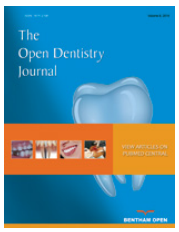

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RESEARCH ARTICLE

Depression, Anxiety and Stress Among Dentists During COVID-19 Lockdown

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Abstract:

Introduction:

The objective of this study was to investigate the levels of depression, anxiety, and stress among dentists during covid-19 lockdown and to investigate the relationship between stress and each mental health state.

Methods:

A cross-sectional survey on 269 dentists was conducted using DASS-21 and PHQ-9 questionnaires. Bivariate and multivariate models were constructed and the odds ratio (OR) was calculated to assess the strength of the association between an independent categorical variable and the outcome.

Results and Discussion:

Being unsatisfied with the job was associated with a statistically significant increase in DASS-21 score by an average of 5.9 points after adjusting for the possible confounding effect of the other independent variables included in the model. For each extra 10 years of clinical experience, there is a statistically significant reduction in DASS-21 score by an average of 1.3 points compared after adjusting for the possible confounding effect of the other independent variables included in the model.

Conclusion:

Stress, depression, and anxiety were prevalent during the pandemic among dentists. These psychological domains were modulated by several factors including marital status, gender, years of clinical experience, and degree of job satisfaction.

Keywords: Depression, Anxiety, Stress, Dentists, DASS-21, PHQ-9, Lockdown.

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1. INTRODUCTION

The pandemic and lockdown of COVID-19 have triggered a sense of panic and anxiety across the globe. For the majority of health practitioners, this pattern has a negative effect via increasing depression, stress, and anxiety [1, 2]. As part of health care workers, dentists naturally are subjected to high levels of stress due to heavy workloads, patient relationships, and the urgency of the job [3]. A survey among Italian dentists showed that both perceived job insecurity and fear of COVID-19 were proportional to depressive symptoms [4]. In addition, online-based surveys showed an increased level of anxiety, fear, and concerns about professional future among Italian dentists [5, 6]. These results were supported by the findings of another study conducted in the UK, indicating that the prevalence of COVID-19-associated stress among dentists was 92% [7].

In 2020, the number of COVID-19 cases in Iraq was 595291, with a mortality of approximately 9.6% [8]. Accordingly, the Iraqi government imposed a series of actions

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to confront the spread of the pandemic, including strict lockdown. These measures are known to be associated with negative psychological impacts as well as increased economic burden [9, 10]. Depression (major depressive disorder) is a common and serious medical condition that, yet treatable, adversely affects how an individual feels, thinks, and acts. Depression triggers feelings of disappointment in things that were once enjoyed and/or a lack of interest. Indeed, worrisome times have tragically been escalating after the pandemic and the depression-related symptoms among dentists were about 60% [7]. Fear, anxiety and concern affected every person to varying degrees during the COVID-19 lockdown faced by many countries, including Iraq, as recent evidence showed that people who are held in isolation or quarantine stress in the form of fear, rage and confusion [11 - 13]. According to a recent study, the prevalence of anxiety and mental disorders associated with COVID-19 among dentists was 42.5% [14]. However, higher figures were reported among dentists from UK in which the prevalence of anxiety-related symptoms was 71% [7].

During lockdown, dentists were concerned about their employment because their private practices were closed, resulting in zero revenue, and their income usually depends entirely on their work, particularly those working in the private sector only. This has contributed to anxiety and depression, mood swings, and anger. According to the aforementioned evidence from the literature, investigating the predisposing factors of stress, anxiety, and depression of dentists is paramount, such that adequate steps can be taken to assist with extreme cases. The limited number of studies on the psychological factors during the COVID-19 pandemic lockdown urged us to investigate the prevalence and severity of stress and the clinical mental condition of depression and anxiety among Iraqi dentists. In addition, they are investigating the relationship between these psychological states with negative affecters that could modify the clinical states as confounding variables.

