

Evaluation of the knowledge levels of dentists and healthcare personnel regarding the changes in dental practice that had occurred during the COVID-19 pandemic

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Abstract

Aim: Coronavirus disease 2019 (COVID-19), which has been declared a pandemic by the World Health Organization, poses a great risk of transmission throughout society, especially among healthcare workers. The aim of this study was to evaluate the knowledge levels of dentists and healthcare personnel regarding the changes in dental practice that had occurred during the COVID-19 pandemic.

Methods: An online questionnaire was sent to dentists and health personnel working in Diyarbakır, Turkey within the period from December 30, 2021 to January 6, 2022, using WhatsApp, e-mail, and special social platforms. The questionnaire was designed to identify the sociodemographic characteristics of the respondents and their awareness of new clinical procedures and of the changes in dental practice that had occurred during the COVID-19 pandemic. The data obtained from 239 dentists and healthcare personnel in Diyarbakır [118 (49.4%) female and 121 (50.6%) male; 177 dentists and 62 healthcare personnel] were evaluated.

Results: Of the dentist participants, 12.7% reported that they did not perform active dental treatment during the COVID-19 pandemic due to their concerns about being infected by their patients with COVID-19 or their existing comorbidities (chronic diseases). Of the participants, 24.6% had acquired COVID-19. Most of the participants used personal protective equipment when conducting all types of dental procedures, including examinations.

Conclusion: Dentists and healthcare personnel play an important role in controlling COVID-19 infection. It is very important to be aware of the possible transmission routes of COVID-19 in clinical applications, to use protective equipment during treatments, and to pay attention to personal hygiene.

Keywords: COVID-19, clinical practice, dentistry, pandemic

Introduction

Coronavirus disease (COVID-19), which has caused a worldwide pandemic, was defined as a very rapidly spreading and atypical viral pneumonia by the World Health Organization (WHO) on February 11, 2020 [1]. Coronaviruses are single-stranded, enveloped, rapidly mutating ribonucleic acid (RNA) viruses [2]. In addition to causing mild cold-like symptoms in humans, these viruses can also cause life-threatening diseases, such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) [3, 4]. The new type of coronavirus (2019-nCoV) first appeared in December 2019 in Wuhan, China [5].

The main clinical manifestation of coronavirus disease 2019 (COVID-19) is respiratory distress, which occurs after an average incubation period of 5 days (0-24 days). The initial symptoms consist of fever, cough, nasal congestion, fatigue, and other signs of upper respiratory tract infection. In about two-thirds of the cases, the infection can progress to severe disease with shortness of breath and severe lung congestion. Multiple organ failure may eventually result in respiratory failure, shock, acute respiratory distress syndrome, arrhythmia, acute myocardial injury, acute liver injury, and sepsis [6]. An increased risk of infection has been found in patients with certain comorbidities, such as hypertension, diabetes, and ischemic heart disease. This may be explained by the nature of these diseases and the types of drugs used to treat them [7]. There are wide variations in the numbers of deaths and positive asymptomatic cases by country, with some reports showing that around 80% of the cases are asymptomatic [8].

Dentists are the occupational group with the highest risk of infection, and many routine dental procedures have the potential to transmit the virus through aerosols. Asymptomatic (carrier) patients and patients with acute respiratory disease can apply for outpatient dental treatment. While it is important to attend to patients who need emergency dental procedures, the primary goal should be to prevent COVID-19 transmission to patients and dental staff. The increasing fear of cross-infection and the possible role of dental practice in the spread of infection have disrupted the provision of oral and dental health services. In addition, there has been a growing demand for personal protective equipment (PPE) consisting of clothing (gloves, masks, and gowns) that protects healthcare workers or other persons from infection. However, to protect oneself against airborne viruses, such as severe acute respiratory syndrome coronavirus 2 (the virus that causes COVID-19), additional equipment should be used, including goggles and face shields for face protection, fluid-resistant gowns or coveralls, caps, and rubber boots [9].

Considering all the aforementioned risk factors, the present study was conducted to evaluate the knowledge levels of dentists and healthcare personnel (the occupational groups with the highest risk of COVID-19

infection) regarding the changes in dental practice that had occurred during the COVID-19 pandemic.

