

Dental Communication

Psychological Effects of Covid-19 Pandemic on Dental Students: A Cross-Sectional Study

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ABSTRACT

The COVID-19 pandemic has had a psychological effect on the general population and healthcare workers. Dentists were not excluded from this and were placed in a high-exposure risk category for infection. This cross-sectional study used the DASS-21 scale to evaluate the level of depression, anxiety, and stress among dental students in Riyadh, Saudi Arabia, during the COVID-19 pandemic and the effects of other variables on their responses. Continuous variables were expressed as mean \pm standard deviation, and categorical variables were expressed as percentages. The student's t-test and one-way ANOVA were used for continuous variables. Multiple linear regressions were also utilized. A p-value <0.05 was considered statistically significant. A total of 138 students contributed to the study. All participants (100%) were female, and 99.28% were single. The majority of the students were enrolled at King Saud University (81.88%), with 42.75% of the participants in the third year. High levels of depression, anxiety, and stress were reported among dental students during the pandemic: 73.2% of respondents had depression, 84.8% had anxiety, and 75.4% had stress. In addition to the stress of dental education itself, the contagious nature of this disease and those dentists were at a higher risk of contracting the infection affected the student's psychological health.

KEY WORDS: PANDEMIC, COVID-19, DENTAL STUDENT, DEPRESSION, PSYCHOLOGICAL IMPACT.

INTRODUCTION

Since late 2019 and early 2020, a new threatening virus, COVID-19, has been spreading worldwide. The World Health Organization (WHO), on 30 January 2020, stated that COVID-19 was a pneumonia-like disease that was highly infectious and displayed severe symptoms. It was officially classified as a pandemic in 2020 (Meng et al., 2020). The causative virus is the *coronavirus*, SARS-CoV-2 virus, discovered in Wuhan, China, in December 2019, then spread worldwide (Zhu et al., 2019). The major route of transmission of the disease is through the respiratory droplets of an infected person or close contact with an infected person (Huang et al., 2020). To date, the confirmed global COVID-19 cases equal 161,513,458; Saudi Arabia has 431,432 cases (WHO, 2019).

The pandemic has had a psychological effect on the general population, and healthcare workers have experienced additional burdens as they are exposed to infected patients, are at risk of getting infected, and fear transmitting the infection to their loved ones and being rejected by society as a possible source of infection (Abdelhafiz et al., 2020; Cawcutt et al., 2020; Nguyen et al., 2020). The activities of dentists, as healthcare workers, have been adversely affected during the pandemic (Consolo et al., 2020; Attia and Howaldt, 2021; Ammar et al., 2021).

Dental care professionals were placed in the high-exposure risk category for COVID-19 by the Occupational Safety and Health Administration (OSHA; OSHA, 2020). This exposure could happen during specific dental procedures that produce bioaerosols (Harrel and Molinari, 2004; Peng et al., 2020). This places dental practitioners and students under pressure, possibly leading to stress, anxiety, and depression. Worldwide, different studies have shown that dental students have various psychological problems, including stress, anxiety, depression, and obsessive-compulsive disorders

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(Loyd and Musser, 1989; Humphris et al., 2002; Montero-Marín et al., 2014; Harris et al., 2020).

The lockdown and online learning have negatively affected students in general and dental students specifically since they face additional stress to finish their clinical requirements. This study uses the DASS-21 scale to assess the level of depression, anxiety, and stress among dental students in Riyadh, Saudi Arabia, during the pandemic, as well as the effects of other variables on their responses.

MATERIAL AND METHODS

A cross-sectional study evaluating the psychological well-being during the COVID-19 pandemic of dental students living in Riyadh using the DASS-21 scale. After ethical approval was obtained from the IRB committee (E-20-4489), an online questionnaire was established using Google Forms Questionnaire and sent via email to the students. The survey consisted of three parts; the first part was consent, where a short explanation of the study was provided, and voluntary participation was requested; the second part consisted of six demographic questions, including age, gender, marital status, number of children, dental academic year level, and psychological status; the last part included “the Depression, Anxiety, and Stress Scale-21 Items (DASS-21), which is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress.” (Lovibond and Lovibond, 1995). Inclusion criteria included any dental student living in Riyadh that was not receiving any psychological management (cognitive or behavioral therapy, medication, or a combination).

