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# Opinions on COVID-19 Vaccines, Professional Continuity and Protective Practices During the Pandemic: A Descriptive Study on Turkish Dentists

## COVID-19 Aşıları, Mesleki Süreklilik ve Pandemi Sırasında Koruyucu Uygulamalara İlişkin Görüşler: Türk Diş Hekimlerinde Tanımlayıcı Bir Araştırma

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**ABSTRACT Objective:** To evaluate the opinions of dentists on the coronavirus disease-2019 (COVID-19) vaccine and to determine their professional continuity during pandemic, protective practices in social life in Turkey. **Material and Methods:** Ethical approval and the mandatory formal permissions were obtained. The data were gathered via an e-questionnaire, which was e-mailed to all members of Turkish Dental Association (n=30,615), between 15 March-15 April 2021. The questionnaire consisted of questions related to sociodemographic, living and professional practice characteristics during COVID-19 pandemic, and opinions about COVID-19 vaccine. **Results:** A total of 364 dentists (216 female, 148 male) with the mean (±standard deviation) age of 42.1 (±13.8) participated in this descriptive study. Of all, 89.1% had continued working and 95.7% continued aerosol operation practice during the pandemic, and 27 (7.4%) were infected with COVID-19. One in 4 (26.2%) of all stated that they were separating themselves from family members in the domestic life like sleeping, eating and relaxing periods. Of all, 326 (89.6%) vaccinated with COVID-19 vaccine, and 58.5% thought that the vaccination should be mandatory for everyone. Being age ≥35 years [odds ratio (OR)=6.57; confidence interval (CI)=2.06-21.01], not having pneumonia vaccine during the pandemic (OR=13.97; CI=1.28-152.06), thought of application of the vaccine not to be mandatory (OR=18.81; CI=5.84-60.58) and not recommending vaccination to family members (OR=19.99; CI=6.84-58.49) were statistically significantly related with not having COVID-19 vaccination. **Conclusion:** Contrary to expectations, the dentists participated in this study showed not very high compliance of vaccination. As a role model in public, dentists have to be aware of their responsibility related to COVID-19 vaccination and protective behaviors.

**Keywords:** Dentists; COVID-19 vaccines; vaccination; opinions; professional practice

**ÖZET Amaç:** Çalışmanın amacı, Türkiye'de diş hekimlerinin koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] aşısı hakkındaki görüşlerini değerlendirmek, pandemi sırasındaki mesleki sürekliliklerini ve sosyal hayattaki koruyucu uygulamalarını belirlemektir. **Gereç ve Yöntemler:** Etik onay ve zorunlu resmî izinler alınmıştır. Veriler, Türk Diş Hekimleri Birliğinin tüm üyelerine e-posta yoluyla gönderilen bir e-anket aracılığıyla 15 Mart-15 Nisan 2021 tarihleri arasında toplanmıştır (n=30.615). Anket, sosyodemografik özellikler ve COVID-19 pandemisi sırasındaki yaşam ve mesleki uygulama özellikleri ile katılımcıların COVID-19 aşısı hakkındaki görüşleriyle ilgili sorulardan oluşmaktadır. **Bulgular:** Tanımlayıcı tipteki bu araştırmaya, yaş ortalaması (±standart sapma) 42,1 (±13,8) yıl olan toplam 364 diş hekimi (216 kadın, 148 erkek) katılmıştır. Pandemi süresince katılımcıların %89,1'i çalışmaya ve %95,7'si aerosollü işlem uygulamasına devam etmiş ve 27 (%7,4) kişide COVID-19 ile enfekte olmuştur. Her 4 kişiden 1'i (%26,2) uyku, yemek yeme ve dinlenme gibi ev hayatında aile üyelerinden kendini ayırdığını belirtmiştir. Katılımcıların 326'sı (%89,6) COVID-19 aşısı ile aşılanmış ve %58,5'i aşının herkes için zorunlu olması gerektiğini düşündüğünü belirtmiştir. Yaşın ≥35 olması [odds oranı (OO) 6,57; güven aralığı (GA)=2,06-21,01], pandemi sırasında zatürre aşısı yaptırmamak (OO=13,97; GA=1,28-152,06), aşının zorunlu bir uygulama olmaması düşüncesi (OO=18,81; GA=5,84-60,58) ve aile üyelerine aşı önermemek (OO=19,99; GA=6,84-58,49) COVID-19 aşısı olmama ile istatistiksel olarak anlamlı derecede ilişkili bulunmuştur. **Sonuç:** Bu araştırmaya katılan diş hekimlerinin aşı uyumunun beklenenin aksine çok yüksek olmadığını görülmüştür. Toplumda rol model olarak diş hekimlerinin COVID-19 aşısı ve koruyucu davranışlarla ilgili sorumluluklarının bilincinde olmaları gerekmektedir.

