

PREVALENCE OF STRESS AND ANXIETY AMONG ORAL HEALTHCARE WORKERS DURING COVID-19 PANDEMIC: CROSS-SECTIONAL STUDY

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**ABSTRACT****Introduction:** The COVID-19 pandemic has significantly affected oral health care workers' lives in all dimensions. They face mental health challenges due to public health actions, such as physical distancing and quarantine, which can make us feel isolated and lonely and increase stress and anxiety. This study aimed to find the prevalence of stress and anxiety among online respondent oral healthcare workers during the COVID-19 pandemic.**Materials and Methods:** This prospective descriptive cross-sectional study was conducted from 24 June 2020 to 13 July 2020 among oral health care workers in a tertiary care centre. Ethical approval was taken from the Ethical Review Board (Reference number: 2710). A convenience sampling method was used. The data were collected using a questionnaire through Google Forms. Point estimate and 95% Confidence Interval were calculated.**Results:** Among 133 oral health care workers, the prevalence of anxiety and stress was found to be 32(24.06%) (17.96 30.16 at 95% Confidence Interval) and 11(8.27 %) (4.34 12.20, 95% Confidence Interval), respectively.**Conclusion:** The prevalence of anxiety among oral health care workers was slightly lower, but higher stress was observed than in similar studies done in similar settings and methods. Further research in this field is needed.**Keywords:** Anxiety, COVID-19, Oral Health, Stress**INTRODUCTION**

Corona Virus Disease (COVID-19) is a complex respiratory disease caused by a newly discovered highly infective novel Coronavirus named the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS CoV-2).¹ Oral HCWs have been described as vulnerable groups having high risks of SARS CoV-2 infection because they work in close physical contact with patients (face to face) and have a longer duration of work. In addition, they have reported feelings of uncertainty and a threat to life, i.e. stress, alongside cognitive and somatic symptoms of anxiety during the early rapid expansion phase of the COVID-19 outbreak. Previous studies showed that the prevalence of anxiety had ranged from 11.3% to 46.3%, and stress ranged from 1.5% to 47.0% among HCWs.^{2,3} Moreover, its prevalence was highest among oral HCWs, with 46.4% to 78.0% of anxiety and 47.0% of stress in the early pandemic.⁴

According to the World health organisation (WHO), stress

means feeling troubled or threatened. On the other hand, anxiety may be defined as apprehension, tension, or uneasiness that stems from the anticipation of danger (stress), which may be internal or external. Stress and anxiety are two powerful emotions that can occur during a pandemic.^{5,6} A little bit is natural and helps to perform protective and preventive behaviours toward pandemic. Nevertheless, very high stress often affects the body, urgent yet to be appreciated among oral HCWs and most frequently has been described in the literature.⁷ High stress and anxiety often affect the body's control system; they are also associated with worsened physical health, including an increased risk of cardiovascular disease, which may be independent of depression. Stress and anxious oral HCWs lose muscle power, feel restless, become easily fatigued, have difficulty concentrating, or their mind goes black and cause sleep disturbance, resulting in poor performance and low productivity in the

workplace. The decline in the ability of oral HCWs to cope with stressful situations led to an increase in professional negligence dramatically.⁸

This emphasises the need for further understanding of the biological mechanisms underlying anxiety and stress disorders among oral HCWs, which may improve mental health delivery and pave the way for further such studies in different parts of the world. This study aimed to assess the stress and anxiety level among oral HCWs during an early phase of the COVID-19 pandemic.

MATERIALS AND METHODS

This is a descriptive cross-sectional study, an internet-based online survey conducted among oral HCWs working in a different health service centre in Nepal. Oral health care services were categorized into university teaching colleges, private dental hospitals, government hospitals, and private dental clinics. The response from the oral HCWs was collected from 24 June 2020 to 13 July 2020 only.

