

Psychological Determinants of COVID-19 Vaccine Acceptance among Dental Students in Turkey

Türkiye'de Diş Hekimliği Öğrencileri Arasında COVID-19 Aşısı Kabulünün
Psikolojik Değerlendirilmesi

Solmaz MOBARAKI¹, Dilber BİLGİLİ CAN², Seçil ÇALIŞKAN³

¹Van Yüzüncü Yıl Üniversitesi Diş Hekimliği Fakültesi, Pedodonti AD, Türkiye

²Van Yüzüncü Yıl Üniversitesi Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Türkiye

³Eskişehir Osmangazi Üniversitesi Diş Hekimliği Fakültesi, Pedodonti AD, Türkiye

ÖZET: Bu çalışma, diş hekimliği öğrencilerinin Covid-19 hastalığına yönelik psikolojik tutumlarını etkileyen nedenleri, stres faktörlerini ve bu faktörlerin aşı kabulüne etkisini araştırmayı amaçlamaktadır. Anket çevrimiçi olarak uygulandı ve öğrencilerin demografik özelliklerini, kaygı-stres faktörlerini ve COVID-19 aşısı uygulama kararlarının nedenlerini belirlemeye yönelik sorulardan oluştu. COVID-19'un psikolojik etkisi, Genelleştirilmiş Anksiyete Bozukluğu-7 ölçeği (GAD-7) kullanılarak değerlendirildi. İstatistiksel analiz için standart tanımlayıcı istatistikler, ki-kare testi ve bağımsız örneklem t-testi kullanıldı. Aşı olmayı kabul eden kadınlar, erkeklerden daha azdı. Endişe düzeyinin aşı kabulü üzerinde istatistiksel olarak anlamlı bir etkisi olmasa da en yüksek aşılama oranına pandemi konusunda hafif veya ciddi düzeyde endişe duyanlar sahip oldu. En az kaygı gösteren katılımcıların aşı kabul yüzdesi istatistiksel olarak en düşük düzeydeydi ($p<0,003$). Katılımcıların büyük çoğunluğu kendilerini (%82,2), ailelerini (%90,8) ve hastalarını (%85,8) korumak için aşı olmak istedi. Aşı ile ilgili sınırlı bilgi (%54,6), kısa (%52,3) ve uzun vadeli (%71,8) yan etkilere ilişkin şüpheler aşı yapılmama nedenleridir. Çoğu dişhekimliği öğrencisi aşı olmayı kabul etmektedir. Kaygıları arttıkça aşı olma istekleri de artmaktadır.

Anahtar Kelimeler: COVID-19, aşı, diş hekimliği öğrencileri, kaygı, eğitim, endişe

ABSTRACT: This study aims to investigate the reasons that affect the psychological attitudes of dental students towards Covid-19 disease, stress factors, and the effect of these factors on vaccine acceptance. The survey was applied online and consisted of questions to determine the demographic characteristics, anxiety-stress factors, and reasons for students' decisions behind COVID-19 vaccine administration. The psychological impact of COVID-19 was assessed utilizing the Generalised Anxiety Disorder-7 scale (GAD-7). Standard descriptive statistics, the chi-square test, and the independent samples t-test were used for statistical analysis. Women who agreed to be vaccinated, were less than men. Although the concern level has no statistically significant impact on the vaccine acceptance, those mildly or severely worried about the pandemic had the highest vaccination rate. The vaccine acceptance percentage of the participants who showed minimal anxiety was at the lowest level statistically ($p<0.003$). The majority of the participants wanted to be vaccinated to protect themselves (82.2%), their families (90.8%), and their patients (85.8%). Limited information about the vaccine (54.6%) and doubts about the short (52.3%) and long-term (71.8%) side effects are the reasons against vaccination. Most dental students agreed to get the vaccination. As their anxiety increased, their desire to be vaccinated increased.

Keywords: COVID-19, vaccine, dental students, anxiety, education, concern

INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a pandemic caused by SARS-CoV-2 and has infected millions worldwide. Hundreds of thousands have died due to this outbreak. Only in Turkey, 5.249.404 people were infected, and 47.527 have lost their lives as of June 2021 (1).