**Anahtar Kelimeler:** Diş hekimleri; COVID-19 aşıları; aşılama; görüşler; mesleki uygulama

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A type of coronavirus disease-2019 (COVID-19) that started in China affected all aspects of life. COVID-19 has been declared a pandemic disease by the World Health Organization (WHO) on March 11, 2020.[1] It is a RNA virus, mainly spread from person to person who are in close contact with each other. The main route of transmission is through respiratory droplets produced when an infected person coughs, sneezes and speaks even he/she does not show any symptoms.[2]

During the pandemic, countries have taken various measures to prevent transmission within the scope of their health policies. The WHO makes recommendations like paying attention to social distance, hand hygiene, wearing a mask, avoiding crowds, airing the rooms and coughing into the elbow.[3] In addition, countries taken some measures such as transition to distance education, and the regulation of workplaces to reduce the number of people.[4] The COVID-19 pandemic caused 6,987,494 infected cases and 62,745 deaths in Turkey by 04.10.2021.[5]

Dentists are at a high risk of transmission of infection from patients, not only by being in close contact with patients, but also being exposed to aerosols and droplets from the patient's oral cavity.[4,6] As a consequence, one of the highly affected sector during the pandemic has been dental medicine.[7] All dental procedures except emergency treatments were postponed in our country at the beginning of the pandemic as well as in many countries of the world with the recommendation of the Turkish Dental Association.[8,9]

Due to the effects of vaccines on preventing disability and death caused by other infectious diseases, it is thought that the control of COVID-19 will be provided by vaccines and it is predicted that the pandemic process will continue until the crowds are overcome.[10] Even vaccine studies require hard work and long period of time, it has been reduced to as short time as possible under extraordinary conditions such as a pandemic.[11] According to WHO data, more than 200 vaccine studies are ongoing worldwide.[12] Pfizer/BioNTech vaccine, 2 versions of the AstraZeneca/Oxford COVID-19 vaccine and Janssen (Johnson & Johnson) received the emergency use validity from WHO as of March 2021 and 3 vaccines (Pfizer/BioNTech, Moderna's and Johnson & Johnson/Janssen COVID-19 vaccine) authorized and recommended as of 23.04.2021 by the Center for Disease Control and Prevention.[13-15]

In Türkiye, Phase 3 study of an inactivated COVID-19 vaccine, Sinovac, was completed with the efficacy level of 83.5% and prevention rate for hospitalization need 100.0%.[16] Besides, vaccine development studies also have been carried out in this period, inactive vaccine development studies at Erciyes and Selçuk Universities, Adenovirus-based vaccine development study at Ankara University, Virus-like particles vaccine study at Middle East Technical University, Peptide and novel adjuvant vaccine study at Boğaziçi University, peptide-based vaccine study at Hacettepe University, recombinant S protein vaccine study at İzmir Biomedicine and Genome Center, DNA vaccine study at Ege University, mRNA vaccine study at Selçuk University.[17]

The introduction of vaccines and the participation of people in vaccination will directly affect the course of the COVID-19 pandemic. Unfortunately, vaccine hesitancy which shows the unwillingness to be vaccinated is making a difficulty; and makes endanger for both individuals and the community.[18] Globally, the average rate of vaccine hesitancy was reported as 16% in October 2020.[19] Low rates of COVID-19 vaccine acceptance in the Middle East, Russia, Africa and several European countries were reported.[20] Higher vaccine hesitancy and the changeable vaccine acceptance is a major problem that might cause barriers in implementing effective interventions to attain maximum vaccine coverage.[19]

As healthcare professionals, dentists' views on vaccines and their motivation for vaccination are important due to their high-risk professional positions and as a role model for both people at risk and society. In the literature, there are several studies that aimed to assess the intention about or hesitancy against COVID-19 vaccination of healthcare workers in various countries as well as Türkiye.[7,21-31] However, few studies focused on Turkish dentists' COVID-19 vaccination hesitation.[25,31]

From this point, in this study it was aimed to evaluate the opinions and status of vaccination with COVID-19 vaccine of dentists in Türkiye, and their

practices related to protective measures against COVID-19 infection.

