

# **Knowledge, Attitude and Preparations Toward COVID-19 Among Dentists in Saudi Arabia: An Online Survey**

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# Knowledge, Attitude and Preparations Toward COVID-19 Among Dentists in Saudi Arabia: An Online Survey

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## Abstract

**Background:** Dental professionals are one of the high-risk categories of getting infected with COVID-19 due to their work nature. The study was aimed to evaluate the knowledge, attitude, and practices (KAPs) related to COVID-19 and their clinical practice in the Kingdom of Saudi Arabia.

**Objective:** 1-To evaluate the level of knowledge and attitude regarding the coronavirus diseases (COVID-19) among dentists in Saudi Arabia .

2-To evaluate the certainty level of dental practitioner in continuing dental practice and the preparedness in screening and dealing of COVID-19 patients .

**Methods:** A cross-sectional online survey was conducted using a pre-tested and validated questionnaire. The questionnaire was comprised of closed-ended items related to KAPs. Participants' correct responses were scored and based on the total scores obtained, each domain was categorized into 'good', 'fair', and 'poor'. Relationship with Sociodemographic details and KAP scores were analyzed using Pearson's Chi-square test.

**Results:** Most of the participants showed good scores in KAPs related to COVID-19. Saudi Dentists had comparatively better KAP scores compared to Non-Saudi dentists ( $p<0.001$ ). Male dentists and specialist dentists had comparatively better knowledge scores than female and general dentists respectively ( $p<0.001$ ). Dentists who had experience for less than 5 years demonstrated lesser knowledge and practice scores than others ( $p<0.05$ ).

**Conclusions:** Dentists practice in Saudi Arabia had good knowledge, attitude, and practices towards COVID-19 and its importance in dentistry. Dentists should mandatorily follow all the guidelines and extra precautionary measures to stop the spread of this pandemic.

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## Original Manuscript

## 1. Introduction

The spread of the newly emerged species of Coronavirus, COVID-19 (SARS-CoV-2) has created much panic and chaos throughout the world. World Health Organization has declared it has pandemic and a public health emergency, which is showing a rapid spread to other parts of the world after its first outbreak in Wuhan, China. <sup>[1]</sup> This pandemic has collapsed the healthcare systems in many countries and drastic efforts are taken to flatten the curve and also reduce the fatalities. Health care systems all over the world have overstretched their capacity and all health care professionals, paramedics, and even sanitary staff are making huge efforts to tackle this health crisis. <sup>[2]</sup> As of July 2, 2020, a total of 10 357 662 cases of COVID-19 have been reported throughout with approximately 4.91% of mortality rate and Saudi Arabia has alone reported 194,225 with 1698 deaths. <sup>[3,4]</sup> The transmission of COVID-19 happened by direct transmissions, mainly person-to-person through respiratory aerosols or droplets when the infected person sneeze or cough, and also by inhalation of small airborne particles and contact transmission through the oral, eye, and nasal mucous membranes. <sup>[5,6]</sup> Dentists are at risk of getting infected and dental clinical settings could act as a possible place for the transmission of the virus when an infected person (symptomatic or asymptomatic) gets dental treatment. Evidence shows that SARS-CoV-2 has been detected in saliva samples and thus it can act as a potential source of transmission. <sup>[7,8,9]</sup>

There is an urgent need to understand the knowledge related to COVID-19 transmission, prevention, and protocols to follow when treating patients among dental health professionals. The growing concerns about cross-infection have created panic among dentists and this has made them step aside from their routine dental services they provide. The primary goal of any dental treatment during this pandemic time should be the prevention of transmission of infection to patients and also to dental health professionals and all the dental treatment should be limited to emergency dental procedures. This study is aimed to evaluate the knowledge, attitude, and practices of dentists related to dental practices during COVID-19 in the Kingdom of Saudi Arabia.