2. METHODS

2.1. Study Design and Population

This cross-sectional survey was performed from 23rd March to 12th April 2020. Only dentists registered in Iraqi Dental Association were included in this study. Online questionnaire was constructed using Google forms and the link with a clear message about the aim of this study was emailed to randomly selected dentists who voluntarily joined the study. The study protocol was approved by the ethics committee, College of Dentistry, University of Baghdad (No. 205620 in 06/12/2020) and was conducted in accordance with the Declaration of Helsinki.

2.2. Sample Size Calculation

Sample size was calculated according to data obtained from a pilot study that was conducted with 25 dentists. At 5% Type I error rate and 95% confidence interval, the estimated sample size was 140 subjects. Calculation was based on the methods described by Kotrlik and Higgins [15] using an online tool: https://riskcalc.org/samplesize/. To avoid dropout, the calculated sample size was tripled, *i.e*., sample size= 420 dentists. Accordingly, the questionnaire was anonymously forwarded to randomly selected dentists via Iraqi Dental Association.

2.3. Elements and Assessment of the Questionnaires

The questionnaire on its first page provided the participants a brief description of the study and informed consent, before responding to answer, the questionnaire was also provided.

2.4. Assessment of Scio-Demographic and General Information

Age, gender, marital status, and physical exercise were assessed first. The occupational state of the dentist was represented by workplace (private, public health center, hospital, or university), the number of years of clinical practice, number of working hours/day (8 hours, 8 to10 hours or >11 hours/day) and job satisfaction (satisfied, somewhat satisfied, unsatisfied) were also assessed. The responders were additionally asked about their perception of the future status of the profession (improved, no change, deteriorate).

2.5. Assessment of Stress, Depression, and Anxiety

The DASS-21, a multidimensional questionnaire assessing negative affectivity through stress, depression, and anxiety, and the PHQ-9 questionnaire were adopted for this study. The DASS-21 questionnaire demonstrated good to excellent consistency [16] and adequate reliability [17]. It includes three self-reported scales designed to measure the emotional states of depression, anxiety, and stress. Each of the three scales with 7 items scored on a 3 level of Likert scale from 0 to 3 (0: Did not apply to me at all, 1: Applied to me to some degree or some of the time, 2: Applied to me to a considerable degree or as a good part of the time, 3: Applied to me consistently or most of the time). Depression, anxiety, and stress scores were calculated by summing the scores of the relevant items. The final score for each subscale was multiplied by two and evaluated according to its severity rating index.

Patient Health Questionnaire (PHQ-9) was also used which monitored the severity of depression and could also be used to make a tentative diagnosis of depression in at-risk population [18]. PHQ–9 is a rapid and effective tool for detection as well as for monitoring the severity of depression [19]. It has been widely used in community-based settings, in the general population, and among people with physical diseases [20, 21]. The questionnaire assesses how often the subjects had been disturbed by any of the 9 items during the immediately preceding 2 weeks. Each item of PHQ–9 was scored on a scale of 0 to 3 (0 = not at all; 1 = several days; 2 = more than a week; 3 = nearly every day). The PHQ–9 total score ranged from 0 to 27 (scores of 5 to 9 are classified as mild depression; 10 to14 as moderate depression; 15 to19 as moderately severe depression; $\geq$ 20 as severe depression) [22].

2.6. Statistical Analysis

The completed questionnaire was then collected and coded for data entry. Data were analyzed using IBM SPSS (version 23, IBM Cooperation, New York, USA). Descriptive statistics (percentages and frequency) were calculated to assess the percentage levels of depression, anxiety, and stress among the study participants. Bivariate and multivariate models were constructed and the odds ratio (OR) was calculated to assess the strength of the association between an independent categorical variable and the outcome. Significance level was set at $p< 0.05$.

3. RESULTS

At the end of the survey, a total of 269 participants (64.05% response rate) completed the questionnaire and were included in the final analysis with the age range 25 to 65 years. Demographic and other independent variables are summarized in (Table **1**).