## MATERIAL AND METHODS

Ethical approval of this study was obtained from Non-Interventional Clinical Research Ethics Committee of Hacettepe University (February 2, 2021; GO 21/185), and the mandatory formal permission from Turkish Republic Ministry of Health (MoH) (2021-01-05T09_52_55). The written informed consents of the participants were obtained. The universe of this descriptive study was all members of Turkish Dental Association (n=30,615; of which n=10,814 public institution workers, n=4,224 university staff and n=15,577 in private practice).[32] No sample size was calculated since it was aimed to reach all members of the association. Unfortunately, opposite to the researchers' consideration, the participation level was too low (2.3%, n=364) despite all efforts (periodically reminding for four times).

The data were gathered via an e-questionnaire, created on an online survey system ("Surveey.com"), between 15 March and 15 April 2021. Turkish Dental Association was responsible with the distribution of the e-questionnaire link. The questionnaire was structured by researchers for this study to evaluate the opinions on COVID-19 vaccines, professional continuity and protective practices in social life of dentists during the pandemic. The questionnaire consisted of 42 questions (13 were related to sociodemographic and 15 were living and professional practice characteristics during the COVID-19 pandemic, and 14 were opinions about the COVID-19 vaccine). In order to evaluate the comprehensibility of the survey questions, a pre-test procedure was conducted on a total of 10 dentists, 5 working in the private sector and 5 working in a dentistry faculty, and these dentists were excluded from the original study group. An informed consent form in accordance with the Helsinki Declaration was placed at the first page of the questionnaire.

The data were analyzed by using Statistical Package for the Social Sciences version 20.0 (SPSS Inc., Chicago, Illinois, United States). Frequency and percentages for the qualitative data, and distribution statistics for the quantitative data were used as descriptive statistics. Besides, the chi-square, Fisher's exact test and exact tests were used to determine the differences between the categorical groups. Binary logistic regression was used to check for related variables of COVID-19 vaccination status, odds ratio (OR) and its confidence interval (CI) values were calculated. The approved statistical significance level was $p<0.05$. STROBE checklist was followed in the preparation of this manuscript.

## RESULTS

A total of 364 dentists (216 female, 148 male) participated in this study. Of the participants, mean (±standard deviation) age was 42.1 (±13.8). Some socio-demographic and general characteristics of the dentists were shown in Table 1. Of all 81.9% were currently living with family members and 1.9% were living with friends. Among all participants, 27.5% were living with an accompanying person working actively as a health personal. Of all, 6.3% (n=23) were not currently working (8 dentists retired with the beginning of the pandemic). Half of the participants were working in their own clinics. One-third had a PhD or specialist degree (pediatric dentistry n=38, oral and maxillofacial surgery n=15, prosthodontics n=15, endodontics n=10, orthodontics n=11, periodontology n=10, restorative dentistry n=6, oral diagnosis and maxillofacial radiology n=3). Of the total, 15.7% had at least one chronic disease [risky health conditions for COVID infection were: hypertension (n=8), Type II diabetes (n=6), chronic obstructive lung disease/asthma (n=7), rheumatoid problems (n=5), cardiovascular problems (n=3), cancer (n=2)]. Besides, almost one-fifth of the accompanying person living with the participant had a chronic disease, also [risky for COVID infection: Type II diabetes (n=13), hypertension (n=12), cardiovascular problems (n=11), chronic obstructive lung disease/asthma (n=6), rheumatoid problems (n=6)].

