Evaluation of knowledge, attitudes, and practices of dentistry faculty students regarding COVID-19 (#48683)

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Evaluation of knowledge, attitudes, and practices of dentistry faculty students regarding COVID-19

Osman Ataş [Corresp., 1], **Tuba Talo Yıldırım** [2]

[1] Department of Pediatric Dentistry, Faculty of Dentistry, Firat (Euphrates) University, Elazig, Turkey

[2] Department of Periodontology, Faculty of Dentistry,, Firat University,, Elazığ, Türkiye

Corresponding Author: Osman Ataş
Email address: osman_atas88@hotmail.com

Abstract

Background: The novel coronavirus disease (COVID-19) is a new viral respiratory illness, first identified in Wuhan province, China. It has been defined as a pandemic due to the global epidemic situation it has created. To evaluate the knowledge, behavior, and attitudes of dentistry faculty students about COVID-19. **Methods:** A total of 355 pre-clinical and clinical dental students (242 and 113, respectively, comprising 190 females and 165 males) at Fırat University Dentistry Faculty, in Elazığ, Turkey answered an online questionnaire about the biosafety procedures for and their attitudes to and knowledge of COVID-19. The study was carried out in March 2020, just one week after the first cases were reported in Turkey. The data gained were analyzed using descriptive statistical methods and chi-square test. **Results:** Both the clinical and preclinical students were found to be afraid of infecting themselves and their environment with COVID-19, and the difference between them was statistically significant (p=0.002 and p=0.012, respectively). Three quarters (74.9%) of the participants responded negatively to the question of whether they thought that experiences related to COVID-19 affected them psychologically, with the differences between females (80.5%) and males (68.5%) and between preclinical (70.2%) and clinical (85%) students being statistically significant (p=0.02 and p=0.01, respectively). Responses to the question of which internship worried them more were 29.9% endodontics, 25.1% oral and maxillofacial surgery, 16.3% prosthesis, 15.2% periodontology, 6.8% restorative dentistry, 3.9% oral diagnosis and radiology, 1.7% pedodontics, and 1.1% orthodontics, with a significant difference between the preclinical and clinical students (p=0,001). Regarding the measures applied by the clinical students in their internships, the responses were 100% gloves and 100% mask (with 11.5% FFP3/N95 mask), 73.6% face protective shield and 37.1% safety glasses, and 49% bonnet and 16.8% disposable box, with 90.2% frequent hand washing, and 86.7% frequent hand antiseptic usage. **Conclusions:** While students gave good responses regarding the standard measures they take to protect against transmission of COVID-19, their knowledge and attitudes about the extra measures they can take should be improved. For students to be least affected by fears associated with the disease, dental faculties should be ready to provide psychological services to those in need.

Evaluation of knowledge, attitudes, and practices of dentistry faculty students regarding COVID-19

Running Title: Dental students and COVID-19

Osman Atas[1*], Tuba Talo Yildirim[2]

[1]Department of Pediatric Dentistry, Faculty of Dentistry, Firat University, Elazig, Turkey.
[2]Department of Periodontology, Faculty of Dentistry, Firat University, Elazig, Turkey.

KEYWORDS: COVID-19, dental student, attitudes, dental education

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

***Corresponding author:** Osman Atas. Assistant Professor. Department of Pediatric Dentistry, Faculty of Dentistry, Firat University, Elazig, 23100, Turkey. Tel.: +90-424-237 00 00. Fax:. +90-424-237 00 01 E-mail:osman_atas88@hotmail.com

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significant difference between the preclinical and clinical students (p=0,001). Regarding the measures applied by the clinical students in their internships, the responses were 100% gloves and 100% mask (with 11.5% FFP3/N95 mask), 73.6% face protective shield and 37.1% safety glasses, and 49% bonnet and 16.8% disposable box, with 90.2% frequent hand washing, and 86.7% frequent hand antiseptic usage.