Materials and Methods

This questionnaire study was carried out between December 30, 2021 and January 6, 2022. Approval from the Dicle University, Faculty of Dentistry, Local Ethics Committee was obtained for our study (decision 2021/63). Dentists, specialist dentists, dentistry residency students and healthcare personnel in Diyarbakır province of Turkey were included. The knowledge levels of dentists and allied health personnel regarding the changes in their clinical practices during the COVID-19 outbreak were evaluated through the online questionnaire. The questionnaire consisted of 12 questions: one question indicating participant consent, five questions related to demographic information, and six questions evaluating the level of knowledge about the changes in clinical practices related to the COVID-19 outbreak. The online questionnaire was designed through Google Forms (docs.google.com) and sent to dentists and healthcare personnel via e-mail. The questionnaire was administered objectively.

Results

A total of 239 dentists and healthcare personnel [118 (49.4%) female, 121 (50.6%) male] participated in this study. Of these, 105 (44%) were aged 23-30; 70 (29%), 31-40; 42 (18%), 41-50; 20 (8%), 51-60; and 2 (1%), over 65 (Fig. 1). Of the participants, 126 (52.71%) were dentists, 51 (21.33%) were specialist dentists, 28 (11.71%) were oral and dental health technicians, and 34 (14.25%) were cleaning staff.

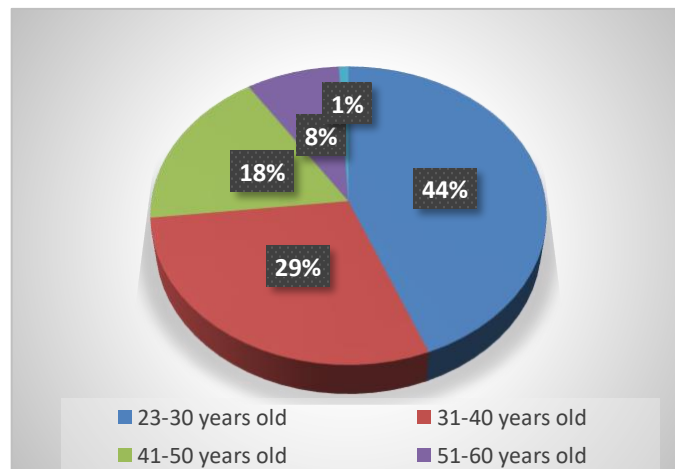


Figure 1. Age parameters of the participants

As shown in Figure 2, only 17.1% of the dentist participants had a chronic or systemic disease, but only 56.3% continued their active patient treatments during the COVID-19 pandemic; 31% started active patient treatments after the normalization process on June 1, 2020; and 32.3% gave no answer to the question “Do you actively conduct dental treatments?” In addition, 12.7% of the participants interrupted their patient treatment during the pandemic, 12.2% due to concerns about being infected by their patients with COVID-19 and 0.5% due to their comorbidity (chronic disease).

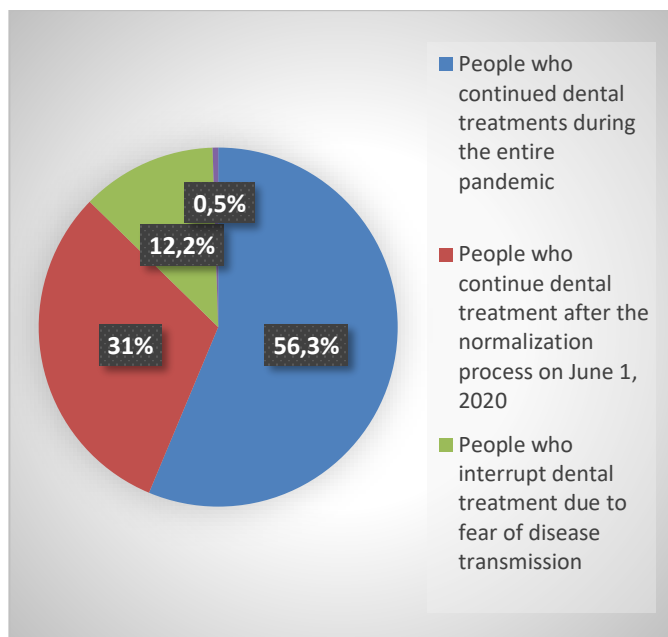


Figure 2. Dental treatment service situations during the pandemic process

The findings regarding the distribution of the procedures during the COVID-19 pandemic in which the participants preferred to use PPE are given in Fig. 3. Of the participants, 168 (70%) stated that they use PPE in all procedures, including examination, and 61 (25.4%) stated that they use PPE only in procedures that produce aerosols and scatter saliva and blood.