About half (48%) of the surveyed sample had any grade of anxiety according to DASS-21, while around two-fifths of them had any grade of depression and stress when measured on the same DASS-21 scale. The prevalence of severe/extremely severe categories of depression, stress, and anxiety in the study sample was 10.4% having depression [ranging between 7.2 to 14.5% in the reference population with 95% confidence interval (CI)], 11.9% having stress (95% CI of 8.4 to 16.2%) and 19.3% having anxiety (95% CI of 15.0 to 24.4%) Table **2**.

Table 1. Description of study sample.

Gender	**N**	**%**
Female	222	82.5
Male	47	17.5
Years of clinical practice experience-categories		
(1-10)	168	62.4
(11-20)	43	15.9
(21-30)	24	8.9
(>30)	34	12.6
Physical exercise		
None	164	60.9
once or twice/week	78	28.9
3-4 times /week	22	8.17
5-7 times/week	5	1.85
Marital status		
Single	103	38.3
Married	160	59.5
Divorced	6	2.2
Work place		
Primary health care	130	48.4
Hospital	25	9.3
Private	89	33.0
University	25	9.3
Average daily working hours		
<8 hours/day	200	74.4
8-10 hours/day	43	15.9
11 + hours/day	26	9.7
Job satisfaction		
Unsatisfied	43	16.0
Somewhat satisfied	127	47.2
Satisfied	99	36.8
Personal perception of career's future during and after the pandemic		
Blind, vague future	107	39.7
No change	40	14.8
Constant deterioration	122	45.3
Total	268	100.0

Table 2. Prevalence of different severity grading of three domains of DASS21 in the study sample.

Total N = 269	N	%	95% Confidence Interval
Depression-DASS21			
Normal	166	61.7	
Mild	40	14.9	(11 to 19.5)
Moderate	35	13	(9.4 to 17.4)
Severe	18	6.7	(4.2 to 10.1)
Extremely Severe	10	3.7	(1.9 to 6.5)
Anxiety-DASS21			
Normal	129	48	
Mild	28	10.4	(7.2 to 14.5)
Moderate	60	22.3	(17.6 to 27.6)
Severe	22	8.2	(5.3 to 11.9)
Extremely Severe	30	11.2	(7.8 to 15.3)
Stress-DASS21			
Normal	164	61	
Mild	38	14.1	(10.4 to 18.7)
Moderate	35	13	(9.4 to 17.4)
Severe	26	9.7	(6.6 to 13.6)
Extremely Severe	6	2.2	(0.9 to 4.5)
Severe/extremely severe category of three domains of DASS21			
Depression-DASS21	28	10.4	7.2 to 14.5
Anxiety-DASS21	52	19.3	15.0 to 24.4
Stress-DASS21	32	11.9	8.4 to 16.2

More than 28% of the studied models suffered from major depressive illness and 16.7% of the models suffered from minor depressive illness according to PHQ-9 scoring method. More than 50% of depressive illnesses were of mild to moderate severity. Moderately severe to severe depressive symptoms were seen in more than 28%. They warrant treatment for depression, using antidepressant/ psychotherapy (Table **3**).

3.1. Predictors of Severe/ Extremely Severe Categories of Depression, Anxiety, and Stress

To assess the predictors for severe to extremely severe depression, anxiety, and stress, an unadjusted bivariate (Table **4**) and adjusted multivariate models were made (Table **5**).

Table 3. PHQ-9 scoring results of the studied sample.

	N	%	95% Confidence Interval
Depression			
Unclassified/No depression	148	55	(49 to 60.9)
Minor depressive syndrome	45	16.7	(12.6 to 21.5)
Major Depressive Syndrome	76	28.3	(23.1 to 33.8)
Severity of depressive symptoms			
None (0-4)	51	19	
Mild (5-9)	71	26.4	(21.4 to 31.9)
Moderate (10-14)	71	26.4	(21.4 to 31.9)
Moderately sever (15-19)	52	19.3	(15 to 24.4)
Severe (20-27)	24	8.9	(6 to 12.8)
Requirement for treatment in screened participants			
(<=4) Patient may not need depression treatment	51	19	(14.6 to 24)
(5-14) Physician uses clinical judgment about the need for treatment	142	52.8	(46.8 to 58.7)
(15+) Warrants treatment for depression, using antidepressant/ psychotherapy	76	28.3	(23.1 to 33.8)
Total	269	100	

Table 4. Prevalence of severe/extremely severe categories of depression, anxiety, and stress DASS-21 domain by selected explanatory variables.

