

Knowledge and Awareness of Turkish Population about Dental Treatment during COVID-19- A Questionnaire based Survey

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ABSTRACT

Introduction: SARS-CoV-2, also known as Coronavirus (COVID-19), is a zoonotic virus, which can spread from animals to humans, such as SARS-CoV and the Middle East Respiratory Syndrome (MERS-CoV) virus. The first case was reported on 31 December 2019 by the WHO Country Office in China.

Aim: This study aimed to assess the knowledge and apprehension of the Turkish population about dental treatments during SARS-CoV-2.

Materials and Methods: A cross-sectional questionnaire-based survey was conducted which consisted of 8 self-prepared questions with two parts. A total of 560 participants, participated in this study. Participants were selected randomly and chi-square analysis was used to analyse statistical significance difference in the response between different groups.

Results: Most of the participants (80.9%) thought that their level of knowledge about coronavirus (COVID-19) was sufficient. More than half of the participants (57.2%) evaluated themselves in the risk group in the COVID-19 pandemic. A few of the participants (16.4%) had dental problems during pandemic and 83.6% did not have any dental problem. Apart from this, 53.3% of the participants think that it is not risky to have treatment with vibrating tools used in dentistry; 47.6% of the participants do not prefer to go to dentist even if they had an abscess.

Conclusion: The majority of the participants thought that they were knowledgeable enough about the risks of dental treatments in the pandemic period. However, the results have shown us that further steps need to be taken to educate people about the risks of dental treatments and the necessary situations that they have to go to the dentist during this period.

Keywords: Aerosol, Coronavirus, Infection, Pandemic

INTRODUCTION

In Wuhan, Hubei, China, pneumonia cases dramatically increased with unknown reasons [1]. The first COVID-19 case was reported on 31 December, 2019 by the WHO country office in China [2]. WHO declared the disease as a Public Health Emergency of International Concern (PHEIC) [3]. This fatal disease is not only China's health problem but it's also become a worldwide major health problem in more than a dozen countries around the world [4,5]. Dr. Tedros Adhanom Ghebreyesus who is the Director-General of the World Health Organisation (WHO), announced that the coronavirus epidemic has turned into a pandemic [6].

SARS-CoV-2 is a zoonotic virus, which can spread from animals to humans, such as SARS-CoV and the MERS-CoV virus. For this virus, commencement searches show that it can take origin from Chinese horseshoe bats (*Rhinolophus sinicus*) and pangolin (*Manis javanica*) [7]. It primarily infects these animals' upper respiratory and gastrointestinal tracts [8]. The most common symptoms of coronavirus disease are fever, tiredness dry cough and shortness of breath [6].

Incubation period with asymptomatic patients of the SARS-CoV-2 considers between 2 and 12 days, nevertheless, in some cases, the incubation period was reported up to 24 days [9,10]. It is mostly seen in the middle aged adults but the elderly patients and children get the infection too [9].

Coronaviruses are in the family of Coronaviridae and have four species: α -CoV, β -CoV, γ -CoV, and δ -CoV. The Sars-CoV and MERS-CoV are in the group of β -CoV which infect the respiratory, gastrointestinal and central nervous system system of mammals and humans [11].

The symptoms of coronavirus are, at the early stages, shown like a basic cold sore, which is fever and tiredness. In addition to the main symptoms; dry cough and shortness of breath, myalgia/fatigue,

dyspnea can be seen [8]. It has been reported that acute respiratory distress syndrome, septic shock, metabolic acidosis, bleeding and coagulation dysfunction can be seen in severely infected patients [7].

Approximately more than 80% of cases are not declared as fatal and recover from the disease without needing any treatment. On the other hand, around 15% of cases are categorised as dangerously ill and the remaining 5% are categorised as severely ill which may cause mortality [6]. Mostly the critical cases attend with chronic systemic diseases such as diabetes mellitus, hypertension, COPD, chronic kidney and liver disease and malignancy [8].

The transmission routes of coronavirus include direct transmission and contact transmission. Studies have shown that the respiratory viruses can spread from person to person through direct or indirect contact or with small droplets. These can happen and infiltrate into human body by cough, sneeze, droplet inhalation transmission and contact with oral, nasal and eye mucous membranes. Dental patients and professionals can be under risk of coronavirus due to the dental treatments which cause exposure of saliva, blood and other body fluids. Pathogenic microorganisms can be transmitted by aerosols caused by dental devices through air and it can suspend in the air for long times. Because of these, an infected person's dental treatment can infect the dental professional and other patients will be treated afterward [11]. Consequently, patients should have sufficient knowledge about dental treatments in case of COVID-19 pandemic. Adequate knowledge will also reduce the risk of disease spread in the community.