Among the currently working participants (n=341), 89.1% (n=302) stated that they were continuing actively working during the pandemic. Of them, 95.7% were practicing aerosol operation, and workload of 51% were similar with before pandemic. Sixteen participants worked in filiation. With the increasing age, the proportions of participants currently working (p=0.000), actively working during the pan-

**TABLE 1:** Some socio-demographic and general characteristics of the dentists (Türkiye, 2021).

| Characteristics (n=364) | n | % |
|---|---|---|
| Sex | | |
| Female | 216 | 59.3 |
| Male | 148 | 40.7 |
| Age (year) | | |
| <35 | 144 | 39.6 |
| 35-44 | 75 | 20.6 |
| 45-54 | 65 | 17.9 |
| ≥55 | 80 | 22.0 |
| | X±SD=42.1±13.8; Median=40.0; 1st-3rd Quartile=30-54; Minimum-Maximum=22-81 | |
| Last educational degree | | |
| Dental faculty (license) | 239 | 65.7 |
| PhD/Specialty | 125 | 34.3 |
| Working period (years)† | | |
| <10 | 130 | 36.5 |
| 10-19 | 78 | 1.9 |
| 20-29 | 53 | 14.9 |
| 30-39 | 66 | 18.5 |
| 40, + | 29 | 8.1 |
| | X±SD=18.2±13.5; Median=15.0, 1st-3rd Quartile=6-30; Minimum-Maximum=1-52 | |
| Working place‡ | | |
| Own private clinic | 171 | 50.1 |
| Private clinic/hospital | 74 | 21.7 |
| Public dental hospital/center | 9 | 2.7 |
| Dental faculty/Health services vocational school | 88 | 25.8 |
| Any chronic disease | | |
| No | 307 | 84.3 |
| Yes | 57 | 15.7 |

†No responses were excluded (n=356); ‡Percentages were calculated for currently working participants (n=341); SD: Standard deviation.

demic (p=0.005), and working in filiation (p=0.005) were decreased. This was similar for the workload of the participants during the pandemic. The proportion of female participants working in filiation was greater than males (p=0.029).

When the risky and preventive behaviors of the participants were evaluated, more than one-fourth (26.2%) stated that they were separating themselves from the other household members living in the house. Likewise, 76.1% were never using public transportation, and 69.8% had not attended a collective event such as wedding or funeral during the pandemic.

Of the participants, 27 (7.4%) were infected with COVID-19 (1 had two, 1 had three episodes), and 3 of them were hospitalized. Among household members, 10.2% were infected also. Among the participants, the most used source of COVID-19 information was internet (82.4%), followed by scientific researches (69.5%) and visual media (56.9%).

Almost all participants heard about CoronaVac (98.1%) and Pfizer/BioNTech (94.0) vaccines. The other vaccines heard by the participants were Oxford University/AstraZeneca (74.5%), Moderna (69.8%) and Sputnik-V (67.0%). Besides, 89.8% of them had an idea about the locally developed vaccines. Only 3 participants reported that they had no idea about corona vaccines.

Among all participants 89.6% were vaccinated with the Sinovac vaccine in priority group within

**TABLE 2:** Vaccination status by opinions of the participants related with the COVID-19 vaccine (Türkiye, 2021).

| | Vaccinated with Sinovac | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | Total | | |
| Characteristics | n | %† | n | %† | n | %‡ | p value |
| Recommendation to family members | | | | | | | <0.001* |
| No/Undecided | 24 | 55.8 | 19 | 44.2 | 43 | 11.8 | |
| Yes | 14 | 4.4 | 307 | 95.6 | 321 | 88.2 | |
| Mandatory application of the vaccine | | | | | | | <0.001** |
| For everybody | - | - | 213 | 100.0 | 213 | 58.5 | |
| For somebody | 4 | 8.3 | 44 | 91.7 | 48 | 13.2 | |
| For nobody | 34 | 33.0 | 69 | 67.0 | 103 | 28.3 | |
| Total | 38 | 10.4 | 326 | 89.6 | 364 | 100.0 | |

†Row percentage; ‡Column percentage; *Exact test; **Chi-square test.

the scope of the MoH vaccination program (Table 2). Among 38 unvaccinated participants, the reason of not having vaccinated was "thinking it was not safe and not trusting the vaccine" for 26 of them. During the pandemic, 11.0% had influenza, and 15.7% had pneumonia vaccines before COVID vaccination. Most of the participants stated that they would recommend to their family members (88.2%) and close friends (87.6%) to be vaccinated. More than half (58.5%) thought that the vaccination should be mandatory for everybody and 13.2% for some special groups (healthcare workers, people with chronic disease, elder people, teachers, public transportation drivers, hairdressers, food sector workers). In the succeeding questions related with the mandatory need of vaccination for special groups showed different percentages between 47.9% (for disabled people) to 93.8% (healthcare workers and people with chronic diseases). All participants who were vaccinated, continued to use masks for protection.

