



Factors Associated with COVID-19 Vaccine Booster Hesitancy Among Sakarya University Students

Sakarya Üniversitesi Öğrencilerinde COVID-19 Aşısının Pekiştirme Dozlarına Duyulan Çekimserliğe İlişkin Faktörlerin İncelenmesi

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ABSTRACT

Introduction: SARS-CoV-2 infection was first reported in Wuhan, China in December 2019, then it rapidly spread around the world and has become a pandemic. Vaccines play a crucial role in providing protection against COVID-19. However, there is a concerning issue of vaccine hesitancy or refusal among some individuals. This research aims to evaluate the general knowledge, attitude, and hesitancy about COVID-19 vaccines at a state university.

Materials and Methods: Our study was designed as an analytical cross-sectional survey-based study. The survey consisted of 23 questions based on sociodemographic features, the status of being infected with COVID-19 and getting vaccinated, knowledge, and attitudes, including hesitancy towards COVID-19 vaccines. We conducted a study between 20 April 2022 and 20 May 2022 in the Sakarya University campus. The survey was distributed face-to-face on Google Documents with QR code. Data were analyzed using Statistical Package for Social Sciences (SPSS) software. Pearson's Chi-Square test was used to compare categorical variables. After descriptive and cross-analysis, Cox regression analysis was used to analyze variables that determine the vaccine discontinuation process.

Results: A total of 1292 students participated in this study. 52.2% of the students were women; 36.7% have studied in engineering and related technical departments. 59.3% of the respondents had never been infected with COVID-19. 44.8% followed the news on social media. The majority (63.3%) had two doses of the vaccine. In the study, 65% of the students did not consider getting the next dose of the COVID-19 vaccine. The most common reasons for individuals not receiving the next dose of the vaccine were concerns regarding potential long-term side effects on their health (19.1%) and the perceived necessity of continuous booster doses (18.7%).

Conclusion: Based on our findings, it can be inferred that the primary barrier to obtaining booster doses is the inadequate level of belief in the efficacy of vaccines. To address this issue, it is crucial to implement media literacy education for all individuals, conduct vaccine awareness campaigns, promote reliable fact-checkers, and enhance public education. These measures are necessary to overcome vaccine booster hesitancy and ensure widespread acceptance and uptake of booster doses.

Key Words: COVID-19; COVID-19 vaccine; Hesitancy; Booster dose; University students

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ÖZ

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Giriş: İlk olarak Aralık 2019'da Çin'in Wuhan kentinde rapor edilen ve tüm dünyaya hızla yayılan SARS-CoV-2 enfeksiyonu daha sonra Dünya Sağlık Örgütü (DSÖ) tarafından pandemi ilan edilmiştir. Aşılar, COVID-19'a karşı en önemli silah olmasına rağmen insanların aşı olmaktan çekindiği veya aşı olmayı reddettiği görülmektedir. Bu çalışma, bir devlet üniversitesinde COVID-19'a karşı geliştirilen aşılarla dair genel bilgiyi, tutumu ve çekimserliği değerlendirmeyi hedeflemektedir.

Materyal ve Metod: Bu araştırma kesitsel analitik tipte bir çalışma olup sosyodemografik faktörler, COVID-19 ile enfekte olma durumu, aşılama durumu, COVID-19 aşılarına dair bilgi, tutum ve çekimserliğe dayanan 23 soruluk bir ankettir. 20 Nisan 2022 ve 20 Mayıs 2022 tarihleri arasında Sakarya Üniversitesi kampüsünde yapılmıştır. Anket, Google Dokümanlar üzerinden QR kod okutarak yüz yüze gerçekleştirilmiştir. Veriler SPSS uygulaması kullanılarak analiz edilmiştir. Kategorik değişkenler karşılaştırılırken Pearson Ki-kare testi kullanılmıştır. Aşıdan vazgeçme sürecini belirleyen değişkenler Cox regresyon analizi kullanılarak incelenmiştir.