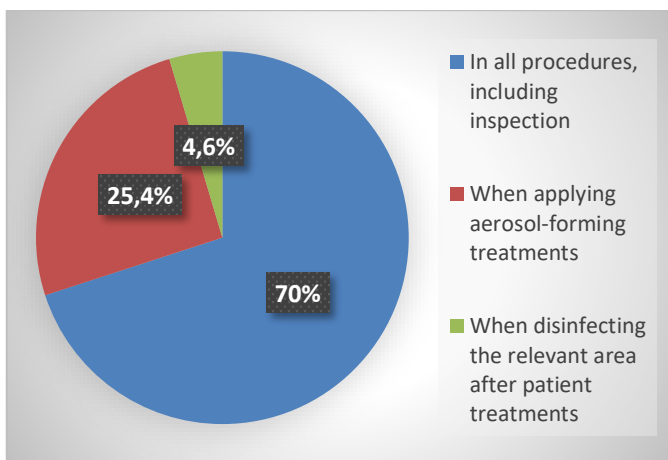


Figure 3. Processes for using personal protective equipment

Regarding the question “Were you present when an aerosol-generating procedure was performed on a patient?” posed to health personnel (e.g., nurses, oral health technicians, cleaning workers), 61.5% answered yes, 22.2% answered no, and 16.3% answered that they did not know (Fig. 4).

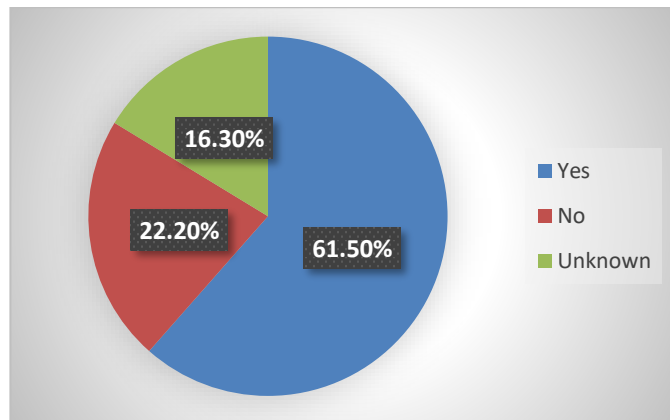


Figure 4. Were you present when any aerosol-generating treatment was being performed on the patient?

It was determined that 146 participants (61.1%) had been previously diagnosed with COVID-19. The distribution of the answers given by the participants to the question “If you have been previously diagnosed with COVID-19, how do you think did you acquire it?” is shown in Table 1.

The findings regarding the distribution of personal protective equipment use during the COVID-19 pandemic are given in Table 2. The participants’ use of personal protective equipment was high when necessary.

Table 1. Possible sources of contagion

Possible Sources of Contagion	n	%
Contact with relatives or friends with COVID-19 infection	39	26.7
Undergoing dental treatment	15	10.3
Funerals, weddings, cafes, and other social environments	12	8.2
From a patient who was sampled during filiation	10	6.8
Hospital origin	9	6.2
Welded from markets, shopping malls, etc.	3	2.1
Other/Unknown	58	39.7

Table 2. Frequency of using personal protective equipment

n = 239	Frequency of use	Number of cases n (%)
Gloves	Always	200 (83.7)
	Often	31 (12.9)
	Sometimes	6 (2.5)
	Rarely	2 (0.9)
Medical mask	Always	197 (82.4)
	Often	38 (15.9)
	Sometimes	3 (1.3)
	Rarely	1 (0.4)
N95-FFP2 or equivalent mask	Always	194 (81.2)
	Often	20 (8.3)
	Sometimes	13 (5.5)
	Rarely	12 (0.5)
Face shield or goggles	Always	201 (84.1)
	Often	24 (10.0)
	Sometimes	10 (4.2)
	Rarely	4 (1.7)
Fluid-resistant gown or coveralls	Always	185 (77.4)
	Often	40 (16.7)
	Sometimes	12 (5.0)
	Rarely	2 (0.9)
Gown or uniform	Always	126 (52.7)
	Often	90 (37.7)
	Sometimes	20 (8.4)
	Rarely	3 (1.2)
Cap	Always	146 (61.1)
	Often	42 (17.6)
	Sometimes	11 (4.6)
	Rarely	40 (16.7)

