Original Article

Self-assessment of Anxiety Level and Oral Hygiene Practice in Dental Students of Cairo University During the COVID-19 Pandemic Lockdown

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Abstract

Objectives : Correlate between the level of anxiety and the practice of oral hygiene during COVID-19 pandemic lockdown in dental students of Cairo University

Methods: A cross sectional study was conducted among dental students in Faculty of Dentistry Cairo University, online questionnaire was sent to their e-mails.

Results: We received 750 responses; the response rate was 35 %. Mild anxiety was the level with the highest percentage (40.9%) while severe anxiety was found mostly in fifth year students (14.9%). The fourth and fifth year students reported the lowest percentages (7.8% and 13.7%, respectively). Despite there being a significant weak inverse relation between anxiety level and self - assessment of oral health during the period of COVID -19 pandemic lockdown, it was found that fifth year students (students with sever anxiety) reported the self -rating of cleanliness of mouth and oral health to be good.

Conclusion: Our study highlighted the invers relation between stress level and the practice of oral hygiene during COVID- 19 pandemic lockdown, also the importance of raising the awareness of oral hygiene practice as it would result in maintaining good oral health despite the exposure to high level of stress in the pandemic situation.

Key words: Anxiety; COVID-19; lockdown; Oral hygiene

Introduction

For the last two years COVID-19 has been an ongoing pandemic that has led to worldwide anxiety and panic and has resulted in multiple lengthy quarantine periods. This outburst resulted in mass quarantine in Egypt in March 2020 (Garda world 2020). The quarantine resulted in suspending face to face classes in many universities worldwide. which - consequently - led to negative psychological effects among college students (Wang and Zhao, 2000)

Brooks et al., 2019 stated that quarantine could lead to "posttraumatic stress symptoms, anger, and misperception. Stressors included longer quarantine duration, fear of infection, insufficient supplies, frustration, lack of clear information, economic problems, and stigma.".

Behavior and attitudes of oral hygiene practice are correlated with oral health status and could be considered as its predictors (Wardle and Steptoe, 1991).

Potential relationship was claimed to be between increased oral bacterial load and occurrence of COVID-19 infection complications (Levin and Shenkman, 2004). Bacteria in the metagenome of severely infected COVID-19 patients included high reads for Fusobacterium, and Prevotella, Staphylococcus, which are commensal oral flora (Sampson ,2020). Also, successful treatment of those cases has been achieved with a dual regime of an antiviral and an antibiotic (Gautret et al., 2020). Therefore, we suggest that maintaining good oral hygiene during COVID-19 outbreak reduces oral bacterial load, diminishing bacterial superinfection risk in case of catching the infection (Liu et al., 2020). Although, it is assumed that there is an effect of stress on oral hygiene practice, this hypothesis has not often been studied (Ghulam, 2018).

Dental students - as future health care providers- are expected to uphold, good oral hygiene practice. Thus, they were the perfect subjects to study how the level of anxiety during a pandemic could affect the practice of oral hygiene. We intended to investigate the association between the level of anxiety and the practice of oral hygiene during the COVID-19 pandemic lockdown.

Subjects and Methods

Study design

This is a cross sectional study (survey) conducted among dental students at the Faculty of Dentistry -Cairo University from June 2020 to July 2020. The online survey was used to reach the students. The questionnaires were sent by email to all students from first year level through fifth year level. We used the students' official mail to increase the expected response rate.

A pilot survey was conducted prior to the actual, large-scale survey to determine the appropriateness of the questions. The pre-test questionnaires were sent by email to a small sample of dental students. Feedback and comments of the students were considered and incorporated into the final version. The study was registered on clinical trial.gov No. (NCT04460469).

Participants

All students attending the Faculty of Dentistry -Cairo University were included. The questionnaire was disseminated as Google form link to their official emails.

Ethical consideration

Ethical approval on the study protocol was obtained from the Institutional Review Board (IRB) of Faculty of Dentistry, Cairo University (No.23 6 20). Submission of the questionnaire by the student was considered as consent to participate in this research.

The instrument of data gathering and variables measured:

The questionnaire has three parts (supplementary). The first part included demographic details. The second part included validated general anxiety disorder scale GAD-7(Spitzer et al., 2006). This scale consists of seven questions which measures students' anxiety level score. The responses of all seven items were added up to produce the total anxiety score, Scale results of 0-4, 5-9, 10-14 and 15-21 indicate minimal, mild, moderate and severe anxiety respectively. The resulting variables that were included in the statistical analysis were the

anxiety score and the anxiety index for which 5, 10, and 15 were used as the cut-off points for mild, moderate and severe anxiety, respectively.