## 2. Materials and Method

We conducted a cross-sectional study using a pre-tested and validated questionnaire among practicing dentists in Saudi Arabia. The Ethics and Research committee of Qassim University approved the study. A pilot study was conducted among 30 dentists with a newly developed questionnaire that initially consisted of 27 items that measured knowledge, attitude, and practices

(KAPs) related to dental practice and COVID-19 to check the validity and reliability. The validation process showed that there is a modification required for some items and the final version of the questionnaire contained 24 items. The questionnaire had two sections and the first section had a statement of anonymity and consent and also Sociodemographic details of the participants. Section two had closed-ended items that measured KAPs related to COVID-19 and dental practices. An online version (Google forms) of the questionnaire was used to collect the data from the participants.

Considering the values derived from the pilot study done did a sample size calculation, a minimum

sample size of 247 was calculated with the formula  $n = \frac{S^2 [Z_{1-\frac{\alpha}{2}} + Z_{1-\frac{\alpha}{2}}]^2}{\hat{\rho}\hat{\rho}}$ . The dentists were

contacted through email and/or phone and the questionnaire was sent. A mixture of convenience and snowball sampling techniques was used and we thus identified a total of 352 dentists. We finally included 299 completed responses thus giving a high response rate of 85% for our study. The correct response for each item was recorded and scores were given for each participant. Total scores were calculated and categorized into 'good' (scores >80%), 'fair' (scores 60-80%), and 'poor' (scores <60%) separately for knowledge, attitude, and practice domains.

The responses were downloaded via Microsoft Excel sheet and then were transferred to SPSS ver 23 (IBM Corp. USA) by an independent biostatistician for statistical analysis. Categorical variables were presented using frequencies and percentages using descriptive statistics. Pearson's Chi-square test was used to analyze any possible association of the categorical variables considering a p-value less than 0.05 to be statistically significant.

### 3. Results:

Our study was conducted to assess the level of knowledge, attitude and practices regarding the coronavirus diseases (COVID-19) among dentists in Saudi Arabia and also to evaluate the certainty level of dentists in continuing dental practice and the preparedness in screening and dealing of these infected patients. Our questionnaire included items that measured knowledge, attitude, and practice items and were sent initially sent to 415 dentists. Finally, we received 299 samples with completed responses, which we included for the final analysis giving a response rate of 72.04%. The Sociodemographic details of the participants are depicted in [ Table 1].

Our

**Table 1: Sociodemographic details of participants**

		N	%
<b>Location</b>	Central	111	37.1
	East	45	15.1
	North	47	15.7
	South	44	14.7
	West	52	17.4
<b>Sector of practice</b>	Both	35	11.7
	Government	145	48.5
	Private	119	39.8
<b>Designation</b>	Dental specialist	95	31.8
	General practitioner	204	68.2
<b>Nationality</b>	Non-Saudi	94	31.4
	Saudi	205	68.6
<b>Setting</b>	Primary Care Hospital	106	35.5
	Secondary Care Hospital	22	7.4
	Tertiary Care Hospital	5	1.7
	Teaching Hospital	64	21.4
	Private Practice	102	34.1

questionnaire consisted of 13 knowledge questions thus giving one point for each correct answer (maximum score: 13). The mean score for knowledge items was found to be  $10.01 \pm 2.36$ . The scores were converted into percentages and scores of  $<60\%$  were categorized as 'Poor',  $60-80\%$  as 'Average' and  $>80\%$  as 'Good'. The responses from participants of each item of knowledge questions are given in [ Table 2]. When we evaluated the relationship of the nationality of dentists with knowledge levels, it was found that 'Saudi' dentists have comparatively Good knowledge than other nationalities ( $p < 0.001$ ). Also, male dentists had better knowledge levels related to Covid-19 compared to female dentists. When we assessed the relationship of the designation of dentists with knowledge level, it was found that 'specialists' dentists showed comparatively good knowledge than general dentists and this was statistically significant ( $p = 0.044$ ). Dentists who work in both government and private sectors had a better knowledge level than those who work alone in each sector ( $p = 0.006$ ). The settings where dentists' works didn't show any statistically significant association with the knowledge level related to Covid-19 ( $p = 0.196$ ) [ Table 3].