In contrast, the exclusion criteria included non-dental students living outside Riyadh who had a history or were receiving any psychological management that would make their participation biased. Data were analyzed using

the Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean \pm standard deviation, and categorical variables were expressed as percentages. The student's t-test and one-way ANOVA were used for continuous variables. Cronbach's alpha was used to assess the reliability and internal consistency of the items in the questionnaire. Multiple linear regression was used. A p-value <0.05 was considered statistically significant. The required sample size was 148.

The sample size was calculated using the following formula

$$n = \frac{Z^2 * P(1 - P)}{d^2},$$

where n = sample size

Z = level of confidence (2-sided 95% CI = 1.96)

P = The percentage of abnormal depression levels in previous studies (p = 55.9%) (Basudan et al., 2017).
d = precision (8%).

Therefore, we distributed the questionnaire to 200 dental students to compensate for non-response.

RESULTS AND DISCUSSION

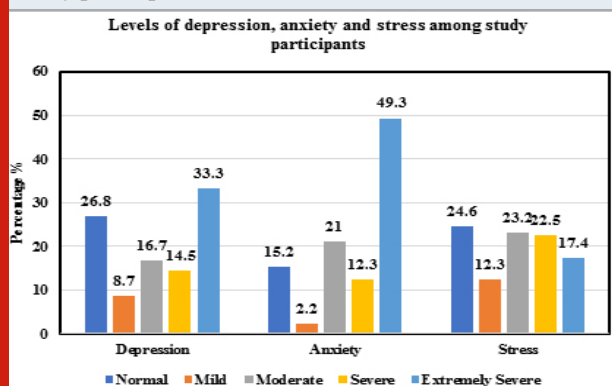
The Cronbach's alpha value of the questionnaires was 0.942, which reflects the excellent reliability of the questionnaire. One hundred thirty-eight students contributed to the study. All the participants (100%) were female, and 99.28% were single. The majority (81.88%) attended King Saud University, and 42.75% of the participants were in their third year (Table 1).

Table 1. Demographic Characteristics of the participants

		Number	%
Gender	Female	138	100.00
Educational institutes	King Saud university	113	81.88
	Riyadh elm University	14	10.14
	Prince norah Bint	11	7.97
Academic year	Internship	14	10.14
	Year 5	16	11.59
	Year 4	27	19.57
	Year 3	59	42.75
	Year 2	13	9.42
	Year 1	9	6.52
Marital status	Single	137	99.28
	Married	1	0.72
Having children	I do not have any children	138	100.00

The levels of depression, anxiety, and stress among study participants were evidently abnormal; it showed that 73.2% of respondents had depression, 84.8% had anxiety, and

75.4% had stress (Figure 1). Multiple linear regression showed that none of the tested variables was a predictor of depression, anxiety, and stress (Table 2).

Figure 1: Levels of depression, anxiety and stress among study participants

The association of demographic characteristics and depression, anxiety, and stress was investigated, and

it showed that the academic year was associated with increased depression, anxiety, and stress; p-value 0.008 (Table 3).

The DASS-21 scale, a standardized self-reported scale that measures depression, stress, and anxiety, was used in this study to measure the psychological effects of the COVID-19 pandemic on dental students. This scale is highly reliable and valid; it is a short-version of DASS-42, proven to be more dependable and less time-consuming than the full version (Westerman et al., 1993; Lovibond and Lovibond, 1995). In the current study, 73.2% of respondents had depression, 84.8% had anxiety, and 75.4% had stress. This was higher than previous studies on dental students in the Riyadh and Mecca regions of Saudi Arabia. This is because those studies were conducted before the pandemic, revealing that the pandemic significantly impacted dental students' psychological health (Aboalshamat et al., 2015; Basudan et al., 2017; Hakami et al., 2021).

