, the rate of healthcare workers willing to have the COVID-19 vaccine was 53.6%.^[8] All of these are pre-vaccination studies. We think that the vaccination initiation in the following days, the publications on the efficacy and safety of vaccines, and the low rates of severe side effects in the vaccinated healthcare staffers may have increased the vaccine acceptance rates. For a new vaccine to be accepted by healthcare professionals, monitoring vaccine-related protection and side effects may be essential.

Vaccine acceptance rates varied considerably based on country and continent, considering the healthcare staffers in different countries. This rate is 86.2%^[9] in China, 64.9%^[10] in Saudi Arabia, 80.9%^[11] in Canada, 91.7%^[12] in Germany and 59% in England.^[13] The COVID-19 vaccine hesitancy was 30.7% in a study conducted in the first week of 2021 among healthcare professionals in Palestine. This study was conducted momentarily before the release of vaccine safety

reports.^[14] During the first wave of pandemics in France, it was reported that 76.9% of respondents accepted a vaccine against COVID-19, whereas 25.9% of respondents were hesitant about the vaccine.^[15]

A retrospective analysis of COVID-19 vaccines administered to healthcare workers at a multicenter medical center between December 2020 and April 2021 was performed in the USA. Accordingly, the vaccination rate in the first four months of the vaccination campaign was 78.6% among 65,270 healthcare staffers. It was 95.8% for doctors.^[16] After the vaccine became available, COVID-19 vaccine hesitancy rates were evaluated in a multinational study with 5708 participants among Arabic-speaking healthcare workers (in Arab countries and abroad).^[17] The study revealed significant vaccine hesitancy among Arabic-speaking healthcare workers residing in and outside Arab countries (25.8% and 32.8%, respectively). It also detected a low vaccine acceptance rate (26.7%) among Arabic-speaking healthcare professionals.

In a meta-analysis of twenty-one studies published recently, the overall acceptance rate for the COVID-19 vaccine among healthcare professionals on the African continent was 46%. Data revealed a low vaccine acceptance among African healthcare staffers.^[18] Another study investigated the COVID-19 vaccine desire and associated factors in 599 Indian healthcare staffers between February and March 2021.^[19] This survey revealed that 73% of healthcare professionals were willing to accept vaccines, 10.9% refused, and 16.2% needed time to decide.

The concern was similar when the medical faculty students were evaluated. In a study conducted in India between February and March 2021, vaccine hesitancy was found to be 20.6%.^[20] On the same dates, in a survey conducted on the students of six medical faculties in China, vaccine hesitancy was found to be 58.2%.^[21] Among medical students in Sudan, vaccine acceptance was 55.8%, and vaccine hesitancy was 44.2%.^[22] The acceptance rate of the COVID-19 vaccine in Egypt was 35%, the hesitation rate was 46%, and the rejection rate was 19%.^[3] In a study conducted on Ankara University Faculty of Medicine students in April 2021, it was reported that vaccination hesitancy was 11.6%, and the rate of those who did not intend to be vaccinated was 2.7%.^[23]

In our study, the vaccination rate among medical students was 97.5%. Concerning the Ministry of Health data, as of May 21, 2022, the rate of the population over 18 of age who received at least two doses of vaccination is 85.48% in Turkey and 76.1% in Konya. (covid19asi.saglik.gov.tr) In our study, the rate of getting at least two doses of vaccination was 95.9% for students, 97.9% for academicians and 96.6% for assistants. In our study group, the rate of getting at least two doses of vaccination was higher than the average in both Konya and Turkey.

In our country, the Sinovac firstly and then the Biontech vaccines were available. The most preferred vaccine by the participants was Biontech, followed by Sinovac+Biontech

addition and Sinovac. We conjectured that the Turkovac Vaccine's low presence in the data was due to its recent implementation, occurring shortly before the survey was conducted. Specifically, our survey was concluded right before the vaccine became accessible, which accounts for its limited representation in our findings.

Despite these high vaccination rates, some participants had concerns about vaccine side effects, efficacy, and safety. Similar hesitations have been reported in previous studies.^[17,18] In our study, however, these concerns were not an obstacle to vaccination by most of the 37.5% population who had concerns. Because vaccine rejection is detected at 2.3%. A systematic review summarizing the results of 34 studies, evaluating 76,471 participants, suggested that vaccine hesitancy among healthcare professionals is attributed to various factors, including safety and efficacy concerns and potential side effects.^[24]

There are some limitations of our study. The research was conducted in a single province. Therefore, the findings may not be representative of the whole country. Because the results of this analysis were based on healthcare professionals' responses, we could not accurately measure response bias. We could also not provide data about those who did not respond to the survey. Therefore, our cohort may not be full coverage of the target audience. Also, the study represents a specific interval in the vaccination campaign. Temporal variations may have appeared in the hesitations of healthcare professionals.

CONCLUSION

As of the study period, our data indicated higher vaccination rates among healthcare staffers and medical school students than the general population average. The most crucial reason for vaccine hesitation was safety and efficacy concerns. This was also a typical result of previous studies. Accordingly, more active dissemination of scientific evidence on COVID-19 vaccine safety will reduce vaccine hesitancy and increase vaccination rates. It appears that COVID-19 vaccine hesitancy is not a solemn problem, with a vaccination rate of over 97% in this population.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of KTO Karatay University Faculty of Medicine Non-Pharmaceutical and Medical Device Research Ethics Committee (Date: 02.03.2023, Decision No: 2023/021).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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