

# Psychological Impact of the COVID-19 Pandemic on Dental Interns in Riyadh, Saudi Arabia: A Cross-sectional Survey

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## ABSTRACT

**Background:** Dental profession is labeled as a high-risk profession, due to which dental care professionals are under tremendous pressure during the outbreak of COVID-19 pandemic. The aim of this study was to assess the psychological impact of the COVID-19 pandemic on dental interns in Riyadh, Saudi Arabia.

**Materials and methods:** A cross-sectional study was conducted among dental interns from different universities in Riyadh, Saudi Arabia. The data were collected using a validated Depression, Anxiety and Stress Scale-21 Items (DASS-21) questionnaire. Descriptive statistics were presented using frequencies (*n*) and percentages (%). Chi-square and Fisher exact tests were used to assess the association between sociodemographic data (age, gender, nationality, marital status, and history of physical and mental illness) and levels of depression, anxiety, and stress. A *p* < 0.05 was considered as statistically significant.

**Results:** A total of 160 dental interns were invited to participate in this survey; out of which 110 participants responded yielding a response rate of 78%. The mean age of the study participants was 25.1 years. About 65% of the participants were female. Only 14.5% of the subjects reported having a past history of physical or mental illness. Depression, anxiety, and stress were identified in 11.9%, 7.3%, and 0.9% of the dental interns, respectively. Demographic characteristics did not appear to influence depression, anxiety, or stress levels (*p* > 0.05).

**Conclusion:** The outbreak of COVID-19 pandemic has affected the mental health of dental interns. The presence of depression, anxiety, and stress among dental interns highlights the need for special intervention and support programs to promote mental health and well-being among dental interns.

**Keywords:** Anxiety, COVID-19, Dental Interns, Depression, Mental Health, Psychological impact, Stress.

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## INTRODUCTION

The outbreak of the coronavirus disease (COVID-19) was first reported in Wuhan city, China, in December 2019. Since then, it has rapidly spread across the world and received huge attention globally.<sup>1</sup> Later, the novel coronavirus was identified and isolated by the Chinese Center for Disease Control and Prevention (CCDC) and named it as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The spread of infection is usually from person to person via close contact and can be transmitted through respiratory droplets of the infected person, so far this is considered the major route of transmission.<sup>2</sup> The virus causes upper respiratory tract infections, where the infected person presents with flu-like symptoms such as fever, dry cough, running nose, fatigue, difficulty in breathing, and shortness of breath, and in severe cases, it causes symptoms similar to acute respiratory distress syndrome (ARDS) which may eventually result in respiratory arrest and death.<sup>2,3</sup>

As of May 11, 2020, the total number of confirmed COVID-19-infected cases globally was 4.18M inclusive of 41,014 confirmed infected cases in Saudi Arabia.<sup>4</sup> It is quite a known fact that healthcare workers, the first-line service providers in combating COVID-19, are exposed to hazards that put them at an elevated risk of exposure to the infectious organisms. In a recent report, a patient who underwent surgery in a hospital in Wuhan infected 14 healthcare workers even before fever onset.<sup>5</sup> In another report, the authors reported that the School and Hospital of Stomatology, Wuhan University, that provides dental care service confirmed nine infected cases with COVID-19 among its employees.<sup>6</sup>

The Occupational Safety and Health Administration (OSHA) places dental care professionals in the category of high exposure

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risk, as the dental profession jobs are at higher risk for exposure to the infectious viruses known to cause COVID-19 while performing dental procedures.<sup>7</sup>

This could be based on the fact that the spread of infectious microorganisms in a dental setting could be through the bio-aerosols that are generated during the dental procedures. The spread of infectious microorganisms could also be through other

routes like contact from salivary and nasopharyngeal droplets from infected patients, direct contact with contaminated instruments or dental water supply system, and cross-contaminations from inanimate surfaces within the dental settings.<sup>8,9</sup>

The ongoing disastrous impact of this pandemic has posed significant challenges for clinical dentistry. For instance, the fact that dentistry is associated with the elevated exposure risk for the disease places oral healthcare providers under high psychological pressure during patient care.