Governments around the world have applied various measures to control the spread of the disease and prevent the burden on their healthcare (2, 3). Measures include social distancing requirements, curfews, voluntary and sometimes mandatory quarantines, a ban on mass gatherings, and sometimes the extent of the isolation of buildings, towns, or even cities.

Since the start of the pandemic, clinical and preclinical activities at the majority of Turkish dental schools have been suspended because dentists, dental students, and dental assistants are considered to be in the very high-risk category due to the possibility of coronavirus exposure during the aerosol generation procedure. (4). Anxiety, stress, and other mental health issues were common among dental students even before the COVID-19 crisis (5, 6) and have been a concern in dental education for some time (6, 7). Previous studies have shown that stress is common among dental students (6).

Despite all personal protective equipment (PPE), healthcare providers and essential workers are still at risk when highly exposed to the virus. Thus, as the virus continued to spread, the most promising strategy in combating COVID-19 turned out to be the rapid development of a prophylactic vaccine that could

facilitate immunity (8). To examine the challenges and needs for COVID-19 vaccination among dental students, understanding how their perception of risk may affect COVID-19 vaccine acceptance would be very helpful. For example, young adults (18-30 years old) may improve an optimistic bias, relying upon that they have a lower risk of infection or that the disease poses a less serious threat to them than other age groups (9, 10). Additionally, their emotional responses may be more affected by decision-making and risk assessment than their adult counterparts (10).

The available public debate on vaccination against COVID-19 is a good opportunity to evaluate students' behaviors and attitudes towards vaccination and investigate the psychological environment of students, such as any symptoms of anxiety, depression, and stress that result from this condition. As a result, this study aims to ascertain a connection between dentistry students and several elements, such as stressors and educational level, as well as students' present level of vaccination knowledge and preparation. (11).

Therefore, this study aims to advance our understanding of key factors associated with vaccine acceptance among dental students in Turkey. The following hypotheses were tested: 1) there would be no difference in the concern and anxiety factors related to COVID-19 with vaccine acceptance; 2) there would be no difference the negative attitudes toward general vaccination with COVID-19 vaccine acceptance.

MATERIALS AND METHODS

An online survey was conducted among dentistry students who enrolled in a dental school in Turkey between April-May 2021.

The sample size was calculated in the G*Power program. In this study, the minimum number of samples required was determined as 446, using the Cohen criteria, taking effect size (f)= 0.3, alpha= 0.05, and power=0.99 (4).

The Non-Invasive Ethics Committee approved the study of Van Yuzuncu Yıl University (decision no: 2021/04-13). The survey was fully voluntary to participate in. The survey's link was distributed online, and participants simply clicked the link to access it. Participants were made aware that the survey was optional, that their answers would be kept private, and that they might withdraw at any moment. Before beginning the survey, individuals were then specifically asked if they wished to take part in the research project. The survey takes about 15 minutes to design using the free Google Forms application.

The poll asked questions regarding how the COVID-19 pandemic affected people's stress levels as well as the causes and circumstances that affected how they felt about the illness. (4). The impact of these causes/factors on attitudes and behaviors connected to vaccination was also a topic of discussion. (12).

Questions were formed using the Likert scale, split (agree/disagree), multiple-choice, and open-ended.

The survey consisted of questions assessing the following areas:(4, 12, 13)

(1) Demographic information about gender, age, and region of residence, (2) Direct and indirect contacts of students with COVID-19 and the level of anxiety caused by probable contact with COVID-19, (3) psychological reactions to COVID-19, aimed to evaluate the emotions experienced by students while thinking about the epidemic, as well as the presence of anxiety symptoms, (4) Acceptance of COVID-19 vaccine, reasons behind wanting to be vaccinated or not.

In the 5th section (explained above) 7-item (GAD-7) Generalized Anxiety Disorder Scale was used.(14) When students were thinking about COVID-19, the following answers were sought to the questions: a) Fear, b) Anxiety, c) Worry, d) Sadness, e) Anger on a scale of I don't feel/ I feel little/ I feel moderately/ I feel quite intense/ I feel intensely. In addition, participants were asked to rate how frequently they experienced the following issues: (1) feeling nervous, anxious, or on edge; (2) being able to stop or control worrying; (3) worrying excessively about various issues; (4) difficulty relaxing; (5) being restless; (6) becoming easily irritated or annoyed; and (7) feeling afraid that something terrible might happen. Their answers were evaluated according to the GAD-7 scale.

