

2023

Prevalence of depression, anxiety and stress after the COVID-19 pandemic period among students at the Medical University of Sofia; Significance of demographic, educational, and pandemic-related variables

Nadya Avramova

Medical University-Sofia, Faculty of Dental Medicine, Department of Dental Public Health, Sofia, Bulgaria

Follow this and additional works at: <https://scholar.valpo.edu/jmms>



Part of the [Dental Public Health and Education Commons](#), [Higher Education Commons](#), [Mental and Social Health Commons](#), and the [Mental Disorders Commons](#)

Recommended Citation

Avramova, Nadya (2023) "Prevalence of depression, anxiety and stress after the COVID-19 pandemic period among students at the Medical University of Sofia; Significance of demographic, educational, and pandemic-related variables," *Journal of Mind and Medical Sciences*: Vol. 10: Iss. 2, Article 10.

DOI: <https://doi.org/10.22543/2392-7674.1376>

Available at: <https://scholar.valpo.edu/jmms/vol10/iss2/10>

This Research Article is brought to you for free and open access by ValpoScholar. It has been accepted for inclusion in *Journal of Mind and Medical Sciences* by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

Prevalence of depression, anxiety and stress after the COVID-19 pandemic period among students at the Medical University of Sofia; Significance of demographic, educational, and pandemic-related variables

Cover Page Footnote

The author would like to thank Assoc. Prof. Dr Boyko Bonev, PhD and Dr Ivanka Mihaylova, PhD for the opportunity provided to take part in the dental students' medical psychology practical training "Communications in dental practice". Additionally, the author acknowledges participation of all dental students in the current study. Last but not least, I am extremely grateful to my mother who inspired me to write this manuscript. R.I.P.

Prevalence of depression, anxiety and stress after the COVID-19 pandemic period among students at the Medical University of Sofia; Significance of demographic, educational, and pandemic-related variables

Nadya T. Avramova^{1*}

¹ Medical University-Sofia, Faculty of Dental Medicine, Department of Dental Public Health, Sofia, Bulgaria

ABSTRACT



This cross-sectional study aimed to determine the prevalence of depression, anxiety, and stress among undergraduate dental students at Sofia Medical University and to investigate its associations with some demographic, educational and pandemic-related variables. A self-reported questionnaire that included the validated DASS-21 scale was administered to a group of 2nd, 3rd, 4th, and 5th year students (n=70, response rate 95.7%). Results indicated abnormal levels of depression, anxiety, and stress in 34.3%, 65.7% and 59.7% of the participants, respectively. A much larger proportion of females suffered from abnormal levels of anxiety (56.6%) as compared with males (9%), p=.003. Single students exhibited significantly higher level of depression (25.4%) than those having a partner (9%), p=.037. Third-year dental students demonstrated higher level of depression (19.4%) compared to 5th year students (1.5%), p=.007 as well as higher stress scores (25.4%) than 2nd year students (17.9%), p=.035. Academic performance (assessed by GPA in this study), dentistry as the first students' choice when applying for MUS, financial responsibilities, and pandemic-related academic responses were not found significant factors for depression, anxiety, and stress (p>.05). These outcomes highlight the need to provide psychological support programs with special attention on susceptible groups. Dental students should implement preventive measures and adopt coping strategies to manage stress and reduce levels of anxiety and depression.

Category: Original Research Paper

Received: February 05, 2023

Accepted: May 21, 2023

Published: October 25, 2023

Keywords:

COVID-19, DASS-21, dental students, depression, anxiety, stress, demographic, educational, pandemic, variables

***Corresponding author:**

Nadya Tsetsova Avramova,

Department of Dental Public Health, Faculty of Dental Medicine, Medical University-Sofia, 1 G. Sofiiski Street, 1431 Sofia, Bulgaria

E-mail: nadya.avramova@fdm.mu-sofia.bg

Introduction

Dental students face significant challenges during their theoretical and clinical curriculum that can result in high level of stress, depression, and anxiety [1,2]. The latter have been reported as common psychological conditions among dentistry students [3]. Moreover, the current evidence suggests higher levels of stress in undergraduate dental students compared to the general population that may lead to depression, anxiety, and suicidal attempts [4,5].