**Table 2: Responses of dentists to knowledge questions related to Covid-19**

		Responses		
		Wrong	Correct	Total
<b>Definition and other names of Covid-19</b>	N	68	231	299
	%	22.7	77.3	100
<b>Route of Transmission of Covid-19</b>	N	6	293	299
	%	2.0	98.0	100
<b>Incubation period</b>	N	17	282	299
	%	5.7	94.3	100
<b>Person to person transmission of Covid-19</b>	N	103	196	299
	%	34.4	65.6	100
<b>Isolation of Covid-19 infected person or suspected</b>	N	13	286	299
	%	4.3	95.7	100
<b>Social distancing</b>	N	20	279	299
	%	6.7	93.3	100
<b>Antibiotics can be used as first line of treatment</b>	N	158	141	299
	%	52.8	47.2	100
<b>Training of triage personnel to rapidly identify and isolate suspect cases.</b>	N	15	284	299
	%	5.0	95	100
<b>Dental treatment of Covid-19 and protocols to follow</b>	N	23	276	299
	%	7.7	92.3	100
<b>Usage of imaging technique for Covid-19 infected / suspected patients</b>	N	104	195	299
	%	34.8	65.2	100
<b>Instead of using rubber dam isolation, we can use high-speed hand-pieces and dental ultrasonic devices are recommended for caries removal and periodontal scaling to minimize the generation of aerosol</b>	N	110	189	299
	%	36.8	63.2	100
<b>The use of a 4-handed technique increase the possible exposure to infectious agents</b>	N	124	175	299
	%	41.5	58.5	100



<b>Treating Patients with suspected or confirmed COVID-19 in a negative pressure rooms or negative pressure treatment room can increase infection.</b>				.0
		134	165	299
	N			
	%	44.8	55.2	100
				.0

**Table 3: Relationship of Knowledge related to Covid and Sociodemographic**

		Knowledge level			Total	P
		Poor	Fair	Good		value
<b>Nationality</b>	Non-Saudi	N 43	27	24	94	<0.001
		% 45.7%	28.7%	25.5%	100.0%	
	Saudi	N 25	43	137	205	0.016
		% 12.2%	21.0%	66.8%	100.0%	
<b>Gender</b>	Female	N 38	38	62	138	0.016
		% 27.5%	27.5%	44.9%	100.0%	
	Male	N 30	32	99	161	0.044
		% 18.6%	19.9%	61.5%	100.0%	
<b>Designation</b>	General practitioner	N 38	51	115	204	0.044
		% 18.6%	25.0%	56.4%	100.0%	
	Dental specialist	N 30	19	46	95	0.005
		% 31.6%	20.0%	48.4%	100.0%	
<b>Experience</b>	< 5 years	N 30	53	103	186	0.005
		% 16.1%	28.5%	55.4%	100.0%	
	5-10 years	N 28	9	37	74	0.006
		% 37.8%	12.2%	50.0%	100.0%	
	10-15 years	N 3	3	4	29	0.006
		% 30.0%	30.0%	40.0%	100.0%	
	>15 years	N 7	5	17	10	0.006
		% 24.1%	17.2%	58.6%	100.0%	
<b>Sector</b>	Government	N 25	36	84	145	0.006

<b>Settings</b>	Private	%	17.2%	24.8%	57.9	100.0%	0.196
					%		
		N	28	32	59	119	
	Both	%	23.5%	26.9%	49.6	100.0%	
					%		
		N	15	2	18	35	
	Primary care hospital	%	42.9%	5.7%	51.4	100.0%	
					%		
		N	20	24	62	106	
	Secondary care hospital	%	18.9%	22.6%	58.5	100.0%	
					%		
		N	5	8	9	22	
	Tertiary care hospital	%	22.7%	36.4%	40.9	100.0%	
					%		
		N	2	1	2	5	
	Private practice	%	40.0%	20.0%	40.0	100.0%	
					%		
		N	21	19	62	102	
	Teaching hospital	%	20.6%	18.6%	60.8	100.0%	
					%		
		N	20	18	26	64	
		%	20	24	62	106	
					%		
		N	20	18	26	64	
		%	20	24	62	106	
					%		
		N	20	18	26	64	
		%	20	24	62	106	
					%		
		N	20	18	26	64	

