

Stress, Anxiety and Depression Levels Associated with COVID 19 among the Oral Health Care Workers in North India: A Cross-Sectional Study

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ABSTRACT

The COVID-19 outbreak has caused an impervious financial and psychological burden. Health care professionals, including oral health care workers, have been risking fighting the pandemic. The chief objective of the current study was to estimate the rates of prevalence of depression, stress, and anxiety among the oral health care professionals in Jammu and Udaipur city. The study was delineated as an online cross-sectional questionnaire-based research. It was mailed to different practitioners between May and July 2020, particularly those offered their services in COVID centers. The participants were to fill the self report questionnaires. Then, the parameters were measured using depression, anxiety, and stress scale 21 (DASS 21) and Hamilton anxiety rating scale (HARS) to measure the degrees of depression, stress, and fear among the volunteers. The target population was divided into age groups between 23 to 28 years and over 28 years. Four hundred ninety responses were received and were considered for the study. The acquired data were analysed using IBM SPSS software (windows version 23). The mean and standard deviations were calculated for stress, anxiety, depression using mentioned scale. The results were compared based on gender and age group. A statistically significant variance in stress level was found between male and female groups ($p=0.002$) and for the two age groups ($p=0.001$). Using the Hamilton anxiety rating scale, no statistically significant divergence could be seen among male and female participants. The current study showed stress, anxiety, and depressions were prevalent among health care workers working in COVID pandemic situations. Therefore, mental health status must be addressed, and issues must be resolved.

Keywords: Coronavirus 2019; Pandemic; Oral health care worker; Hamilton anxiety scale; Stress; Depression

NOMENCLATURE

COVID	-	Coronavirus disease
DASS 21	-	Depression, anxiety, stress scale 21
HARS	-	Hamilton Anxiety Rating Scale
HCP	-	Health care professional
MERS	-	Middle East respiratory syndrome
OHCP	-	Oral health care professional
OPD	-	Out patient department
PPE	-	Personal protective equipment
SARS	-	COVID-19 - severe acute respiratory syndrome coronavirus 19
WHO	-	World Health Organisation

1. INTRODUCTION

A pandemic is a global epidemic that spreads across continents. The end of 2019 witnessed a pandemic caused by severe acute respiratory syndrome coronavirus

disease (SARS COVID-19), which erupted from Wuhan, Hubei province, People's republic of China. The symptoms varied between mild to severe respiratory symptoms, with many being asymptomatic as well¹⁻². The world health organisation (WHO), later on, March 11th, 2020, declared it as a global pandemic with their public health guidelines to guide the pandemic response. National Health Commission of China reported the mortality rate of the infection to be between 2.1 per cent-0.2 per cent as of February 2020³. Joseph A Leonardet, *et al.*, reported that between March 2020 to June 2021, a total of 87870 human demises were recorded in a major metropolitan city of India, i.e., Chennai epitomised by the census report of 2011, which exceeded the anticipated deaths by 25990, i.e., 5.18 excess deaths per 1000 people⁴. In a qualitative comparative study, JiYounYoo, *et al.* found different death rates in South Korea, The United States, Brazil, China, Haiti, and UK⁵. In India, the death rate among hospitalised patients was reported between 11 per cent-15 per cent, suggesting that COVID-19 was

moderately infectious and was associated with a high mortality rate⁶. The highest effect of the infection was found among the elderly individuals with other systemic or medical compromises. The clinical presentations were severe interstitial pneumonia and multi-organ failure resulting in fatalities reported in India, China, and European countries⁵. By October 2020, approximately 500 lakhs certified cases of COVID-19 were reported with over ten lakhs mortalities across the globe, resulting in significant economic, social and psychological burden among the government, public and health care workers⁷. A combination of government and private health care facilities is available in India. To avoid the risk of spreading the COVID-19 infection, many private hospitals had closed their medical facilities to the patients. In public, these led to restlessness, irritation and despair. Health care workers facing a global health care crisis often have found themselves as unexpected targets in the fight against the pandemic. Stretched resources, shortage of personal protective and other types of equipment further aggravate the situation. All this together may create fear, stress, anxiety and depression among the frontline health care workers, which needs to be addressed⁸.

