



Libyan Journal of Public Health Practices (LJPHP)

Journal homepage: <https://journals.uob.edu.ly/LJPHP>
ISSN (Online) 3008-1467



Research article

Stress, Anxiety, And Depression Among Dentists Three Years into The Pandemic

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ARTICLE INFO

Article history:

Received 28/6/2024

Revised 4/9/2024

Accepted 30/10/2024

Available online xxxx

Keywords:

Depression

Anxiety

Stress

COVID

Dentists

ABSTRACT

The COVID-19 pandemic had a significant impact on healthcare workers globally, including the psychological wellbeing of dentists. To evaluate the effect of the early phase of the pandemic on the long-term psychological well-being of dentists, this study assessed dentists' mental health outcomes at two time points, at fall 2020 (six months into the pandemic), and at winter 2023 (three years into the pandemic). Specifically measuring the prevalence of symptoms of depression, anxiety, stress, and potential associated risk factors. The study surveyed dentists in Libya who responded to the study questionnaire. Specifically measuring the prevalence of symptoms of depression, anxiety, stress, and potential associated risk factors. The study surveyed dentists in Libya who responded the study questionnaire in fall 2020 ($n = 67$) and winter 2023 ($n = 38$). The survey included self-report measures assessing four mental health outcomes: depression, anxiety, and stress. The chi-square test was used to compare mental health outcome measures between fall and winter. The prevalence of self-reported depression, anxiety, and stress decreased between fall 2020 and winter 2023 (40% vs. 37%, $p = 0.27$; 55% vs. 42%, $p = 0.37$; 97% vs. 71%, $p = 0.11$ respectively). These estimates were particularly higher among those with a history of psychiatric disorder. Three years into the coronavirus disease 2019 pandemic, poor mental health outcomes were highly prevalent among dentists. Further research is needed to assess contributing factors in this specific population. Dental syndicates should promote targeted programs and services aimed at improving dentists' well-being.

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1. Introduction

The dental profession is highly stressful. Influenced by various factors including challenging nature of dental clinical work, adverse working conditions, stressors related to the dentist-patient relationship, and time pressure. Additionally, dentists face occupational hazards such as biological, chemical, and radiation risks [1]. These stressors contribute to a high risk of professional burnout, workplace and poor mental health outcomes, including anxiety and depression. The repercussions of depression and anxiety extend beyond the individual, affecting families and communities by interfering with work and productivity. Fortunately, both conditions are reliably diagnosed and treated in primary care settings [2]. Before the COVID-19 pandemic, depression and serious depression occurred among dentists, and much of it was untreated. The rate of depression among dentists was prevalent with a reported rate of 9% [3]. A study conducted in Egypt highlighted that 98.5% of healthcare workers including dentists experienced moderate to severe stress during the pandemic, with 90.5% reporting anxiety and 18.5% facing depression [4]. The pandemic has exacerbated the well-being of healthcare professionals globally, as inadequate preparation and organizational support have intensified the mental burden on these workers. Elevated levels of stress, anxiety, and depressive symptoms may have long-term psychological implications, particularly for dentists. Most research on the impact of stress, psychological distress, and burnout has primarily focused on physicians and nurses [5]. A systematic review has confirmed the significant psychological impact of the COVID-19 pandemic on the dentists' mental health worldwide; however, few studies have conducted follow-up analyses to assess changes in mental health parameters over the period of the COVID pandemic among dentists. Dentists reported that direct contact with patients during this period heightened their fear of infection and potential transmission to families, staff, and patients. Many viewed the pandemic as a dangerous

experience, leading to feelings of insecurity regarding infection control protocols [5].

To date, no studies have specifically examined the mental health status of dentists in Libya during the COVID-19 pandemic. This study's main aim was to compare dentists' mental well-being between two time points, i.e. fall 2020 (6 months from the start of the pandemic) and winter 2023 (three years into the pandemic), focusing on the prevalence of symptoms related to depression, anxiety, and stress, as well as potential associated risk factors.

The findings of this study will contribute valuable longitudinal data on dentists' wellness throughout the COVID-19 pandemic. Additionally, the results can inform Libyan dental syndicate administrators in developing interventions aimed at improving the well-being of dentists in Libya.