Statistical Analysis

Standard descriptive statistics were used to summarize the responses to all survey questions. The chi-square test and independent-sample t test were used to assess the difference in frequencies of educational status, stress levels, vaccine attitudes, and related factors using the Statistical Package for the Social Science

2.0 (IBM SPSS 22.0, Armonk, NY) program. The statistical significance level was accepted as $p < 0.05$

RESULTS

579 dental students completed the survey.

3.1. The effect of demographic data on vaccine acceptance

51.6% of the participants were female, and 48.4% were male. While the mean age was 21.57 (± 2.43), the oldest participant was 39, and the youngest was 17 years old. The percentage of females (77.3%) who accepted to be vaccinated was less than the percentage of males (81.1%). The rate of the female who refused to be vaccinated was 19.1%. There was no statistically significant difference in vaccine acceptance rate between males and females.

Most of the participants were from Eastern Anatolia Region (28.3%), followed by the Mediterranean Region (18.1%) and the Southeastern Anatolia Region (17.6%). The Aegean region, which has the lowest survey participation rate, had the highest vaccine acceptance rate (96.9%). In the Eastern Anatolia Region, 77.4% percent accepted the vaccination, and 20.1% refused it.

3.2. The effect of concern questions on vaccine acceptance

The majority of participants thought that COVID-19 would negatively affect their work and education in the long run (often 36.6%, always 29%). The effect of this situation on vaccine acceptance (often 36.7%, always 29.5%) and vaccine refusal (often 35%, always 25.2%) was almost the same. Among the participants who thought

that the Faculty of Dentistry could not prepare properly for the end-of-year exams, the percentage of those who answered always was the highest (35.2%), and the rate of vaccine acceptance (34.9%) and refusal (37.9%) was similar (Table-1).

40.9% of participants are moderately concerned about contracting COVID-19 during their daily activities, and those with the highest impact on vaccine refusal (43.7%) were also moderately concerned. The number of participants concerned about a family member contracting COVID-19 was quite high, with 1.12% of them not being concerned. Those who were concerned about this issue had similar rates of acceptance and refusal of the vaccine. The proportion of participants who were not worried about contracting COVID-19 during their future university activities (i.e., lectures and educational activities) was 22.8%. This situation had little effect on the vaccine acceptance rate (21%) (Table-1).

The concern level values of the participants are presented in Table-2. 11% of the participants felt minimal, 8% mild, 46.8% moderate, and 34.2% severe concern. Severely concerned had the highest impact on vaccine acceptance (83.5%) and mildly concerned (87.5%), while those with this level of concern had the least impact on vaccine refusal (12.6%, mild 8.3%). There was no statistically significant difference between students' anxiety and vaccine acceptance.

3.3. The effect of anxiety questions on vaccine acceptance

The anxiety symptoms of the participants and the effects of these conditions on vaccine acceptance are shown

Table 1. Dental students' demographic data, and its effect on vaccine acceptance, refusal, and hesitancy.

FACTOR		Overall respondents (n= 579)	COVID-19 vaccine acceptance group n(%)	COVID-19 vaccine refusal group n (%)	COVID-19 vaccine hesitant group n (%)	p
Gender	Female	299 (51.6%)	231 (77.3%)	57 (19.1%)	11 (3.7%)	0.478
	Male	280 (48.4%)	227 (81.1%)	46 (16.4%)	7 (2.5%)	
Region of residence	Mediterranean Region	18.1%	70.0%	18.1%	2.9%	0.234
	Eastern Anatolia Region	28.3%	77.4%	20.1%	2.4%	
	Southeast Anatolia Region	17.6%	83.3%	14.7%	2.0%	
	Aegean Region	5.5%	96.9%	13.1%	0.0%	
	Central Anatolia Region	10.7%	72.6%	22.6%	4.8%	
	Black Sea region	8.5%	73.5%	18.4%	8.2%	
	Marmara Region	9.3%	79.6%	16.7%	3.7%	
Did you contract COVID-19?	I do not know	90 (15.5%)	76(84.4%)	12 (13.3%)	2 (2.2%)	0.220
	Yes	110 (19,0%)	92 (83.6%)	17 (15.5%)	1 (0.9%)	
	No	379 (65.5%)	290 (76.5%)	74 (19.5%)	15 (4.0%)	
Do you know someone who contracted COVID-19?	One or more relatives	288 (49,7%)	236 (81.9%)	43 (14.9%)	9 (3.1%)	0.082
	One or more acquaintance	276 (47,7%)	214 (77.5%)	54 (19.6%)	8 (2.9%)	
	No	15 (2,6%)	8 (53.3%)	6 (40.0%)	1 (6.7%)	