	Severe/extremely severe Depression-DASS21								Severe/extremely severe Anxiety - DASS21							Severe/extremely severe Stress - DASS21						
	Total No.	N	%	95% CI	P*	OR	Inverse OR	95% CI OR	N	%	95% CI	P*	OR	Inverse OR	95% CI OR	N	%	95% CI	P*	OR	Inverse OR	95% CI OR
Gender					0.43							0.013*							0.2			
Female	222	25	11.3	(7.6 to 15.9)					49	22.1	(17 to 27.9)					29	13.1	(9.1 to 18)				
Male	47	3	6.4	(1.8 to 16.1)		0.54	1.9	(0.16 - 1.86)	3	6.4	(1.8 to 16.1)		0.24	4.2	(0.07 - 0.81)	3	6.4	(1.8 to 16.1)		0.45	2.2	(0.13 - 1.56)
Marital status					<0.001							0.022*							0.42			
Single	103	20	19.4	(12.7 to 27.8)					29	28.2	(20.2 to 37.4)					15	14.6	(8.8 to 22.3)				
Married	160	8	5	(2.4 to 9.2)		0.22	4.6	(0.09 - 0.52)	22	13.8	(9.1 to 19.7)		0.41	2.5	(0.22 - 0.76)	17	10.6	(6.6 to 16.1)		0.7	1.4	(0.33 - 1.47)
Divorced	6	0	0			0.31	3.2	(0.04 - 2.69)	1	16.7	(1.9 to 55.8)		0.51	2	(0.06 - 4.56)	0	0			0.44	2.3	(0.05 - 3.82)
Work place					0.05							0.72							0.13			
Primary health care	130	18	13.8	(8.7 to 20.6)					28	21.5	(15.1 to 29.2)					15	11.5	(6.9 to 17.9)				
Hospital	24	4	16.7	(5.9 to 34.9)		1.24	**	(0.38 - 4.07)	4	16.7	(5.9 to 34.9)		0.73	1.4	(0.23 - 2.31)	5	20.8	(8.4 to 39.8)		2.02	**	(0.66 - 6.2)
Private	89	3	3.4	(1 to 8.7)		0.22	4.6	(0.06 - 0.76)	17	19.1	(12 to 28.2)		0.86	1.2	(0.44 - 1.69)	12	13.5	(7.6 to 21.7)		1.19	**	(0.53 - 2.69)
University	25	3	12	(3.5 to 28.7)		0.85	1.2	(0.23 - 3.13)	3	12	(3.5 to 28.7)		0.5	2	(0.14 - 1.78)	0	0			0.15	6.8	(0.02 - 1.15)
Job satisfaction					<0.001							<0.001*							0.014*			
Unsatisfied	43	12	27.9	(16.3 to 42.4)					18	41.9	(28 to 56.7)					10	23.3	(12.6 to 37.3)				
Somewhat satisfied	127	15	11.8	(7.1 to 18.3)		0.35	2.9	(0.15 - 0.82)	25	19.7	(13.5 to 27.2)		0.34	2.9	(0.16 - 0.72)	16	12.6	(7.7 to 19.2)		0.48	2.1	(0.2 - 1.15)
Satisfied	99	1	1	(0.1 to 4.6)		0.03	37.9	(0 - 0.21)	9	9.1	(4.6 to 15.9)		0.14	7.2	(0.06 - 0.35)	6	6.1	(2.6 to 12.1)		0.21	4.7	(0.07 - 0.63)
Personal perception of career's future development prospects					0.06							0.17							0.07*			
Bright future with career advancement	107	6	5.6	(2.4 to 11.2)					15	14	(8.4 to 21.5)					7	6.5	(3 to 12.4)				
No change	39	7	17.9	(8.4 to 32)		3.68	**	(1.15 - 11.75)	10	25.6	(14 to 40.7)		2.11	**	(0.86 - 5.21)	7	17.9	(8.4 to 32)		3.13	**	(1.02 - 9.59)
Constant deterioration in career prospects	122	15	12.3	(7.4 to 19)		2.36	**	(0.88 - 6.33)	27	22.1	(15.5 to 30.1)		1.74	**	(0.87 - 3.49)	18	14.8	(9.3 to 21.8)		2.47	**	(0.99 - 6.17)

