



Research

Predictors of stress among dental students in the University of Benin, Benin-City, Nigeria

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Article history: Received 29 December 2022, Reviewed 8 January 2023, Accepted for publication 19 February 2023

Abstract

Background: While the learning environment stress is well studied in other climes, few studies are seen in our environment. This study assessed the predictors of stress among the clinical dental students at the University of Benin, Nigeria.

Methods: This cross-sectional study was conducted on the undergraduate clinical dental students of the School of Dentistry, University of Benin, Benin City. All consecutive undergraduate clinical dental students were included, and

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How to cite this article:

Agbapuonwu A, Ekaniyere EB. Predictors of stress among dental students in the University of Benin, Benin-City, Nigeria. *The Nigerian Health Journal* 2023; 23(2):633 - 640

sociodemographic, economic, academic and stress data were collected with a modified Dental Environmental Stress (DES) questionnaire. Both descriptive and inferential statistics were performed. In descriptive statistics, categorical data were summarized in frequency and percentages while the continuous data were expressed in ranges, means and standard deviations. Inferential statistics were performed with Chi-square or Fisher exact where appropriate. P-value <0.05 was used as the cut-off level for statistical significance.

Results: The ages of the respondents range from 19-40 years with a mean age of 25.0 ± 4.12 years. More than half (69.4%) of the students were males given a male-to-female ratio of 2:1. In the overall stress percentage, only 7(11.3%) respondents don't have any form of stress while 55(88.7%) had stress given a prevalence of 88.7%. The age, gender, mode of entry, level of education, marital status, place of residence, type of sponsorship, and religion were also not statistically associated with the presence of stress ($P > 0.05$).

Conclusion: The prevalence of stress among clinical dental students was generally high. None of the demographic characteristics was significantly related to the presence of stress.

Keywords: Dental, education, environmental, covid, stress, Benin-City, Nigeria.

Introduction

Stress is defined as a physiological or physical strain caused by external pressures that are thought to be difficult or hazardous to an individual's physical and mental well-being.^{1,2} Depending on how it is rated, it can be adaptive or debilitating.³ Several international studies have found that dental students are more stressed than other medical students.^{4,5} High levels of stress have been linked to psychological burnout, higher levels of depression, anxiety, and poor academic performance among dental students. According to research

conducted in the United States, the degree of anxiety, sadness, and hostility in dental students was comparable to that of mental outpatients.⁶

The curriculum of dental students in Nigeria demands that students gain academic knowledge, practical competency as well as best practices abilities.

Academic constraints linked with the number of topics to be mastered, clinical obligations to meet, and tests to pass as prerequisites to graduation leave dental students with little time to relieve stress, tension, and anxiety. Numerous research has been conducted on the stress experienced by dental students to identify the most



significant stressors and reduce their intensity in order to enhance the circumstances and quality of education. The most common means of evaluation of stress among undergraduate students in dentistry is the Dental Environmental Stress questionnaire, a 38-item scale developed and validated by Garbee.⁷ With this scale, participants could range their levels of perceived stress on a scale of 1-4 with 1 being “not stressful at all” to 4 being “Very stressful”.

Many studies have been conducted in dental schools around the world, including Saudi Arabia,^{8,9} Australia,² India,¹⁰ UK,¹¹ Malaysia,¹² Pakistan,¹³ US,¹⁴ Israel,¹⁵ Canada,¹⁶ and some European countries.^{17,18} Few studies have been carried out in Africa such as South Africa¹⁹ and only two in Nigeria.^{20,21} Furthermore, to the best of our knowledge, it appears that only one study²³ has reported Dental environmental stress during the COVID-19 pandemic globally. Therefore, this study aims to examine the dental environmental and COVID-related stress among Nigerian clinical dental students at the University of Benin.

Methods

Study setting: This study was conducted at the School of Dentistry of the University of Benin, Benin City, Edo State, Nigeria. The School of Dentistry was established in 1976 as an integral part of the College of Medical Sciences to train dental personnel. The University of Benin provides training for undergraduate students for a period of 6 years. Years 1 to 3 are preclinical years while 4 to 6 are clinical years. After completion of the training, the students receive a bachelor's degree in dental surgery (BDS).

Study design: This was a cross-sectional study design.

Sample size calculation: The sample size was determined using the Yamane formula⁵ for finite population.

$$n = \frac{N}{1 + N e^2}$$

n= Desired minimum sample size; N= Total population; e = margin of error. For sample size, the following assumptions will be applied. The margin of error (e) will be 5% and the confidence level of 95%.

$$n = (74) / (1 + 74(0.05)^2) \\ = 62$$

Study population: The study population was undergraduate clinical dental students at the School of Dentistry.