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INTRODUCTION

An outbreak of pneumonia with an unknown etiology occurred in December 2019 in Wuhan, China. (Ge et al. 2020) A month later, scientists isolated a new coronavirus (SARS-CoV-2), which was found to cause severe acute respiratory syndrome.(Meng et al. 2020) The pathogen was identified as the seventh member of the coronavirus family to have infected humans, and the disease it caused became known as the 2019 corona virus disease, or COVID-19. (Ge et al. 2020; Peng et al. 2020) COVID-19 created a public health problem affecting not only China but the whole world. On January 31, the World Health Organization (WHO) declared COVID-19 an international emergency that threatened public health. Later, the infection became much more widespread, and on March 12 the WHO updated the situation, declaring COVID-19 a pandemic.

COVID-19 is detected in the saliva of infected patients, so dental/oral and other healthcare professionals in particular should be most careful in protecting against the spread of the disease. (Sabino-Silva et al. 2020; To et al. 2020) Transmission is similar to other respiratory diseases; it can occur with droplets ejected during speaking, coughing, or sneezing (activities of the respiratory system) and also through aerosols employed during clinical procedures. (Sabino-Silva et al. 2020)

In this process, dentists may provide routes for virus transmission from unrecognized COVID-19-infected patients and patients under surveillance. It appears possible to have asymptomatic infections and thus for contamination to occur before symptoms of the disease appear. Relatedly, a recent clinical study showed that 29% of 138 COVID-19 patients hospitalized in Wuhan, China were healthcare professionals.(Chan et al. 2020)

Routine dental practices that emit aerosols pose a risk to patients, dentists, and ancillary staff.(Sabino-Silva et al. 2020) As with bronchoscopy, using aerosols during dental treatments may constitute a high-risk procedure for these people in respect of the inhalation of airborne particles, causing them to be directly exposed to the virus. (2020)

Therefore, dentists and dentistry students need to be very careful and develop preventive strategies to avoid COVID-19 involving, for example, patient placement, hand hygiene, and personal protective equipment (PPE) for all staff when performing aerosol-emitting procedures. It is inevitable that dentistry faculty students with insufficient clinical experience will be more exposed to infectious diseases.(Stewardson et al. 2002) In previous studies, occupational exposure to infective diseases in dentistry faculties has been reported at 66–80%. (Kennedy & Hasler 1999; Stewardson et al. 2002)

In order to increase the compliance of dentistry students with universal measures and to eliminate their deficiencies, student understanding and behavior should be determined. In this study, therefore, students at the Firat University Faculty of Dentistry inElazig, Turkey were investigated in order to evaluate their general knowledge levels, attitudes, and practices in regard to COVID-19.

MATERIAL AND METHODS

The cross-sectional study was conducted at the Faculty of Dentistry at Firat University in March 2020, during the week after the first reported COVID-19 cases in Turkey. The participants were students doing their preclinical education (first, second, and third grades) and clinical internships (fourth and fifth grades). An online questionnaire was developed in Google Forms containing 17 questions about the students' knowledge, attitudes, and practices in

respect of the new disease COVID-19. The study was approved by the Firat University Research Ethics Committee (2020/30-06). All participants voluntarily participated in this study. Participants were informed about the nature of the study. The IRB did not request written informed consent form due to being a cross-sectional study where no personal identifiers were used. Prepared e-survey forms were sent to students via a link created for the purpose. It was explained at the start of the questionnaire that the purpose of the data collection was for scientific research. From the total number of 363 students in the faculty, 355 completed the whole questionnaire (participation rate: 97.7%).

Since there was no known study on dentistry students concerning COVID-19, studies related to infectious diseases were used to create the survey.(Alharbi et al. 2019; Lorosa et al. 2019; Myers et al. 2012) We prepared the questions in three parts. In the first part, the participants were asked to supply demographic data (Course period, gender); in the second part, questions were asked about attitudes and knowledge (e.g.,the fear of infecting themselves or their environment while treating someone with COVID-19, on which internship worried them more, and on whether antibiotics are beneficial in COVID-19 treatment); and in the third part, questions were asked about biosafety procedures applied for COVID-19 (e.g., individual and infection control measures).