When we assessed the attitude and practices of dentists related to Covid-19, it was found that 55.2% had 'Good', 35.1% had 'fair' and 9.7% had 'poor' scores. When we assessed the relationship of these attitudes and practices with the Sociodemographic characteristics, it was found that male ( $p < 0.001$ ) and specialist dentists ( $p = 0.03$ ) showed statistically significant good levels than their counterparts. Also, dentists who had experienced more than 5 years ( $p < 0.001$ ) and those working in private sectors ( $p = 0.011$ ) showed better good scores in attitude and practices than their counterparts, which showed statistical significance. But there was no statistically significant association observed with nationality and settings they work [Table 4].

**Table 4: Relationship of attitude and practices related to Covid and Sociodemographic characteristics**

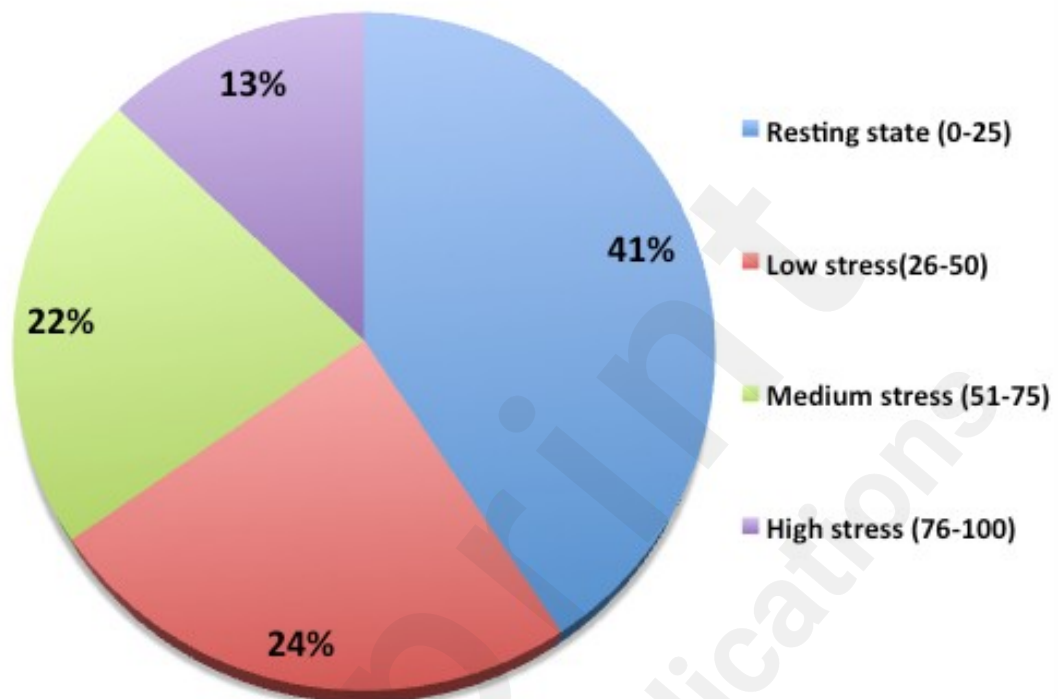
		Attitude and Practices			Total	P value
		Poor	Fair	Good		
<b>Nationality</b>	Non-Saudi	N	11	37	46	0.326
		%	11.7%	39.4%	48.9%	
					100.0	
					%	