Stress can be described as a mental or emotional strain or tension predicament that can ramify from any untoward or demanding circumstance. Studies have revealed a sheer surge in the prevalence of anxiety, stress, depression and other mental illness among healthcare professionals (HCP)⁹. According to the American Psychiatric Association, anxiety disorders are emotional disorders that can affect anyone, ranging from increased heart rate, rapid breathing, restlessness, trouble in concentration to sleep difficulty.

Anxiety attacks vary significantly among individuals and symptoms may differ from person to person. One may feel overwhelming apprehension, worry, distress or fear resulting from a combination of factors. Depression is generally defined as a mood disorder narrated by feelings of sadness, loss or anger that interfere with daily activities¹⁰. As per the National Institute of Mental Health report, persistent sad/ anxious mood, feelings of hopelessness, irritability, frustration, restlessness, guilt, worthlessness, loss of interest in activities, decreased energy, fatigue, etc., are symptoms of depression. The widespread effect of COVID-19 has had its share of influence in India, just as in the rest of the world. Health care workers had fallen under immense pressure to tackle the situation that required long and continuous working days, scarcity of proper personal protective devices, medicines, and family support¹¹. Previous studies have revealed that SARS COVID-19 and the Middle East respiratory syndrome (MERS) had rendered the medical employees with severe stress that ultimately resulted in post-traumatic stress disorder¹². Each of them had their reasons or traumatic experiences such as stigmatisation, fear of getting infected, or being the reason for communicating the infection to their family, friends, or neighbours that left them anxious by the

end of their working shifts. For their fear coming true, India has reported a more significant number of positive cases of COVID-19 among the medical professionals and even a few succumbing to the illness. This had a psychological impact on this frontline workers¹³. Stress, anxiety, depression, and fear may affect family and kids, work, finances, or relationships. Mental stress may disturb all facets of life, including emotions, behaviors, rational thinking, and physical health. Oral health care professionals (OHCP), i.e., dental surgeons are an essential part of India's health care sector and actively work in various COVID centers to combat the pandemic. However, Mascitti M, *et al.* reported anxiety and fear among OHCPs due to social concerns¹⁴. Around March 2020 to July 2020, faced the most critical period of COVID-19, a time when the world lacked proper understanding and constant changes regarding the transmission rate of the disease, lack of adequate health care facilities, and fear among the general population. As a result, India experienced an increase in cases not only in metropolitan cities but also in smaller cities and towns got affected by the burden of the disease where health care facilities were limited compared to Tier I cities. This present online questionnaire-based study evaluates the stress, depression, and anxiety level among the OHCPs working in COVID-19 centers at Udaipur and Jammu city. While most of the published study focused on major cities, our study aimed at evaluating the stress, depression, anxiety and other related factors among the frontline OHCPs working in smaller cities where facilities are very different from many major cities of India.

2. METHODOLOGY

The current study was designed as an online questionnaire-based cross sectional study conducted between May and July 2020. Google forms were used to generate 45 online questionnaires and the dental surgeons associated with screening, diagnosing or treating patients in various COVID-19 centers were requested to fill the forms. The questionnaire form and described protocol were accepted and approved by the institutional ethical review board. The study participants were requested to give their consent online, and confidentiality of data was assured. The questionnaires link was sent to the practitioners, i.e., dental health care workers, via WhatsApp and mail. The total sample included 490 OHCPs, i.e., dental surgeons. By July 30th, 2020, the anticipated sample size was achieved, keeping the power of the study at 80 per cent. To filter out the doctors who were involved in practice during the pandemic, a standard "Yes/No" question was included that confirmed their work field. Only those who had chosen "Yes" could go ahead with the survey with five parts, covering aspects of socio-demographic characteristics, stress level, anxiety, depression, and other miscellaneous questions that dealt with their psychological health. Participants who already had any previous known major psychological health disorder or were recently diagnosed with any such diseases were excluded from the survey.

Table 1. Comparison of stress scores among groups

Variables	Mean	S. D	't' value	p-value [#]	Normal N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	Extremely severe N (%)
Gender	Male	12.89	7.14	1.30	49 (25.9)	42 (22.2)	70 (37.0)	14 (7.4)	14 (7.4)
	Female	10.51	8.87	1.42	161 (53.5)	0 (0.0)	84 (27.9)	42 (14.0)	14 (4.7)
Age (years)	Group I (23-28)	12.34	8.33	1.76	111 (31.8)	28 (8.0)	40 (40.1)	56 (16.0)	14 (4.0)
	Group II (>28)	9.16	7.87	1.64	99 (70.2)	14 (9.9)	14 (9.9)	0 (0.0)	14 (9.9)