MATERIALS AND METHODS

A cross-sectional questionnaire-based survey was conducted from May 16, 2020, to May 19, 2020. The pilot study contained the same questions as the main study, with the exception of demographic questions. The questions in the pilot study consisting of 5 questions

were answered by the participants in the main study. Pilot study was carried out on the Internet platform for 26 volunteers who were treated at the Istanbul Medipol University Dental Clinics. According to the result of the pilot study, 74.6% of the participants evaluated themselves in the risk group in the COVID-19 Pandemic. Based on the response, appropriate adjustments were made. Sample size was calculated at 99% confidence level with a margin of error of 5%, formula of Sample size= $Z^2 \cdot P \cdot (1-P) / C^2$

Z=Z value (2.576 for 99% confidence level), P=percentage of picking a choice, expressed as a decimal (0.815). C=confidence interval or margin of error expressed as decimal. (.05)

$$(2.576)^2 \cdot (0.815) \cdot (1-0.815) / (.05)^2 = 400.20$$

Sample size was calculated as 400.20. In our cross-sectional study, a total of 560 participants were included who were patients previously treated at Istanbul Medipol University Dental Clinics. Participants were selected by method of simple random sampling. Random sampling is a part of the sampling technique in which each sample has an equal probability of being chosen. A sample chosen randomly is meant to be an unbiased representation of the total population. Each of the participants approved the noninterventional consent form.

Participants belonging to the adult Turkish population, who approved the required consent and answered all the questions in the survey completely, were included in the study. All of the participants were patients who had previously been treated at the Istanbul Medipol University Hospital. Participants with previous coronavirus disease or nonadults were excluded from the study. In addition, Participants who marked more than one option in the questionnaire or answered incomplete were excluded from the study.

Ethical clearance (No; 379) was obtained from the institutional review board of Istanbul Medipol University Ethical Committee.

Questionnaire design: The questionnaire consisted of 8 self-prepared questions. If the survey is approved for participation, it takes about two minutes to complete. The questionnaire consists of two parts, in the first part of the questionnaire including 3 questions, we gathered demographical information about participants. The second part is about general knowledge about COVID-19 and dentistry treatments while in the COVID-19 pandemic. The questionnaire was answered online by the participants by giving multiple options. It is aimed to compare the awareness-related questions about COVID-19 and the questions about dental treatments with demographic data. Questions about awareness and knowledge level were asked cross-sectionally. Cronbach's Alpha score was calculated as 0.365. The questions about the level of knowledge and awareness asked in the questionnaire were compared statistically with demographic questions. The method used for statistical analysis was the chi-square test. Also, scoring was done by comparing the questions asked on demographic data. With the answers given to the demographic questions, the questions measuring the level of knowledge and awareness were evaluated statistically among themselves. No statistical scale was used this cross-sectional survey.

In demographic questions, we obtained demographic information such as age, sex, and educational status. Based on age, participants were categorised into four groups, 18-35, 35-50, 50-70, >70 years. At the end of the questionnaire, one participant was in >70 years group, thus modified our age groups like 18-35, 35-50, 50-70 years. Based on sex, groups categorised the groups into two, male and female. Based on education status categorised the groups into four; primary school graduate, high-school graduate, bachelor's degree, master's/Ph.D graduate.

The second part of the questionnaire has five questions, these questions are intended to analyse the general knowledge and awareness of the participants about COVID-19 and dental treatments.

STATISTICAL ANALYSIS

Statistical software used in the study was SPSS 21.0 version. Chi-square analysis was used to analyse statistical significance difference in the response between different groups. Statistical significance was set at p-value <0.05.

RESULTS

A total of 560 participants participated in the study. [Table/Fig-1] depicts the demographics of the participating participants.

Demographic Information	Frequency (n)	Percentage (%)
Age groups		
18-35	224	40.1
35-50	207	36.9
50-70	128	22.8
70 and above	1	0.2
Sex		
Female	384	68.6
Male	176	31.4
Education status		
Primary school graduate	11	2.0
High-school graduate	97	17.3
Bachelor's degree	338	60.2
Master's/PhD graduate	114	20.5

[Table/Fig-1]: Frequency of demographic questions.