(Table 4) contd.....

Years of clinical practice experience					0.001							0.002*							0.17		
(1-10)	168	25	14.9	(10.1 to 20.8)					43	25.6	(19.5 to 32.6)					24	14.3	(9.6 to 20.2)			
(11-20)	43	1	2.3	(0.3 to 10.4)		0.14	7.3	(0.02 - 1.04)	4	9.3	(3.2 to 20.6)		0.3	3.4	(0.1 - 0.88)	4	9.3	(3.2 to 20.6)		0.62	1.6	(0.2 - 1.88)
>20	56	0	0			0.05	20.1	(0.01 - 0.38)	4	7.1	(2.5 to 16.1)		0.22	4.5	(0.08 - 0.65)	3	5.4	(1.5 to 13.6)		0.34	2.9	(0.1 - 1.17)

* Significant at P< 0.05

Table 5. Multiple linear regression model with selected explanatory variables and depression , anxiety, and stress DASS21 score as the dependent (outcome) variable.

	Depression				**Anxiety**				**Stress**			
	Std. Coeff	**Beta**	**95% CI for beta**	**P***	**Std. Coeff**	**Beta**	**95% CI for beta**	**P***	**Std. Coeff**	**Beta**	**95% CI for beta**	**P***
(Constant)		9.96	(8.01 to 11.91)	<0.001		10.53	(8.76 to 12.29)	<0.001		13.71	(11.66 to 15.76)	<0.001
Ever married compared to single	-0.16	-2.7	(-4.92 to -0.39)	0.022	-0.14	-2.1	(-4.11 to -0.01)	0.049	-0.18	-0.13	(-0.23 to -0.02)	0.017
Being unsatisfied with job	0.25	5.4	(2.81 to 8.05)	<0.001	-0.16	-3.2	(-5.58 to -0.71)	0.011	0.25	5.9	(3.1 to 8.62)	<0.001
Male gender compared to female	-0.02	-0.5	(-3.19 to 2.19)	0.71	0.24	4.8	(2.42 to 7.17)	<0.001	-0.02	-0.38	(-2.76 to 2)	0.75[NS]
Years of clinical practice experience	-0.12	-0.08	(-0.18 to 0.02)	0.12	-0.12	-0.07	(-0.16 to 0.02)	0.11	-0.11	-2.38	(-5.21 to 0.45)	0.1[NS]
Determination Coefficient (R2) = 0.154 * P (Model)<0.001					**Determination Coefficient (R2) = 0.167 * P (Model)<0.001**				**Determination Coefficient (R2) = 0.174 * P (Model)<0.001**			

Factors that significantly decrease the risk (protective factors) of having severe/extremely severe depression defined by the DASS-21 scale include: being married, working in a private sector, being satisfied or somewhat satisfied with the job, and long years of clinical experience (>20 years). On the contrary, an unfavorable personal perception of the career's future during and after COVID-19 pandemic was associated with a statistically significant increase in the risk of having severe/extremely severe depression (p< 0.01).

Factors that significantly decrease the risk (protective factors) of having severe/extremely severe anxiety defined by the DASS-21 scale included: male gender, being married, being satisfied or somewhat satisfied with the job, long years of clinical experience (>10 years) (Table **5**).