Table 2. Comparison of anxiety scores among group

Variables	Mean	S. D	't' Value	p-value [#]	Normal N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	Extremely severe N (%)
Gender	Male	6.96	5.91	2.87	119 (63.0)	0.0 (0.0)	56 (26.0)	0.0 (0.0)	14 (7.4)
	Female	8.98	7.67	1.06	161 (53.5)	14 (4.7)	14 (4.7)	84 (27.9)	28 (9.3)
Age (years)	Group I (23-28)	8.58	7.12	3.05	181 (51.5)	16 (3.8)	42 (12.3)	89 (30.1)	29 (8.0)
	Group II (>28)	7.15	6.96	1.96	99 (70.2)	0.0 (0.0)	28 (19.9)	0.0 (0.0)	14 (9.9)

The demographic part recorded the age and gender of the participants. Data collection was done anonymously. A person could give only one response, fatigability, restlessness); fears (including of the dark/strangers/crowds); insomnia; 'intellectual' (poor memory/difficulty concentrating); depressed mood (including anhedonia); somatic symptoms (including aches and pains, stiffness, bruxism); sensory (including tinnitus, blurred vision); cardiovascular (including tachycardia and palpitations); respiratory (chest tightness, choking); gastrointestinal (including irritable bowel syndrome-type symptoms); genitourinary (including urinary frequency, loss of libido); autonomic (including dry mouth, tension headache) and observed behavior at interview (restless, fidgety)¹⁵. These elements cater to somatic and psychological symptoms; sensory, cardiovascular, respiratory, gastrointestinal and autonomic. The scale also has provisions for recording the subject's behavior at the time of the interview. Any score between 0-7 is considered normal, whereas any score above 20 is indicative of moderate or severe depression. Hence, HARS is considered the "gold standard" for assessing the severity of anxiety¹⁶.

3. RESULTS

Acquired data were scrutinised and detailed analysis was done using IBM SPSS software version 23.0. Shapiro-Wilk/ Kolmogorov and Levene's tests were performed to check the data normality and variance homogeneity. The scores of all the parameters were calculated to acquire the mean values and standard deviation. The severity of DASS-21 and HARS was assessed by calculating their frequencies and percentages and the results were compared based on age and gender using Student's t-test and chi-square test. Out of the 600 responses, 110 had to be excluded as they were incomplete and only 490 were considered (301 females and 189 males) for the statistical analysis. The participants were aged between 23 to 60 years, out of which 349 were between 23 years - 28 years (Age group I) and 141 were aged >28 years (Age group II). A statistically significant score for the stress levels between the male and female groups could be seen ($p=0.002$). The mean value of anxiety among the participants who belonged to the age group I was 12.34, while those of age group II exhibited an average score of 7.15, indicating a statistically significant

Table 3. Comparison of depression scores among groups

Variables		Mean	S. D	't'	p-value [#]	Normal N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	Extremely severe N (%)	p-value [@]
Gender	Male	9.78	7.89	0.91	0.084	147 (77.8)	14 (7.4)	16 (9.0)	14 (7.4)	0.0 (0.0)	0.003*
	Female	11.72	9.38	1.65		203 (67.4)	29 (9.3)	28 (9.7)	42 (14.0)	0.0 (0.0)	
Age (years)	Group I (23-28)	11.63	9.45	2.37	0.001*	223 (63.9)	42 (12.0)	42 (12.0)	43 (13.8)	0.0 (0.0)	0.001*
	Group II (>28)	9.33	7.03	0.67		127 (90.1)	0.0 (0.0)	0.0 (0.0)	14 (9.9)	0.0 (0.0)	

Table 4. Comparison of HARS scores among groups

Variables		Mean	S. D	't'	p-value [#]	Normal N (%)	Moderate N (%)	Severe N (%)	p-value [@]
Gender	Male	8.36	5.57	1.02	0.103	175 (92.6)	14 (7.4)	0.0 (0.0)	0.153
	Female	9.96	9.34	3.81		231 (84.6)	42 (15.4)	0.0 (0.0)	
Age (years)	Group I (23-28)	10.10	8.07	1.67	0.506	279 (66.9)	42 (13.1)	0.0 (0.0)	0.001*
	Group II (>28)	6.16	5.02	2.05		127 (90.1)	14 (9.9)	0.0 (0.0)	

difference (p=0.001). (Table 1) The anxiety score was found statistically significant among males and females (p=0.003). The mean anxiety score for the age group I (8.58) compared with the age group II (7.15) was also statistically significant (p=0.043). (Table 2) The depression score was found statistically significant among males and females (p=0.018). The depression score among the two age groups was also statistically significant (p=0.009). (Table 3) Considering the HARS score, it was found statistically non-significant among males and females (p=0.153), but it was found statistically significant among the two age groups (p=0.001) (Table 4).