Even though most of dental care settings have been suspended in countries experiencing COVID-19 pandemic, dental care professionals are still reported of undergoing enormous physical and psychological pressure, knowing the fact of being at a higher risk group.<sup>10,11</sup> A recent study has addressed the stress among medical students at a health university in Saudi Arabia during the outbreak of Middle East respiratory syndrome-related coronavirus (MERS-CoV).<sup>12</sup> Hence, the aim of this study was to assess the psychological impact of the COVID-19 pandemic on dental interns in Riyadh, Saudi Arabia. More specifically, this study sought to assess depression, anxiety, and stress among dental interns and determine the effect of certain demographic and health variables on participants' responses.

## MATERIALS AND METHODS

A cross-sectional study was conducted among dental interns to assess the psychological impact of the COVID-19 pandemic. The ethical clearance was obtained from the Institutional Review Board (IRB) before the initiation of the study (RC20/263/R, IRB NCBE Reg. No H-01-R-005). Required sample size was estimated based on the results of a recently published study.<sup>13</sup> Using 10% relative precision and 95% confidence level, the required sample size was 157, which was rounded off to 160.<sup>14</sup> The data were collected from the dental colleges located in Riyadh, Saudi Arabia.

Dental interns who were willing to participate were included in this study, and written informed consent was obtained from those participants. The data were collected using a web-based questionnaire that was sent to study participants. The questionnaire was designed after referring to similar studies reported in the literature. The questionnaire consisted of two sections, the first section consisted of demographic data which included the age, gender, nationality, marital status, and history of physical and mental illness followed by the second section which included the pre-validated Depression, Anxiety and Stress Scale-21 Items (DASS-21).<sup>15</sup> DASS-21 consists of seven items each, related to depression, anxiety, and stress. An individual's perception is assessed on a four-point scale of did not apply to me at all, applied to me to some degree, applied to me to a considerable degree, and applied to me very much. Scores were calculated by adding the scores for the relevant items and interpreted as normal, mild, moderate, severe, and extremely severe.

The feasibility of the questionnaire was assessed by conducting a pilot study among the interns in our college. The data were entered and analyzed using SPSS version 23 (IBM Corporation, Armonk, NY, USA). Since all the variables described in the attached questionnaire are categorical variables, the data were summarized as proportions. The Chi-square and Fisher exact tests were used to assess the association between sociodemographic data (age, gender, nationality, marital status, and history of physical and mental illness) and levels of depression, anxiety, and stress. A  $p < 0.05$  was considered as statistically significant.

## RESULTS

Out of the 160 interns who were contacted to participate in this study, 110 filled the questionnaire yielding an overall response rate of 78%. Table 1 shows the descriptive statistics based on demographic variables of study participants. The mean age of the participants was 25.1 years. About 65% of the participants were female. Only 14.5% of the subjects reported having a past history of physical or mental illness. The summary of the responses towards the questions related to DASS-21 is presented in Table 2. In general, most of the respondents expressed low DASS-21 scores.

Table 3 describes the comparisons between depression, stress, and anxiety levels in relation to age, gender, nationality, marital status, and medical history of participants. Interestingly, there were no statistically significant differences with any of these variables. In the present study, the prevalence of depression, anxiety, and stress was found to be 11.9%, 7.3%, and 0.9%, respectively (see Table 4).

## DISCUSSION

The aim of this study was to assess the psychological impact of the COVID-19 pandemic on dental interns in Riyadh, Saudi Arabia. The participants reported experiencing varying levels of mental health symptoms during the outbreak of COVID-19.