The third part had 15 validated self-administered, structured, close-ended questions that assessed the self-reported oral hygiene practices (Naveenkumar et al., 2019). The questionnaire was assessed for validity and reliability by examining the internal consistency of the items included using Cronbach's alpha measure. The questionnaire forms were kept anonymous.

Discontinuation of study/subject withdrawal

The study participants are free to withdraw from the study at any time by discontinuing completion of the survey. Their choice to withdraw did not affect their grades or evaluation.

Statistical Analysis

The data was computerized and analyzed using the statistical package for social sciences (SPSS version 20). Descriptive statistics including frequency tables, graphs, and cross tabulations were computed. Also, Comparisons concerning the oral hygiene practices and self-assessment of oral health were done between different academic years using Chi-square test. The level of significance was set at P<0.05.

To determine if there is any statistical relationship between anxiety of the students during the period of COVID-19 and their oral hygiene practices, Chi square test along with other statistical measures such as gamma measure were used. Also, the relationship between anxiety score and selfassessment of oral health during the period of COVID-19 pandemic lockdown was investigated. Moreover, Welch's test was used to test the mean differences of anxiety score among different academic years. Games-Howell test was used in case of having significant differences to make pairwise comparisons. Also, one sample t-test was computed to test the mean difference of anxiety scores with respect to gender.

Results

A total of 2142 surveys were dispatched, however we received only 750 replies. Table (1) identifies the number of respondents by each academic year and gender as well. The response rate was similar for all academic years, giving an overall response rate of 35%.

1-Investigation of GAD score and anxiety categories

The total anxiety score ranged from 0 to 21 with a mean and SD of 8.84 ± 4.9 . The mean anxiety score among first year students was 7.23 and for second year 8.04, while it was almost the same among third and fourth year students (9.39 and 9.3 respectively). Fifth year students have had the highest mean anxiety score (11.8). The mean score of fifth year students was significantly higher than the mean scores of all other groups (p < 0.05). Also, there are significant differences between first year students and each of fourth and fifth year students. Additionally, the mean anxiety score was found to be statistically higher in females than males p < 0.05.

First year students had the highest minimal (9.1%), mild (12%) and moderate (6.5%) anxiety scores, while fifth year students were at the top of the leaderboard for severe anxiety (Table 2).

2-Oral hygiene practice assessment:

The responses of the students concerning their oral hygiene practices are displayed in table (3). It

shows that the majority of the students (94.8%) use both tooth brush and tooth paste. 4.7% of the students used the electric toothbrushes, most of whom were first year students.

Concerning the tooth brushing technique, the circular method was reported by 33.1% of the students followed by the vertical movements (20.7%). Additionally, half the study population was in the habit of flossing.

Regular mouthwash users were mostly first year students; they were also the most to report bleeding on brushing and bad breath.

self-assessment of overall mouth cleanliness and oral health show that the majority of the students rated the cleanliness of their mouth following their routine tooth brushing regime to be good. Moreover, the majority were satisfied about their overall dental health during the period of COVID-19 pandemic lockdown (Table 3).

Academic Year	Total questionnaires	Total questionr		Response rate	
	sent	Female	Male	Total	(%)
First	750	114	112	226	30.13%
Second	450	119	49	168	37.3%
Third	335	83	44	127	37.9%
Fourth	254	68	33	101	39.76%
Fifth	353	95	33	128	36.26%
Total	2142	479	271	750	35%

Table (1): Number of returned questionnaires according to the academic year and gender

Table (2): Anxiety index according to the academic year level

			Academic year						
			First year	Second year	Third year	Fourth year	Fifth year	Total	
Anxiety	Minimal	Count	68	33	20	20	2	143	
Index	anxiety	% of Total	9.1%	4.4%	2.7%	2.7%	0.3%	19.1%	
	Mild	Count	90	81	48	33	55	307	
	anxiety	% of Total	12.0%	10.8%	6.4%	4.4%	7.3%	40.9%	
	Moderate	Count	49	38	39	34	28	188	
	anxiety	% of Total	6.5%	5.1%	5.2%	4.5%	3.7%	25.1%	
	Severe	Count	19	16	20	14	43	112	
	anxiety	% of Total	2.5%	2.1%	2.7%	1.9%	5.7%	14.9%	
Total		Count	226	168	127	101	128	750	
		% of Total	30.1%	22.4%	16.9%	13.5%	17.1%	100.0%	