Data analysis

SPSS 21.0 for Windows was used to make a statistical analysis of the data. Descriptive statistical methods and a chi-square test were employed. The significance level was set at $p<0.05$.

RESULTS

Of the 355 students, 190 (53.6%) were female and 165 (46.4%) were male; 242 (68.1%) were first, second, and third grade students doing their preclinical education, and 113 (31.9%) were fourth and fifth grade students doing their clinical internships (Table 1).

Table 2 shows the students' knowledge and attitudes towards COVID-19 as shown by their questionnaire responses. A quarter (25.1%) responded positively to the question of whether a lecture or seminar-like information had been given in their faculty about COVID-19

The question on whether their experiences related to COVID-19 affected them psychologically received a negative response from the majority (74.9%) of participants. The difference between females (80.5%) and males (68.5%) was statistically significant (p=0.02); the difference between preclinical (70.2%) and clinical (85% students) was also statistically significant (p=0.01).

To the question on whether they were afraid of being infected by the COVID-19 virus since they were entering a profession that works very closely with other healthcare workers and patients, a total of 82.3% of the participants responded in the affirmative. For males, this figure was 74.5% and for females 88.9%, a statistically significant difference (p=0.001]); for preclinical students, it was 77.6% and clinical students 92%, again, a statistically significant difference (p=0.002).

To the question of whether they were afraid of infecting relatives or people around them with the COVID-19 virus because of their profession, 93.0% of the participants responded in the affirmative. There was no significant difference by gender, but the difference between the preclinical (90.5%) and clinical (98.2%) students was statistically significant (p=0.012). A total of 44.2% of the participants replied in the affirmative to the question of whether they would hesitate to treat a patient who came to dental treatment after recovery from COVID-19 infection, comprising 50% of the females and 37.6% of the males, which was statistically significant (p=0.001). The difference between preclinical (40%) and clinical (53%) students for this measure was not significant (p=0.066).

Regarding whether they thought that after the COVID-19 pandemic they would be more careful in their standard measures related to contamination of their patients, 77.6% of females responded positively and 88.9% of males,

165 which was statistically significant (p=0.012). The proportion for preclinical students was 80.2% and for clinical
166 students 91.2%, which also constituted a significant difference (p=0.033).

167 In the wake of the onset of the COVID-19 pandemic, 74.7% of the participants answered negatively to the question
168 of whether they regretted having chosen the dentistry profession. There was no significant gender or preclinical-
169 clinical student difference.

170 In respect of COVID-19 treatment, 80% of participants responded in the negative to the question of whether
171 antibiotics are beneficial. There were no significant differences in terms of gender or clinical-versus-preclinical
172 students for these question

173 In Table 3, responses are shown to the questions distinguishing between among clinical internships, on care in
174 regard to patient contamination, and on any regrets about entering dentistry. Regarding the internship that worried
175 participants most, 29.9% gave endodontics as their answer, 25.1% oral and maxillofacial surgery, 16.3% prosthesis,
176 15.2% periodontology, 6.8% restorative dentistry, 3.9% oral diagnosis and radiology, 1.7% pedodontics, and 1.1%
177 orthodontics. There was a significant difference between the preclinical and clinical students (p=0.001).

178 Figure 1 shows the individual measures taken by students against COVID-19. To the question of which individual
179 measures they were taking against COVID-19, the wearing of gloves and of a mask received responses of 33.8%
180 and 44.4%, respectively; frequent hand-washing was 93% and use of cologne, wet wipes, and hand disinfectant
181 84.9%; not entering public areas was 93.3%, not having physical contact (handshaking, kissing, etc.) 88.8%, and
182 frequent ventilation of the environment 78.2%, while changing clothes and taking a shower upon arrival home were
183 65.3% and 33.2%, respectively; 2.7% of the respondents indicated that they did not do anything extra.