A total of 52.4% of the participants stated that during coronavirus (COVID-19) pandemic, they will go to the dentist in abscess and swellings, and 47.6% will not. While 80.7% of the participants stated that they would not go to the dentist for the broken fillings without pain (asymptomatic) during COVID-19 pandemics, while 19.3% stated that they would go. 72.9% of the participants stated that they would not go to the dentist for the knobs formed in removable dentures during COVID-19 pandemics, while 27.1% stated that they would go [Table/Fig-2].

	Yes I visit my dentist	No, I don't visit my dentist
Severe dental pain accompanied by night pain	394 (70.4)*	166 (29.6)
Routine dental checks and check-ups	27 (4.8)	533 (95.2)
Gingival bleeding while brushing teeth	24 (4.3)	536 (95.7)
Abscess/Swellings	293 (52.4)	267 (47.6)
Broken fillings without pain (asymptomatic)	108 (19.3)	452 (80.7)
Scaling (Oral prophylaxis/ Teeth cleaning)	22 (3.9)	538 (96.1)
Knobs formed in removable dentures	152 (27.1)	408 (72.9)

[Table/Fig-2]: During the coronavirus (COVID-19) pandemic, which of the following conditions would you prefer to visit your dentist? Frequency of the answers given to the question.

*Frequency (Percentage)

Cross-sectional assessment was made according to the yes and no answers given by the participants. There was no significant connection between the participants' thinking about their knowledge of COVID-19 and their demographic variables ($p > 0.05$) [Table/Fig-3].

About 31% of 50-70 age group does not consider themselves at risk. In the coronavirus (COVID-19) pandemic, the status of self-assessment in the risk group varies according to the age groups ($p < 0.001$). While 54.7% of the 18-35 age group do not evaluate them into risk groups, 62.8% of the 35-50 age group and 69% of the 50-70 age group evaluate them into risk groups. In the coronavirus (COVID-19) pandemic, the status of self-assessment in the risk group does not differ according to gender and education level ($p > 0.05$) [Table/Fig-4].

	Yes	No	Chi-square	p-value
Age				
18-35	171 (76.4)*	53 (23.6)	$\chi^2=5.135$	0.077
35-50	172 (83.1)	35 (16.9)		
50-70	110 (85.3)	18 (14.7)		
Sex				
Female	314 (81.8)	70 (18.2)	$\chi^2=0.632$	0.427
Male	139 (79)	37 (21)		
Education status				
Primary school graduate	10 (90.9)	1 (9.1)	$\chi^2=1.298$	0.730
High-school graduate	79 (81.4)	18 (18.6)		
Bachelor's degree	275 (81.4)	63 (18.6)		
Master's/PhD graduate	89 (78.3)	25 (21.7)		

[Table/Fig-3]: Do you think your knowledge of corona virus (COVID-19) is sufficient? Comparison of the question with demographic questions.
*Frequency (percentage) χ^2 : Chi-square test

Participants' experience of any dental problems (pain, bleeding, swelling, etc..) in Coronavirus (COVID-19) pandemic varies according to age groups ($p=0.009$). This rate is 12.1% in the 35-50 age group and 13.2% in the 50-70 age group, while 22.2% of the 18-35 age group experienced any dental problems (pain, bleeding, swelling, etc..). Participants' experience of any dental problems (pain, bleeding,

swelling, etc..) in Coronavirus (COVID-19) pandemic does not differ according to gender and education level ($p>0.050$) [Table/Fig-4].

The situations that the participants thought to be risky in the coronavirus (COVID-19) pandemic process do not differ by age and gender ($p=0.060$). The situations that participants consider risky in the coronavirus (COVID-19) pandemic process differ according to the level of education ($p=0.011$) [Table/Fig-5].

DISCUSSION

In the survey studies about previous outbreaks and COVID-19 pandemic, studies related to dentistry students' and dentists' knowledge were carried out [12-14]. However, dentists and dentistry students are more well-prepared in the struggle against the pandemic, because of their high level of general medical knowledge and easy access to the latest information. For this reason, survey studies started to focus on patients [15]. Ashok N et al., emphasised the importance of patients' awareness and apprehension in their survey study [16]. Unlike other studies, this research is based on the general knowledge levels, awareness and apprehensions of the Turkish population about both COVID-19 and dental treatments during the COVID-19 pandemic.

According to the results obtained from the first findings of the disease, it was reported that most adult patients were infected in Wuhan city. Furthermore, pneumonia prevails in all cases [17,18].