A recent study assessing the mental health status of dental care providers during the outbreak of COVID-19 has reported that dentists are under increased pressure and have reported high levels of fear and psychological distress during this outbreak.<sup>11</sup> Another study also investigated the mental health status of dentists during the COVID-19 outbreak and found different levels of fear and anxiety among dentists from 30 countries.<sup>10</sup> These studies have reported high proportion of participants experiencing depression, anxiety, and stress. This could be attributed to the fact that the ongoing pandemic is transmissible between humans and is also potentially fatal. This might be a reason for this self-reported behavior. Dental care providers are at a high risk of being exposed to the infectious disease, which might intensify the perception of personal danger. The fear of being exposed at work during their clinical hours has affected the mental health of dental interns.

**Table 1:** Descriptive statistics of demographic variables

Variable	Frequency	Percentage
Age	22	1
	23	22
	24	40
	25	36
	26	10
	31	1
Sex	Male	39
	Female	71
Nationality	Saudi	109
	Non-Saudi	1
Marital status	Married	9
	Unmarried	100
Medical history	Yes	16
	No	94

**Table 2:** Percentage of DASS-21 responses

		<i>Did not apply to me at all</i>	<i>Applied to me to some degree</i>	<i>Applied to me to a considerable degree</i>	<i>Applied to me very much</i>
Depression	I couldn't seem to experience any positive feeling at all	55	34	14	7
	I found it difficult to work up the initiative to do things	50	30.9	12.7	6.4
	I felt that I had nothing to look forward to	44.5	35.5	13.6	6.4
	I felt down-hearted and blue	56.4	32.7	9.1	0.9
	I was unable to become enthusiastic about anything	54.5	32.7	9.1	3.6
	I felt I wasn't worth much as a person	74.5	15.5	7.3	2.7
Anxiety	I felt that life was meaningless	59.1	30.9	6.4	3.6
	I was aware of dryness of my mouth	71.8	19.1	6.4	2.7
	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	85.5	10.9	3.6	0
	I experienced trembling (e.g. in the hands)	84.5	13.6	0.9	0.9
	I was worried about situations in which I might panic and make a fool of myself	60.9	30	7.3	1.8
	I felt I was close to panic	69.1	23.6	6.4	0.9
Stress	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	73.6	16.4	4.5	5.5
	I felt scared without any good reason	63.6	25.5	9.1	1.8
	I found it hard to wind down (relax)	31.8	49.1	15.5	3.6
	I tended to over-react to situations	50.9	32.7	11.8	4.5
	I felt that I was using a lot of nervous energy	58.2	26.4	12.7	2.7
	I found myself getting agitated (upset)	47.3	30.9	15.5	6.4
	I found it difficult to relax	41.8	46.4	10.9	0.9
	I was intolerant of anything that kept me from getting on with what I was doing	57.3	26.4	13.6	2.7
	I felt that I was rather touchy (oversensitive)	41.8	39.1	10	9.1

**Table 3:** Association of depression, anxiety, and stress scores among sociodemographic characteristics

	<i>Depression, Ø (N = 110)</i>			<i>Anxiety, Ø (N = 110)</i>			<i>Stress, Ø (N = 110)</i>		
	$\chi^2$	<i>df</i>	<i>p value</i>	$\chi^2$	<i>df</i>	<i>p value</i>	$\chi^2$	<i>df</i>	<i>p value</i>
Age	6.32	12	0.899	5.07	12	0.956	11.32	6	0.079
Gender	1.62	2	0.445	1.14	2	0.565	0.554	1	0.457
Nationality	0.124	2	0.94	0.079	2	0.961	0.009	1	0.923
Marital status	1.54	2	0.463	0.755	2	0.685	11.21	1	0.083
Medical history	1.357	2	0.507	2.099	2	0.35	0.172	1	0.679

Ø: Chi-square analysis

**Table 4:** Levels of depression, anxiety, and stress among study participants

<i>Levels</i>	<i>Depression, N (%)</i>	<i>Anxiety, N (%)</i>	<i>Stress, N (%)</i>
Normal	98 (89.1)	102 (92.7)	109 (99.1)
Mild	7 (6.4)	2 (1.8)	1 (0.9)
Moderate	5 (4.5)	6 (5.5)	0 (0)
Total	110 (100)	110 (100)	110 (100)