184 Figure 2 shows the precautions taken by clinical students for themselves in internships. These participants responded
185 to the above question on which measures they were taking in the following proportions—use of gloves: 100%,

mask: 100%, ffp3/n95 mask: 11.5%, face protective shield: 73.6%, safety glasses: 37.1%, bone: 49%, disposable box: 16.8%, frequent hand-washing: 90.2%, and frequent hand antiseptic: 86.7%.

Figure 3 shows the precautions taken by clinical students regarding COVID-19 with the patient during dental treatment. To the question of which measures for COVID-19 they were taking in this situation, the responses were as follows. Before the procedure, 73.4% asked whether the patient had symptoms, such as fever, cough, or shortness of breath, 14.2% measured the patient's fever, 15.9% applied a rubber dam, 17.7% rinsed the mouth with a mouthwash containing chlorhexidin, 1.77% rinsed the mouth with a mouthwash containing 1% hydrogen peroxide content, 42.4% used a strong saliva absorber during the procedure, 12.3% avoided aerosols and processes that would create droplets, preferring to use hand tools instead of an aerator, cavitron, or micromotor, 24.7% postponed appointments of potentially infected patients for at least 14 days, and 8.8% stated that they did nothing.

Figure 4 shows the sources of information about the disease and virus. To the question of where they gained information about COVID-19, 75.8% indicated the websites or social media accounts of professional organizations, such as the Ministry of Health, Dental Association, and WHO, 21.9% gave information meetings held in institutions, 29.2% gave published scientific articles, 41.4% physicians' individual websites or social media accounts, 60.1% social media accounts, like Instagram, Facebook, and Twitter, 64.8%, television and radio programs, and 65.3% communication groups, such as Whatsapp or Line.

DISCUSSION

Dentists, dentistry students, and assistant personnel are at more risk of encountering pathogens transmitted through blood or other body fluids than is the normal population.(Al-Maweri et al. 2015) The key to reducing and preventing contamination of various microorganisms is dentists' strict adherence to infection control procedures. Thus, the knowledge about and attitudes towards infectious diseases of dentistry students who have started patient treatment

procedures in the clinic are very important. Less experienced dentistry students are likely to be more susceptible to the risk of infection diseases.(Singh & Purohit 2011)

There are many studies investigating the knowledge levels and attitudes of dental faculty students about infectious diseases. (Al-Maweri et al. 2015; Al-Shamiri et al. 2018; Alharbi et al. 2019; KARCIOĞLU 2020; Lorosa et al. 2019; Myers et al. 2012) COVID-19 is a very new disease that has spread rapidly and about which information is limited. To our knowledge, no study has yet been made related to COVID-19 and students of dentistry. This study investigated the knowledge, attitudes and practices regarding COVID-19 of preclinical and clinical dental faculty students at Firat University Faculty of Dentistry, in Elazig, Turkey.

COVID-19 transmission routes are through direct contact and airborne droplets, including aerosol delivery.(Ge et al. 2020) Most of the treatments in dentistry produce droplets and/or use aerosols that can cause infection. Dentistry students, especially those with little clinical experience, should be very careful about infectious diseases, both for themselves and for their patients and employees. In this study, 74.9% of the students reported that there had been no course or seminar-like information about COVID-19 provided in their faculty. As COVID-19 very quickly became a pandemic, it appears likely that many health institutions did not provide sufficient information to their students and staff.

Only 11.5% of the clinical students had asked any of their patients they had been treated in the previous three months whether they had a high fever or dry cough or had traveled abroad. This indicates a need to inform students as soon as possible about diseases following outbreaks and for them to provide the necessary information in their anamneses.