Discussion

COVID-19 is the recent infectious disease that has rapidly evolved worldwide [10]. It was first discovered in Wuhan, China in 2019 and has spread globally. This situation was declared a 2019-2020 pandemic by the World Health Organization [WHO] and a Public Health Emergency of International Concern [PHEIC] [10,11]. With the first COVID-19 case seen in Turkey on March 11, 2020 the number of cases increased rapidly, affecting all areas of life. Due to the vital risks caused by the pandemic, various precautions have been taken in our country and all over the world [12]. This situation has also affected people's social lives, business lives, daily activities, habits and psychology. Many scientific articles have been published evaluating the levels of anxiety and hopelessness people have experienced during the pandemic [12-17]. In the current study, the demographic data of dentists and healthcare personnel, their working status during the COVID-19 pandemic, and their knowledge levels about changes in clinical practices were evaluated.

An examination of the gender of the dentists and healthcare personnel included in our study revealed

virtual gender equity, with 49.4% female and 50.6% male participants. Although the percentage of women in the overall Turkish labor force is low, our study results is expected since the health sector is an area where women are more predominant [18].

The age distribution of the participants was less balanced, with 73% under the age of 40.27% of the participants were 40 years or older. This situation may be explained by the fact that the study was carried out in an electronic environment in accordance with social distancing rules, and young people are more familiar with online work.

COVID-19 can be transmitted by the inhalation of disease agents in bioaerosols through droplets, sneezing, coughing, or contact with nasal, oral, and eye mucous membranes [19,20]. Considering these transmission routes, it has been reported that dentistry is at the top of the list of high-risk professions in the COVID-19 pandemic due to exposure to aerosols released during dental treatments and particles suspended in the air [19,21].

It has been observed that the level of anxiety of health personnel during the pandemic has increased due to the risk of disease transmission, intense work tempo, mental dilemmas, and generally working outside of the

usual conditions [22]. The findings from several studies suggest that dentists may have a fear of contracting COVID-19 and transmitting the disease to their family and friends, and this may cause anxiety [21,23,24].

In their research, Tunç et al., observed that 15.4% of dentists completely stopped providing clinical services during the COVID-19 pandemic [25]. In our study, it was determined that 0.5% of the dentist participants interrupted dental treatments during the pandemic due to chronic disease, and 12.2% stopped dental treatments during the pandemic due to concerns about disease transmission. While 31% of the participants stated that they started their patient treatment after the normalization process began in Turkey on June 1, 2021, 56.3% provided uninterrupted dental treatments throughout the entire pandemic.

Due to the strong risk of transmission of COVID-19 and the uncertainty of the infection status of patients, healthcare workers should use personal protective equipment (PPE) while interacting with patients [26]. Gloves, medical masks, N95 and equivalent masks, disinfectants, face shields or protective glasses, disposable coverall gowns, and caps are personal protective equipment tools used in health care [27-29]. The order of putting on PPE should be gown, mask, eye protector/face protector, and gloves, and when removing, the order should be gloves, goggles/face protector, gown, and mask [30-32].

According to the guide published by the Centers for Disease Control and Prevention (CDC) [30,31], the contact of healthcare workers with patients infected with COVID-19 is divided into three categories of risk exposure: high, medium, and low. Depending on the type and duration of the procedure performed on the patient, if the primary healthcare personnel use PPE, they are in the medium- or low-risk group. There is a low risk in applications that do not produce aerosols. The rules for using PPE, especially for field teams (filiation teams) working in case follow-up and taking test samples, are clearly stated: contact precautions should be taken in cases where aerosol generating procedures are not performed and a distance of 2 meters from the patient can be maintained, and droplet precautions should be taken if the patient will be present within 2 meters. In addition, goggles or face shield should be added according to the risk and the patient should be provided with a liquid-proof surgical mask. In aerosol-generating processes, air flow precautions should be taken and everyone in the room should continue to apply PPE until the virus is sufficiently reduced.