<b>Gender</b>	Saudi	N	18	68	119	205	<0.001
		%	8.8%	33.2%	58.0%	100.0	
	Female	N	14	64	60	138	
		%	10.1%	46.4%	43.5%	100.0	
<b>Designation</b>	Male	N	15	41	105	161	0.033
		%	9.3%	25.5%	65.2%	100.0	
	General practitioner	N	26	70	108	204	
		%	12.7%	34.3%	52.9%	100.0	
<b>Experience</b>	Dental specialist	N	3	35	57	95	<0.001
		%	3.2%	36.8%	60.0%	100.0	
	< 5 years	N	69	96	21	186	
		%	37.1%	51.6%	11.3%	100.0	
<b>Sector</b>	5-10 years	N	26	44	4	74	0.011
		%	35.1%	59.5%	5.4%	100.0	
	10-15 years	N	5	1	4	10	
		%	50.0%	10.0%	40.0%	100.0	
<b>Settings</b>	>15 years	N	5	24	0	29	0.159
		%	17.2%	82.8%	0.0%	100.0	
	Government	N	16	63	66	145	
		%	11.0%	43.4%	45.5%	100.0	
<b>Settings</b>	Private	N	12	30	77	119	0.159
		%	10.1%	25.2%	64.7%	100.0	
	Both	N	1	12	22	35	
		%	2.9%	34.3%	62.9%	100.0	
<b>Settings</b>	Primary care hospital	N	15	31	60	106	0.159
		%	14.2%	29.2%	56.6%	100.0	
	Secondary care hospital	N	3	4	15	22	
		%	13.6%	18.2%	68.2%	100.0	
<b>Settings</b>	Tertiary care	N	0	3	2	5	

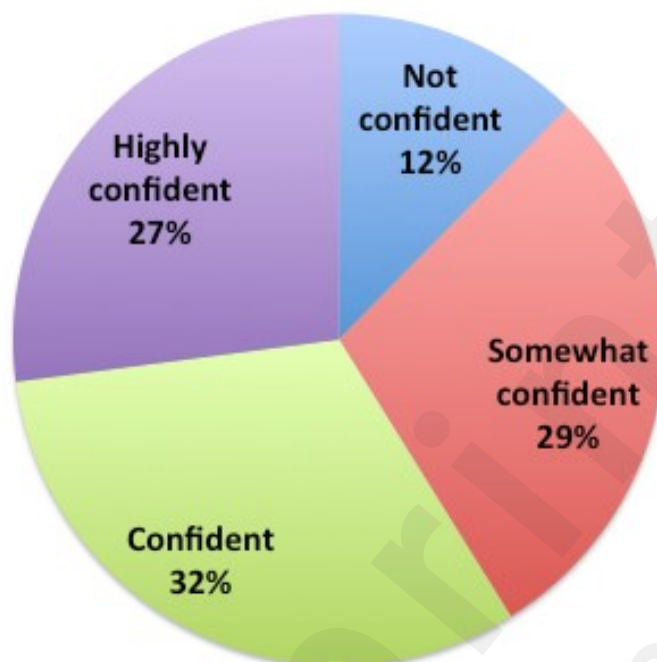
hospital	%	0.0%	60.0%	40.0%	100.0
					%
Private practice	N	7	38	57	102
	%	6.9%	37.3%	55.9%	100.0
Teaching hospital	N	4	29	31	64
	%	6.3%	45.3%	48.4%	100.0
					%

When we assessed the stress level of dentists in the future when treating patients infected with Covid-19, it was found that only 13% of dentists reported that they have high stress [figure 1]. The assessment of confidence level of dentists in treating Covid-19 infected or suspected patients showed that 12% of the dentists were 'not at all confident' and 27% reported that they are 'highly confident' in this regard [figure 2].