2. Methodology

2.1. Study design:

Ethical approval for this study was obtained from the ethical committee of the Libyan International Medical University (LIMU). This study utilized cross-sectional data collected through two administrations of an unidentified survey collected using an internet-based Form. Participation in this study was entirely voluntary and uncompensated. All dentists in Libyan academic institutions and dental clinics were invited to participate via email (with two follow-up reminders).

The initial survey was administered from September 3, 2020, to October 28, 2020, and the follow-up survey was conducted from February 12, 2023, to February 25, 2023.

2.2. Survey measures

The survey included questions addressing depression, anxiety, and stress. It comprised previously validated scales and additional questions about demographics, psychiatric history, and pandemic-related data. The first survey included 28 items, while the second one contained 32 items; both were identical except that the 2023 survey included four newly added

items related to COVID-19 inquiring about vaccination status.

2.3. Demographics

Demographic data (age, gender, specialty, marital status, and city of residence) were self-reported by participants. The type of clinical practice was also documented.

2.4. Psychiatric and pandemic-related data

Questions related to the pandemic included susceptibility to serious COVID-19 outcomes, a personal and/or family history of psychiatric disorders, and current treatment for a psychiatric disorder. In addition to the current activity status of the dental practice where they worked.

2.5. Mental health data

To investigate our main study aim, we examined four outcomes related to mental health: depression, anxiety, and perceived stress. The depression levels of participants were measured using the 9-item Patient Health Questionnaire (PHQ-9). This standardized tool is constructed directly on the diagnostic criteria for major depressive disorder and is both highly valid and reliable in screening and assessing the degree of depression [6]. Each item was given a score ranging from 0 to a score of 3, then item scores were added to calculate the total score. Utilizing the typical threshold decided by the scale authors, a PHQ-9 overall score of 10 or higher has a sensitivity of 88% and a specificity of 88% for major depression. Scores were interpreted as follows: 5 = mild, 10 = moderate, 15 = moderately severe, and 20 = severe depression. Anxiety was assessed with the 7-item Generalized Anxiety Disorder scale, which is based directly on the diagnostic criteria for generalized anxiety disorder and is a widely used screening tool that assesses the severity of generalized anxiety disorder with high validity and reliability [7]. Each item was given a score ranging from 0 to a score of 3, then we added item scores to find the total score. Using the average cutoff of a total score of 10 or higher to categorize participants as probably fulfilling the criteria for generalized anxiety disorder (a

scale of normal (0-4), mild (5-9), moderate (10-14), and severe (15-21) anxiety) (8). Perceived stress: The PSS-10 is a self-reported scale to measure the global level of perceived stress. This scale includes two factors: Factor 1 (perceived helplessness) has consisted of negatively phrased items (i.e., items 1, 2, 3, 6, 9, and 10; e.g., "In the last month, how often have you felt nervous and stressed"); and Factor 2 (perceived self-efficacy) which is made of positively phrased items (i.e., items 4, 5, 7, and 8; e.g., "In the last month, how often have you felt that things were going your way") [9].

2.6. Data analysis

All data were analyzed by using the Statistical Package for the Social Sciences (SPSS), version 24. Descriptive statistics, including percentages for categorical and means/standard deviations for continuous variables, were calculated. Differences in continuous variables were analyzed using independent samples t-tests, while differences in categorical variables (demographic characteristics, psychiatric history, and pandemic-related experiences) were analyzed using the chi-square tests. In addition, we examined if the prevalence of each of the mental health outcomes assessed differed significantly between fall 2020 and winter 2023 using the chi-square test. Significance was assessed at the $P < 0.05$ level. To identify potential predictors (gender, marital status, employment status), vaccination status, history of psychiatric disorder, currently being treated for psychiatric disorder, and conditions that predispose to serious COVID-19 outcomes. When all the parameters were entered simultaneously, full models were used to evaluate these variables' relative contributions to our main mental health outcomes at both baseline and follow-up.

3-Results and discussion

3.1 Demographics

A total of 67 dentists finished the first survey in fall 2020 and 38 dentists completed the second survey in winter 2023. At both baseline and follow up, the majority were women and living in Benghazi. We found no significant

differences in demographic data between the two questionnaire administrations except for the dental specialty and whether the dentist worked in a private clinic (Table 1).