To the question on whether COVID-19 had affected them in a negative way psychologically, some three quarters of the participants replied that it had, with a difference between females (80.5%) and males (68.5%) that was statistically significant ($p=0.02$). In a study conducted at a medical school in China, it was shown that the psychology of female and male students there was similarly affected by the COVID-19 outbreak.(Cao et al. 2020) Physiological

sensations related to stress, social phobia, depression, panic and fear are widespread in women, and these may be related to anxiety. It can be said that women are more negatively affected by these stressful periods than men and that anxiety is positively related to this psychological condition.(Yildirim et al. 2017) Already, under normal conditions, it has been shown in many studies that female dentistry students are more stressed than their male counterparts. The reason for this situation is thought to be related to the fact that women feel stress more intensely in general, while men hide their anxiety. (Divaris et al. 2013; Jowkar et al. 2020)

Also, there were differences between the proportions of preclinical and clinical students who thought that the disease had a negative psychologically impact (70.2% and 85%, respectively) and who were afraid of being infected with COVID-19 (77.6% and 92%, respectively), which were statistically significant (p=0.02 and p=0.04, respectively). The majority of the participants (93.0%) responded in the affirmative to the question of whether they were afraid of infecting someone around them with COVID-19, the difference between the preclinical (90.5%) and clinical (98.2%) students again being statistically significant (p=0.012). These results can be explained by the fact that clinical students are in contact with patients during dental treatment and so the risk of infection transmission is higher for clinical than for preclinical students. Dental clinical students have increasing patient contact during their education and clinical years; they are at massive risk of cross-infection. (Milward & Cooper 2007)

To the question of whether they would hesitate to give dental treatment to a patient who had COVID-19, 44.2% of the participants responded in the affirmative and 36.6% in the negative, with 19.2% undecided. Studies have shown that as the knowledge level of dentistry faculty students increases, so does their willingness to treat patients with infectious diseases.(Aggarwal & Panat 2013; Sadeghi & Hakimi 2009) Prejudice against such patients in respect of COVID19 can be prevented by providing students with appropriate training.

Regarding the question of which internship worried them more, the clinical students were most concerned about endodontics (40.7%), prosthetics (23%), and periodontology (16.8%), while pre-clinical students were most concerned about oral and maxillofacial surgery (35%), endodontics (24.7%), and periodontology (14.5%). We think

that this is due to the better awareness of clinical students about aerosols and droplets. Infected children with COVID-19 have relatively mild clinical symptoms compared to infected adults, and no deaths in the pediatric population had been reported at the time of the study.(Sun et al. 2020) We think that the very low rate of pedodontics (1.7%) was related to this situation.

Regarding whether, after the COVID-19 pandemic, students were more careful in their standard measures regarding patient contamination, the majority (83.7%) of participants replied positively. COVID-19 appears to have increased the awareness of students of the risks of infectious diseases.

Three quarters (74.7%) of participants in the study answered "No" to the question of whether they regretted having chosen dentistry. This result may be explained by the assessment that as student knowledge about infectious diseases increases, such regrets become meaningless.

In this study, 80% of students stated that antibiotics would not be useful in COVID-19 treatment, presumably because they knew that COVID is a viral disorder. While this 80% rate was satisfactory, we think that it should have been higher.

Many individual measures were taken by students in daily life related to COVID-19, the foremost among which were not entering public areas (93.3%), frequent hand-washing (93%), avoiding physical contact (88.8%), and antiseptic use (84.9%). It is understood that these students were conscious of the individual measures they should take.

In respect of the results gained from questions on the precautions taken in internships and measures taken by students for their patients regarding COVID-19, the clinical students were found to be very careful about standard measures but less concerned about extra measures to be taken. This was probably because they were doing their internships in the week after the first cases in Turkey had been reported.