During the last two years dental practices, universities and research institutions around the world have been strongly affected by the novel SARS-CoV-2 pandemic [6,7]. Considering the high risk of transmission of the virus and the specifics in clinical practice (face-to-face communication with the patient, aerosol generating procedures, and constant contact with body fluids – saliva,

blood, etc.), the current pandemic posed additional challenges for dental care and education [8]. The need to establish a safe working and educational environment led to interruption of traditional classroom education and its replacement with online learning. Multiple lines of evidence showed how dental students perceived and assessed effectiveness of distant education as well as its associated impacts on students' physical and mental health, their clinical competence concerns, and long-term plans [9-11]. In this aspect, some recent surveys on the perceived psychological impact of the COVID-19 pandemic reported elevated levels of depression, anxiety, and stress among a significant number of dental undergraduate students [12-15].

Immediately after the onset of the current pandemic, in-person training at Sofia Medical University was interrupted and subsequently, after the end of the movement lockdown imposed by the government, a hybrid dental education was

implemented. This type of training presented a dynamic strategy combining virtual theoretical education via Google classroom platforms and direct clinical training on real patients. In the context of dental education and the stage of the pandemic, the scientific literature has suggested that hybrid training is a good solution to mitigate skill deficit and ensure an effective and safe learning environment [16,17]. However, returning back to training in the university in the era of COVID-19 might be related to high levels of anxiety and stress. In a study by Kharma et al. about 85% of dental students in Al-Farabi Private College/Jeddah/KSA reported anxiety and stress to return to the dental college and 67% of respondents preferred alternative methods of learning [18].

Considering the unexpected length and severity of the outbreak, dental students need to adapt rapidly to the new learning methods. Stress and worries about contracting coronavirus or that a family member may contract it, anxiety related to the examinations or losing manual dexterity skills as well as a variety of other academic, demographic, health, and lifestyle-related stressors (such as age, gender, year of study, marital status, financial problems, living arrangement, workload, patients, etc.) may be essential predictors of abnormal levels of depression, anxiety and stress [4,11].

In the light of these considerations, the current study aimed to determine the prevalence of depression, anxiety, and stress among undergraduate dental students at Sofia Medical University and to investigate its associations with some demographic, educational and pandemic-related variables.

Materials and Methods

Study design and participants

The present survey was a descriptive cross-sectional questionnaire study conducted at the Faculty of Dental Medicine of the Medical University-Sofia (MUS), Bulgaria, during April and May of 2022. Eligibility criteria were applied to all study participants – being an undergraduate dental student, with at least one completed year of dental school. Therefore, first-year dental students were excluded from the study. In addition, the latter was performed in full accordance with the standards of the local ethics committee of the MUS as well as all ethical requirements of the Declaration of Helsinki of the WMA as revised in 2008.

Overall, 70 dental students from 2nd, 3rd, 4th, and 5th study years were invited to participate. Of these, 67 respondents provided duly completed questionnaires, resulting in a response rate of 95.7%. Of the study participants, 49 (73.1%) were females and more than 2/3 – 48 (71.6%) presented 2nd and 3rd year students. Further demographic details of the study sample can be seen in Table 1.

Table 1. Demographic characteristics of the study sample

Demographic variable	No.	%
Gender		
Male	18	26.9
Female	49	73.1
Year of study		
2 nd year	23	34.3
3 rd year	25	37.3
4 th year	7	10.4
5 th year	12	17.9
Marital status		
Single	37	55.2
Married /with a partner	30	44.8
Grade Point Average (GPA) of previous year		
5.50 – 6.00	12	17.9
4.50 - < 5.50	28	41.8
3.50 - < 4.50	24	35.8
3.00 - < 3.50	3	4.5
Dentistry 1 st choice		
Yes	63	94.0
No	4	6.0
Financial problems		
Yes	1	1.5
No	49	73.1
Sometimes	17	25.4
Do you think that restrictions on in-person training related to COVID-19 pandemic have negatively affected your education?		
Only in terms of my practical training	26	38.8
In theoretical disciplines only	2	3.0
In all disciplines	28	41.8
I don't think there are any negative consequences for my training	11	16.4
Note: N=67		