In the present study, the psychological impact of the COVID 19 pandemic on dental interns was assessed using the validated the DASS, which is a standardized self-report scale which measures all the three domains of emotional states of an individual, which mainly includes depression, anxiety, and stress at a time. The DASS is mainly developed to maximize discrimination between the three components it measures. The DASS has shown high reliability and validity at measuring anxiety and depression in both clinical and community samples.<sup>15,16</sup> The DASS-21 which was used in this study

is a short version of the DASS-42 and has the advantage of being less time-consuming and more consistent when compared to the full-scale version.<sup>15,16</sup>

Majority of the studies which have reported on the mental health status of dental students have used DASS for assessing the mental health variables. Studies reported on the mental health status of dental students have revealed that dental students undergo a lot of mental health stress and depression. To our surprise in the present study, the prevalence of depression, anxiety, and stress was 11.9%, 7.3%, and 0.9%, respectively. These scores were comparatively less, when compared to the results of studies reported in the literature. Our results showed that dental interns experienced less psychological symptoms compared to the results of a study conducted on dental students in Saudi Arabia, which revealed that 55.9%, 66.8%, and 54.7% of the study participants experienced depression, anxiety, and stress, respectively,<sup>13</sup> and also with the results of a study conducted in Mecca region of Saudi Arabia that reported the elevated levels of DASS scores among students.<sup>17</sup> Another study conducted in Kuantan, Malaysia, also reported a higher prevalence of depression, anxiety, and stress among study participants.<sup>18</sup> Another study conducted among dental students in Selangor, Malaysia, also reported high levels of depression, anxiety, and stress scores among study participants.<sup>19</sup> Similar results were reported from studies conducted on dental students in Denmark,<sup>20</sup> India,<sup>21</sup> Pakistan,<sup>5</sup> and Jordan.<sup>23</sup> The elevated levels of depression, anxiety, and stress levels in cited studies were attributed to the pressure that is exerted on dental students during the dental education by their workload, clinical requirements, examinations, and with the competition that persists throughout years of study.<sup>24,25</sup> In our study, however, dental interns expressed lower levels of DAS scores when compared to the reports mentioned above. This could be attributed to the timing of data collection. In the present study, the data were collected during the lockdown period that coincided with the end of the academic year, where participants were completely relieved from their clinical duties. This could be a reason for reporting bias, which could have affected the results of our study.

In the present study, we also assessed the association between age, gender, nationality, marital status, and medical history of the study participants with that of depression, anxiety, and stress levels, but there were no statistically significant results found. The previously reported studies have shown that female students reported higher levels of stress and anxiety when compared to male participants.<sup>17,19,22,25-27</sup> Few studies conducted on dental students have also reported that male students were more affected than female students.<sup>24,28</sup> In the previously published studies, married students showed more symptoms than the unmarried ones.<sup>21</sup> In the present study, very few participants were married, and marital status did not seem to affect the psychological status of participants. Of note is that around 15% of the participants reported that they had a past history of physical or mental illness, but this did not have any impact on their responses.

This study has its own limitations. For instance, data collection was accomplished using a questionnaire-based online survey. Therefore, the probability of reporting bias should be considered. Furthermore, data collection was performed during the lockdown period and after the completion of the academic year. Since the interns were completely relieved from their clinical duties, there could be a chance of underreporting. In addition to that, this study

did not take into consideration the difference in depression, anxiety, and stress levels at variable times, which is before and after the outbreak of COVID-19.

## CONCLUSION

The present study found that a few percentage of the study population were affected by the outbreak of COVID-19 and have revealed symptoms of mental health issues. This could be because of the contagious nature of this respiratory disease. Being aware of the fact that dentists are at a higher risk could have had an impact on the mental health status of participants. Dental interns facing mental health issues should be provided with professional counseling. Moreover, special intervention programs should be developed to promote mental health and well-being among these young dental professionals.

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