The effect of vaccine acceptance on the data does not differ significantly ($p < 0.05$).

Table 2. Dental students' concern about contracting COVID-19, the level of concern attributed to patients, and its effect on vaccine acceptance, refusal, and hesitancy.

FACTOR	Overall respondents	COVID-19	COVID-19	COVID-19
		vaccine acceptance group (%)	vaccine refusal group (%)	vaccine hesitant group (%)
Minimal	11.0%	69,7%	27.3%	3.0%
Mild	8.0%	87.5%	8.3%	4.2%
Moderate	46.8%	75.2%	21.3%	3.5%
Severe	34.2%	83.5%	12.6%	3.9%

The effect of vaccine acceptance on the level of concern does not differ significantly ($p < 0.05$).

in Table-3. When thinking about COVID-19, 13.5% of participants reported no fear, 16.2% reported feeling intensely, while the majority reported moderate (30.4%) or little fear (25.3%). While the effect of those who experienced intense fear was quite high on vaccine acceptance (85.9%), this group did not have any vaccine hesitancy. The majority reported feeling moderate (27.5%) or quite intense anxiety (25.6%), whereas only 5.5% reported no anxiety experience. Participants who did not feel anxiety had less impact on getting vaccinated (67.7%), while their impact on vaccine refusal was highest (32.3%). While only 6.5% reported no concern, the majority reported concern levels ranging from quite intensely (27.1%) to moderate (27.3%). Those with quite intense (81.3%) and intense (83.3%) levels of concern also had the highest vaccine acceptance. Only 23.0% of the participants felt intensely sad, while 12.6% experienced no sadness. The impact of those who reported intense sadness (14.6%) on vaccine refusal was minimum, and vaccine acceptance was maximum (81.5%). 30% of the participants experienced intense anger,

and 13.8% reported no experience of anger, which was the least chosen response of those who were; 79.9% of intensely angry and agreed to be vaccinated. There was no correlation between participants' anxiety levels and vaccine acceptance.

15.1% of the respondents felt minimal anxiety, 26.7% mild, 29.3 moderate, and 28.8% severe anxiety. The COVID-19 vaccine acceptance percentage of the participants who showed minimal anxiety (64.2) was statistically the lowest ($p < 0.003$). However, there was no difference between those with minimal to moderate anxiety (79.0). There was no statistically significant difference between mild, moderate, and severe anxiety scores ($p > 0.003$). When the vaccine refusal rates were analyzed, statistically, the highest scores were those with minimal (33.3) anxiety ($p < 0.003$), while there was no significant difference between the minimal and moderate (19.7) scores ($p > 0.003$). In terms of vaccine refusal, there was no significant difference between the mild, moderate, and severe anxiety scores ($p > 0.003$). There was no statistically

Table 3. Which one of the emotions do you feel when you are thinking about COVID-19 and its effects on vaccine acceptance, refusal, and hesitancy.

Which of the following emotions do you feel when thinking about COVID-19?	Overall respondents (%)	COVID-19 vaccine acceptance group (%)	COVID-19 vaccine refusal group (%)	COVID-19 vaccine hesitant group (%)	p
Fear	I do not feel it	13.5%	68.8%	27.3%	3.9%
	I feel it lightly	25.3%	78.8%	16.7%	4.9%
	I feel it moderately	30.4%	78.6%	18.5%	2.9%
	feel it quite intensely	14.6%	84.3%	12.0%	3.6%
	I feel it intensely	16.2%	85.9%	14.1%	0.0%
					0.125
Anxiety	I do not feel it	5.5%	67.7%	32.3%	0.0%
	I feel it lightly	18.5%	76.2%	20.0%	3.8%
	I feel it moderately	27.5%	77.6%	19.2%	3.2%
	feel it quite intensely	25.6%	81.4%	15.9%	2.8%
	I feel it intensely	22.9%	83.1%	13.8%	3.1%
					0.462
	I do not feel it	6.5%	64.9%	35.1%	0.0%