Study instrument

A self-reported questionnaire, consisting of two parts was administered to the surveyed participants. The first section included 11 questions and gathered socio-demographic information regarding students' gender, year of study, marital status, financial issues, grade point average (GPA) of previous year, and whether dentistry was students' first choice of admission when applying for

dental school. Four questions assessed dental students' peer, faculty and patients relationships in the background of the educational environment, which will be particularly presented in further discussions. A final question addressed the students' opinion related to COVID-19 pandemic and its associated impacts on their education.

The second part of the questionnaire included the validated DASS-21 scale that is the short-form version of the original 42-item questionnaire. The Depression, Anxiety and Stress Scale was developed by Lovibond SH and Lovibond PH as an assessment tool that evaluates the severity of behavioral and emotional symptoms that are correlated with depression, anxiety disorder and stress [19]. DASS-21 is a single, concise, and comprehensive instrument to measure these psychological conditions [4] and it contains three 7-items subscales regarding each condition [20]. The questions are scored on a 4-point Likert scale from 0-3 (never – did not apply to me at all, awarded 0 points; sometimes – applied to me to some degree, or some of the time, awarded 1 point; often – applied to me to a considerable degree, or a good part of time, awarded 2 points; almost always – applied to me very much, or most of the time, awarded 3 points). The scores along the three axes of depression, anxiety and stress are calculated by summing the points of the relevant items. Therefore, according to its severity rating index, this depression anxiety stress scale test provides a normal, mild, moderate, severe, or extremely severe result.

Data collection methods and procedures

A convenience sampling technique was used to recruit the study participants. Hard copies of the questionnaires were distributed to the dental students (n=70) during their optional training in medical psychology and communications in dental practice. Participation was voluntary and anonymous, and no identifying information was gathered. After having received explanations on the purpose of the study and the essence of the project, the respondents were asked to fill in the questionnaires. Voluntary completion and return of the inquiry forms by all participants was considered as written implied informed consent to take part in the present study.

Statistical analysis

The data obtained was analyzed using SPSS Statistics 28.0 (IBM Corporation, New York, USA). Descriptive statistics (percentages and frequencies) were calculated to determine the levels of depression, anxiety, and stress among the dental students. Kolmogorov-Smirnov test was used to check the normality of the data. To test the null hypothesis that the distribution of depression, anxiety, and stress was the same across categories of different variables as well as to compare distributions across groups either the Mann-Whitney U test for 2 samples or the Kruskal-Wallis 1 way ANOVA for k samples were used. The significance

level was set at $p < .05$. Precision and internal consistency of the questions were calculated with Cronbach's alpha coefficient.

Results

Prevalence of depression, anxiety, and stress (DAS)

Abnormal levels of depression, anxiety, and stress were identified in 34.3%, 65.7% and 59.7% of the dental students, respectively. Prevalence of severe and extremely severe depression was 6.0%. However, almost a third of the respondents (29.8%) experienced severe or extremely severe anxiety. Every one in ten students reported severe or extremely severe stress as well (Table 2).

Table 2. Levels of depression, anxiety, and stress (DAS) among dental students

Level	Depression N (%)	Anxiety N (%)	Stress N (%)
Normal	44 (65.7)	23 (34.3)	27 (40.3)
Mild	10 (14.9)	9 (13.4)	24 (35.8)
Moderate	9 (13.4)	15 (22.4)	9 (13.4)
Severe	2 (3.0)	9 (13.4)	6 (9.0)
Extremely severe	2 (3.0)	11 (16.4)	1 (1.5)
Note: N=67			
DAS, student demographic factors and post-pandemic related perspectives			

The Cronbach's alpha coefficients for each of the three subscales (range: 0.72-0.93) were acceptable and demonstrated the high internal consistency and reliability of the questionnaire. Gender was found significantly associated with dental students' anxiety ($p = .003$), Table 3.