Table 2. Multiple linear regression model for the prediction of depression, anxiety and stress

Predictor	Subscale	Unstandardized Coefficients		Standardized Coefficients Beta	t	P value	Collinearity Statistics	
		B	SE				Tolerance	VIF
		(Constant)	D	18.325	2.597		7.058	<0.001*
	A	17.811	2.224		8.010	<0.001*		
	S	21.007	2.162		9.714	<0.001*		
Marital status (1 = Married, 0 = Not Married)	D	-6.325	12.432	-0.042	-0.509	0.612	0.963	1.038
	A	6.189	10.646	0.049	0.581	0.562	0.963	1.038
	S	-3.007	10.354	-0.025	-0.290	0.772	0.963	1.038
Academic year (1. Internship=1, from year 1 to year 5 = 0)	D	-6.443	3.486	-0.154	-1.848	0.067	0.967	1.034
	A	-1.001	2.985	-0.028	-0.335	0.738	0.967	1.034
	S	-2.599	2.903	-0.076	-0.895	0.372	0.967	1.034
Educational institutes (KSU = 1, other = 0)	D	1.738	2.769	0.053	0.628	0.531	0.941	1.062
	A	0.740	2.372	0.027	0.312	0.756	0.941	1.062
	S	0.476	2.306	0.018	0.206	0.837	0.941	1.062

Another study, conducted during the pandemic, reported 60.64%, 37.02%, and 34.92%, respectively (Hakami et al., 2021). This might be due to differences in the timing of data collection, as we collected data during the peak of confirmed COVID-19 cases, which might attribute to the high level of depression, anxiety, and stress among dental students. Comparing our study results to studies worldwide, the current study reported higher levels of depression, anxiety, and stress; this might be due to that some of these studies were conducted before the pandemic, the difference in sample size, the scale used, differences in the curriculum, and requirements of each university (Abu-Ghazaleh et al., 2011; Radeef and Faisal, 2018; Saravani et al.; 2018; Moore et al., 2020; Ammar et al., 2021).

The association of demographic characteristics and depression, anxiety, and stress showed that the academic year was associated with increased depression, anxiety, and stress (p-value = 0.008), where the 4th-year students reported the highest level of depression, anxiety, and stress.

This might be due to the fact that the 4th-year curriculum is filled with several didactic and clinical requirements. Also, previous studies reported that senior students experience more stress than junior students (Shamsuddin et al., 2013). In previous studies, there was an association between gender and marital status with depression and stress, as females and married students were more depressed, anxious, and stressed than males and unmarried students (Takayama et al., 2011; Al-Sowygh et al., 2013; Takayama et al., 2013; Aboalshamat et al., 2015; Radeef and Faisal, 2018; Saravani et al.; 2018; Moore et al., 2020). However, there were exceptions, as some studies reported that male students and students who are single reported higher levels of depression, anxiety, and stress (Basudan et al., 2017; Hakami et al., 2021).

In our study, all participants were female, and only one student was married; this explains why no association was detected. The high levels of depression, anxiety, and stress among dental students in this study might be related to the fear of the unknown nature of COVID-19 and the

high-risk cross-infection transmission among dentists. A study assessed the mental health among dentists from 30 countries during the pandemic and revealed that most of them were at high levels of stress and fear (Ahmed et al., 2020). Another study reported that dental caregivers had high levels of fear, distress, and pressure during the

pandemic outbreak (Shacham et al., 2020). The current study's limitations include being an online survey; as such, reporting bias should be accounted for. We do not have any background check of the past students' psychological status other than the psychological medication, which might affect the results.

Table 3. Mean and standard deviation for score of Depression by Demographic Characteristics of the participants

		Mean\$	SD	P value
Educational institutes	King Saud university	10.22	6.51	0.381
	Riyadh elm University	7.71	4.91	
	Prince Norah Bint	9.91	6.27	
Academic year	Internship	6.50	4.74	0.008*
	Year 5	7.88	5.78	
	Year 4	12.59	6.60	
	Year 3	10.97	6.13	
	Year 2	7.92	5.88	
	Year 1	7.22	7.03	
Marital status	Single	9.97	6.36	0.535
	Married	6.00		
	Yes	17.13	3.44	
* Significant p value				
\$ out of 21				

CONCLUSION

High levels of depression, anxiety, and stress were reported among dental students during the pandemic. In addition to the stress of dental education itself, the contagious nature of this disease and those dentists were at a higher risk of getting the infection affected the student's psychological health. Universities should take this into consideration by developing psychological programs to help students face stress and depression.

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