Bulgular: Bu çalışmada 1292 öğrenci yer almıştır. Katılımcıların %52.2'si kadınlardan, %36.7'si mühendislik ve ilgili teknik departmanlarda öğrenim görenlerden oluşmaktadır. %59.3 COVID-19 ile hiç enfekte olmadığını belirtmiştir. %44.8 haberleri sosyal medyadan takip etmektedir. Çoğunluk (%63.3) iki doz aşı olmuştur. Çalışmaya katılan öğrencilerin %65'inin COVID-19 aşısının bir sonraki dozunu olmayı düşünmediği görülmüştür. Aşıların uzun süreli olası yan etkileri (%19.1) ve sürekli hatırlatma dozunun gerekliliği (%18.7) düşüncesi bir sonraki doz olmamak için en sık sebeplerdendir.

Sonuç: Yaptığımız çalışmaya göre aşının yeterince korumadığı düşüncesi, hatırlatma dozunu yaptırmada en büyük engel olarak saptanmıştır. Toplumun her kesimine yönelik medya okuryazarlığı eğitimi, aşılar ile ilgili farkındalık kampanyaları, bilgi doğrulama platformlarının desteklenmesi ve halk eğitimi; hatırlatma dozlarına karşı çekimserliği aşmak için gereklidir.

Anahtar Kelimeler: COVID-19; COVID-19 aşısı; Çekimserlik; Hatırlatma dozu; Üniversite öğrencileri

INTRODUCTION

SARS-CoV-2 infection was first reported in Wuhan, China in December 2019 and then it rapidly spread around the world. The disease, coronavirus disease-2019 (COVID-19), was characterized as a pandemic by World Health Organization (WHO) on March 11, 2020. On the same day, the Turkish Ministry of Health reported the first case in Türkiye^[1,2]. SARS-CoV-2 is primarily transmitted through exposure to infectious respiratory fluids. The virus has affected a significant number of individuals, with approximately 515 million people being infected and resulting in the unfortunate loss of 6.24 million lives within the first three years of the COVID-19 pandemic^[3]. Throughout this ongoing crisis, numerous healthcare systems have faced overwhelming challenges, and the substantial burden placed on hospital services has had a detrimental impact on the overall management of

COVID-19. For COVID-19, there is currently no approved treatment. However, vaccines that have demonstrated their effectiveness in controlling infectious disease outbreaks and eradicating diseases serve as vital protective factors against the SARS-CoV-2 pandemic. People hesitate or refuse to get vaccinated for COVID-19. Vaccine hesitancy (VH) is described as the reluctance or refusal to vaccinate despite the availability of vaccine by WHO and the WHO designated vaccine hesitancy as one of the ten threats to global health in 2019^[4]. To comprehend and address vaccine hesitancy, it is crucial to take into account the psychological aspects of human behaviors and choices^[5]. The most common framework for operationalizing vaccine hesitancy is the 5C model of individual-level determinants of vaccine hesitancy: confidence, complacency, convenience (or constraints), risk calculation, and collective responsibility^[6]. The most commonly

cited reasons for vaccine refusal include concerns about the perceived risks of a vaccine produced in a short timeframe, worries about potential side effects, doubts regarding efficacy, and the belief that prior exposure to the virus already confers immunity^[7]. In research studies, it is crucial to identify and engage individuals who oppose vaccination since its production and those who exhibit vaccine hesitancy even after receiving the vaccine. Thus, vaccination and vaccine hesitancy are related concepts. People who hesitated but then got vaccinated may give ideas to overcome vaccine hesitancy. This idea draws attention to investigating VH among young adults and has also gained importance despite surging cases. Nowadays, the vaccine is the key element to prevent pandemics. Therefore, it is crucial to identify the factors associated with vaccine hesitancy in order to effectively control the ongoing pandemic. Universities possess a rich structure in cultural and intellectual aspects, showcasing diverse perspectives on education. Additionally, university students play a vital role as part of the mobile population. Thus, this research aims to comprehend attitudes towards vaccines and the reasons behind hesitancy towards booster doses among students within a state university.