Table 3. Distribution of dental students' DAS across different demographic variables

Variables	D	A	S
Gender*	.725	.003	.471
Marital status*	.037	.979	.815
GPA**	.492	.894	.713
Dentistry 1 st choice*	.808	.848	.750
Financial problems**	.228	.502	.254
COVID-19**	.500	.791	.680

Note: The significance level is 0.05. Asymptotic significances (2-sided tests) are displayed.

* Independent-Samples Mann-Whitney U Test

** Independent-Samples Kruskal-Wallis Test

A much larger proportion of females suffered from abnormal levels of anxiety (56.6%) as compared with males (9%), Figure 1.

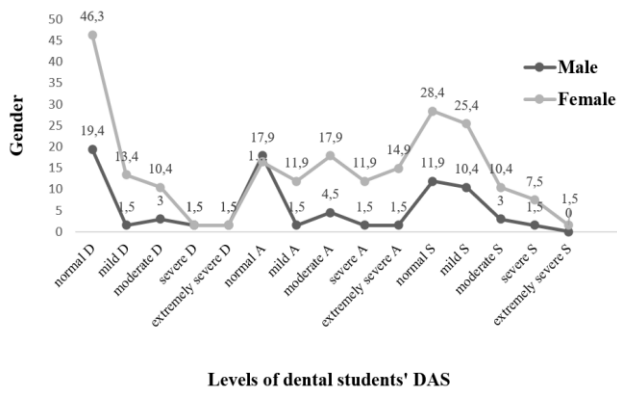


Figure 1. Distribution (%) of DAS levels according to respondents' gender (N=67)

Additionally, respective year of study was statistically significantly associated with depression ($p=.048$) and stress ($p=.035$), Table 4. It can be seen in Figure 2 that 3rd year students experienced higher levels of mild, moderate, and severe depression (19,4%) compared to their 5th year colleagues (1.5%), $p=.007$. Furthermore, higher abnormal levels of stress were observed again in the group of 3rd year dental students (25.4%) as compared to 2nd year students (17.9%) with significant differences among examined groups ($p<.05$).

Table 4. Distribution of respondents' DAS across dental students' year of study

DAS categ.	Year of study* (Sample 1 - Sample 2)						Sig.**
	2 nd year 3 rd year	2 nd year 4 th year	2 nd year 5 th year	3 rd year 4 th year	3 rd year 5 th year	4 th year 5 th year	
D	.101	.884	.179	.209	.007	.873	.048
A	.513	.140	.694	.205	.281	.392	.906
S	.035	.782	.454	.254	.331	.757	.198

Note: Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same
 * Independent-Samples Kruskal-Wallis Test
 ** The significance level is 0.05. Asymptotic significances (2-sided tests) are displayed.

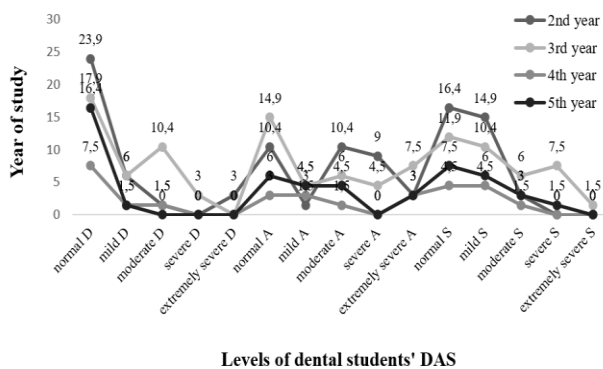


Figure 2. Distribution (%) of DAS levels according to respondents' year of study (N=67)

In terms of students' marital status, the level of depression was found to be statistically significant ($p=.037$), Table 3. The results of the study revealed that married dental students or these with a partner had higher normal level of depression (35.8%) than single students (29.9%). Respectively, abnormal levels of mild, moderate, severe, and extremely severe depression were significantly lower in the first group (9%) as compared to the second one (25.4%), Figure 3.