Concern	I feel it lightly	17.1%	77.6%	17.3%	5.1%	0.128
	I feel it moderately	27.3%	76.9%	20.5%	2.6%	
	feel it quite intensely	27.1%	81.3%	15.5%	3.2%	
	I feel it intensely	22.0%	83.3%	13.5%	3.2%	
Sadness	I do not feel it	12.6%	76.1%	22.5%	1.4%	0.783
	I feel it lightly	19.6%	79.3%	16.2%	4.5%	
	I feel it moderately	24.1%	75.7%	21.3%	2.9%	
	feel it quite intensely	20.7%	80.3%	17.1%	2.6%	
	I feel it intensely	23.0%	81.5%	14.6%	3.8%	
Anger	I do not feel it	13.8%	76.9%	17.9	5.1%	0.942
	I feel it lightly	17.0%	80.2%	17.7%	2.1%	
	I feel it moderately	21.5%	79.3%	18.2%	2.5%	
	feel it quite intensely	17.7%	77.0%	21.0%	2.0%	
	I feel it intensely	30.0%	79.9%	16.6%	3.6%	

The effect of vaccine acceptance on emotions does not differ significantly ($p < 0.05$).

Table 4. Dental students' anxiety about contracting COVID-19, level of anxiety attributed to patients, and its effect on vaccine acceptance, refusal, and hesitancy.

FACTOR	Overall respondents (%)	COVID-19 vaccine acceptance group (%)	COVID-19 vaccine refusal group (%)	COVID-19 vaccine hesitant group (%)
Minimal	15.1	64.2 ^a	33.3 ¹	2.5 ^x
Mild	26.7	81.1 ^b	14.7 ²	4.2 ^x
Moderate	29.3	79.0 ^{ab}	19.7 ¹²	1.3 ^x
Severe	28.8	83.1 ^b	12.3 ²	4.5 ^x

The superscript lowercases and numbers indicate the statistical differences within columns (p<0.05).

Table 5. Dental students' reasons for vaccine acceptance and vaccine refusal

Reasons for vaccine acceptance		Overall respondents (%)	COVID-19 vaccine acceptance group (%)	COVID-19 vaccine refusal group (%)	COVID-19 vaccine hesitant group (%)
Protect me: (I feel safe if I get the COVID-19 vaccine)	Agree	476(82.2%)	377 (82.3%)	86(83.5%)	13(72.2%)
	Disagree	103(17.8%)	81(17.7%)	17(16.5%)	5(27.8%)
Protect my family	Agree	526(90.8%)	419(91.5%)	90(87.4%)	17(94.4%)
	Disagree	53(9.2%)	39(8.5%)	13(12.6%)	1(5.6%)
Protect my patients	Agree	497(85.8%)	396(86.5%)	86(83.5%)	15(83.3%)

	Disagree	82(14.2%)	62(13.5%)	17(16.5%)	3(16.7%)
I do not want to miss work due to illness	Agree	480(82.9%)	381(83.2%)	84(81.6%)	15(83.3%)
	Disagree	99(17.1%)	77(16.8%)	19(18.4%)	3(16.7%)
My supervisor/my employer asked me to get the vaccine	Agree	225(38.9%)	182(39.7%)	38(36.9%)	5(27.8%)
	Disagree	354(61.1%)	276(60.3%)	65(63.1%)	13(72.2%)
My doctor/family/friends recommended that I get the vaccine	Agree	357(61.7%)	281(61.4%)	63(61.2%)	13(72.7%)
	Disagree	222(38.3%)	177(38.6%)	40(38.8%)	5(27.8%)
I feel like I have to get vaccinated	Agree	318(54.9%)	244(53.3%)	64(62.1%)	10(55.6%)
	Disagree	261(45.1%)	214(46.7%)	39(37.9%)	8(44.4%)
Vaccination of all healthcare workers	Agree	371(64.1%)	296(64.6%)	65(63.1%)	10(55.6%)
	Disagree	208(35.9%)	162(35.4%)	38(36.9%)	8(44.4%)
I have a high-risk medical condition	Agree	301(52.0%)	237(51.7%)	53(51.5%)	11(61.1%)
	Disagree	278(48.0%)	221(48.3%)	50(48.5%)	7(38.9%)
It was highly publicized in the media	Agree	135(23.3%)	101(22.1%)	28(27.2%)	6(33.3%)
	Disagree	444(76.7%)	357(77.9%)	75(72.8%)	12(66.7%)
It is my personal choice	Agree	472(81.5%)	375(81.9%)	83(80.6%)	14(77.8%)
	Disagree	107(18.5%)	83(18.1%)	20(19.4%)	4(22.2%)
Others	Agree	250(43.2%)	194(42.4%)	49(47.6%)	7(38.9%)
	Disagree	329(56.8%)	264(57.6%)	54(52.4%)	11(61.1%)
Reasons for vaccine refusal					