MATERIALS and METHODS

This research is a cross-sectional analytical study and was conducted on the campus of our University between 20 April-20 May 2022. The universe of the research consists of Sakarya University students. The population of university students, which totaled 53.000, was determined using the Open Epi program. The sample size was calculated as 763 to achieve a 50% unknown prevalence, with a 95% confidence level and a 5% margin of error. Considering the use of the cluster sampling method and accepting a pattern effect of two, a multistage sampling approach was employed. The clusters included the engineering faculty, health-related faculties, political sciences faculty, science and literature faculty, and other faculties. According to the number of students, a unit was accepted as 70 people and six units from the faculty of engineering, three units from the faculty of

political sciences, three units from the faculties related to health, three units from the faculty of science and literature, and one unit from the other faculties were sampled. There was stronger survey participation in some departments than in others, and the study was terminated after reaching the desired numbers. The surveys were distributed in a face-to-face manner using Google Documents through QR codes. The survey was administered to individuals aged 18 years and older, following their informed consent. It comprised a total of 23 questions, encompassing various aspects such as sociodemographic characteristics, personal or familial experience with COVID-19, awareness level regarding COVID-19 news, COVID-19 vaccination status, potential side effects of the COVID-19 vaccine, and reasons influencing their decision to receive or not receive the COVID-19 vaccine.

For the research, approval was obtained from the Sakarya Faculty of Medicine Non-Interventional Ethics Committee at the meeting dated 16.03.2022 with the ethical approval number 121148-71 and from the Sakarya University Rectorate. The study was conducted in accordance with the Declaration of Helsinki.

Statistical Analysis

Descriptive statistics were utilized to present the average, standard deviation, minimum, and maximum values for normally distributed continuous variables in the study. For categorical variables, the identification was based on the number (n) and percentage (%). When comparing categorical variables, the Pearson Chi-Square test was employed. The dates for discontinuation of vaccination were asked to be specified in days and months and the process from the beginning of the inoculation process was taken as the inoculation process. In cases where participants indicated only a month without specifying the exact day of discontinuation, the 15th of that month was recorded as the discontinuation day. Individuals who did not provide any timeframe for discontinuation were excluded from the analysis. Cox regression analysis was performed to analyze the variables that influenced the process of vaccine discontinuation. Statistical significance level was set at $p < 0.05$. Data

analysis was performed using the SPSS 20.0 (Statistical Package for the Social Sciences, Version 20.0) software.

RESULTS

Out of the total 1292 respondents, 674 (52.2%) were women. The average age of the students was 21.52 years, with a standard deviation of 1.99. Among the respondents, 474 (36.7%) were from engineering and related technical departments, 200 (15.5%) were from health-related faculties, 211 (16.3%) were from the faculty of political science, and 239 (18.5%) were from the faculty of science and literature.

The findings revealed that among the participants, 727 individuals (56.3%) resided in dormitories, 260 (20.1%) stayed with their families at home, 206 (15.9%) stayed with friends at home, and 99 (7.7%) lived alone at home. Regarding health status, 11.2% of respondents reported having a chronic disease, while 51.5% stated that their relatives had chronic diseases. In terms of COVID-19 infection history, 59.3% of respondents reported never having been infected, 33.9% had been infected once, and 6.8% had experienced multiple infections. Additionally, 50.7% of respondents stated that they had not lost anyone to COVID-19 (Table 1).

Table 1. Participants’ sociodemographic features

Parameters	n (%)
Gender	
Female	674 (52.2)
Male	618 (47.8)
Age (as the year)	
Mean ± Standard deviation	21.52 ± 1.99
Minimum-Maximum alues	18.0-47.0
Faculty of Study	
Engineering and related technical departments	474 (36.7)
Faculty of law and political sciences	211 (16.3)
Faculties associated with health care	200 (15.5)
Faculty of science and literature	239 (18.5)
Other departments	168 (13.0)
Place of Residence	
Home with family	260 (20.1)
Home with roommates	206 (15.9)
Home, alone	99 (7.7)
Dorm	727(56.3)
Presence of Chronic Disease	
Yes	143 (11.1)
No	1149 (88.9)
Presence of Chronic Disease in Relatives	
Yes	627 (48.5)
No	665 (51.5)
History of COVID-19 Infection	
None	766 (59.3)
Yes, once	438 (33.9)
Yes, more than once	88 (6.8)
Loss of Relatives Due to COVID-19 Disease*	
No, I have not lost anyone.	656 (50.7)
Yes, I have lost someone around me.	472 (36.5)
Yes, I have lost a family member.	22 (1.7)
Yes, I have lost one of my extended family.	172 (13.3)
Total	1292 (100.0)

*Multiple options are selected.

