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Assessment of Contributors of Stress Among Dental Undergraduate and Postgraduate Students: A Cross Sectional Study

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ABSTRACT
Dental education is viewed as complex, challenging and pedagogical learning experience that demands theoretical knowledge, clinical proficiency and interpersonal skills which are associated with high levels of stress. Identifying such sources of stress among dental students can help dental education system map out strategies and programs to alleviate this stress. To study the contributors of stress among Dental Undergraduate and Postgraduate students. This was a cross-sectional study wherein a validated and modified questionnaire based on Dental Environment Stress (DES) questionnaire, consisting of demographics and 29 questions divided into six domains, was used as the study tool. The questionnaire was mailed to 300 subjects which included both Dental Undergraduate and Postgraduate students, out of which 277 (92.3%) responded after two gentle reminders. Descriptive statistics were performed using SPSS 20.0 version and association of stressor with variables was performed using one way ANOVA.The most stressful items were "stress related to examination and viva-voce" (97.01%), "stress regarding responsibility for managing suitable patients for exam purposes" (94.40%) and "stress related to insecurity concerning professional future / lack of employment positions" (94.03%) among all the respondents. The amount of stress varied among UG and PG students for 7 out of 29 stressors (p<0.05). Stress was found to be comparatively higher among females and hostelites (p<0.05).Dental students do face a considerable amount of stress that demands heed. The curriculum needs to be reformed to include standardized stress management protocol and emphasis should be put to prevent such increasing tax on psychosocial wellbeing of the students.
Key words: Stress, Dental students, Dental education, Contributors.

INTRODUCTION

Stress is defined as the pattern of specific and nonspecific responses an organism makes to stimulus events that disturb its equilibrium and tax or exceed its ability to cope [1].In 1936 Hans Selye stated that stress includes a wide range of strong external stimuli, both physiological and psychological, which can cause a physiological response called the General Adaptation Syndrome.The transition from Eustress (curative stress or positive form of stress) to distress (having negative implications) occurs when the demands exceed the personal and social resources that the individual is able to mobilize.

Attending a school, college or university is a rewarding experience but it is also a time of considerable anxiety and stress for students.The Council on Dental Education in 1977 reported that students who withdrew from dental school for personal reasons were usually not in academic difficulty but withdrew for other reasons [2,3].

Dental education is viewed as complex, demanding and pedagogical learning experience that demands theoretical knowledge, clinical competencies, and interpersonal skills which are associated with high levels of stress.The academic demands, manual dexterity, clinical management and skill requirement expose dental students toward stresses which are quite dissimilar as compared to students in other academic fields. In dentistry, the undergraduate course comprises 4+1 years: years 1 and 2 deal mainly with medical and preclinical curricula, while the clinical training along with didactic courses is intensely distributed in the remaining two years whereas the postgraduate course comprises of 3 years: first 6 months comprise of preclinical training followed by clinical and academic training for rest of period [4,5].

Stress can hamper one's corporal and intellectual health. Students under stress may show symptoms of psychological distress that ranges from mild apprehension to a sense of overwhelming panic— from

inability to start an activity or, once begun, to sustain it— to severe feelings of guilt and worthlessness. Physical symptoms may also be present that include gastrointestinal symptoms, bowel disturbances such as diarrhea or constipation, loss of appetite or gluttony, sleeplessness, intense fatigue, dizziness, tachycardia, feelings of a lump in the throat, dry mouth, and excessive palm sweating [6-9].

The stress associated with dental education is multifactorial. The heterogenous sources of stress among dental students include fear of failing examinations, academics, clinical training, financial resources, and fear of unemployment [2].

This stress can lead to depression, anxiety, absenteeism, diminished work efficiency, and burnout in the students. The most important undesirable effect of stress as far as dental education is concerned is the impairment of effective intellectual function and detriment to learning. Hence, it becomes very essential to identify current sources of stress among dental students and make fruitful efforts to help students combat it. Thus, the need behind this study was to identify the perceived sources of stress among dental undergraduate and postgraduate students.