This study protocol followed the American Association for Public Opinion Research (AAPOR) reporting guideline. Furthermore, the study protocol was submitted for ethical clearance to the Nepal Health Research Council (NHRC), Kathmandu, Nepal (NHRC Reg 445/2020P) and ethical approval for this study was provided by the ethical review board (ERB) of NHRC in a letter (Ref No 2710) before the initiation of this study. In addition, the study followed the principles of the Helsinki Declaration and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline.

Participants were oral HCWs who were involved in oral health care management. The oral HCWs included junior residents, senior residents, faculty members, dental surgeons, dental nurses, dental hygienists, dental chairside assistants, technicians, clerical staff, administrators, security staff, sanitation workers, and maintenance worker drivers from 7 provinces of Nepal. This study did not collect participants' names or other personal information, and their confidentiality was well maintained. However, an informed e-consent was obtained from individual participants before enrollment in this study.

The inclusion criteria were DOHCWs of any gender, above 18 years, reading English/Nepali and consent for this study. The Exclusion criteria were duplicated entries and incomplete forms not providing informed consent for the study or wanting to drop out of the study within two weeks of submission.

The minimum required sample size was 97. In the calculated sample size, 10% was added to address the

non-response rate, after which the required sample size was 107. Finally, a sample size of 133 was taken for the study. The convenience sampling method was used to collect the desired sample for the present study.

Mental health issues were assessed using the well-established 21-item Depression, Anxiety and Stress Scale (DASS-21).⁹ DASS-21 is a set of three self-reported scales designed to measure depression, anxiety and stress. Each component DASS category contained seven items scored on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic nonspecific arousal. It assesses difficulty relaxing, nervous arousal, being easily upset/agitated, irritable/over-reactive and impatient. Scores for anxiety and stress items were calculated by summing the scores for the relevant items (Table 1).

The questionnaire was sent as Google Forms to oral HCWs via social media platforms. The participants were recruited by sending the survey link to dental and oral HCWs through different electronic platforms. The data were extracted to Microsoft Excel 2016 from the Google Form. Data analysis was performed using IBM SPSS Statistics 11.5. Point estimate and 95% CI were calculated.

RESULTS

Among 133 oral HCWs during the COVID-19 pandemic, the prevalence of anxiety was found to be 32(24.06%) (17.96 -30.16, 95% CI), and stress was 11(8.27%) (4.34 -12.20, 95% CI) (Table 2). On DASS analysis, the total anxiety score was 2.37 ± 2.73 , and the stress score was 3.12 ± 3.22 . Categorically, the highest number of oral HCWs experienced moderate symptoms of mild anxiety 15(11.27%) (4.60 ± 0.51) and moderate stress 5(3.75%) (10.4 ± 0.89).

Table 1. DASS (Depression, Anxiety, Stress) scale score analysis.

DASS Scale	Mean	SD	Range	IQR	Prevalence n (%)	95%(CI)
Anxiety						
Mild	4.60	0.51	4-5	1	15(11.27)	(6.77 to 15.79)
Moderate	6.67	0.50	6-7	1	9(6.76)	(3.18 to 10.35)
Severe	9.28	0.95	8-10	1	3(2.25)	(2.08 to 8.45)
Extremely severe	1.00	0.0	12	0	5(3.75)	(-0.48 to 1.98)

Overall Anxiety	2.37	2.726	0-12	3	32(24.06)	(17.96 to 30.16)
Stress						
Mild	8.67	0.57	8-9	1	3(2.25)	(0.14 to 4.37)
Moderate	10.40	0.89	10-12	2	5(3.75)	(1.05 to 6.47)
Severe	13.33	0.58	13	1	3(2.25)	(0.14 to 4.37)
Overall Stress	3.12	3.226	0-14	5	11(8.27)	(4.34 to 12.20)