Table 2. The participants' status of monitoring the news on COVID-19 disease

Parameters	n (%)
I do not follow the news.	409 (31.6)
I follow the news on social media.	580 (44.8)
I follow the news from the official sites of the Ministry of Health (the official Twitter, Instagram pages, and website of the Minister of Health).	408 (31.5)
I follow the news through people around me (friends, neighbors).	195 (15.0)
I follow the news through mass media (television, radio, newspaper).	215 (16.6)
I follow the news from the articles.	55 (4.2)
Total*	1292 (100.0)

*Multiple options are selected.

In terms of following news about COVID-19, 31.9% of respondents reported not following the news, while 44.8% stated they obtained information through social media. Additionally, 31.5% reported being informed by official sites of the Ministry of Health, 16.6% through mass media outlets, 15.0% from people around them, and 4.2% through articles (Table 2).

Regarding COVID-19 vaccination status, 4% of respondents declared having no vaccines, 4.1% had received one vaccine, 63.3% had received two vaccines, 26.7% had received three vaccines, and 1.4% had received four vaccines. Among those who had not received a COVID-19 vaccine, reasons cited included concerns about potential long-term adverse effects on health (39.8%), doubts about the safety of the COVID-19 vaccine (37.7%), concerns about new variants due to the virus's constant mutation (32.2%), skepticism arising from the rapid development of the vaccine (25.6%), and agreement with the notion that the COVID-19 vaccine was produced as a biological weapon (18%) (Table 3).

According to the results obtained in the study, out of the 1292 participants who were surveyed and had received the COVID-19 vaccine, 441 individuals (34.1%) expressed their intention to continue receiving the vaccine, while 851 individuals (65.9%) stated that they were not considering getting further doses.

Among the participants considering taking the next dose of the COVID-19 vaccine, 21.9% cited reliance on experts' knowledge as a reason, 12.5% mentioned that it was time for their

reminder dose, and 8.6% expressed concern about contracting COVID-19 (either for the first time or again).

In contrast, among those not considering the next dose of COVID-19 vaccines, 19.1% expressed concerns about potential long-term side effects of the vaccine on their health, 18.7% indicated that the continuous need for reminder doses raised doubts in their minds, 17.4% no longer believed that the vaccine provided sufficient protection, and 10.9% stated that they did not consider getting vaccinated due to having contracted COVID-19 even after receiving a double dose of the vaccine.

Among the respondents, 42.5% reported experiencing no side effects after receiving the COVID-19 vaccine. Meanwhile, 43.1% stated they had experienced side effects that did not interfere with their daily work, 10.4% indicated that their daily work was moderately disrupted by side effects, and 4% reported severe disturbance due to side effects.

Regarding perceptions of the protective nature of COVID-19 vaccines, 8.8% of respondents believed that the vaccines offered no protection at all. Additionally, 20.6% felt that the vaccines provided insufficient protection, 34.3% believed they were sufficiently protective, and 1.3% perceived them as offering complete protection (Table 4).

Sociodemographic features and health-related issues were found to be unrelated to the participants' decision to get the COVID-19 vaccine after the study was conducted (Table 5).

Table 3. The participants' status of COVID-19 vaccination

COVID-19 Vaccination Status	
Not vaccinated	52 (4.0)
Received one dose of the vaccine.	53 (4.1)
Received two doses of the vaccine.	818 (63.3)
Received three doses of the vaccine.	345 (26.7)
Received four doses of the vaccine.	18 (1.4)
Received five doses of the vaccine.	1 (0.1)
Received more than five doses.	5 (0.4)
Reasons for non-vaccination for COVID-19	
Suspicious about possible long-term adverse health effects	515 (39.8)
Concerns about the protection offered by the COVID-19 vaccine	488 (37.7)
Emergence of new variants due to continuous virus mutation	417 (32.2)
Insecurity due to the rapid development of the vaccine	332 (25.6)
Belief that the COVID-19 vaccine was developed as a biological weapon	233 (18.0)
Perception of no need for vaccination after having contracted the disease	205 (15.8)
Vaccine being produced in a foreign country	95 (7.3)
Religious sentiments	43 (3.3)
Perception of necessity	9 (0.6)
Indolence	7 (0.5)
Ignorance	5 (0.3)
Perception of vaccine being unnecessary	5 (0.3)
Short-term side effects after vaccination	3 (0.2)
Disbelief	2 (0.1)
Total*	1292 (100.0)

*Multiple options are selected.