When the question “Were you present when any aerosol-generating procedure was being performed on a patient?” was asked of healthcare personnel, such as nurses, oral health technicians, and cleaning workers, the answers were as follows: 61.5% said yes, 22.2% said no, and 16.3% stated that they did not know. This verifies that not only dentists but also the majority of healthcare personnel are exposed to aerosols released during dental treatments. Placement and preparation of the patient in the dental unit are also included in aerosol-generating

procedures; thus, they require personal protective equipment and proper hand hygiene [33].

Additionally, 61.1% of the participants stated that they had been diagnosed with COVID-19. When “What do you think was the possible source of infection if you have been diagnosed with COVID-19?” was asked, 23.3% thought that healthcare services were a possible source of transmission.

Turkey was among the countries that took the earliest preventive measures worldwide regarding the coronavirus pandemic [34]. The basic principles of fighting the disease effectively during the pandemic process include using personal protective equipment, isolation, using appropriate screening methods, early diagnosis, providing treatment under appropriate conditions, and effective surveillance [30, 35].

The study’s results showed that 70% of the participants used PPE during all dental procedures in which there was contact with the patient, including the examination. Additionally, 25.4% used PPE only in procedures with aerosol production and blood/saliva spilling into the environment, and 4.6% used PPE while disinfecting the relevant area after treatment.

Medical masks are an important personal protective equipment tool for preventing the spread of respiratory infections. When used in a way that covers the mouth and nose of the user, a mask can effectively prevent the spread of respiratory viruses and bacteria [36]. During pandemic periods, such as COVID-19, it is recommended to use protective masks that meet the National Institute of Occupational Safety and Health certification, such as N95s and their equivalent. The “N” indicates the National Institute of Occupational Safety and Health, and the “95” indicates filtering efficiency. These masks have a 95% filtration efficiency for particles ≥ 300 nm in size. They fit snugly on the face to prevent the inhalation of smaller infectious particles that can become suspended in the air after an infected person coughs or sneezes [37]. The diameter of SARS-CoV-2, which is the causative agent of COVID-19, is between 80 nm and 120 nm, but when the virus is expelled from an infected person, it becomes a larger droplet because it is surrounded by saliva. Therefore, the N95 mask is an effective method for preventing the spread of COVID-19 [38].

As a result of the study conducted by Polat et al., it was determined that the depression and anxiety levels of health workers who use PPE during the pandemic process are low [17]. In the study conducted by Dikilitaş et al., it was reported that dentists showed positive behavior by using protective equipment against COVID-19 infection [39]. In our study, personal protective equipment such as gloves, medical masks, N95 and equivalent masks, face shield or goggles, disposable gowns / overalls, uniforms, caps are mostly used by dentists and healthcare personnel whenever in any case.

Due to close contact with patients, exposure to secretions such as saliva, blood, etc., and the application of aerosol-generated treatments, clinics where dental procedures are performed always carry the risk of transmission of COVID-19 and similar viral diseases. In order to prevent disruption of dental health

services, to prevent cross-infection and to be prepared for possible future epidemics while effectively combating COVID-19. It is necessary to make infrastructure changes in clinics where dental treatment services are given intensively, such as dental hospitals, Faculties of Dentistry and private practice in the current order. Clinics should be planned as single-unit rooms, and if possible, special areas or cabins with hepafilter and aspiration systems that provide the exit of polluted air should be created in places where dental procedures are performed.

Notably, this study has some limitations. It was prepared on the Internet in accordance with social distancing rules, and the answers were obtained on the Internet. Therefore, the data were limited to participants who had good relationships with computers and/or social media, as well as Internet access. Additionally, as a cross-sectional study, it provides information about only a certain period of the pandemic process. We believe that more comprehensive studies should be conducted with more questions and data by reaching out to a larger sample in the future.

Conclusion

The best way to curb viral diseases during pandemic periods is to prevent the spread of the virus. The best prevention for healthcare personnel, including dentists, is to increase awareness about using personal protective equipment during dental procedures and applying personal hygiene behaviors at the maximum level. Taking additional measures and making significant changes in dental treatment habits will also contribute to the management of possible outbreaks in the future. For this reason, it is necessary to increase awareness by conducting wider studies about the process and to implement infection prevention and control programs effectively.

Disclosures

Ethics Committee Approval: This study was approved by Dicle University, Faculty of Dentistry, Local Ethics Committee (Approval Number: 2021/63).

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