I am concerned because I don't have enough information about the vaccine.	Agree	316(54.6%)	254(55.5%)	53(51.5%)	9(50.0%)
	Disagree	263(45.4%)	204(44.5%)	50(48.5%)	9(50.0%)
I am concerned about short term side effects (e.g., fever, etc.).	Agree	276(47.7%)	231(50.4%)	41(39.8%)	4(22.2%)
	Disagree	303(52.3%)	227(49.6%)	62(60.2%)	14(77.8%)
I am concerned about possible long-term side effects.	Agree	416(71.8%)	325(71.0%)	79(76.7%)	12(66.7%)
	Disagree	163(28.2%)	133(29.0%)	24(23.3%)	6(33.3%)
I am concerned that the COVID-19 vaccine may not be effective	Agree	216(37.3%)	178(38.9%)	31(30.1%)	7(38.9%)
	Disagree	363(62.7%)	280(61.1%)	72(69.9%)	11(61.1%)
I am anti-vaccine in general.	Agree	70(12.1%)	58(12.7%)	9(8.7%)	3(16.7%)
	Disagree	509(87.9%)	400(87.3%)	94(91.3%)	15(83.3%)
Concern for the acquisition of Covid-19 from the vaccine	Agree	138(23.8%)	113(24.7%)	20(19.4%)	5(27.8%)
	Disagree	441(76.2%)	345(75.3%)	83(80.6%)	13(72.4%)
I am not afraid of contracting COVID-19	Agree	118(20.4%)	91(19.9%)	23(22.3%)	4(22.2)
	Disagree	461(79.6%)	367(80.1%)	80(77.7%)	14(77.8%)
Not the right time to get vaccinated	Agree	111(19.2%)	84(18.3%)	24(23.3%)	3(16.7%)
	Disagree	468(80.8%)	374(81.7%)	79(76.7%)	15(83.3%)
I have limited contact with high-risk patients	Agree	145(25.0%)	114(24.9%)	25(24.3%)	6(33.3%)
	Disagree	434(75.0%)	344(75.1%)	78(75.7%)	12(66.7%)
COVID-19 vaccine is contraindicated for me	Agree	81(14.0%)	62(13.5%)	15(14.6%)	4(22.2%)
	Disagree	498(86.0%)	396(86.5%)	88(85.4%)	14(77.8%)

I do not like needles	Agree	107(18.5%)	83(18.1%)	20(19.4%)	4(22.2%)
	Disagree	472(81.5%)	375(81.9%)	83(80.6%)	14(77.8%)
I don't think it's necessary to be vaccinated.	Agree	173(29.9%)	131(28.6%)	37(35.9%)	5(27.8%)
	Disagree	406(70.1%)	327(71.4%)	66(64.1%)	13(72.2%)
I do not need the vaccine because I have a good diet/take vitamins/take other supplements that work as well or better.	Agree	91(15.7%)	69(15.1%)	17(16.5%)	5(27.8%)
	Disagree	488(84.3%)	389(84.9%)	86(83.5%)	13(72.2%)
I do not need to be vaccinated because I have a healthy immune system	Agree	104(18.0%)	82(17.9%)	17(16.5%)	5(27.8%)
	Disagree	475(82.0%)	376(82.1%)	86(83.5%)	13(72.2%)
It is my personal choice	Agree	244(42.1%)	186(40.6%)	53(51.5%)	5(27.8%)
	Disagree	335(57.9%)	272(59.4%)	50(48.5%)	13(72.2%)
I am allergic to eggs or the COVID-19 vaccine	Agree	47(8.1%)	34(7.4%)	10(9.7%)	3(16.7%)
	Disagree	532(91.9%)	424(92.6%)	93(90.3%)	15(83.3%)
I had already had COVID-19 and recovered when the vaccine became available	Agree	69(11.9%)	53(11.6%)	14(13.6%)	2(11.1%)
	Disagree	510(88.1%)	405(88.4%)	89(86.4%)	16(88.9%)
Others	Agree	144(24.9%)	111(24.2%)	27(26.2%)	6(33.3%)
	Disagree	435(75.1%)	347(75.8%)	76(73.8%)	12(66.7%)