**Figure 1: Reported stress level by dentists  
in treating patients with sign and symptoms of COVID-19**



**Figure 2: Confidence levels among dentists in treating COVID -19 infected or suspected patients**



#### 4. Discussion

This cross-sectional survey was done to evaluate the practicing dentists' knowledge, attitude, and practices during this COVID-19 pandemic period. The study findings showed that dentists showed good knowledge in most of the questions related to COVID-19, but there was a lack of knowledge in a few aspects. The dentist had very good knowledge about the route of transmission and incubation period of this viral infection. Like most of the respiratory viruses, SARS-CoV-2 also spreads through mucous secretion and/ or saliva in the form of aerosols, droplets or fomites from person-to-person. <sup>[10,11]</sup> Epidemiological studies show that the incubation period of this virus varies worldwide. <sup>[12,13]</sup> As assumed by World Health Organization (WHO) the time between exposure to the virus and appearance of the symptoms ranges from 0-14 days. <sup>[14]</sup> And according to European Centre for Disease Prevention and Control (ECDC) it ranged from 2-14 days. <sup>[15]</sup> Dentists need to know the incubation period and route of all the possible transmission of this virus as this would help them to determine the safe period for treating the suspected patients. Dental clinicians are probably at high risk of getting infected, hence it should be made mandatory for all to take all preventive measures

during this panic time such as using Personal protection equipment (PPE), autoclaving handpiece after each, pre-procedural mouth rinse with 0.2% povidone-iodine, hand hygiene with alcohol sanitizers before and after each procedure, high-speed evacuation for treatment generating aerosols (eg. Endodontic, Restorative and ultrasonic scaling procedures), social distancing inside the dental clinic by isolating patients in separate rooms, routine cleaning and disinfection procedures that should include daily fumigation of the clinic every day.

In our study, 52.8% of dentists agreed that antibiotics could be used as the first line of treatment. Currently, there is no vaccine and/ or specific treatment regimens that target SARS-CoV-2 and also there is no enough evidence to support that antibiotics can be used as a first-line for its treatment.<sup>[16]</sup> Azithromycin has proven to be effective in reducing respiratory tract infections in patients who had Zika and Ebola viral infections.<sup>[17,18]</sup> The majority of the dentists demonstrated good knowledge training of triage personnel to rapidly identify and isolate suspect cases, protocols for treating COVID-19 infected or suspected patients. According to the Centers for Disease Control and Prevention (CDC) infection control guidelines for dentistry, all the procedures other than urgent or emergency dental procedures should be postponed until the patient is non-contagious.<sup>[19]</sup> In our study, Saudi nationals, male dentists, and specialists showed good knowledge when compared to their counterparts. A recent study conducted among dentists in Jordan showed similar findings to our study.<sup>[20]</sup> In another study conducted in Saudi Arabia reported that dental health professionals' knowledge regarding the droplet and airborne transmission of the COVID-19 was low compared to other health professionals.<sup>[21]</sup>

The attitude and practices related to COVID-19 were found to be good among our participants. Majority of them (96%) reported their clinical setting is prepared when a suspect case is identified to include immediate notification to the responsible government organization. The same percentage of participants also agreed that hand hygiene supplies, including alcohol-based hand sanitizers, were readily accessible in waiting areas, including areas where dental practitioner removed PPE. When doing a dental procedure a 4-handed technique is useful to decrease the spread of possible infections by the use of high volume saliva evacuators that will reduce the aerosols and droplet production.<sup>[22]</sup> The use of the intraoral imaging technique should be minimized and extra-oral techniques should be encouraged whenever it is possible and indicated. This will help to reduce the saliva and gag reflex often associated with intra-oral radiographs.<sup>[23]</sup>

Another important concern to look for in practicing dentists is the stress they experience in treating patients during this pandemic time. Studies have shown global infectious diseases such as COVID-19, SARS, MERS, etc. have affected the mental health of health professionals.<sup>[24,25]</sup> Our study findings show that more than half (65%) of our participants had some stress, of which 12% had very high stress in treating patients who had signs and symptoms of COVID-19. Dentists can utilize a tele-screening technique such as a telephonic conversation or video conferencing if possible to enquire about the travel history, the existence of any febrile respiratory illness (FRI) symptoms such as cough and fever, etc. A convincing response to all questions may help the dentists to reduce the stress while providing dental treatment for these patients. In our study the confidence levels of the dentists in treating suspected or infected patients also varied, it was found that 12% were not all confident in treating such patients.

One of the limitations of our study is that the differences between the reported responses and actual KAPs in dentists. This may have resulted in social desirability bias. Another limitation of our study is the inadequate and limited assessment of attitudes and practices towards COVID-19. The reason for the fewer questions related to attitude and practice was the limited time that we had for developing this questionnaire.