It has been determined that the frequency of giving up vaccination is higher in those who are concerned about insecurity due to the vaccination in a very short time and the protection of the COVID-19 vaccine. (in order $p= 0.005$, $p= 0.007$, 0.045) (Table 6).

In the model, it was determined that individuals who stated a lack of confidence in the vaccine's ability to provide sufficient protection had a 1.24 times increased risk of vaccine discontinuation. Other parameters did not have a statistically significant contribution to the model. (Table 7)

DISCUSSION

In this study, we investigated the hesitation and opposition to the COVID-19 vaccine booster

dose among Sakarya University students. The survey results revealed that 65.9% of university students who participated in the study are not considering receiving the next dose of the COVID-19 vaccine.

Among those who are considering the next dose of the COVID-19 vaccine, the most significant reason cited was "Trusting the expert knowledge," accounting for 21.9% of respondents. On the other hand, for those who do not plan to get the next dose of the COVID-19 vaccine, the most important reasons include "Concerns about the long-term health impacts of the vaccine" at 19.1%, "Doubts about the necessity of the next reminder dose" at 18.7%, "Not being convinced that the vaccine protects

Table 4. Participants' consideration of getting the next COVID-19 vaccine and reasons for decision

Parameters	n (%)
Considering Getting the Next COVID-19 Vaccine	
Yes, I am thinking of getting vaccinated.	441 (34.1)
No, I do not intend to get vaccinated.	851 (65.9)
Reasons for Getting the Next Dose of COVID-19 Vaccine*	
I am thinking of getting it done because I trust the experts' knowledge.	283 (21.9)
I am thinking of getting it because it is time for me to take a reminder dose.	162 (12.5)
I am considering getting vaccinated because I am worried about getting COVID-19 disease (for the first time/again)	112 (8.6)
I am thinking of getting it because my relatives, with whom I have contact, have a chronic disease.	94 (7.2)
I am thinking of getting it because the total number of cases in the community has increased (is increasing).	80 (6.1)
I am thinking about getting it because I am a chronic patient.	21 (1.6)
I am thinking of getting it because of the requirements of foreign countries.	3 (0.2)
Reasons for Those Who Do Not Plan to Get the Next Dose of COVID-19 Vaccine*	
I am not thinking about getting it because I am worried about the long-term side effects.	247 (19.1)
I do not think I should get it because the need for a constant reminder dose raises doubts in my mind.	242 (18.7)
I do not plan to get it because I do not think the vaccine provides sufficient protection anymore.	225 (17.4)
I do not plan to get it because I contracted COVID-19 after receiving a double dose of vaccination.	141 (10.9)
I do not plan to have it because I am concerned about experiencing side effects similar to those I had with the previous dose.	133 (10.2)
I do not intend to get it due to the side effects I haven't personally experienced, but have heard from others, and fear experiencing them.	108 (8.3)
Total	1292 (100.0)

*Multiple options are selected.

adequately anymore" at 17.4%, and "Side effects experienced or heard from their environment" at 18.5%. Among the most important reasons for not receiving the COVID-19 vaccine among individuals who remain unvaccinated are "Doubt about possible long-term health effects," "Concern about the protection of the COVID-19 vaccine," "The emergence of new variants as a result of the constant mutation of the virus," and "The insecurity against the vaccine caused by its invention in a very short time." In the current study, similar to the results found in other studies in the literature, university students were found to have concerns about COVID-19 vaccine protection^[8]. Students in the current

study shared similar concerns expressed in the Fridman, Gershon, and Gneezy study regarding the efficacy and safety of the vaccine^[9,10]. In a study of 1600 students, nearly half did not consider getting vaccinated, and 22% were undecided. Reasons for vaccine hesitancy were identified as follows: 72% of individuals expressed concerns about the safety of the vaccine, 78% were fearful of potential side effects, and 60% reported being influenced by negative news from the media^[9]. Another study highlighted the significance of scientific explanations, emphasizing that confidence in the vaccine's protective effect plays a crucial role in individuals' decision to get vaccinated^[8,11].