Inclusion and exclusion criteria: Included in the study were all consecutive undergraduate clinical dental students from 400L - 600L who gave their consent to be included in this study by completing the self-assessment

questionnaire. Excluded were clinical dental students that did not give consent to participate in the study.

Sampling method: All consecutive clinical dental students were recruited.

Study instrument: To evaluate stress among the students, a modified Dental Environmental Stress (DES) questionnaire was used. The self-administered and structured questionnaire²² contains 50 questions designed in two sections (A and B). Section A consist of the demographic data and Section B contains the Dental Environmental Stress Questions which were subdivided into 6 domains (Living accommodation, Personal factors, Educational Environment, Academic work, Clinical factors and COVID factors). The DES was modified by adding 7-item COVID-19-related factors. The COVID-19-related factors were: (1) Level of stress as a result of COVID (2) Anxiety about a possible infection while in school or clinic, motivation to study now compared to the period before COVID-19 (3) Motivation to study now compared to the period before COVID-19 (4) Insecurity about future after graduation compared to before COVID-19 (5) Stress workload compared to before COVID-19 (6) Lack of time for personal study compared to the period before COVID-19 (7) Financial difficulties due to COVID-19. Participants were asked to rate their perceived stress on a scale of 0-4; with 0 being 'Not pertinent', 1 'Not stressful', 2 'slightly stressful', 3 'moderately stressful' and 4 'very stressful'. Since the questionnaire was already validated in a previous study, only the reliability was tested, and the internal consistency of the questionnaire was assessed with Cronbach's alpha coefficient. All domains of the modified DES questionnaire were characterized by a satisfactory level of reliability with Cronbach's alpha of 0.85 indicating good internal consistency.

Ethical consideration: Ethical approval was obtained from the Research and Ethics Committee of the institution (ADM/E22/A/VOL.VII/141735178). All participants were provided with relevant information regarding the study and informed consent was obtained from them. The participants' responses were held in strict confidence. There were no identifiers on the questionnaire to maintain anonymity. Access to questionnaires was restricted. The study did not pose any risk or harm to the research participants. Recruitment was based on participants' voluntariness to take part in the study. They were free to withdraw their consent at any time.

Data analysis: The data collected were age, sex, ethnicity, marital status, religion, place of residence, mode of entry, level of study, type of sponsorship, and



family structure. Other collected data were the occupation of parents and the presence of stress. Both descriptive and inferential statistics were analysed. In descriptive statistics, the categorical variables were expressed in frequency and percentages while numerical variables were expressed in mean and standard deviation. In inferential statistics, the Chi-square test was used to find any association between the dependent and independent variables. The data was entered and analyzed using the statistical package for the social sciences (SPSS), version 26 (IBM, Armonk, NY, United States of America). A critical probability level (p-value) of <0.05 was used as the cut-off level for statistical significance.

Results

Socio-demographic characteristics

Sixty-two respondents of the total 74 total dental students from 400 to 600 levels filled and returned the questionnaires which gave a response rate of 83.8% response rate. The ages of the respondents ranged from 19-40 years with a mean age of 25.0±4.12 years. Table 1 shows the socio-demographic characteristics of the respondents. Sixty per cent of the respondents were within the age group of 18-24 years. More than half (69.4%) of the students were males giving a male-to-female ratio of 2:1. Majority (88.7%) of the respondents were admitted through Joint Admission and Matriculation Board (JAMB) examination. Half (50.0%) of the respondents were in their fourth year of learning. Two (3.2%) were married while the rest were single. A majority (74.2%) of them resided within the campus hostel. About two-thirds (71.0%) of the respondents were under the sponsorship of their parents. Most (67.7%) of the respondents were not of the major tribes in Nigeria. The parents of most (59.7%) of the respondents were skilled labourers. The majority (80.6%) of the respondents came from monogamous family settings.

Perceived stressors

Out of the total stress score of 200, the total mean score of stress among the respondents in this study was 90.1±31.3 with a score range of 2-139. Table 2 shows the top 10 stressors among study participants and their average mean scores. The top four items perceived to be moderate to severely stressful were 'examination stress', 'fear of being unable to keep up with workload', 'lack of time for relaxation' and 'expectation vs reality of dental school'. The topmost stressor in the 400, 500 and 600 levels was 'examination stress', 'shortage of time to complete requirements' and 'completing requirements'

respectively as shown in Table 3. The top two perceived sources of stress among the males were "examination stress" and "lack of time to meet up with requirements" while for females were "expectation vs reality and examination stress" as shown in Table 4.