significant difference between COVID-19 vaccine hesitant groups ($p>0.003$).

3.4. Reasons for vaccine acceptance or refusal

When the reasons for the participants for vaccine acceptance were examined, the majority indicated to "protect themselves" (82.2%), protect their family (90.8%), and protect their patients (85.8%). At the same time, the participants willing to be vaccinated with the recommendation of their doctor, family, or friends were still in the majority (61.7%). Almost half of the participants did not consider the vaccine mandatory (45.1%). The fact that all healthcare providers were vaccinated had a relatively high impact on participants' acceptance of vaccination (64.1%). About half of the participants (52%) wanted to be vaccinated because they had high-risk medical conditions. Media coverage (23.3%) was not very effective in accepting the vaccine. It was a highly personal choice (81.5%) for participants to accept the vaccine.

When asked why the participants were against the vaccine, more than half of them stated that they did not have enough information about the vaccine (54.6%) and were concerned about short-term side effects of the vaccine (52.3%). Concerned about possible long-term side effects was higher (71.8%). While the rate of those who did not think that the vaccine would be effective was 37.3%, the rate of those who were against the vaccine, in general, was low (12.1%). Most participants were not concerned about contracting COVID-19 from the vaccine (76.2%). 20.4% of the participants were not afraid of being

COVID-19. The proportion of participants who thought it was not the right time to get vaccinated (19.2%), had limited contact

with high-risk patients (25%), thought the vaccine was contraindicated for them (14.0) and disliked needles (18.5%) was quite low. 29.9% of the participants thought that the vaccine was not necessary. Having a good diet (15.7%) and having a healthy immune system (18.0%) did not have a high impact on not accepting the vaccine. Almost half of the participants did not accept the vaccine because of their personal choices (42.1%).

DISCUSSION

This study investigates how the COVID-19 pandemic affected dental students' anxiety, stress factors, and psychological attitudes towards this disease affect their attitudes and hesitations toward COVID-19 vaccines.

Despite the growing literature on the factors associated with COVID-19 vaccine acceptance and people's willingness to vaccinate when the vaccine is available, as far as is known, this study is the first to evaluate attitudes and vaccine hesitations towards COVID-19 vaccination among dental students in Turkey. As future healthcare providers, understanding dental students' perspectives has a crucial role, both in the accurate dissemination of information about the efficacy and safety of COVID-19 vaccines and because of the potential assignment of dentists to play additional roles during a pandemic (15). Due to their clinical training, some occupational illnesses also pose a risk to dental students; as a result, preclinical and clinical immunization programs for dental

students have been progressively introduced in recent years (16). Despite having favourable views regarding vaccinations since they were accustomed to them, dentistry students demonstrated inadequate understanding of and attitudes toward novel vaccinations (17-19).

Most research examining vaccine acceptance or reluctance started when vaccines weren't yet available, and at that time, it was still unknown how vaccines worked. (20-22). When this study was being conducted, COVID-19 vaccines had just become accessible, and dentists and dental clinical (trainee) students had already started receiving them. But vaccination of preclinical dental students had not yet begun because they were continuing their distance lessons. Due to well-established evidence of virus transmission by aerosols and droplets, which places dentists at an even higher risk for potential exposure to the SARS-CoV-2 virus, dentists have also received priority for vaccination as part of healthcare providers in numerous countries, including Turkey. (23). Although both sexes participated in this study at almost the same rates (female 51.6% and male 48.4%), male participants (81.1%) were more willing to be vaccinated, but this did not make a statistical difference between the two genders. Although no difference in the acceptance rate between the two sexes was noted among dental students in the USA (19, 24), in another study of dental students in Palestine, female students were less willing to be vaccinated (25).