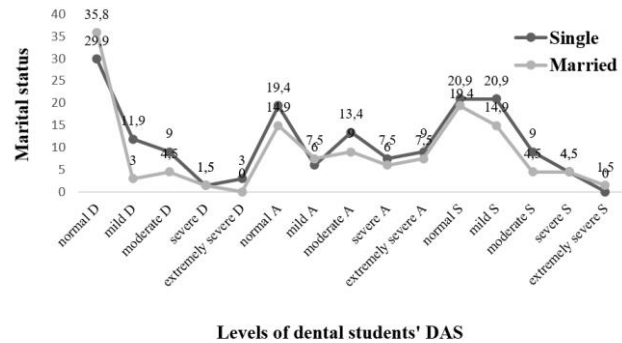


Figure 3. Distribution (%) of DAS levels according to respondents' marital status (N=67)

GPA of previous year, presence of financial problems, and dentistry as the first choice of admission were also examined as potential demographic variables and tested for significant relationships with each subscale. Table 3 shows that the distribution of dental students' DAS across these variables was the same ($p>.05$). Similar results were obtained regarding students' perspectives on the implementation of online and hybrid learning during the COVID-19 pandemic and subsequently their effect on student training ($p>.05$). Although statistically significant association of DAS prevalence with students' opinion was not found, most of the respondents reported that restrictions on in-person training have negatively affected their education either in all disciplines (41.8%) or only in terms of practical training (38.8%). Surprisingly, 16.4% of surveyed students did not think that this situation might be related to any negative consequences for their training (Table 1).

Discussions

The present study was undertaken to investigate the levels of self-perceived depression, anxiety, and stress in a cohort of Bulgarian undergraduate dental students at the Medical University-Sofia and to test for any associations with students' demographic characteristics. The results indicated a high prevalence of symptoms of abnormal depression, anxiety, and stress as anxiety was the most prevalent condition, followed by stress and depression. In terms of severity, the prevalence of anxiety was also highest with almost one-third of the participants demonstrating severe and extremely severe scores in this aspect. Similar findings were reported by several studies

involving dental students in Australia, Saudi Arabia, and India [1,4,21]. In contrast, other investigations suggested that the overall percentage of level of depression was higher than level of anxiety among dentistry students [2,22-24]. Nonetheless, we can still argue that anxiety and depression are the most common mental health issues among dental students.

In our study we found a significant relationship between gender and anxiety as most of the students (86.1%) that experienced abnormal levels of anxiety were females. However, gender had no significant effect on depression and stress. This outcome is to some extent in line with other findings in the literature. Basudan, Binanzan & Alhassan (2017) reported that gender was a significant predictor for anxiety and stress, whereas Ghasemi et al. (2017) revealed no associations of gender with depression and anxiety [4,25]. Additionally, the current literature indicated that female students showed significantly higher depression, anxiety, or stress scores as compared to males [2,21,26,27], although there are exceptions [22,28,29]. A possible explanation of this fact was considered by Gao, Ping & Liu (2020). The authors examined the gender differences in college students' depression, anxiety, and stress and subsequently reported a significantly larger proportion of female students that experienced anxiety above the normal threshold. They found a significant positive correlation between anxiety and introversion, females' body image, drinking habits, and academic performance [30].

Marital status was another demographic factor that we explored in the current research. According to our results single students exhibited significantly higher level of depression than those having a partner. Compared to pre-existing evidence that found no relationship between students' marital status and depression, anxiety, or stress [4,31], this result indicates a considerable difference. Undoubtedly, being alone might be a source of depression and stress while partner relationships if providing mutual support, love, effective communication, and positive emotions can help reduce these conditions.

Regarding educational factors, the present study revealed significant differences among dental students with different academic levels in terms of depression and stress. In this survey examined cohort of dental students included one preclinical course of training (2nd year students), one course transitioning from preclinical to clinical training (3rd year students), and two clinical courses of training (4th and 5th year students). We found that 3rd year dental students demonstrated higher level of depression as compared with 5th year students as well as higher stress scores than 2nd year students. Studies in the literature reported various results if it refers to the association of this academic factor (year of study) with students' DAS levels: lack of such an association [4], no