The factors associated with the presence of stress

The stress characteristic of the studied participants is shown in Table 5. In Personal factors, a majority (54.8%) of the study participants reported mild stress while just one (1.60%) respondent reported severe stress. In the Living Accommodation factor, only two (3.20%) respondents reported severe stress. In the Academic Work factor, there was severe stress in 13(21.0%) respondents. Only 7(11.3%) participants did not have any form of stress associated with the COVID-19 factor while 55(88.7%) had stress giving a prevalence of 88.7%. 3(4.80%) respondents were severely stressed by the COVID-19 factor. Overall, COVID-19 and Academic factors contributed most (18.9% respectively) to perceived stress by the study participants. This was followed by Personal (16.2%) and Clinical factors (16.2%). The least contribution to stress was the Living Accommodation factor (14.1%).

Table 6 shows the relationship between the study variables and the presence of stress among the study participants. Those in the age group of 18-24 years were more stressed compared to other age groups but this difference was not statistically significant (p = 0.77). The level of stress was more among the male students compared to their female counterparts. This finding, however, was not statistically significant (p > 0.05). The 400L students and those that came into the university through JAMB reported more stress although it was not statistically significant (p > 0.05) when compared to the other group of students. The marital status, place of residence, type of sponsorship, and religion of the studied participants were also not statistically associated with the presence of stress (Table 6).

Table 1: Shows the socio-demographic characteristics of the respondents (n=62)

Variables	Freq(n)	Percent (%)
Age range(years)		
18-24	37	59.7
25-34	24	38.7
35-44	1	1.6
Sex		
Male	43	69.4
Female	19	30.6
Mode of entry		
JAMB	55	88.7



Variables	Freq(n)	Percent (%)
Direct entry	7	11.3
Study level		
400	31	50
500	9	14.5
600	22	35.5
Marital status		
Single	60	96.8
Married	2	3.2
Place of residence		
On-campus	46	74.2
Off-campus	16	25.8
Source of sponsorship		
Self	17	27.4
Parents	44	71
Others	1	1.6
Religion of students		
Christian	60	98.2
Muslims	2	1.8
Others	0	0.0
Ethnicity		
Hausa	0	0.0
Ibo	13	21
Yoruba	7	11.3
Others	42	67.7
Occupation of parents		
Skilled	37	59.7
Semi-skilled	12	19.4
Unskilled	8	12.9
Dependent	5	8

Table 3: Shows top 5 stressors according to the year of study

Year of study	Stress Item	Mean (SD)
400	Examination stress	2.58 (1.31)
	Fear of being unable to keep up with the workload.	2.55(1.21)
	Stress of workload compared to before COVID-19	2.35(1.23)
	Financial difficulties due to COVID19	2.32(1.28)
	Academic stress associated with online teaching	2.29(1.32)
500	Shortage of time to complete requirements.	2.67(1.41)
	Lack of time for relaxation	2.67(1.33)
	Examination stress	2.56(1.33)
	Lack of finance to get dental materials	2.44(1.33)
600	Concerns about grades	2.44(1.24)
	Completing requirements	3.14(1.24)
	Shortage of allotted time	3.09(1.01)
	Lack of time to meet up with requirements due to COVID19	2.95(1.05)
	Examination stress	2.86(1.25)
	Lack of time for relaxation	2.82(1.10)

Variables	Freq(n)	Percent (%)
Family structure		
Monogamous	50	80.6
Polygamous	9	14.5
Single parent	3	4.8

JAMB = Joint Admission and Matriculation Board

Table 2: Shows top 10 stressors among study participants and their average mean scores (n=62).