Having vaccinated with Sinovac percentage was 90.7% among females and 89.6% among males. The highest percentage of having vaccinated with Sinovac was in the participants less than 35 years-old (94.4%) and the participants having working period less than 10 years (93.8%). Besides, currently working participants, participants who are actively working during pandemic and who worked in filiation had higher percentages of vaccination with Sinovac. However, the observed differences were not statistically significant (Table 3).

It was asked to the participants whether they had pneumonia and influenza vaccination. Among not vaccinated participants with pneumonia, 87.9% had Sinovac vaccination; this proportion was 98.7% among participants who had pneumonia vaccination (p=0.020). However, this situation was not similar for influenza vaccine. The figures were 89.2%, 92.5% and p=0.783, respectively.

Binary logistic regression results indicating the odds ratios for the association between the COVID-19 vaccination status and variables that had p values <0.20 in bivariate analyses. Even sex variable had p value >0.20, because it is potential confounding effect sex had been added to regression model, also. These were shown in Table 4. Being ≥35 years of age (OR=6.57, CI=2.06-21.01), not having pneumonia vaccine during the pandemic (OR=13.97, CI=1.28-152.06), thought of COVID-19 vaccine application not to be mandatory (OR=18.81, CI=5.84-60.58) and not recommending vaccination to family members (OR=19.99, CI=6.84-58.49) were found statistically significant variables related with "not having COVID-19 vaccination" (the model had 93.0% explanatoriness (p=0.527; Hosmer Lemeshow test).

**TABLE 3:** Vaccination status of the participants by some characteristics (Türkiye, 2021).

| | Vaccinated with Sinovac | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | Total | | |
| Characteristics | n | %† | n | %† | n | %‡ | p value* |
| Sex | | | | | 364 | | 0.374 |
| Female | 20 | 9.3 | 196 | 90.7 | 216 | 59.3 | |
| Male | 18 | 12.2 | 130 | 87.8 | 148 | 40.7 | |
| Age (year) | | | | | 364 | | 0.080 |
| <35 | 8 | 5.6 | 136 | 94.4 | 144 | 39.6 | |
| 35-44 | 12 | 16.0 | 63 | 84.0 | 75 | 20.6 | |
| 45-54 | 8 | 12.3 | 57 | 87.7 | 65 | 17.9 | |
| ≥55 | 10 | 12.5 | 70 | 87.5 | 80 | 22.0 | |
| Working period (years) | | | | | 356§ | | 0.171 |
| <10 | 8 | 6.2 | 122 | 93.8 | 130 | 36.5 | |
| 10-19 | 12 | 15.4 | 66 | 84.6 | 78 | 21.9 | |
| 20-29 | 6 | 11.3 | 47 | 88.7 | 53 | 14.9 | |
| 30, + | 12 | 12.6 | 83 | 87.4 | 95 | 26.7 | |
| Last educational degree | | | | | 364 | | 0.144 |
| Dental faculty (license) | 29 | 12.1 | 210 | 87.9 | 239 | 65.7 | |
| PhD/Specialty | 9 | 7.2 | 116 | 92.8 | 125 | 34.3 | |
| Current working status | | | | | 364 | | 0.282** |
| No | 4 | 17.4 | 19 | 82.6 | 23 | 6.3 | |
| Yes | 34 | 10.0 | 307 | 90.0 | 341 | 93.7 | |
| Active work during pandemic | | | | | 341¶ | | 0.568 ** |
| No | 5 | 12.8 | 34 | 87.2 | 39 | 11.4 | |
| Yes | 29 | 9.6 | 273 | 90.4 | 302 | 88.6 | |
| Worked in filiation | | | | | 302ᵍ | | 1.000** |
| No | 28 | 9.7 | 260 | 90.3 | 288 | 95.4 | |
| Yes | 1 | 7.1 | 13 | 92.9 | 14 | 4.6 | |

†Row percentage; ‡Column percentage; *Chi-square test; **Fisher's exact test; §No responses were excluded (n=356); ¶Among currently working participants (n=341); ᵍAmong actively working participants during pandemic (n=302).

## DISCUSSION

A total of 364 dentists participated in this e-survey. The response rate was very low, which might be sourced from the insufficient compliance to the e-survey technique among healthcare workers due to their heavy workload.