## 5. Conclusion

The knowledge, attitude, and practices related to COVID-19 and clinical practice among dentists practicing in Saudi Arabia were found to be satisfactory. However, some dentists showed limited knowledge about the extra precautionary measures that protect the dental staff and other patients from COVID-19. Still, there are no universal guidelines or protocols to follow when providing dental care for COVID-19 infected or suspected patients. Dentists should compulsorily follow all the appropriate precautions and safety measures given by the CDC and WHO that should be followed during the times of any epidemic, pandemic, national or global disaster.

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## Supplementary Files

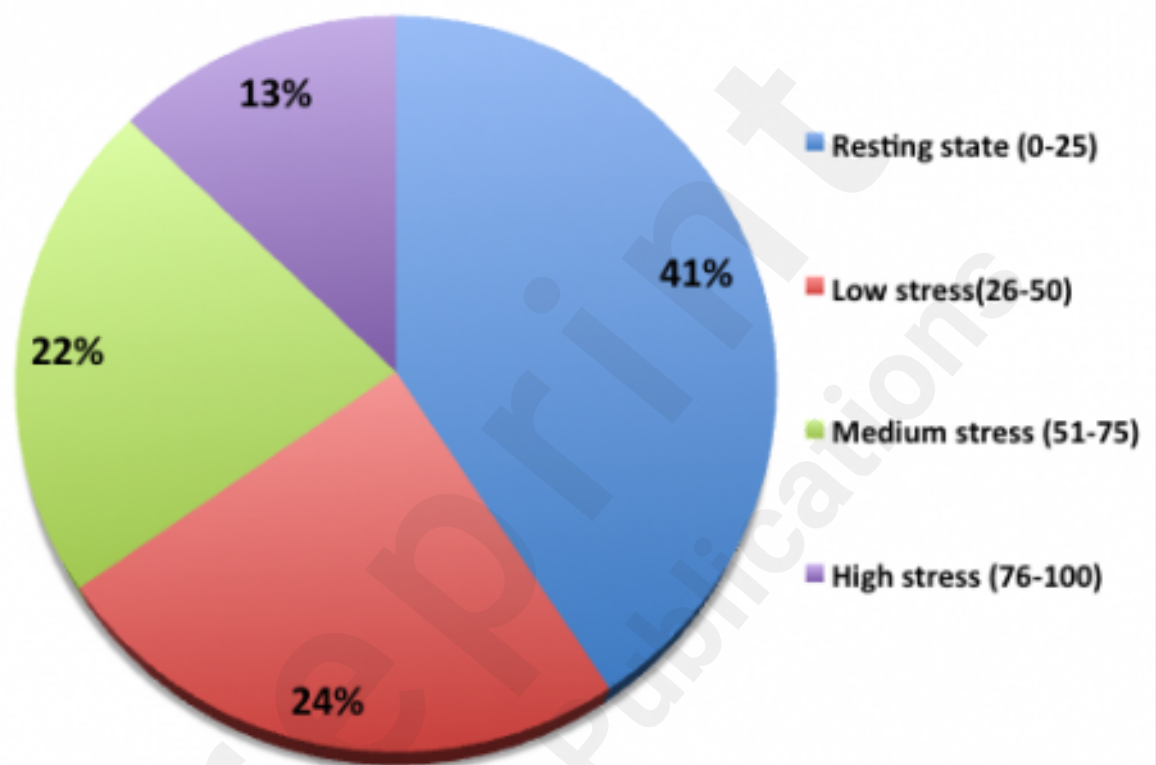
Tables.

URL: <https://asset.jmir.pub/assets/096402e2090201504a172b77c60d29dc.docx>

## Figures

Untitled.

**Figure 1: Reported stress level by dentists  
in treating patients with sign and symptoms of COVID-19**



Untitled.

**Figure 2: Confidence levels among dentists in treating COVID -19 infected or suspected patients**



## **Related publication(s) - for reviewers eyes onlies**

ethical approval.

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