4. DISCUSSION

The phase of the pandemic had led human life into isolation, resulting indetrimental effects on their psychological health, causing anxiety, depression, stress and fear. The best method of prevention of its progress is its early recognition. This current research has focused

on the level of mental stress, depression and anxiety among the OHCPs working in COVID-19 centers.

It was found that about 53 per cent of female participants were undergoing normal/usual levels of stress at their workplace, while it was 25.9 per cent for the male study participants. 41.9 per cent of the females and 74.1 per cent of males exhibited marginal degrees of stress. A narrow population was under a severe degree of stress, whereas 7.4 per cent of males and 4.7 per cent of females had exhibited the characteristics of severe degree of stress.

When age as a factor was taken into consideration, it was noticed that among the age group I, about 31.8 per cent were under the average stress level. In comparison, about 68.2 per cent, 16 per cent, and 4 per cent of the population had exhibited features of mild, severe and highly severe levels of stress, respectively. Among those in age group II, around 70.2 per cent of the participants fell with in the normal range, and 29.8 per

cent exhibited a marginal degree of stress which was much lower juxtaposed to the age group I contemplated in this study. The percentage of people exhibiting severe and extremely severe levels of stress was equivalent to that of the age group I and II at 9.9 per cent and 9.4 per cent respectively. Another important parameter that was considered in the current study was the anxiety level. Among the total population, 63 per cent of the males and 63.5 per cent of the females fell under the group of the normal range. Some degree of anxiety was exhibited by 37 per cent of males and 46.5 per cent of females. 27.9 per cent of the females were anxious and 9.3 per cent of them were highly anxious. Compared to females, males exhibited more anxiety levels, 7.4 per cent being extremely anxious. However, no male exhibited a severe degree of anxiety. On considering the age of the participants to measure the anxiety levels, those who were over the age group II were normally anxious and none of them exhibited a severe degree of anxiety. However, 9.9 per cent were extremely anxious. Among the age group I, 51 per cent were normally anxious, 24.1 & and 8 per cent exhibited severe and extremely severe levels of anxiety, which is higher than the older age group.

On measuring the level of depression among the participants, it was found that 77.8 per cent and 67.4 per cent of males and females, respectively were within the standard scores. 22.2 per cent of the males and 32.6 per cent of the females exhibited mild depression. 7.4 per cent of males and 14 per cent of females were severely depressed, which is almost double that of males. Among those of age group II, 90.1 per cent of the participants were within the normal levels of depression and 63.9 per cent among those of age group I and 13.1 per cent exhibited mild to moderate anxiety respectively according to the HARS. Nader Salari *et al.* In a systemic review, found that the prevalence of stress in 5 reported studies (n=9074) was 29.6 per cent, the prevalence of anxiety in 17 studies (n=63,439) as 31.9 per cent, and the prevalence of depression in 14 studies (n=4,531) as 33.7 per cent¹⁷.

Recent studies by Ahmed, M.Z. *et al.* and Cao, W. *et al.* also have reported that COVID-19 influences mental health outcomes such as anxiety, depression and post-traumatic stress symptoms^{18,19}.

Lim, G.Y. *et al.*, in an epidemiological study, showed that the female gender was at greater risk of having depression²⁰. A Moghani bashi Mansourieh, *et al.* a study based on Iran using DASS21, reported an anxiety level of 50.9 per cent²¹. C. Wang, *et al.* in China found depression, anxiety, the stress level of 30.3 per cent, 36.4 per cent, and 32.1 per cent respectively¹⁹. S.S.H. Kazmi, In India, (n=1000) DASS-21 based online survey reported depression, anxiety and stress levels of 38.9 per cent, 43 per cent and 35.7 per cent, respectively²². N. Othman, *et al.* in Iraq (n=548) reported depression, anxiety, the stress level of 44.9 per cent, 47.1 per cent, and 17.5 per cent, respectively, using DASS-21²³. C. Mazza, *et al.* in Italy (n=2766) DASS-21 showed depression, anxiety, the stress level of 32.8 per cent, 18.7 per cent

and 27.2 per cent respectively²⁴. The prevalence rates of depression and anxiety in the present study were similar to the findings given by various other studies. Our study reported that the levels of stress were relatively low, but several participants did exhibit moderate or severe stress that was clinically evident.