Note: IQR: Inter Quartile Range; M: Mean; SD: Standard Deviation

Compared within cohort, female: [15(29.41); P = .258]

and [7(13.73); P=.348], married [15(25.86%); P=.873] and [5(8.62%); P=.727], lack of comorbidities [30(24.39%); P=.941] and [11(8.94%); P=.974] reported experiencing highest symptom of anxiety and stress respectively. (Table 2). In the current workplace, the highest anxiety was [5(55.55%); P=.459] is involved in teaching-learning activities only, whereas the highest stress was [5(11.36 %); P=.707] in oral HCWs halted clinical work on patients. In the workplace, dental surgeons [21(26.58 %); P=.185] had the highest anxiety, but junior residents had [3(13.63%); P=.730] had the highest stress. The highest anxiety [5(31.25%); P=.931] was found in oral HCWs of private dental hospitals, and the highest stress [7(11.86%); P=.152] was found in teaching hospital oral HCWs.

Table 2. Descriptive analysis and point prevalence of anxiety and stress among groups.

SN	Variables	Categories	Response Number (%)	Anxiety Symptoms n(%)	p-value	Stress Symptoms n(%)	
1.	Age (in years)	20 – 29	69(51.87)	13(18.84)	.843	4(5.80)	.348
		30 – 39	48(36.09)	14(29.17)		5(10.42)	
		≥40	16(12.03)	5(31.25)		2(12.5)	
2.	Gender	Male	82(61.65)	17(20.73)	.258	4(4.82)	.727
		Female	51(38.35)	15(29.41)		7(13.73)	
3.	Marital status	Single	70(52.63)	16(22.86)	.873	5(7.14)	.432
		Married and living with spouse	58(46.61)	15(25.86)		5(8.62)	
		Married and staying away from the spouse	4(3.00)	1(25.0)		1(25.0)	
4.	Morbidity	No	123(92.48)	30(24.39)	.941	11(8.94)	.974
		Yes	10(7.52)	2(20.0)		0	
5.	Work Position	Junior Resident	22(16.54)	4(18.18)	.185	3(13.63)	.730
		Senior Resident	2(1.50)	0		0	
		Faculty Member	27(20.30)	7(25.92)		3(11.11)	
		Dental surgeon	79(59.39)	21(26.58)		5(6.33)	
		Sanitation worker	3(2.25)	0		0	
6.	Place of current work	Clinically active during outbreak	80(60.15)	15(18.75)	.459	5(6.25)	.707
		Halt clinical work	44(33.08)	12(27.27)		5(11.36)	
		Involved in academic activity only	9(6.76)	5(55.55)		1(11.11)	
7.	Type of Institution	University / Medical / Dental teaching college	59(44.36)	17(28.81)	.931	7(11.86)	.152
		Private Dental hospital	16(12.03)	5(31.25)		1(6.25)	
		Government hospital	24(18.05)	6(25.0)		1(4.16)	
		Private Dental clinic	34(25.56)	4(11.76)		2(5.88)	
8.	Location	Province -1	27(20.30)	5(18.52)	N/A	3(11.11)	N/A
		Madhesh	37(27.81)	12(32.43)		2(5.41)	
		Bagmati	53(39.84)	12(22.64)		5(9.43)	
		Gandaki	2(1.50)	0		1(50.0)	
		Lumbini	9(6.76)	1(11.11)		0	
		Karnali	1(0.75)	0		0	
		Sadurpanchim	4(3.00)	2(50.0)		0	

Of the 32 oral HCWs with anxiety, the majority, 17(53.13%) were males, 16(50.00%) were single, 30 (93.75%) did not have any comorbidities, and 21(65.63%) were dental surgeons. On the other hand, of 11 stressed oral HCWs, the majority, 7(63.63), were female, and 5(45.45%) were single dental surgeons and worked in Bagmati provinces.

Table 3. Demographic characteristics of oral healthcare workers with Anxiety and Stress.