Table 5. Comparison of selected characteristics of participants regarding the COVID-19 booster dose

Parameters		Getting the Next COVID-19 Vaccine Dose		p
		Yes, I am thinking of getting vaccinated. n (%)	No, I do not intend to get vaccinated. n (%)	
Gender	Female	242 (54.9)	432 (50.8)	0.161
	Male	199 (45.1)	419 (49.2)	
Presence of a diagnosed chronic disease	Yes	53 (12.0)	90 (10.6)	0.433
	No	388 (88.0)	761 (89.4)	
Presence of chronic disease in relatives	Yes	220 (49.9)	407 (47.8)	0.482
	No	221 (50.1)	444 (52.2)	
History of COVID-19	No	277 (62.8)	489 (57.5)	0.063
	Yes	164 (37.2)	362 (42.5)	
Losing someone due to COVID-19	Yes	215 (48.8)	421 (49.5)	0.807
	No	226 (51.2)	430 (50.5)	

Table 6. Association between participants who have been vaccinated at least once and selected prejudices with choosing the COVID-19 booster dose

Parameters		Getting the Next COVID-19 Vaccine Dose		p
		Yes, I am thinking of getting vaccinated. n (%)	No, I do not intend to get vaccinated. n (%)	
Insecurity due to the development and manufacture of the vaccine in a very short time	Yes	89 (30.49)	204 (69.6)	0.005*
	No	343 (39.6)	523 (60.4)	
Suspicious about the vaccines are being produced abroad	Yes	39 (47.0)	44 (53.0)	0.057*
	No	393 (36.5)	683 (63.5)	
Suspicion due to religious sensitivities	Yes	21 (51.2)	20 (48.8)	0.060*
	No	411 (36.8)	707 (63.2)	
The idea that the vaccine was produced as a biological weapon	Yes	86 (40.8)	125 (59.2)	0.247*
	No	346 (36.5)	602 (63.5)	
Concerns about the protection of the COVID-19 vaccine	Yes	144 (33.6)	285 (66.4)	0.045*
	No	288 (39.5)	442 (60.5)	
Doubts about possible effects on health in the long-term	Yes	164 (35.0)	304 (65.0)	0.196*
	No	268 (38.8)	423 (61.2)	
New variants emerge as a result of continuous mutation of the virus	Yes	148 (38.7)	234 (61.3)	0.468*
	No	284 (36.6)	493 (63.4)	
Belief that vaccination is unnecessary after recovering from the illness	Yes	59 (32.4)	123 (67.6)	0.140*
	No	373 (38.2)	604 (61.8)	

Table 7. Cox regression analysis of parameters associated with discontinuing the COVID-19 booster vaccine

	B	SE	Sig.	Exp (B)	95.0% CI for Exp (B)	
					Lower	Upper
Concerns about side effects heard from others and feared to experience	0.016	0.114	0.886	1.017	0.812	1.272
Worries about long-term vaccine side effects on health	0.118	0.083	0.153	1.126	0.957	1.324
Perception of insufficient vaccine protection	0.220	0.086	0.010	1.246	1.053	1.474
Doubts about the need for constant reminder doses	0.092	0.083	0.264	1.097	0.933	1.289
Concerns about re-experiencing previous dose side effects	0.104	0.106	0.326	1.110	0.901	1.367
Contracting COVID-19 after receiving double dose vaccination	0.161	0.106	0.127	1.175	0.955	1.445
Age	0.043	0.023	0.062	1.044	0.998	1.092
History of COVID-19 infection	-0.083	0.077	0.285	0.921	0.791	1.071

The study findings indicate that experiencing COVID-19 or the loss of a relative due to the disease does not significantly influence the decision to consider the next dose of the COVID-19 vaccine. While individual reasons for vaccine hesitancy (VH) are crucial, it is important to recognize that young adults may have distinct motivations compared to adults, as they are often driven by social factors. Therefore, it is equally essential to consider the social reasons underlying vaccine hesitancy among young adults. In an online survey among 256 college students in the United States, 51% of students reported low health literacy. Students with lower health literacy use social media more frequently^[12]. Another research proposes that young adults have lower general risk perception and consequently are inclined to take more risks than adults^[13]. Some researchers claim that young adults perceive themselves as being invulnerable to the consequences of their risky behaviors and underestimate these risks, negatively influencing the initiation and maintenance of health-promoting behaviors^[14]. The literature supports the conclusion that university students are more affected by social media and social environment rather than their immediate environment and their own experiences. It has been determined that the effect of social media is dominant in students' access to information^[15,16].