Some three quarters (75.8%) of the participants had received information about COVID-19 from the websites or social media accounts of professional organizations, such as the Ministry of Health, the Dental Association, and the WHO, with a fifth (21.8%) gaining information from meetings in institutions. In previous studies, the most important information source for students has been those of mass communication (television, newspapers, and magazines).(Gökengin et al. 2003; Opt & Loffredo 2004; Ungan & Yaman 2003) Nowadays, we can easily say that social media accounts have replaced the mass media. The experience we have acquired with COVID-19 suggests that after outbreaks and with the emergence of an epidemic, faculties must definitely hold lectures and/or informative meetings for their students. Also, the awareness of students regarding scientific articles should be increased.

CONCLUSION

Dentistry students are inherently at high risk of exposure to infectious diseases. The emergence of COVID-19 brought new challenges and responsibilities to institutions providing dentistry education. In particular, students should be informed that special measures should be taken for asymptomatic carrier patients in addition to the standard measures. During the preclinical years, students' knowledge of and appropriate attitudes to infectious diseases, especially pandemics, should be developed. This is extremely important in the fight against infectious diseases.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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367 **FIGURE LEGEND**

368 **Figure 1:** Individual measures taken by our students against COVID-19 in their daily lives

369 **Figure 2:** Measures taken by clinical students for themselves in internships related to COVID-19

370 **Figure 3:** Precautions taken with the patient regarding COVID-19 while treating teeth

371 **Figure 4:** Sources about information about COVID-19

372

Table 1(on next page)

Table 1

Table 1: Distribution of the students according to gender and course period

Table 1: Distribution of the students according to gender and course period

Students		N	(%)	N
Gender	Male	165	(46.4%)	355 (100%)
	Female	190	(53.6%)	
Course period	Clinical	113	(31.9%)	355 (100%)
	Preclinical	242	(68.1%)	

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40
41

Table 2(on next page)

Table 2

Knowledge and attitudes of students about COVID-19

Table 2: Knowledge and attitudes of students about COVID-19

Questions		Male (n=165) %	Female (n=190) %	P value	Preclinical (n=242) %	Clinical (n=113) %	P value
Have you been informed about COVID-19 in your faculty like lectures or seminars?	Yes	25.5%	24.7%	.486	19.8%	36.3%	.001*
	No	74.5%	75.3%		80.2%	63.7%	
Have you asked questions such as high fever, dry cough or travel abroad while taking an anamnesis from your patients in the last 3 months?	Yes	13.9%	16.8%	.273	17.4%	11.5%	.102
	No	86.1%	83.2%		82.6%	88.5%	
Did COVID-19 negatively affect your psychology?	Yes	68.5%	80.5%	.002*	70.2%	85%	.001*
	No	19.4%	6.8%		13.2%	11.5%	
	Undecided	12.1%	12.6%		16.6%	3.5%	
Are you afraid of becoming infected with COVID-19 as a healthcare professional working at close range with the patient?	Yes	74.5%	88.9%	.001*	77.6%	92%	.002*
	No	15.2%	5.3%		12%	5.3%	
	Undecided	10.3%	5.8%		10.4%	2.7%	
Are you afraid to infect any relatives or people around you in terms of COVID-19 because you are a healthcare worker working very close to the patient?	Yes	91.6%	94.2%	.485	90.5%	98.2%	.012*
	No	4.2%	3.7%		5.4%	0.9%	
	Undecided	4.2%	2.1%		4.1%	0.9%	
Would you hesitate to treat a patient who came to dental treatment after getting over and recovering from COVID-19 infection?	Yes	37.6%	50%	.001*	40%	53%	.066
	No	47.2%	27.4%		38.9%	31.9%	
	Undecided	15.2%	22.6%		21.1%	15.1%	
Do you think that after your COVID-19 pandemic, you will be more careful in your standard measures regarding contamination in your patients?	Yes	77.6%	88.9%	.012*	80.2%	91.2%	.033
	No	4.8%	1.6%		3.7%	1.7%	
	Undecided	17.6%	9.5%		16.1%	7.1%	