	Yes Evaluate themselves in risk group	No Not evaluate themselves in risk group	Chi-square	p-value	Yes Had any dental problems	No Had no any dental problems	Chi-square	p-value
Total number of participants	320 (57.2)*	240 (42.8)			92 (16.4)	468 (83.6)		
Age								
18-35	101 (45.3)	123 (54.7)	$\chi^2=22.925$	<0.001	50 (22.2)	174 (77.8)	$\chi^2=9.361$	0.009
35-50	130 (62.8)	77 (37.2)			25 (12.1)	182 (87.9)		
50-70	89 (69)	40 (31)			17 (13.2)	112 (86.8)		
Sex								
Female	217 (56.6)	167 (43.4)	$\chi^2=0.178$	0.673	68 (17.7)	316 (82.3)	$\chi^2=1.428$	0.232
Male	103 (58.5)	73 (41.5)			24 (13.6)	152 (86.4)		
Education status								
Primary school graduate	10 (90.9)	1 (9.1)	$\chi^2=5.543$	0.136	4 (36.4)	7 (63.6)	$\chi^2=7.502$	0.058
High-school graduate	57 (58.8)	40 (41.2)			9 (9.3)	88 (90.7)		
Bachelor's degree	191 (56.5)	147 (43.5)			61 (18)	277 (82)		
Master's/PhD graduate	62 (54.8)	52 (45.2)			18 (15.7)	96 (84.3)		

[Table/Fig-4]: The participants' self-assessment in the risk group and the result of dental problems in the COVID-19 pandemic. Comparison of the question with demographic questions.
*Frequency (percentage) χ^2 : Chi-square test

	To have treatment with vibrating tools used in dentistry	Touching the surfaces of the where the dental treatments done	Air in the environment where dental treatments were done	Dentists and dental assistants	Chi-square	p-value
Age						
18-35	105 (47.1)*	171 (76.4)	144 (64.4)	154 (68)	$\chi^2=14.944$	0.060
35-50	107 (51.7)	144 (69.6)	133 (64.3)	158 (76.3)		
50-70	49 (38)	97 (75.2)	80 (62)	84 (65.1)		
Sex						
Female	183 (47.8)	283 (73.8)	245 (63.9)	263 (68.6)	$\chi^2=2.594$	0.628
Male	78 (44.3)	129 (73.3)	112 (63.6)	131 (74.4)		
Education status						
Primary school graduate	4 (36.4)	7 (63.6)	9 (81.8)	4 (36.4)	$\chi^2=25.987$	0.011
High-school graduate	46 (47.4)	69 (71.1)	52 (53.6)	62 (63.9)		
Bachelor's degree	152 (45)	252 (74.6)	212 (62.7)	239 (70.7)		
Master's/PhD graduate	59 (52.2)	84 (73.9)	84 (73.9)	89 (78.3)		

[Table/Fig-5]: Comparison of situations considered to be risky in the corona virus (COVID-19) pandemic process with demographic questions.
*Frequency (percentage) χ^2 : Chi-square test

Initial studies obtained similar results about age. For example, one of them included 425 patients and the mean age was 59 years (range, 15 to 89) [19], the other study's mean ages were 55,5 years (range 21-82) [17], 49 years (range 41-58) [20] and 56 years (range 42-68) [18]. According to the results obtained from these articles, it is clear that the risk group is generally composed of adult patients. It seems clear in our study that 54.7% of the 18-35 age group of participants do not evaluate themselves in the risk group, and as the age gets older, participants evaluate themselves in the risk group. For this reason, we have obtained that, the participants are aware that the age group is an important factor in the COVID-19 pandemic.

Due to the nature of dental procedures, contamination with blood and saliva is unavoidable because of the dental devices. According to data obtained by Liu L et al., salivary gland epithelial cells can potentially be infected by SARS-CoV2 and become a major source of the virus in saliva [20]. Besides, the spread risk of the virus in dental clinics is very high due to prolonged close contact with the patient in dental treatments [21].

As a result of our study, 92 participants (16.4%) had dental problems during the COVID-19 pandemic. If we compared this percentage to the Turkey population, we achieve that many people would suffer from their dental problems. Turkish population, about 82 million, nearly 13 million people suffers a dental problems during the COVID-19 pandemic. 13 million people are too important to underestimate. It will increase the need of individuals in this population for dental treatment. Therefore, this may increase the likelihood of patients to visit their dentist and also trigger the spread of the virus.