3.2 Psychiatric and Pandemic-related data

Psychiatric and Pandemic-related data

The psychiatric related history was not statistically different between the two administrations. The status of the dental practice activity differed significantly between the two groups ($p < 0.001$). In the first survey the majority answered that their dental practice was open but have a lower patient volume than usual. However in the second survey the majority reported that their practices were open and conducting business as usual (Table 2). Twenty-eight (74%) participants reported receiving COVID vaccination, nineteen (32%) received two doses, nine (32%) AstraZeneca, eight (29%) Pfizer, and ten (36%) Sinovac.

3.3 Mental health data

This study found no significant differences in the prevalence of likely depression, anxiety, or perceived stress in fall 2020 compared to winter 2023 (40% in fall vs. 37% in winter, $p = 0.27$; 55% in fall vs. 42% in winter, $p = 0.37$; 97% in fall vs. 71% in winter, $p = 0.11$, respectively) (Table 3). The median PHQ-9 scores at both baseline and follow-up were higher among people with psychiatric disorders compared to those without psychiatric disorder diagnosis at baseline ($p = 0.62$), follow-up ($p < 0.001$). The median GAD scores at both baseline and follow-up were higher among people with psychiatric disorders compared to those without psychiatric disorder diagnosis ($p = 0.03$). Similarly, there were no significant differences in responses to the PSS-10 between our subgroups except for the median PSS scores at both baseline and follow-up were higher among people with psychiatric disorders compared to those without psychiatric disorder diagnosis ($p = 0.05$).

At baseline, The combination of predictors were significantly related to anxiety, $F(13,46) = 2.06$, $p = 0.03$, adjusted $R^2 = 0.36$. PHQ score

and marital status were significantly related to this outcome. The combination of predictors were not significantly related to depression diagnosis, $F(12,47) = 1.82$, $p = 0.07$, adjusted $R^2 = 0.31$. The depression score, psychiatric history, employment status, and GAD score predicted having depression. The combination of predictors were not significantly related to perceived stress and none of the parameters were significantly related to perceived stress.

At follow up, the combination of predictors were significantly related to anxiety diagnosis, $F(8,29) = 4.44$, $p = 0.001$, adjusted $R^2 = 0.42$. The depression score, psychiatric history, and current psychiatric problem significantly predicted having anxiety at follow-up. The combination of predictors were significantly related to depression diagnosis, $F(10,27) = 2.29$, $p = 0.04$, adjusted $R^2 = 0.45$. The psychiatric history, GAD score, and marital status significantly predicted having anxiety at follow up. The combination of predictors were also significantly related to severity of perceived stress, ($F(10,27)=3.00$, $p=0.011$, adjusted $R^2 = 0.52$). at follow -up.

The study surveyed dentists in Libya to assess changes in mental health outcomes during the COVID-19 pandemic. While the prevalence of likely depression, anxiety, and stress decreased from the initial to follow-up surveys, the levels remained high, particularly among individuals with a history of psychiatric disorders. Approximately 40% met criteria for depression, and about half exhibited symptoms of generalized anxiety disorder. These figures highlight substantial emotional distress among dentists, emphasizing the importance of addressing mental health issues in this population. Despite efforts by the World Health Organization to improve mental health services in Libya, these services remain underdeveloped, and patients often present at late stages of mental illness. Stigma surrounding mental health leads families to manage these issues without seeking help, underscoring the need for increased awareness and psycho-education [10].

Table 1: Demographic data of the sample of Libyan dentists in fall 2020 and winter 2023