With the COVID-19 outbreak, did you regret that you chose the dentistry profession?	Yes No Undecided	9.7% 78.8% 11.5%	8.9% 74.7% 16.4%	.426	7.9% 78.1% 14%	12.4% 73.5% 14.2%	.382
Do antibiotics benefit in the treatment of COVID- 19?	Yes No I don't know	3.6% 83% 13.4%	3.7% 77.4 % 18.9%	.357	2.2% 76.4% 21.4%	5.1% 83.5% 11.4%	.133
Can a mother diagnosed with COVID-19 breastfeed her child?	Yes No I don't know	15.2% 49.0% 35.8%	12.1% 54.2% 33.7%	.559	11.6% 53.3% 35.1%	14.7% 49. % 35.6%	.285

*Chi-square test $p<0.05$

Table 3(on next page)

Table 3

Demonstrates in which internship students are more concerned about COVID-19

Table 3: Demonstrates in which internship students are more concerned about COVID-19

Internships	Preclinical (n=242) %	Clinical (n=113) %	P value
Oral and Maxillofacial Surgery	35.1%	4.5%	.001*
Endodontics	24.8%	40.7%	
Periodontology	14.5%	16.8%	
Prosthodontic	13.2%	23%	
Oral Diagnosis and Radiology	2.1%	7.9%	
Restorative dentistry	6.6%	7.1%	
Pediatric Dentistry	2.1%	0.8%	
Orthodontics	1.7%	0%	

*Chi-square test $p<0.05$

Figure 1

FIGURE 1

Individual measures taken by our students against COVID-19 in their daily lives

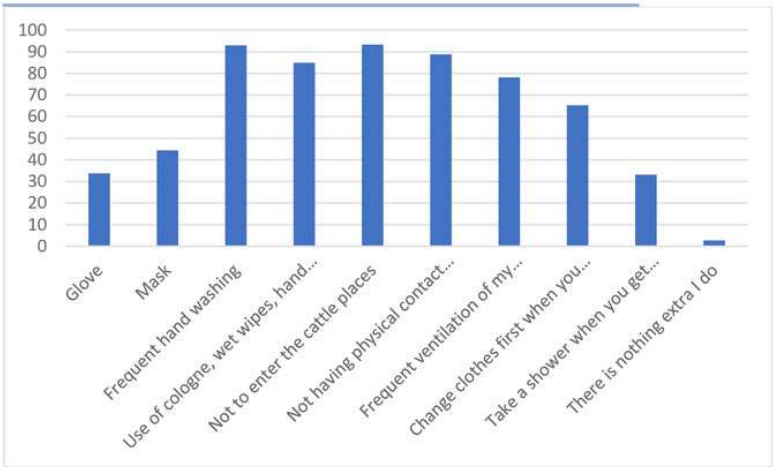

100
90
80
70
60
50
40
30
20
10
0
Glove
Mask
Frequent hand washing
Use of cologne, wet wipes, hand...
Not to enter the cattle places
Not having physical contact...
Frequent ventilation of my...
Change clothes first when you...
Take a shower when you get...
There is nothing extra I do

Figure 2

FIGURE 2

Measures taken by clinical students for themselves in internships related to COVID-19

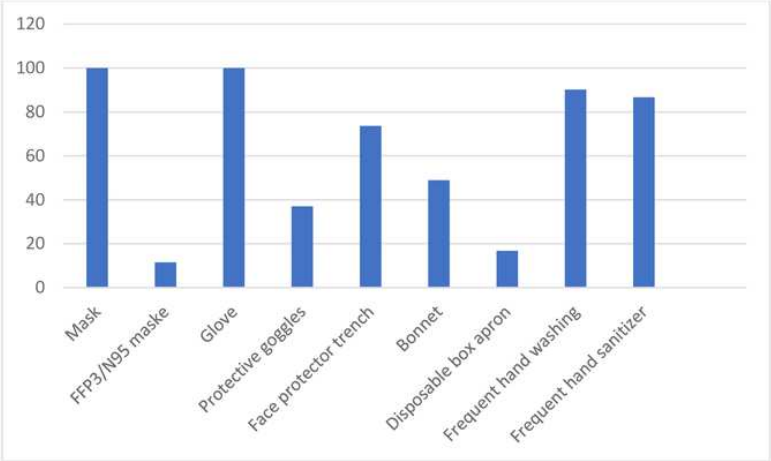

120
100
80
60
40
20
0
Mask
FFP3/N95 maske
Glove
Protective goggles
Face protector trench
Bonnet
Disposable box apron
Frequent hand washing
Frequent hand sanitizer