SN	Variables	Categories	Anxiety n(%)	Stress n(%)
1.	Age (in years)	20 – 29	13(40.63)	4(36.36)
		30 – 39	14(43.75)	5(45.45)
		≥40	5(15.62)	2(18.18)
2.	Gender	Male	17(53.13)	4(36.36)
		Female	15(46.87)	7(63.63)
3.	Marital status	Single	16(50.00)	5(45.45)
		Married and living with spouse	15(46.87)	5(45.45)
		Married and staying away from the spouse	1(3.13)	1(9.09)
4.	Morbidity	Yes	2(6.25)	0
5.	Work Position	Junior Resident	4(12.50)	3(27.27)
		Senior Resident		0
		Faculty Member	7(21.88)	3(27.27)
		Dental surgeon	21(65.63)	5(45.45)
		Sanitation worker	0	0
6.	Place of current work	Working in routine duties on crisis of COVID-19	15(46.88)	5(45.45)
		Currently do not working on patients	12(37.50)	5(45.45)
		Involved in teaching learning activities only	5(15.63)	1(9.09)
7.	Type of Institution	University / Medical / Dental teaching college	17(53.13)	7(63.63)
		Private Dental hospital	5(15.63)	1(9.09)
		Government hospital	6(18.75)	1(9.09)
		Private Dental clinic	4(12.50)	2(18.18)

8.	Location	Province -1	5(15.63)	3(27.27)
		Madhesh	12(37.50)	2(18.18)
		Bagmati	12(37.50)	5(45.45)
		Gandaki	0	1(9.09)
		Lumbini	1(3.13)	0
		Karnali	0	0
		Sadurpanchim	2(6.25)	0
	Total	32(24.06)	11(8.27)	

DISCUSSION

Recent papers highlight the need for high-quality data on the mental health effects of the COVID-19 pandemic across oral HCWs.^{10,11} The COVID-19 pandemic has severely impacted the mental health and well-being of oral HCWs worldwide.¹²⁻¹⁶ The vision of the WHO special initiative for mental health is that all people achieve the highest standard of mental health and well-being.^{4,17} Hence, this study was designed and conducted to assess the stress and anxiety level among oral HCWs during the early COVID19 pandemic. This study found the prevalence of anxiety 32(24.06%) (17.96 to 30.16 at 95% CI) and stress 11(8.27%) (4.34 to 12.20 at 95%CI) among oral HCWs. The main finding of this study is an elevated level of stress and anxiety among oral HCWs than public and HCWs.^{2,14} Nevertheless, oral HCWs had a lower level of anxiety and higher stress than frontline HCWs.^{2-6,18} Studies from different parts of the world have reported the prevalence of anxiety from 11.3% to 50%¹⁹⁻²⁰ and stress from 5.2% to 7.43%.^{6,21} The findings of the present study are within this reported range. However, this finding is slightly less than those found in a recent study conducted among the HCWs during the early COVID-19 pandemic in the developing country Nepal.²² This could have occurred due to the demanding nature of clinical work among HCWs. Most participants in those studies were medical doctors and nurses; they had been forced to work in this emergency.

Humans worldwide have experienced elevated mental health concerns during Corona Virus Disease (COVID-19) pandemic,¹ with significant differences seen among health care workers (HCWs) across several countries and phases of the pandemic. Oral HCWs have been described as the most vulnerable groups.²⁻⁶ The evolution of mental health problems is related to the pandemic's evolution and the social, economic and health issues accompanying it. Depression and anxiety appeared to peak in May 2020 and decreased throughout 2021. At the same time, stress remained elevated throughout the pandemic.^{7,8} Previous studies showed that the prevalence of anxiety had ranged from 11.3% to 46.3%, and stress ranged from 1.5% to 47.0% among HCWs.^{2,3} Moreover, its prevalence was highest among oral HCWs, with 46.4% to 78.0% of anxiety and 47.0% of stress in the early pandemic.⁴

However, longitudinal studies have yet to be conducted. Moreover, because they are a high-risk group and the pandemic has not been eradicated, oral HCWs are more concerned about COVID-19. Therefore, this study may help researchers and policymakers to take further action.