The only factor that significantly decreased the risk (protective factors) of having severe/extremely severe stress defined by DASS-21 scale was being satisfied with the job (Table **5**). On the contrary, an unfavorable personal perception of a career's future during and after COVID-19 pandemic was associated with a statistically significant increase in the risk of having severe/extremely severe stress (Table **4**).

3.2. Multivariate (Adjusted Models)

A list of 8 independent explanatory models was included in the multiple linear regression model to assess the net and independent effect of each on DASS-21 score as a quantitative variable. The list consists of Gender, marital status, work place, average daily working hours, job satisfaction, personal perception of career's future development prospects, years of clinical practice experience, and physical exercise.

As shown in Table **5**, only two explanatory variables showed a statistically significant independent effect on DASS-21 score of depression domain. Being ever married was associated with a statistically significant reduction in DASS-21 score by an average of 2.7 points compared to single dentists after adjusting for the possible confounding effect of the other independent variables included in the model. Being unsatisfied with the job was associated with a statistically significant increase in DASS-21 score by an average of 5.4 points after adjusting for the possible confounding effect of the other independent variables included in the model. The model was statistically significant and able to explain 15.4% of the variation in the outcome measurement.

Regarding the anxiety domain, only three explanatory variables showed a statistically significant independent effect on DASS-21 score. Being ever married and male gender was associated with a statistically significant reduction in DASS-21 score by an average of 2.1 and 3.2 points, respectively, compared to single dentists after adjusting for the possible confounding effect of the other independent variables included in the model. Being unsatisfied with the job was associated with a statistically significant increase in DASS-21 score by an average of 4.8 points after adjusting for the possible confounding effect of the other independent variables included

in the model. The model was statistically significant and able to explain 16.7% of variation in the outcome measurement.

Regarding the stress domain, only two explanatory variables showed a statistically significant independent effect on DASS-21 score. For each extra 10 years of clinical experience, there is a statistically significant reduction in DASS-21 score by an average of 1.3 points after adjusting for the possible confounding effect of the other independent variables included in the model. Being unsatisfied with the job was associated with a statistically significant increase in DASS-21 score by an average of 5.9 points after adjusting for the possible confounding effect of the other independent variables included in the model. The model was statistically significant and able to explain 17.4% of variation in the outcome measurement.

4. DISCUSSION

Long-term stress has been linked to the development of many disorders, particularly those related to anxiety and depression. Bergdahl & Bergdahl stated that high level of stress is associated with depression, whereas low and moderate stress is associated with anxiety [23]. Simon (1986) reported that the higher the stress, the higher the incidence of suicide, particularly in female physicians [24]. Dentists are also exposed to higher stress than other professions for many reasons, like the limited surgical workplace [25], maintaining the same posture for a long time with a bended waist [26], the noise perceived during dental procedures [27]. The burden to meet the patient's high esthetic demands and the persistent determination for technical perfection are also major stress factors [28]. Recently, the COVID-19 pandemic lockdown has also been taking a toll on people's psychological state. The present cross-sectional study was conducted during the global pandemic (March-April 2020).

The response rate to participate, according to gender, in this study was very low in males when compared to females. Indeed, the woman's duties during the pandemic and crises increased as keeping her family healthy and safe is an extra burden added to the routine house and/or job duties. However, this result might specifically reflect the level of frustration the male dentist experienced, which is beside the lockdown, due to many factors. For instance, cultural/social traditions consider the male as the main provider for the family and must fulfil this role to the best.