Similar to the concerns about the development of the COVID-19 vaccine in a short time, its protection, potential side effects, and possible long-term harms as the determining factors

in vaccine hesitancy detected in this study conducted with university students, the attitude toward vaccination is a determinant factor in the study conducted in South Carolina^[17]. Similar to research findings, several reasons for hesitation against COVID-19 vaccines have been reported in the literature, including vaccine side effects^[18-20], marketing time of the vaccine^[21], and uncertainty about the efficacy of the vaccine^[22].

Although there are studies in the literature showing that men are more likely to be vaccinated than women, in general, there is no difference between genders in considering the next dose of the COVID-19 vaccine, as in the current study^[9,17,23]. Furthermore, it has been observed that the presence of a diagnosed chronic disease, either in individuals themselves or their relatives, does not serve as a statistically significant determining factor when considering the next dose of the COVID-19 vaccine. Similarly, studies in the literature have indicated that the absence of comorbidities can be a determinant in COVID-19 vaccine hesitancy^[24,25].

In this study, a statistically significant finding has been revealed, indicating that individuals who express insecurity due to the COVID-19 vaccine being developed and administered within a short timeframe, as well as those who have concerns about the vaccine's protection, are less likely to consider receiving the COVID-19 vaccine booster dose. Cox regression analysis of the possible causes associated with the withdrawal of the COVID-19 vaccine booster dose was determined to increase the risk of giving up the vaccine by

1.24 times. It was determined that the variables did not have a statistically significant effect on the model. The news about this situation in the press and social media, as well as the negative reports related to the vaccine, also constitute an obstacle to the booster dose. The data suggest that as the duration of the pandemic extended, there was an increase in reservations about receiving a booster dose. Therefore, it is crucial to foster collaboration among healthcare professionals, academia, and the press to address concerns and promote vaccination. In global studies on vaccine hesitancy, common reasons for opposition to vaccines include safety concerns related to the perceived risks associated with the rapid production time, the unique nature of COVID-19, doubts about the vaccine's efficacy in the face of the virus's rapid mutation, skepticism regarding the effectiveness of the vaccine, reliance on prior vaccination as a source of protection, and concerns or doubts about the vaccine's composition^[26].

CONCLUSION

Our study investigated attitudes towards the COVID-19 vaccine and booster doses of the vaccine, among Sakarya University students, with some limitations. The majority of survey participants had received two doses of the vaccine, but they expressed no intention to receive the next dose. Furthermore, the number of respondents decreased as the number of vaccine doses increased. The study findings indicate that the main factors contributing to negative attitudes towards booster doses are concerns regarding potential long-term side effects of the vaccine on health and the perceived necessity of continuous booster doses. A notable portion of the students reported contracting COVID-19 even after receiving a double dose of the vaccine. The analysis of factors contributing to vaccine booster hesitancy highlighted that the perception of insufficient protection provided by the vaccine serves as a significant obstacle to receiving booster doses. To address this challenge, there is a need for comprehensive media literacy education, targeted vaccine awareness campaigns, and the promotion of reliable fact-checkers. These efforts aim to enhance awareness and understanding regarding

the importance and effectiveness of vaccine booster doses. By identifying the underlying reasons for vaccine hesitancy, it is possible to explore convincing approaches supported by scientific data. Communication with influential individuals on social media platforms can facilitate the creation of diverse content highlighting the importance of vaccines. Such content may take the form of posters, selfie videos, and various entertaining events. Providing information about the effects, purpose, and protective benefits of vaccines during primary and secondary education vaccinations can be beneficial. Scientific publications can contribute by sharing the disparity in mortality and morbidity rates between vaccinated and unvaccinated individuals against the current disease. Moreover, public education efforts can reinforce the ongoing significance of the pandemic and underscore the importance of exercising caution, especially concerning booster doses.

ETHICS COMMITTEE APPROVAL

This study was approved by the Sakarya University Non-Invasive Ethics Committee (Decision no: 121148-71, Date: 04.04.2022).

CONFLICT of INTEREST

The authors have no conflicts of interest to declare that are relevant to the content of this article.

AUTHORSHIP CONTRIBUTIONS

Concept and Design: EK, OK

Analysis/Interpretation: EK, MÖ, UA, ŞSK

Data Collection or Processing: UA, MÖ, ŞSK, FÖ, FP, EE, ŞÇ, ÇY

Writing: MÖ, UA, EK, ŞK, FÖ, FP

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