The lower anxiety in the present study may be attributed to respondents being somewhat accustomed to changes in COVID-19 protocol and guidelines. In contrast, the higher stress may be attributed to curiosity, insecurity, and uncertainty about the future, particularly regarding job losses and economic stress. This pandemic has been described as a public health crisis for countries worldwide and announced as a public health emergency of international concern. While the centres for disease control and prevention (CDC) and dental association recommended halting oral health care facilities (except for urgent or emergent treatment)²³. HCWs worldwide had mobilised for health care crisis management; many oral HCWs had worked as frontline or reserve frontline. Consequently, a very high prevalence of anxiety, 78% and stress, 92% were reported in previous studies conducted among oral HCWs.^{5,12-14} Initially, oral HCWs response has much visible flight and fight response to excessive pressures and demands placed on an individual could be reasons for high stress. Their fear of being infected or the chance of unknowingly infecting patients, family members or friends and pandemic-related concerns (workload, provision of quarantine and social distancing, logistic support) could be reasons for high anxiety. However, the lesser prevalence in the present study could have occurred due to the psychological adaptation, mental fatigue, burnout, or early mitigation of psychological issues in our country.²⁴ Moreover, the timing and assessment technique used could be reasons for anxiety and stress among oral HCWs. Similarly, the WHO report described that the COVID-19 pandemic led to a 25.6% increase (95% CI: 23.2–28.0) in anxiety worldwide in 2020.⁶ Therefore, the finding is again within the range of the present study.

Although many risk factors have been identified to predispose someone to an anxiety and stress disorder, the biological mechanisms underpinning the disorders are not yet fully understood. One primary explanation for the increase is the unprecedented stress caused by the social isolation and lockdown resulting from the early pandemic.^{25,26} Linked to this were constraints on oral HCWs' ability to work, seek support from loved ones and engage in their communities. Loneliness, fear of infection, suffering and death for themselves and loved ones, grief after bereavement and financial worries have also been cited as stressors.²⁵⁻²⁷ However, scarcity of logistic support and conflict among professionals could be the main reason for stress. Anxiety is closely associated with

stress. The leading cause of anxiety could be knowing about belonging to a highly vulnerable group. Oral HCWs often have direct contact with the patient. They work very close to a nasopharyngeal area, and a longer work duration (SARS CoV-2) puts them at high exposure risk. However, the lack of PPE, sanitation and aeration handwash in health service centres concerns personal protection; this likely explains higher anxiety in this study. They may have concerns about many other issues such as frequent changing guidelines, lack of information, poor communication and the need for infection prevention and control training, which could cause anxiety in the present study. The pandemic continues to raise concerns, and it has a potential effect on the mental health of oral HCWs. Lastly, anxiety and stress promptly will increase the risk of physical health conditions, such as metabolic disorders, cardiovascular disease and infections.^{7,8} While addressing mental health and well-being, basic needs and support should be actively provided to the oral HCWs.

Point prevalence of anxiety and stress within the cohort is shown in Table 2. A higher prevalence of anxiety and stress was found among females than males (Table 2). Our studies showed a wide gender gap similar to past evidence about psychological issues among HCWs.^{16,20}

Similarly, the highest anxiety was seen in married oral HCWs in the age group more than 40 years; probably, they have high self-awareness and concern for their increased age and family health.¹⁹ Moreover, these age groups are critical active working forces having responsibilities of family and are, therefore, affected mainly by redundancies and dental clinic closures.¹⁸ Interestingly, 21(26.58%) anxiety levels were found among dental surgeons, whereas higher stress 3(13.63%) among junior residents. However, previous studies found an association between education and anxiety or stress levels.^{2,3,18,19,20} The present study showed higher anxiety and stress among oral HCWs involved in academic activity than those with a higher academic degree. A high prevalence of anxiety and stress could be due to insufficient knowledge, awareness, or training related to COVID-19; studies showed that higher academic degrees had excellent knowledge, attitude and practiced toward COVID-19. Similarly, Lia et al.2020 found that lower occupation posts (nursing staff) exhibited a higher prevalence of anxiety and depression than faculties.¹⁹ The present study observed higher anxiety among dental surgeons because they were key workforces during an early pandemic. They might be concerned about high exposure risk as they spend more time in oral health care centres and are directly involved in patient care and human excreta. Higher stress among junior residents could be a higher workload for them. Compared with those working in hospitals, oral HCWs working in private