Stressors	Mean score (SD)
Examination stress	2.68 (1.21)
Fear of being unable to keep up with workload	2.47 (1.25)
Lack of time for relaxation	2.40 (1.40)
Expectation vs reality of dental school	2.39(1.32)
Difficulty of coursework	2.35 (1.23)
Lack of time to do assigned work	2.32 (1.35)
Shortage of time to complete requirements	2.32 (1.49)
Lack of time to meet up with clinical requirements due to lockdown	2.31(1.31)
Fear of failing a course or year	2.31(1.30)
Lack of time for personal study compared to period before COVID lockdown	2.31(1.31)



Table 4: Shows top 5 stressors for males and females

Gender	Stressor	Mean (SD)
Male	Examination stress	2.76(1.67)
	Lack of time to meet up with requirements	2.60(1.14)
	Fear of being unable to keep up with workload	2.58(1.29)
	Difficulty of coursework	2.42(1.22)
	Financial problems	2.35(1.41)
Female	Expectation vs reality	2.58(1.22)
	Examination stress	2.42(1.50)
	Lack of time for relaxation	2.42(1.43)
	Stress because of COVID	2.32(1.24)
	Amount of assigned work	2.26(1.24)

Table 5: The stress characteristic of the studied participants (n=62)

Variables	Freq(n)	Percent (%)
Personal factor		
No stress	7	11.3
Mild stress	34	54.8
Moderate stress	16	25.8
Severe stress	5	8.1
Living accommodation		
No stress	7	11.3
Mild stress	17	27.4
Moderate stress	36	58.1

Variables	Freq(n)	Percent (%)
Severe stress	2	3.2
Education environment		
No stress	7	11.3
Mild stress	34	54.8
Moderate stress	19	30.6
Severe stress	2	3.2
Academic work		
No stress	7	11.3
Mild stress	19	30.6
Moderate stress	23	37.1
Severe stress	13	21
Clinical work		
No stress	7	11.3
Mild stress	15	24.2
Moderate stress	35	56.5
Severe stress	5	8.1
COVID-19 factor		
No stress	7	11.3
Mild stress	22	35.5
Moderate stress	30	48.4
Severe stress	3	4.8
Total stress score		
No	7	11.3
Mild	25	40.3
Moderate	29	46.8
Severe	1	1.8

Table 6: Shows the relationship between the Presence of stress and some variables (n = 62)

Variables	Presence of stress		Total	p-value
	Yes (n = 55) (n (%))	No (n=7) (n (%))		
Age range(years)				
18-24	32(51.6)	5(8.1)	37(59.7)	0.77
25-34	22(35.5)	2(3.2)	24(38.7)	
35-44	1(1.6)	0(0.0)	1(1.6)	
Sex				
Male	39(62.9)	4(6.5)	43(69.4)	0.46
Female	16(25.8)	3(4.8)	19(30.6)	
Mode of entry				
JAMB	49(79)	6(9.7)	55(88.7)	0.79
Direct entry	6(9.7)	1(1.6)	7(11.3)	
Study level				
400	27(43.5)	4(6.5)	31(50.1)	0.53
500	9(14.5)	0(0)	9(14.5)	
600	19(30.6)	3(4.8)	22(35.4)	
Marital status				
Single	54(87.1)	6(9.7)	60(96.8)	0.18
Married	1(1.6)	1(1.6)	2(3.2)	



Variables	Presence of stress		Total	p-value
	Yes (n = 55) (n (%))	No (n=7) (n (%))		
Place of residence				
On-campus	42(67.7)	4(6.5)	46(74.2)	0.86
Off-campus	13(21)	3(4.8)	16(25.8)	
Source of sponsorship				
Self	13(21)	4(6.5)	17(27.5)	0.94
Parents	41(66.1)	3(4.8)	44(70.9)	
Others	1(1.6)	0(0)	1(1.6)	
Religion of students				
Christian	54(87.1)	6(9.7)	60(96.8)	0.71
Muslims	1(1.6)	1(1.6)	2(3.2)	
Others	0(0)	0(0)	0(0)	
Ethnicity				
Hausa	0(0)	0(0)	0(0)	0.94
Ibo	11(17.7)	2(3.2)	13(20.9)	
Yoruba	5(8.1)	2(3.2)	7(11.3)	
Others	39(63)	3(4.8)	42(67.8)	
Occupation of parents				
Skilled	33(53.2)	4(6.5)	37(59.7)	0.86
Semi-skilled	10(16.1)	2(3.2)	12(19.3)	
Unskilled	7(11.3)	1(1.6)	8(12.9)	
Dependent	5(8.1)	0(0)	5(8.1)	
Family structure				
Monogamous	45(72.6)	5(8.1)	50(80.7)	0.61
Polygamous	8(12.9)	1(1.6)	9(14.5)	
Single parent	2(3.2)	1(1.6)	3(4.8)	