A study conducted by Zhou, *et al.*, described stress, anxiety and depression rates among 5,062 HCPs at 29.8 per cent, 13.5 per cent and 24.1 per cent respectively in those who were a part of public hospitals Wuhan, China²⁵. A similar study by Lai *et al.* had quoted that the rates of severe stress, depression and anxiety stood at 10.5 per cent, 14.8 per cent, and 13.3 per cent among 1,257 HCPs who participated in the study²⁶.

COVID19 did take some time to reach the rest of the world like a pandemic, giving some period of pre-pandemic fear and stress among the population also. One such study reported by Grover, *et al.* conducted at pre-pandemic period among the doctors of Chandigarh had stated that the symptoms of moderate or severe depression in 13.2 per cent and moderate or high degrees of stress were identified among the frontline health workers²⁷. A study published by Swapnil *et al.* quoted that the rates of depression and anxiety among the nursing staff handling intensive care units in India stood at 14.18 per cent and 64.60 per cent²⁸. Sahin *et al.* had conducted a questionnaire study to assess the level of stress among the healthcare workers posted in the emergency department in Turkey²⁹. The research results disclosed that the pandemic situation had some detrimental effect on the mental health of about 80.8 per cent of the participants. It was observed that 51.3 per cent of them treated COVID patients and were at a high risk of contracting the infection. Although 71.7 per cent of the participants thought that they had all the Personal protective equipment (PPE) and proper disinfection protocols being followed in those wards while dealing with COVID-19 patients, 79.2 per cent were dissatisfied with the same and believed that the PPEs offered to them benefit up to the level of their expectations.

As a whole, the data shows that the pandemic situation did not affect the health care workers in India as much as it affected the other countries, particularly Wuhan, China. One possible explanation for this difference may be attributed to the total lockdown imposed by the central government that contained the infection from community transmission. This reduced the load of patients in the public sector tertiary care hospital. Another reason may be the competitive spirit of Indian doctors.

Medical education in India had already exposed them to handling patient's burdens and long working hours³⁰. Many times, they had also been in contact with a variety of communicable diseases, in both private and public sectors, metropolitan or rural areas that handle a large number of patients regularly in their out patient departments (OPDs), most of them with very minimal medical and paramedical staff and no proper infrastructure. Based on the study as mentioned above by Bajpai in

2014, one could understand that the health care workers in India, both oral and general were less panic-stricken and were psychologically less affected by COVID-19, particularly the old practitioners who had been serving for long years. Although the stress and anxiety levels regarding the proper handling of patients did not show much difference between the pre-pandemic period and the outbreak of pandemic in 2020, stress and fear at the risk and the thought of communicating the infection to their families and the reduced level of administrative support and deficient supplies of PPEs have, for sure, caused some amount of anxiety and depression among the healthcare professionals³¹.

The Indian Medical Association (IMA) reported and published government data that around 87,000 HCWs have got infected, and 573 HCPs have lost their lives due to COVID-19. Another survey conducted by the ICMR has evaluated that 5 per cent of frontline HCPs may have hospital-acquired COVID-19 due to the exhaustion of the facility's workforce³². An essential factor to be considered in a country like India is its population density, as an event as a virus outbreak can result in great variability in the burden of people getting diagnosed with the same. Moreover, the distribution of the infection was also variable in such a way that the metropolitan cities of the country had to live through the brunt of COVID. At the same time, the rural regions remained fairly unaffected. Hence, the results of this study may not represent the oral health care professional (OHCP) in the entire country but can give us an outlook on the psychological impact the pandemic has brought upon the practitioners.

5. CONCLUSION

In this present study, the prevalence of severe or extremely severe stress and anxiety symptoms was found among both male and female participants. These were comparable to the current reports from other countries. Staying away from family and fear of spreading disease in the family were significant stress predictors. The government and medical associations are taking many initiatives to match the psychological need of the general population and HCPs. Thus, it is recommended that these measures should carry on at least till the pandemic situation is prevalent.

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