association with students' depression and anxiety only [27], higher depression and stress in 3rd year students compared to 2nd year students [22], a peak rise in level of depression among 4th and 6th year students [2], higher anxiety and depression in the students of first and final year [5], higher prevalence of stress in clinical students than in preclinical students [21], lowest and highest stress scores among 6th and 5th year students, respectively [27]. Observed findings might be largely due to existing distinctions in dental training programs across different countries – in terms of their duration, content, number of examinations after each year of study, etc. It was not surprising that in the current study dental students were more depressed and stressed in the third year. Dental education in MUS is a 6-year training consisting of several basic, medical, and dental preclinical and clinical disciplines. During the second semester of the third-year dental students are expected to meet their first patients in prosthetic dentistry. Besides its transitional nature (from preclinical to clinical training) with emerging patient relationships that could be a possible source of stress, this period of students' education is particularly important. The future dentists need to successfully pass all examinations related to preclinical dental disciplines as a mandatory condition to proceed their education in the next clinical years. Therefore, change in educational environment, workload, the thought of failing the upcoming exam session and not being able to continue training, might facilitate depressive and stress symptoms among dentistry students.

Academic performance (assessed by GPA in this study), dentistry as the first students' choice when applying for MUS, and financial responsibilities were not found significant factors for depression, anxiety, and stress. Similar results regarding dental students' GPA and financial responsibilities were reported by Basudan, Binanzan & Alhassan (2017) [4]. However, in the same study, the authors indicated that students whose first choice for field of study was dentistry reported less stress. In contrast, Waqas et al. (2015) suggested that moderate levels of anxiety and low levels of depression were associated with higher academic performance of medical students [32]. Additionally, previous studies showed that level of anxiety and depression was higher in students at universities with tuition fee compared to free public institutes [25] as well as economic hardship and income were factors associated with depressive and stress symptoms [23].

Finally, we investigated students' pandemic-related educational responses and whether there was an association with their DAS levels. Although most of the surveyed students considered the negative consequences of online and hybrid training, this study did not identify any relationship of this fact with students' psychological

wellbeing. This result is in line with our previous research regarding dental students' perspectives on the implementation and effectiveness of online learning due to COVID-19 pandemic. While most of the respondents did not find remote education more stressful than in-person training, more concerns were expressed about financial issues than mental health problems [33,34]. Unlike our findings, the current evidence suggested several times in the literature that dentistry students experienced elevated symptoms of depression, anxiety, and stress during and after the end of the movement lockdown [9,11,13, 15,18,24].

The current study provides valuable information on the prevalence of dental students' depression, anxiety, and stress as well as its associations with some demographic and academic factors. However, it had some limitations. First, the small sample size necessitates conducting further investigations, including more units of observation, and providing more reliable data on the studied phenomena. Second, the cross-sectional design of the survey does not allow to track these phenomena in time. And third, the present study explored only a limited number of factors related to students' demographic and educational characteristics. Therefore, future research should focus on performing studies with a longitudinal design that include more schools and examine additional academic environment determinants.

Conclusions

The present results indicated relatively high abnormal depression as well as alarmingly high anxiety and stress scores among survey participants. In addition, significant associations between these psychological conditions and students' socio-demographic and academic characteristics were found. These outcomes highlight the need to provide psychological support programs with special attention on susceptible groups. More importantly, dental students should implement preventive measures and adopt coping strategies to manage stress and reduce levels of anxiety and depression. This can play an important role in prevention and early identification of these mental health issues thus providing opportunities for protecting and improving psychological well-being of dental students.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