JAMB = Joint Admission and Matriculation Board

Discussion

The purpose of this study was to identify the perceived sources of stress among dental undergraduate students enrolled at the University of Benin, so that staff and administrators can be proactive in their approach to student stress and modify the teaching curriculum or environment to be more conducive to the students. The burden of stress experienced by dentistry students has been the subject of numerous studies.^{2,5,7,8} This knowledge enables the identification and reduction of the intensity of the stressors to improve the conditions of study and, consequently, the quality of education. The tools used to identify stressors and their intensity were reliable and valid.^{7,22}

The high response rate of 83.8% in this study implies that the findings can be readily generalized to a general population of clinical dental students. The mean age of 25 years in this study is comparable to that reported in a previous study.⁷ The reason for this predominant age group could be related to the lower number of respondents admitted through direct entry. From this study, male students reported more stress when

compared with female students. This result agrees with the findings by Kumar et al¹⁰ in a study of Indian dental students in which they affirmed that male dental students exhibited a higher degree of stress than their female peers. It was also observed in this study that though there were differences in responses to the perceived presence of stress among the genders, it was not statistically significant $P = 0.46$. This result is comparable to the study of Sofola and Jeboda,²⁰ where there was also no statistically significant variation in reported stress levels across gender. Contrarily, another research in Saudi Arabia revealed that female dental students were much more stressed.²³

In this study, the top two perceived sources of stress among the males were 'examination stress' and 'lack of time to meet up with requirements' while for females it was 'expectation vs reality' and 'examination stress'. However, the topmost stressor reported in males and females by Sofola and Jeboda²⁰ were the 'amount of assigned work' and 'getting study materials' respectively while Osagbemi and Soroye²¹ reported 'lack of time for relaxation' and 'feeling of overload due to a huge syllabus' as top stressors respectively.



Gender disparities in stress responses may be related to differences in psychological patterns among genders and the fact that males are less communicative about their problems. Therefore, females who are more communicative about their feelings of stress were more likely to be offered support than males.

The total mean stress score in this study was 90.1 and this was greater than the 1.63 and 2.45 reported by Halboub et al²⁴ and Osagbemi and Soroye²¹ respectively. The difference in these findings could be related to methodological factors.

The top four items perceived to be moderate to severely stressful were 'lack of examination stress', 'fear of being unable to keep up with workload', 'lack of time for relaxation' and 'expectation vs reality of dental school'. Osagbemi and Soroye²¹ reported the five topmost stressors to be 'lack of time for relaxation', 'overload feeling due to the huge syllabus', 'responsibility of getting suitable patients', 'completion of clinical requirements', and 'amount of assigned class work'. Zarzecka et al²⁵ reported 'academic stress' to be the most stressful factor in their study.

Dental program unlike most undergraduate programs has a very demanding curriculum. Academic pressures associated with a large volume of medical/dental information to be understood and examinations that require serious study can leave students with little time for rest to release their tension and anxiety. As a hands-on profession, emphasis is not only on theoretical and academic knowledge but also on clinical skills. In addition, these skills are to be learnt over a short period adding to their increased feelings of stress.

From literature reviews, this study appears to be the first study in Nigeria to assess the prevalence of stress among dental students because of the COVID-19 pandemic. In assessing the impact of COVID-19 factors, the prevalence rate for stress was found to be 88.7% in the COVID-19 factor with 'lack of time for personal study' compared to the period before COVID-19 lockdown reported among the top 10 stressors among study participants. A similar study by Zarzecka et al²⁵ in Poland reported that 'fear of return to clinical classes' due to fear of contact with infected patients and 'disruptions in the course of clinical education' was a source of stress among dental students. The stress perceived by the students in this study is reasonable given that in Nigeria, there was a disruption in dental education for almost a year because of the COVID-19 pandemic and students had a lot to catch up on in a short period when the dental schools eventually resumed.

This study has some limitations. First, this study is a single-centre study so its findings should be generalised with caution. Further research is needed to determine if dental students would report similar results across Nigeria. Also, longitudinal studies can be used to determine if stressors change as student progress from the preclinical to the clinical year of study. Lastly, the sample size may be small.

Conclusion

The prevalence of stress among clinical dental students was generally high. None of the demographic characteristics was significantly related to the presence of stress. Policies to improve academic stress are highly recommended towards the optimum outcome for dental students at the University of Benin.

Declarations

Acknowledgement: We want to thank all the staff of the University of Benin for their support.

Funding: No funding was obtained for the study.

Conflict of Interest: The authors declare that they do not have any conflict of interest.

Availability of Data: The dataset for the study is available on request.

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