3-Relationships between oral hygiene practices and anxiety during the period of COVID-19 pandemic lockdown:

Regarding the relationship between anxiety and self-assessment of oral health during the period of COVID-19 pandemic lockdown, it was found that there is a significant weak inverse relation between them (Gamma -0.144, P -value 0.018); such that, among those who reported the cleanliness of their mouth following their routine tooth brushing regime to be good, most of them have minimal or mild anxiety. While, most of those who reported it to be poor have moderate and severe anxiety. Also, there is a significant inverse moderate relation between anxiety and rating the overall dental health during the period of COVID-19 pandemic lockdown (Gamma -0.34, P -value 0.000). Such that among those who were satisfied about their overall dental health during COVID-19 pandemic lockdown, most of them have minimal and mild anxiety (table 4).

In general, we can discover that anxiety may have an effect on self-assessment of dental health of the students during the period of COVID-19 pandemic lockdown.

Discussion

Oral health reflects the level of an individual's selfcare and their general health status (Shiva et al., 2017). The COVID-19 pandemic has so far lead to a variety of psychological consequences such as anxiety, depression, change in personal routine and overall behavior (Liu et al., 2020).

Dental students in general have been found to have a positive oral health attitude (Umsan et al., 2007; Dagli et al., 2008). Thus, this study aimed to investigate whether COVID-19 lockdown lead to an increase in the level of anxiety of a sample of dental students and the subsequent effect on their oral hygiene practices.

We found that the majority of our sample suffered from mild anxiety, with most of them being in preclinical academic years (first through third years), while only a small portion suffered from severe anxiety, the majority of which were fifth year students. Agius et al., 2021offered a possible explanation to such a finding, citing fear of losing their manual dexterity skills, anxiety related to its consequences on their long-term plans, and anxiety related to the examinations as the main stressors for these students. This is made more plausible as at the time of dispatching this survey, the ministry of higher education had announced that senior year students will be sitting their final exams, while other undergrad years were to be evaluated by graduation projects (Egypt independent 2020). Additionally, these students had spent less time in clinical training than their counterparts in the previous years. In accordance with our results, Lingawi and Afifi 2020 who investigated the effect of anxiety on changes in social habits in dental students reported that most of the students suffered from mild anxiety, while a few of them suffered from moderate to severe anxiety. Similarly, lesser percentages of moderate (2.7%) to severe anxiety (0.9%) were detected in a sample of Chinese medical students during the pandemic (Cao et al., 2020).

On the other hand, in a study done in the United Arab Emirates on university students, it was found that 25% of the study population had severe anxiety based on the GAD-7 scale. This difference may be due to the way the survey was conducted, Seddik's at al.,2020 survey was interview based during the clinical setting while ours was self-administered during the lockdown. **Table (3):** Oral hygiene practices among dental students of Cairo University during the period of COVID-19 pandemic lockdown

		Academic year				
		1 st year	2 nd year	3 rd year	4 th year	5 th year
		Count	Count	Count	Count	Count
Oral hygiene aids used:	Both tooth brush and tooth paste.	199	159	126	101	126
	Tooth brush	21	9	1	0	2
	Tooth paste	6	0	0	0	0
Type of	Electric	16	7	7	2	3
used:	Manual	210	161	120	99	125
Frequency of	> Twice	24	22	14	9	24
tooth brushing/day:	Once	84	54	60	23	38
	Twice	118	92	53	69	66
Toothbrush	Extra-soft	15	4	4	11	12
bristles:)	Hard	7	6	2	1	1
	Medium	134	88	82	34	36
	Soft	70	70	39	55	79
Tooth	Bass method	12	5	0	26	28
brushing technique:	Charters method	2	1	0	6	6
	Circular method	66	62	64	35	21
	I don't know	79	37	19	2	1
	Scrubbing	11	8	10	3	7
	Stillman's method	8	5	1	20	50
	Vertical movements	48	50	33	9	15
Duration of	>1 min	78	39	36	43	42
tooth brushing:	1 min	105	102	56	45	63
	30 s	43	27	35	13	23
Time of tooth brushing:	Morning before breakfast and night after dinner	131	97	51	65	79
	Only once post breakfast	20	7	10	2	4
	Only once post dinner	28	31	28	10	20
	Other	47	33	38	24	25
Inter-dental	Dental floss	71	66	62	67	102
cleaning devices used:	Inter-dental brush	88	47	35	12	5
	More than one device	40	23	13	11	12
	Tooth picks	27	32	17	11	9