In the present study, according to DASS-21, the occurrence of depression, anxiety, and stress among Iraqi dentists was high, and the levels of these conditions were abnormal in more than half of the participants. The latter percentage was consistent with that found in other studies [4, 5]. Severity of depression was assessed by PHQ-9 questionnaire showed that 28.3% of the studied sample suffered from major depressive syndrome which warrants antidepressants, psychotherapy, and/or a combination of both. This percentage is higher than that reported in previous literature [29]. This could be due to ethnic variation or the increase could be attributed to the lockdown itself. Interestingly, the prevalence of depression (moderately severe and severe) was inconsistent between the two tools used in this study, 28.2% (for PHQ-9) versus 10.4% (for DASS-21). This could be explained by results from a systematic review and meta-analysis which indicated that PHQ-9 is potentially associated with high false-positive rates [30].

From the results of our bivariate analysis, it was found that personal perception of a career's future development prospects and job unsatisfaction were associated with a statistically significant increase in the risk of having severe stress, depression and anxiety. In the present study, job unsatisfaction was associated with a statistically significant increase in DASS-21 score by an average of 5.4 (for the depression domain) and by 3.2 (for the anxiety domain) and by 5.9 (for the stress domain) after adjustment of other confounding variables included in the model. This suggests that job unsatisfaction among Iraqi dentists could be the major stressor leading to severe depression, anxiety, and stress. Marital status of the dentist also doubles the increased risk of having depression (Unstandardized Partial Regression Coefficient β= -2.7). Previous studies on stress in dentists have identified burnout as a predisposing factor of depression [31, 32]. Burnout indicates mental or emotional exhaustion owing to the long-term exposure to stress [33]. When dentists suffer from burnout, they typically underestimate their accomplishments in a negative and cynical manner in front of their patients. In the burnout state, the stress adaptation mechanism does not function properly and does not recover to the normal state, resulting in increased job turnover and absenteeism, lack of job commitment, and job dissatisfaction [34 - 37]. Since their training as dental college students, dentists are subject to a high risk of anxiety and depression [33, 38]. In a study with more than 3500 dentists, 34% reported physical or emotional exhaustion, 38% reported constant or frequent worries or anxiety, and 26% reported headaches and/or backaches [39]. In the present study, the factors that significantly decreased the risk of severe depression, anxiety, or stress were; being married, a long years of clinical experience (>20 years), and job satisfaction. There is no doubt that the presence of a partner is a protective factor from being lonely, which potentially decreases depression. In addition, the feeling of satisfaction is increased when job-associated problems are minimal and have clinical experience that represents as a guarantee to continue to work or find another job opportunity. Besides, it will be necessary to address early proper stress management to dental college students and dentists and to provide counseling services to dentists to prevent the negative impact associated with crises. Nevertheless, stress management in developing countries is considered neglected and underappreciated as compared with developed countries. In addition, a systematic education curriculum should be prepared in the future for dentist-tailored stress management. In this study, the high job satisfaction groups displayed lower job stress, depression, and anxiety. Therefore, future studies aimed at investigating the causes of dissatisfaction and its relationship with mental health among dentists in their work are suggested.

There are several limitations to our present study. First, this study adopted questionnaires with a cross-sectional design for the assessment of stress, depression, and anxiety. In this type of study, causal relationships cannot be identified by multiple regression analysis alone. However, we examined

various socio-demographic variables and evaluated stress-associated psychological factors as well as other psychological states using proven scales. Second, the sample size was relatively small, especially for males. To increase the statistical power, it is essential to include a much larger sample size. Continuous professional development is needed at a regular pace since dentistry is evolving rapidly to achieve job satisfaction, especially through webinars during COVID-19 pandemic.

CONCLUSION

Within the limitations of this study, it can be concluded that the pandemic negatively affected stress, depression, and anxiety which were highly reported by Iraqi dentists. These domains seem to be regulated by range of independent variables, including marital status, gender, years of clinical experience, and degree of job satisfaction.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was approved by the ethics committee, College of Dentistry, University of Baghdad, Iran (No. 205620 in 06/12/2020).

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are base of this research. All the humans used were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent, before responding to answer the questionnaire, was also provided.

STANDARDS OF REPORTING

STROBE guidelines and methodologies were followed.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None

CONFLICT OF INTEREST

The authors have no conflict of interest regarding this investigation.

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