Among healthcare professionals, dentists have a great risk of getting infection due to close contact with patients.[7] Besides, in Türkiye, dental professionals have been charged with filiation and positioned in the first steps among healthcare workers who are responsible for managing the COVID-19 pandemic. Further, dental professionals have a role model position to the public. With these points of view, the opinions of dentists about COVID-19 vaccination and practices in social life for protection were important to be revealed.

In the present study, 89.6% of participants were vaccinated with Sinovac in their turn with the scope of MoH vaccination protocol. According to the records of MoH, 48,702,500 vaccines applied, and 14,989,981 people received the second dose of vaccination by 29.06.2021.[33] Belingheri et al. reported that 82.2% of the participated dentists in a study conducted in Italy declared their intent to be vaccinated against COVID-19.[21] Kaplan et al. found that 84.1% of participated dentists declared willingness to accept

**TABLE 4:** Binary logistic regression results that show the related variables of COVID-19 vaccination status (Türkiye, 2021).

| Variables | OR | 95% CI | p value |
|---|---|---|---|
| Age (year) | | | 0.002 |
| <35 (ref) | | | |
| ≥35 | 6.571 | 2.055 | 21.009 |
| Having pneumonia vaccine during pandemic | | | 0.030 |
| No | 13.973 | 1.284 | 152.057 |
| Yes (ref) | | | |
| Opinion about mandatory application of the vaccine | | | <0.001 |
| For everybody/For somebody (ref) | | | |
| For nobody | 18.809 | 5.840 | 60.579 |
| Recommendation of the vaccination to family members | | | <0.001 |
| No/Undecided | 19.996 | 6.836 | 58.490 |
| Yes (ref) | | | |

Sex (male/female), age, working period (<10/≥10 years), last educational degree (Licence graduate/specialty education), mandatory application of vaccine, recommendation of vaccination to the family members, pneumonia vaccination in this season were the variables that comprised in the model at the beginning; which were all had p values less than 0.20 in bivariate analyses, except sex (p=0.374). Table shows the variables of the model after Backward (LR) method.

High OR values are caused by the frequency deficiencies of the categories.

OR: Odds ratio; CI: Confidence interval; Ref: Reference category.

the COVID-19 vaccine whenever possible in Türkiye and they stated that would play a leading role in optimizing the vaccination rate of the entire population.[25] Opposite to these high percentages, among dental students in USA, only 56% were willing to get vaccinated.[26]

It is found that one out of ten participants were not vaccinated. The most reported reasons were "thinking it was not safe" and "not trusting the vaccine". The hesitation might be caused by the possible side effects and use with "emergency-use" permission. There are various vaccine studies are ongoing worldwide and within Türkiye.[12,15,17] The large number of vaccine development studies of different nature inside and outside the country might also cause doubts and some question marks, especially among health personnel, regarding the quality of vaccines. Results indicate that most of the dentists have information about various vaccines. The sources of information were scientific researches (69.5%) and visual media (56.9%), which were higher than Kaplan et al.'s study results that reported 40.3% from social media, 35.4% from online medical publications, 46.2% from scientific associations. Belingheri et al. reported that dentists had opposed to COVID-19 vaccination due to lack of information about vaccines (39%), unsafe vaccines (37%), and fear of adverse events (35%).[21,25] Similarly, concern of new vaccine (56%), prefer others to vaccine first (53%) and lack of information (47%) were the refusal reasons of COVID-19 vaccination of healthcare workers in Dzieciolowska et al.'s study; inadequate information about the vaccines (74.9%), concerns about vaccine safety (36.2%) were the common reasons for intent to decline vaccination in Maltezou et al.'s study.[23,24,34]

Kaplan et al. reported that some of the factors associated with the willingness to accept the COVID-19 vaccine were found to be advanced age (≥50 years), living with family, and having a chronic disease.[25] In the present study, of the participants who were living with family members 88.3%, and who had a chronic disease 87.7% were vaccinated with COVID-19 vaccine. Further, it was reported that 61.1% of the health workers with comorbidities in Greece were vaccinated according to Maltezou et al.'s study.[24] In the present study, participants older than 54 years old had the least proportion of actively working during pandemic (77.3%). This age group also stated that they were smoothed their workload comparing with the period before the pandemic; these findings might indicate that the relatively older