References

1. Stormon N, Ford PJ, Kisely S, Bartle E, Eley DS. Depression, anxiety and stress in a cohort of Australian dentistry students. *Eur J Dent Educ.* 2019;23(4):507-514. doi:10.1111/eje.12459
2. Anwar N, Alshammary F, Siddiqui AA, Alenzi RH, Alshmmari BH, Alam MK. Level of anxiety and depression among undergraduate dental students of University of Hail, Saudi Arabia. *Work.* 2021;70(3): 853-859. doi:10.3233/WOR-213605
3. Aboalshamat K, Al-Zaidi D, Jawa D, Al-Harbi H, Alharbi R, Al-Otaibi S. The effect of life coaching on psychological distress among dental students: interventional study. *BMC Psychol.* 2020;8(1):106. doi:10.1186/s40359-020-00475-5
4. Basudan S, Binanzan N, Alhassan A. Depression, anxiety and stress in dental students. *Int J Med Educ.* 2017;8:179-186. doi:10.5116/ijme.5910.b961
5. Bathla M, Singh M, Kulhara P, Chandna S, Aneja J. Evaluation of anxiety, depression and suicidal intent in undergraduate dental students: A cross-sectional study. *Contemp Clin Dent.* 2015;6(2):215-222. doi: 10.4103/0976-237X.156050
6. Barabari P, Moharamzadeh K. Novel Coronavirus (COVID-19) and Dentistry-A Comprehensive Review of Literature. *Dent J (Basel).* 2020;8(2):53. Published 2020 May 21. doi:10.3390/dj8020053
7. Gambarini G, Di Nardo D, Obino FV, et al. Academic Dental Activities and COVID-19 Pandemic. *J Contemp Dent Pract.* 2020;21(6):598. Published 2020 Jun 1.
8. Gurgel BCV, Borges SB, Borges REA, Calderon PDS. COVID-19: Perspectives for the management of dental care and education. *J Appl Oral Sci.* 2020;28: e20200358. doi:10.1590/1678-7757-2020-0358
9. Hung M, Licari FW, Hon ES, et al. In an era of uncertainty: Impact of COVID-19 on dental education. *J Dent Educ.* 2021;85(2):148-156. doi:10.1002/jdd.12404
10. Loch C, Kuan IBJ, Elsalem L, Schwass D, Brunton PA, Jum'ah A. COVID-19 and dental clinical practice: Students and clinical staff perceptions of health risks and educational impact. *J Dent Educ.* 2021;85(1):44-52. doi:10.1002/jdd.12402
11. Agius AM, Gatt G, Vento Zahra E, et al. Self-reported dental student stressors and experiences during the COVID-19 pandemic. *J Dent Educ.* 2021;85(2):208-215. doi:10.1002/jdd.12409
12. Generali L, Iani C, Macaluso GM, Montebugnoli L, Siciliani G, Consolo U. The perceived impact of the COVID-19 pandemic on dental undergraduate students in the Italian region of Emilia-Romagna. *Eur J Dent Educ.* 2021;25(3):621-633. doi:10.1111/eje.12640
13. Hakami Z, Khanagar SB, Vishwanathaiah S, et al. Psychological impact of the coronavirus disease 2019