Figure 3

FIGURE 3

Precautions taken with the patient regarding COVID-19 while treating teeth

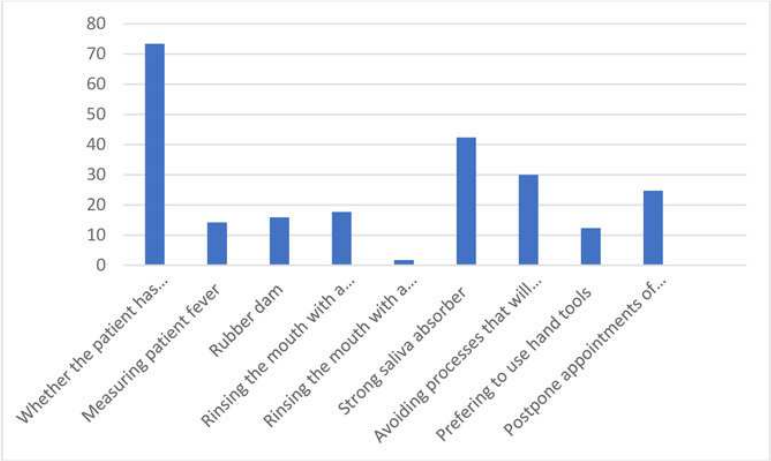
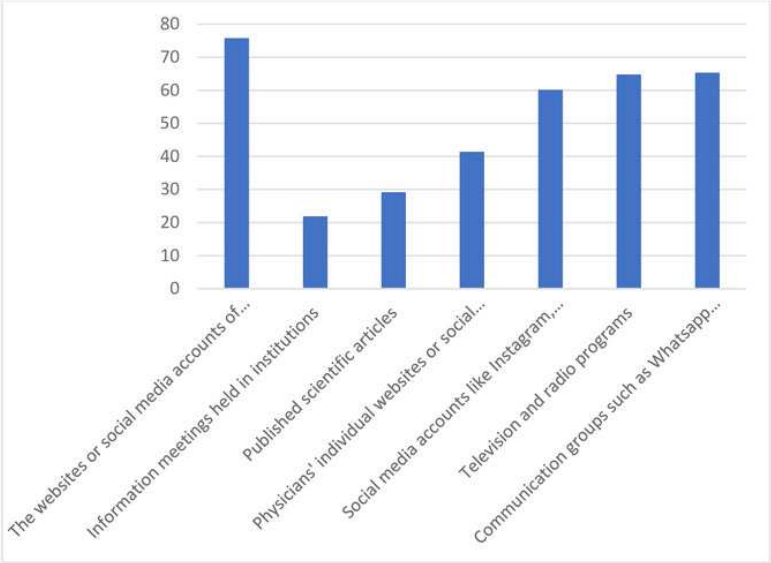

80
70
60
50
40
30
20
10
0
Whether the patient has...
Measuring patient fever
Rubber dam
Rinsing the mouth with a...
Rinsing the mouth with a...
Strong saliva absorber
Avoiding processes that will...
Prefering to use hand tools
Postpone appointments of...

Figure 4

FIGURE 4

Sources about information about COVID-19


80
70
60
50
40
30
20
10
0
The websites or social media accounts of...
Information meetings held in institutions
Published scientific articles
Physicians' individual websites or social...
Social media accounts like Instagram,...
Television and radio programs
Communication groups such as Whatsapp...