Fluoridated paste used:	I don`t know	114	34	13	4	6
	No	36	26	17	9	21
	Yes	76	108	97	88	101
Use of	No	99	102	88	62	82
mouthwash:	Yes	127	66	39	39	46
How often do	Intermittently.	61	42	27	34	38
you use a mouth wash:	Rarely.	105	106	98	65	82
	Regularly.	60	20	2	2	8
Do you	Maybe	83	46	40	28	29
bleeding	No	73	75	59	57	85
during tooth brushing:	Yes	70	47	28	16	14
Do you	Maybe	66	48	38	20	31
bad breath:	No	130	97	72	71	77
	Yes	30	23	17	10	20
Rate the cleanliness of your mouth, following your routine tooth brushing regime	Fair	66	33	40	28	32
	Good	146	126	71	67	90
	Poor	14	9	16	6	6
Rate your overall dental health during the period of Covid-19 pandemic	Fair	67	46	46	36	45
	Good	145	109	68	61	76
	Poor	14	13	13	4	7

A higher percentage of females suffered from anxiety in our results is consistent with finding of lingawi & affifi, 2020 and Saddik et al.,2020 we can clarify these finding by the higher number of females participating in the study 64.9 % of the sample in addition to the postulation that "females are more prone to get emotional and neurotic problems because of their metacognitive beliefs and thought control strategies" (Muhammad and Rajan 2020).

Concerning the self-assessment of oral health status, the majority of the students were satisfied with their overall dental health and cleanliness of their mouth during the period of Covid-19 pandemic, however, there was a statistically significant difference in self-assessment of level of overall oral health status between different academic years, where the clinical students in fourth and fifth years were the least to report poor oral health.

This finding is in accordance with reports by several studies (Shabeer et al.,2015; Mekhemar et al., 2021; Yildiz and Dogan, 2011) that revealed that the level of self-reported oral health status of clinical students was better than the preclinical students. This reflects the level of oral health awareness of students during the clinical years of their study.

Up to our knowledge, our study is the first to discuss the relation between the stress and oral hygiene practice and self-reported oral health status and cleanliness of the mouth during pandemic lockdown. We found a significant inverse relation between the level of anxiety and self- rating of oral

Table (4): The relationship between anxiety level and self-assessment of the cleanliness of the mouth and dental oral health during the period of COVID-19 pandemic lockdown.

		Anxiety Index			Chi square (p-value)	Association measure (p-value)	
		Minimal anxiety	Mild anxiety	Moderate anxiety	Severe anxiety		
Rate the cleanliness of	Poor	9.8%	29.4%	33.3%	27.5%		Gamma=
your mouth, following your routine tooth	Fair	20.6%	36.7%	25.6%	17.1%	15.241	-0.144
brushing regime	Good	19.4%	43.8%	24.0%	12.8%	(.018*)	(0.010*)
Rate your overall dental	Poor	15.7%	25.5%	23.5%	35.3%	22.041	Gamma-
health during the period of	Fair	15.4%	37.1%	29.2%	18.3%	32.041	-0.345
Covid-19 pandemic	Good	21.4%	44.7%	23.1%	10.9%	(.000*)	(0.000*)

*P-value < 0.05

health and hygiene in general where most of the students reported mild anxiety level and overall good oral hygiene and oral health. However, we also observed that groups with sever anxiety (fifth year students) were the least to report poor oral health, which as explained before proves the elevated level of awareness due to their academic advancement (Shabeer et al.,2015). The present study has some limitations, such as being conducted on a single dental school; however, it is the biggest faculty of dentistry in Egypt in which the students come from most of Egypt cities. Also, we evaluated the stress and oral hygiene practice during the pandemic, without prior reference about the study group before the pandemic.

The non-responding bias may have impact on the final results as the study was conducting during

lockdown and we did not have the chance to contact the students by other means only the e-mail. In addition, COVID-19-related stressors need to be investigated to identify how to minimize their effects on the students and on their social habits.

Conclusion

Our study outlined the inverse relation between stress level and the practice of oral hygiene during COVID-19 pandemic lockdown. Most of the students suffered from mild stress, and reported good oral hygiene practice also, most of them rated their oral health and mouth cleanliness to be good especially clinical students (fourth and fifth year).

Clinical significance

It is important to design awareness programs to encourage the population to maintain good oral hygiene, especially in the pandemic situation when the stress and anxiety level increase in general as we found that the increase in awareness may mitigate the effect of stress on the practice of oral hygiene.

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