- (COVID-19) pandemic on dental students: A nationwide study. *J Dent Educ.* 2021;85(4):494-503. doi:10.1002/jdd.12470
14. Akinkugbe AA, Garcia DT, Smith CS, Brickhouse TH, Mosavel M. A descriptive pilot study of the immediate impacts of COVID-19 on dental and dental hygiene students' readiness and wellness. *J Dent Educ.* 2021; 85(3):401-410. doi:10.1002/jdd.12456
 15. Chakraborty T, Subbiah GK, Damade Y. Psychological Distress during COVID-19 Lockdown among Dental Students and Practitioners in India: A Cross-Sectional Survey. *Eur J Dent.* 2020;14(S 01):S70-S78. doi: 10.1055/s-0040-1719211
 16. Haridy R, Abdalla MA, Kaisarly D, Gezawi ME. A cross-sectional multicenter survey on the future of dental education in the era of COVID-19: Alternatives and implications. *J Dent Educ.* 2021;85(4):483-493. doi:10.1002/jdd.12498
 17. Sukumar S, Dracopoulos SA, Martin FE. Dental education in the time of SARS-CoV-2. *Eur J Dent Educ.* 2021;25(2):325-331. doi:10.1111/eje.12608
 18. Kharma MY, Koussa B, Aldwaik A, et al. Assessment of Anxiety and Stress among Dental Students to Return to Training in Dental College in COVID-19 Era. *Eur J Dent.* 2020;14(S 01):S86-S90. doi:10.1055/s-0040-1717052
 19. Lovibond SH, Lovibond PH. Manual of the depression anxiety stress scales. 2nd ed. Sydney: Psychology Foundation of Australia; 1995.
 20. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *Br J Clin Psychol.* 2005;44(Pt 2):227-239. doi:10.1348/014466505X29657
 21. Ahad A, Chahar P, Haque E, Bey A, Jain M, Raja W. Factors affecting the prevalence of stress, anxiety, and depression in undergraduate Indian dental students. *J Educ Health Promot.* 2021;10:266. Published 2021 Jul 30. doi:10.4103/jehp.jehp_1475_20
 22. Aboalshamat K, Hou XY, Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: a cross-sectional study. *Med Teach.* 2015;37 Suppl 1:S75-S81. doi:10.3109/0142159X.2015.1006612
 23. Arrieta Vergara K, Cárdenas SD, Martínez FG. Síntomas de depresión, ansiedad y estrés en estudiantes de odontología: prevalencia y factores relacionados [Symptoms of Depression, Anxiety and Stress Among Dental Students: Prevalence and Related Factors]. *Rev Colomb Psiquiatr.* 2013 Jun;42(2):173-81. doi: 10.1016/S0034-7450(13)70004-0
 24. Woon LS, Leong Bin Abdullah MFI, Sidi H, Mansor NS, Nik Jaafar NR. Depression, anxiety, and the COVID-19 pandemic: Severity of symptoms and associated factors among university students after the end of the movement lockdown. *PLoS One.* 2021;16(5):e0252481. Published 2021 May 27. doi:10.1371/journal.pone.0252481
 25. Ghasemi M, Lotfollahzadeh H, Kermani-Ranjbar T, Kharazifard MJ. Effect of Music Practice on Anxiety and Depression of Iranian Dental Students. *J Dent (Tehran).* 2017;14(3):138-143.
 26. Khanagar SB, Al-Ehaideb A, Jamleh A, et al. Psychological Distress among Undergraduate Dental Students in Saudi Arabia and Its Coping Strategies-A Systematic Review. *Healthcare (Basel).* 2021;9(4):429. Published 2021 Apr 7. doi:10.3390/healthcare9040429
 27. Jowkar Z, Masoumi M, Mahmoodian H. Psychological Stress and Stressors Among Clinical Dental Students at Shiraz School of Dentistry, Iran. *Adv Med Educ Pract.* 2020;11:113-120. doi:10.2147/AMEP.S236758
 28. Peker I, Alkurt MT, Usta MG, Turkbay T. The evaluation of perceived sources of stress and stress levels among Turkish dental students. *Int Dent J.* 2009; 59(2):103-111.
 29. Sanders AE, Lushington K. Effect of perceived stress on student performance in dental school. *J Dent Educ.* 2002; 66(1):75-81. doi: 10.1002/j.0022-0337.2002.66.1.tb03510.x
 30. Gao W, Ping S, Liu X. Gender differences in depression, anxiety, and stress among college students: A longitudinal study from China. *J Affect Disord.* 2020;263:292-300. doi:10.1016/j.jad.2019.11.121
 31. Muirhead V, Locker D. Canadian dental students' perceptions of stress. *J Can Dent Assoc.* 2007;73(4):323.
 32. Waqas A, Rehman A, Malik A, Muhammad U, Khan S, Mahmood N. Association of Ego Defense Mechanisms with Academic Performance, Anxiety and Depression in Medical Students: A Mixed Methods Study. *Cureus.* 2015;7(9):e337. Published 2015 Sep 30. doi:10.7759/cureus.337
 33. Avramova NT. Dental fear, anxiety, and phobia; causes, diagnostic criteria and the medical and social impact. *J Mind Med Sci.* 2022;9(2):202-208. doi: 10.22543/2392-7674.1348
 34. Avramova N, Mihaylova I, Yaneva-Ribagina K, Bonev B, Nenov S. Dental students' perspectives on the implementation and effectiveness of online learning due to COVID-19 pandemic: a descriptive cross-sectional study in Bulgaria. *Advanced Education.* 2021;18:109-118. doi: 10.20535/2410-8286.231011