In general, when the concern levels of the students were evaluated, moderate (46.8%) and severe (34.2%) levels were evident. This high level of concern was also

reflected in the students' willingness to vaccine acceptance. When thinking about COVID-19, most of the students stated that they felt moderate levels of fear, anxiety, concern, and sadness. However, in terms of anger, 30% reported they feel intense anger. Those who stated that they did not feel these emotions had the lowest percentage. However, no statistically significant difference was found between these feelings of anxiety and vaccine acceptance. In other studies Evaluating the students' emotional response to the pandemic using the GAD-7 scale, it was stated that the participants generally showed mild anxiety (4, 13, 26, 27). Consolo et al. reported that only 8.7% of the participants indicated a severe level of anxiety (13), while Generali et al. showed a similar rate, only 6.5% of the participants (4). In both studies, the majority showed minimal to mild anxiety. Contrary to these findings in our study, while the rate of those who felt minimal (15.1%) anxiety according to the GAD-7 scale was the least, the percentages of those who felt mild (26.7%), moderate (29.3%) and severe (28.8%) anxiety were closer to each other. In addition, this situation was reflected in the cases of vaccine acceptance and refusal. Those who showed minimal anxiety accepted the vaccine the least and rejected it the most statistically. Therefore the first hypothesis was partially accepted. A similar study found that higher anxiety levels increased vaccination acceptance determination (28). This suggests that this situation strengthens the feeling that vaccination is the right approach.

Also, the second hypothesis was partially accepted. When people are faced with a new virus, it is possible that they have concerns

about the safety of new vaccines. Lu et al. noted that the vaccination rate for the anti-H1N1 vaccine in the 2009 influenza pandemic was below expectations (29). Therefore, the side effects of short-tested vaccines are likely to affect people's confidence in the vaccine. Students' lack of knowledge about the vaccine (55%) and concerns about short-term side effects (50.4%) proved to be important elements in vaccine refusal. A survey of medical students' attitudes and behaviors towards vaccines reported that students were most concerned about long-term side effects, followed by short-term side effects (11). The current study confirmed that vaccines' side effects and potential long-term harms contribute to vaccine hesitancy. Interestingly, although the media reported the vaccination of healthcare professionals widely, it did not affect dental students' willingness to be vaccinated. However, the lack of media influence on students may be explained by the fact that the data collection period of this study coincided with the start of vaccination campaigns, and they were not fully effective at the time.

As far as is known, this study is the first to evaluate COVID-19 vaccine attitudes among dental students in Turkey. The study also provides information about the possible effects of the gender, region of residence, educational status, concerns about vaccination, and anxiety levels' impact on the dental students' attitudes towards COVID-19 vaccination.

Even though the current study was meant for all dentistry schools in Turkey, it's possible that the participants who chose not to answer the current questionnaire were reluctant to get immunized. Additionally,

generally speaking, a desire to get vaccinated may not be followed through on verbally. Because of this, we are unable to verify whether those who said they would get vaccinated did so in fact. The results of the current study might be supported by a follow-up investigation into how this demographic really uses vaccines.

CONCLUSION

The majority of dental students in Turkey were willing to get the COVID-19 vaccine. With the increase in the participants' anxiety, their desire to get vaccination increased. The general reluctance to get vaccinated was due to a lack of knowledge about the vaccine and possible long-term side effects. The desire to be vaccinated is related to the desire to protect herself/himself, her/his family, and patients.

Conflict of Interest: The named authors have no conflict of interest, financial or otherwise.

Ethical Approval: The Non-Invasive Ethics Committee approved the study of Van Yuzuncu Yıl University (decision no: 2021/04-13).

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Dr. Öğr. Üyesi Solmaz MOBARAKI"
Psychological Determinants of COVID-19
Vaccine Acceptance among Dental Students in
Turkey " Van Dış Hekimliği Dergisi 2023;4(2);10-
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