dentists preferred to be not so active in their profession, possibly occurring from the high risky nature of dentistry and their relatively fragility against COVID-19 infection. Although vaccination status of the participants didn't differ statistically significant according to age, ≥55 age group the proportion of vaccinated participants was the least (87.5%). Participants who were aged ≥35 years had 6.57 times more not having COVID-19 vaccination (p=0.002; CI=2.06-21.01). Controversially, Belingheri et al. reported that participants >55 years old were 2.26 times (CI=1.74-6.18) adherent to COVID-19 vaccination program; Dzieciolowska et al. reported the participants among healthcare workers ≥60 years of age had 3.28 times more acceptance of vaccination (CI=2.06-21.01).[21,23,34] This difference could be stemmed from the age categorization of the studies and in our study, hesitancy might be occurred in the vaccination period, while the other was gathered before vaccination. More than ninety percent of vaccinated participants stated that they would recommend the vaccination to their family members and people in their close surrounding; this is very important as a role model responsibility of a dentist in the society/public. Besides, not having COVID-19 vaccination was seen 19.99 times more among participants who were not recommending vaccination to family members (CI=6.836-58.490.; p<0.001). On the other hand, all participants who think that the vaccination needs to be mandatory for everybody were vaccinated with Sinovac in their turn. In addition, the responses of participants to the mandatory need of vaccination for special groups were not so different with the vaccination plan of MoH. In two studies, 53.9% and 53.5% of dental students stated "the COVID-19 vaccination should be mandatory for all health care providers", respectively.[22,26] In another study, 83.9% of the participants who thought that "COVID-19 vaccination should be mandatory for health care professionals" had intended to get vaccinated.[24] Among the participants of the present study, 7.4% (n=27) were infected with COVID-19 and among them 29.7% (n=8) didn't get vaccinated. Parallelly, Belingheri et al. reported a negative association with a previous COVID-19 diagnosis (OR=0.32, CI=0.15-0.66) and potential adherence to the COVID-19 vaccination program.[21]

The continuity of immunization of pneumococcal and influenza vaccines during the pandemic is also a need. Turkish Republic MoH had recommended to have vaccination against pneumococcal and influenza infections during the pandemic before the COVID-19 vaccination program started.[35] However, the study results showed only 15.7% and 11.0% were vaccinated with pneumococcal and influenza vaccines, respectively, and 98.2% of the participants who were vaccinated for pneumonia and 92.5% for influenza were vaccinated with Sinovac, also. This might give a clue about the positive practices of these participants in the thought of importance of protection with vaccination. Parallel with this, Belingheri et al. reported that dentists who had flu vaccination in 2020-21 season had 5.15 (2.14-12.39) times more potential adherence to the COVID-19 vaccination program than the participants who didn't had flu vaccination. In the current study, participants who did not have pneumonia vaccine during the pandemic had 13.97 times more not having COVID-19 vaccination (CI=1.28-152.06; p=0.030).[21]

It is known that the vaccines could end the pandemic, but depends on many factors such as the effectiveness of the vaccine, the number of people vaccinated, how much attention is given to protective measures like wearing mask, distance and cleaning after vaccination. Safe and effective vaccines will be a gamechanger in only compliance with these measures, particularly because it is still not clear the degree to which the vaccines could protect from the infection. Also, everyone might not develop the same level of protection, and the vaccinated person could transmit the infection to others if he/she is infected even having the vaccine.[33] In this study, all vaccinated dentists stated that they were wearing mask, however only 70.6% stated not participating crowded organizations like wedding, funeral, etc. as much as possible, and one-third not using public transportation.

In order to make it clear, it is very important to pay attention to the limitations of the study. Although, the nature of the study plan was aimed to reach all Turkish dentists, the presented results were gathered from only 2.3% of aimed population which

limits the generalizability of the findings for all Turkish dentists. Due to the fact that it is one of the studies conducted only for dentists and the diversity of the topics examined, it is thought that the information obtained will make an important contribution to the literature, although it has no generalizability. The type of residence (urban/rural) of the dentists was not questioned.

## CONCLUSION

The participant dentists in this study did not show high compliance of vaccination. Moreover, main preventive practices failed in some of the participants. As a role model in public, dentists have to be aware of their responsibility related to COVID-19 vaccination and protective behaviors.

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### *Conflict of Interest*

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### *Authorship Contributions*

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