Variable	Baseline (%) or M \pm SD N=67	Follow-up N=38	p-value
Age (years)	37.94 \pm 6.19	37.0 \pm 11.8	0.96
Gender			
Female	38 (57%)	37 (97%)	0.09
Male	29 (43%)	1 (3%)	
Marital status			
Married	51 (76.11)	29 (76%)	0.77
Single	12 (17.91)	6 (16%)	
Divorced	4 (5.97)	3 (8%)	
City of residence			
Benghazi	44 (66%)	37 (97%)	0.86
Other	20 (30%)	1 (3%)	
Dental specialty			
General Practice	19 (28%)	10 (26%)	0.01
Prosthodontics	11 (16%)	7 (18%)	
Oral pathology	6 (9%)	8 (21%)	
Public health	6 (9%)	2 (5%)	
Orthodontics	5 (7%)	1 (3%)	
Pediatric dentistry	4 (6%)	2 (5%)	
Periodontics	2 (3%)	2 (5%)	
Endodontics	2 (3%)	3 (8%)	
Oral biology	1 (1%)	2 (5%)	
Other	8 (12%)	1(3%)	
Do you work in a private dental practice?			
Yes	43 (64%)	15 (39%)	0.02
No	24 (36%)	23 (61%)	
Do you currently use tobacco products?			
Yes	9 (13%)	1 (3%)	<0.001
No	58 (87%)	36 (97%)	

Table 2. Comparison of psychiatric and pandemic related data of the study population of Libyan dentists in fall 2020 and winter 2023

	2020	2023	P-value
PHQ-9	40%	37%	0.27
GAD-7	55%	42%	0.37
PSS*	97%	71%	0.11

* moderate or severe stress %

Before the pandemic, dentists reported high levels of stress and burnout and low well-being [11]. Unfortunately, we do not have data about pre-pandemic depression, anxiety, and stress estimates among Libyan dentists which would provide a better picture of the contribution of the pandemic to changes in these parameters. To improve mental health care for dentists after the pandemic, it is essential to understand their mental health status and psychosocial

problems. Care should be directed towards identifying and managing preexisting mental health issues among dentists. Dental clinics/institutions should build a strong sense of belonging for their dentists to improve dentists' wellness. The main strength of our study is the repeated collection of cross-sectional data which allows us to compare samples over time. In addition, we used validated tool to assess mental health parameters which can effectively screen for these disorders. To the best of our knowledge, this is the first study to examine the psychological impact of COVID-19 on dentists in Libya. In terms of study limitations, first, due to the relatively low response rate to our survey, we cannot generalize our results to this population. Second, due to the anonymous nature of our survey, we did not obtain

Table 3. Comparison of proportion of Libyan dentists who met criteria for depression, anxiety, and stress between fall 2020 and winter 2023

Variable	Baseline % N=67	Follow up % N= 38	p- value
Are you currently being treated for, or have been told by a doctor that you have, a condition that may make you more susceptible to serious COVID outcomes? <i>Yes</i> <i>No</i> <i>Don't know</i>	9 (13%) 54 (81%) 4 (6%)	3 (8%) 33 (87%) 2 (5%)	0.86
Do you have a history of psychiatric disorders? <i>Yes</i> <i>No</i>	2 (3%) 65 (97%)	2 (5%) 36 (95%)	0.82
Do you have a family history of psychiatric disorders? <i>Yes</i> <i>No</i>	0 67 (100%)	4 (8%) 34 (92%)	0.82
What is the current status of the dental practice where you work? <ul style="list-style-type: none"> <i>Open but have a lower patient volume than usual</i> <i>Closed and not seeing any patients.</i> <i>Closed and seeing emergency patients only.</i> <i>Open and conducting business as usual.</i> 	35 (52%) 11 (16%) 7 (10%) 12 (18%)	14 (37%) 2 (5%) 2 (5%) 19 (50%)	<0.001
Are you currently being treated for a psychiatric disorder? <i>Yes</i> <i>No</i>	1 (1%) 66 (99%)	2 (5%) 36 (95%)	0.81

participants' identifiers which prevented us from being able to compare each participant's data between both survey administrations and obtain data about intra-individual variability.

4. Conclusions

The mental wellness of dentists is crucial for the sustainability of dental services during challenging times like the COVID-19 pandemic. Although the prevalence of depression, anxiety, and stress decreased by nearly 15% between fall 2020 and winter 2023, these levels remained high, indicating on going poor mental health among dentists

in Libya. Further studies should explore the risk factors contributing to these elevated levels. These findings can guide dental syndicates in directing efforts to improve dentists' wellness and alleviate the remaining mental health effects of the COVID-19 pandemic.

Acknowledgment

The authors would like to thank Dr. Lisa Heaton (Care Quest Institute for Oral Health, University of Washington) for providing advice on earlier drafts of this manuscript.

Conflict of Interest and Financial Disclosure

The authors declare no conflict of interest or funding.

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