dental hospitals were more likely to report higher anxiety 5(31.25%). However, higher stress 7(11.86%) was found among tertiary care health care centres (Medical / Dental teaching college) (Table 2). Predictably shortages of supplies (lack of logistics, deprivation of protective gear, food and transport) in private dental hospitals could be reasons for high anxiety,^{18,19,20,22} and more workload in tertiary health care centres could be reasons for high stress among oral HCWs. Previous studies also found a similar association between psychological issues and the inadequacy of PPEs.^{18,19}

Previous studies have described that the COVID-19 pandemic has increased anxiety and stress three to six-fold worldwide in 2020 within the cohort. Similarly, the present study showed a two to three-fold increase within the cohort. Out of 32(24.06%), anxious oral HCWs, single male dental surgeons working in routine duties on the crisis of COVID-19 in a tertiary hospital (University / Medical / Dental Teaching College) had shown an increased prevalence of anxiety two-fold in a cohort. Similarly, 11(8.27%) stressed oral HCWs, female, married, dental surgeons, working on crisis in a tertiary hospital (university / Medical / Dental teaching college) had shown an increased stress prevalence by three-fold. Similar to the past evidence, the present study demonstrated a wide demographic gap in anxiety and stress among oral HCWs.

After each wave of COVID19, oral HCWs may have a strong and lingering reaction.²⁴ Therefore, this study emphasises learning healthy ways to cope and getting the proper care and adequate support for the mental health and well-being of oral HCWs. Any changes concerning oral HCWs regarding their mental health issues, i.e. stress, and anxiety, should be addressed as soon as possible.^{28,29} WHO guide recommended some healthy ways to deal with stress and anxiety: understanding standard coping mechanisms, addressing the myriad of emotions that may surface, enhancing social support, timely dissemination of information, and encouraging the development of adaptive coping strategies during such times.⁶ Stress reducers are eating healthy, regular physical activity, and practising good sleep hygiene. Grounding himself/herself during emotional storms by noticing thoughts and feelings, slowing down and connecting with the body by slowly pushing feet into the floor, stretching and breathing are successful measures to reduce stress levels. It is refocusing and realising about thoughts or feelings that make him stressed and unhook them. Choose the values most important to their life, i.e. being kind and caring, helpful, brave, and hardworking.

Access to appropriate psychological mitigation in oral HCWs is essential as the risk of future outbreaks remains real. These findings could potentially inform the

formulation of much-needed mental health awareness programs for oral HCWs who may face similar disease outbreaks. The coping strategies akin to positive lifestyle behaviours can vastly improve mental health and well-being.^{28,29} At the time of the survey, some support mechanisms and resources were already being offered; It would be helpful to explore the differences among the support services in these different healthcare settings and share good practices and learning. It highlights the need for effective and streamlined communication to ensure awareness of what is available. It is an essential contributor to the success and survival of our oral health care. Extending appointments can help reduce team stress while allowing for increased time for patient education and, most importantly, an opportunity to address fears and answer questions.

There are several limitations of the study. First, the small sample size and use of convenience sampling could limit the generalisability of all oral HCWs. The small sample size could be explained by a higher non-response rate than expected due to the short period of data collection (3 weeks), willingness, harshness and fewer oral HCWs in Nepal. Second, this study did not examine factors that could potentially contribute to the stress and anxiety of oral HCWs. Nonetheless ought to be considered in comparisons with other related literature. Third, recall bias can still be a potential confounder, although measures had been taken during the recruitment process to minimise this as much as possible.

CONCLUSION

The prevalence of anxiety among oral health care workers was slightly lower, but higher stress was observed than the similar studies done in similar settings and methods. However, this prevalence of anxiety and stress in oral health care workers emphasises the need for psychological intervention during health crises and other outbreaks.

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CONFLICT OF INTEREST: None

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