According to the information obtained by Meng L et al., and Rothe C et al., it has reported that symptomatic patients are effective in terms of the transmission rate. Also, it has been stated that it is also effective in terms of transmission during incubation periods in asymptomatic patients [22-24]. Transmission routes of the viruses can be in direct or indirect (contact) ways. Direct transmission ways are cough, sneeze, and droplet inhalation transmission, Indirect transmission ways contact with oral, nasal, and eye mucous membranes [25]. Contaminated surfaces where the dental treatments are done are risky contacts, in terms of viral load [11]. In our study, 26.4% of respondents, think that contact with these surfaces is not risky. Also, the people working here such as dentists and dental assistants are at-risk groups too. As a result of ongoing studies, viruses can spread through the air-borne and aerosol path [26,27]. Therefore, it is inconvenient for dentists to use devices that emit aerosols, except for emergency cases. Most of our participants (53.3%) have insufficient knowledge on this subject. A 63.8% of them thinks inhalation is risky where the dental treatments were done. In summary, according to the results obtained by Peng X et al., the virus may spread from infected patients to suspected patients by droplets. Also, infected patients can be a risk factor for dental clinics by causing contaminated surfaces and aerosols as a result of dental procedures for that reason, inhalation the air in the environment where dental treatments were done and to have a treatment with vibrating tools used in clinics are risky, in terms of air-borne and aerosol path. However, it is clear that dentists and dental assistants are in danger as they are exposed to aerosol and contaminated areas [11]. Most of participants (70.4%) agree with this.

According to the guideline created in the study of Alharbi A et al., dental procedures are proposed to be divided into five categories: emergency management of life-threatening conditions, urgent conditions that can be managed with minimally invasive procedures and without aerosol generation, urgent conditions that need to be managed with invasive and/or aerosol-generating procedures, nonurgent procedures, and elective procedures. Nonurgent procedures and elective procedures are not recommended during the pandemic [6]. Apart from nonurgent

and elective procedures, other dental procedures are categorised according to the patient's condition.

As a result of our study 29.6% of our participants do not prefer to visit dentist while they had night pain, 47.6% of participants also do not prefer to visit dentist while they had abscess or swellings. However it is recommended to go to the dentist in cases of severe toothache, which are accompanied by night pain, abscess, and swelling [6]. On the other hand, it is not recommended by Alharbi A et al., to go to the dentist for the remaining dental problems which we stated in our survey [6], except removable dentures adjustments recommended for radiation/oncology patients, most of our participants (72.9%) do not prefer visit their dentists for knobs. A few of the participants (4.8%) might visit their dentist for routine dental checks during outbreak, 4.3% of them might visit their dentist for gingival bleeding while brushing teeth, 3.9% can visit for scaling/dental cleaning. By the guideline created by Alharbi A et al., asymptomatic cases categorised as nonurgent such as broken fillings without pain, however, 19.3% of our participants can visit their dentist with asymptomatic broken fillings. In our study, we gathered that most of the patients' attitudes towards dental treatment are correct.

Limitation(s)

The main limitations of this study were COVID-19 studies are still ongoing and updated, and also most of the questions included in the questionnaire were related to general knowledge and the awareness of the Turkish Population towards COVID-19 and there were fewer questions related clinical aspect of COVID-19.

CONCLUSION(S)

During the pandemic, other than the precautions taken by patients, they should also have information about dental procedures. It is necessary to know in which cases the patients should go to the dentist and how dangerous dentistry procedures are in terms of the spread of the outbreak. Patient information studies should be done on this subject.

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SURVEY SAMPLE

1. Age
 - 18-35
 - 35-5
 - 50-70
 - 70 and above
2. Sex
 - Female
 - Male
3. Education level (status)
 - Primary school graduate
 - High-school graduate
 - Bachelor's Degree (University graduate)
 - Master's/PhD graduate
4. Do you think your knowledge of coronavirus (COVID-19) is sufficient?
 - Yes
 - No
5. Do you think that you are in the risk group of coronavirus (COVID-19) pandemic?
 - Yes
 - No

6. Have you had any dental problems (pain, bleeding, swelling, etc.) in the coronavirus (COVID-19) pandemic?
 - Yes
 - No
7. Which of the following situations do you think is risky during the Coronavirus (COVID-19) pandemic process? (Multiple choice)
 - To have treatment with vibrating tools used in dentistry.
 - Touching the surfaces of the where the dental treatments done
 - Air in the environment where dental treatments were done
 - Dentists and dental assistants (staff)
8. During the coronavirus (COVID-19) pandemic, which of the following conditions would you prefer to visit your dentist?

	Yes I visit my dentist	No, I don't visit my dentist
Severe dental pain accompanied by night pain		
Routine dental checks and check-ups		
Gingival Bleeding while brushing teeth		
Abscess/Swellings		
Broken fillings without pain (asymptomatic)		
Scalling		
Knobs formed in removable dentures		