Hence, the aim of the study was to identify the contributors of stress among dental undergraduate and post graduate students.

MATERIAL AND METHODS

Study setting and ethical clearance: This cross-sectional study was conducted in Gujarat state, India. After getting approval from the ethical committee of the institution, a validated, self-administered, close -ended questionnaire was formulated with the help of Google forms to assess perceived sources of stress among dental undergraduate and postgraduate students.

Study population and sample: Study population consisted of dental undergraduate and postgraduate students.Prior to the start of the study the purpose of the study was explained to the participants and their consent was obtained via text message to reduce the nonresponse bias. The data was collected from October 2020 to February 2021.E survey was mailed to 300 students selected by computer randomization method out of which 277 responded to the survey after 2 gentle reminders. Hence, the response rate was 92.3%.

Study Instrument: The first part of the questionnaire included demographic data regarding the gender of the student (male/female), the course that they study in (undergraduate/postgraduate), the type of college that they study in (government/self-finance), accommodation details(athome/hostel/paying guest) and their marital status (married/unmarried). The second part of the study consisted of questionnaire that was based on Dental Environment Stress (DES) questionnaire which originally consisted of 38 items that were used to assess sources of stress in undergraduate students.[2]Here, modified version of DES was used after validation by expert evaluation and was translated to suit the Indian dental environment comprising of 29 questions after adding and removing items in original DES questionnaire. The 29 items in the questionnaire were divided into six main domains namely: Profession related stressors (item 1-6), Accommodation stressors (item 7-8), Performance stressors (item 9-11), Clinical stressors (item 12-19), Staff and administration related stressors (20-27) and Personal stressors (28-29). The above-mentioned domains were not shown in the e-questionnaire and the response to each item was recorded using a five point Likert scale with response options of:not applicable, not stressful, mildly stressful, moderately stressful and highly stressful.

Statistical Analysis:

The responses for each item in the questionnaire were in the form of Categorical data which were converted into numerical data to calculate counts and percentages for statistical analysis. Mean and Standard Deviation was calculated for Continuous variable. Discrete variable was presented as number and percentage. Continuous groups were compared by one way analysis of variance (ANOVA) and the significance of mean difference between the groups was done by Bonferroni post hoc test. The entire data was statistically analysed using Statistical Package for Social Sciences (SPSS version 20.0, IBM Corporation, USA) for MS Windows. Probabilities of less than 0.05 and 0.001 were accepted as statistically significant and highly significant respectively.

RESULTS

Comparison of stress among demographic variables:

It was noted that many of the items that were considered stressful for females were not stressful for males. Hence, females experienced more stress than males. Stress among PG students was found to be more than UG students. Stress among students residing in hostels or as paying guests was reported more than those living at home with family. (Table1)

Table 1: Comparison of mean ± SD stress score according to different demographic variables

Variables	Not stressful	Mildly stressful	Moderately stressful	Highly Stressful	P value
Gender					
Female (n=201)	3.93± 4.21	9.50±5.00	7.52±4.01	5.85±5.63	<0.01
Male (n=67)	5.06±4.31	10.00±4.52	7.12±4.35	4.87±4.90	<0.01
P value	**<0.05***	>0.05	>0.05	>0.05	
Student					
UG (n=154)	4.08±3.78	10.22±5.15	7.05±3.99	5.41±5.91	<0.01
PG (n=114)	4.39±4.85	8.93±4.41	7.92±4.20	5.87±4.80	<0.01
P value	>0.05	**<0.05***	>0.05	>0.05	
College					
Government (n=65)	5.32±5.22	9.37±4.92	7.14±4.57	5.31±5.77	<0.01
Private (n=203)	3.89±3.86	9.77±4.88	7.51±3.94	5.70±5.37	<0.01
P value	>0.05	>0.05	>0.05	>0.05	
Marital status					
Married(n=26)	3.23±4.01	10.12±4.43	8.00±4.43	6.12±5.31	<0.01
Unmarried (n=242)	4.32±4.28	9.62±4.93	7.36±4.06	5.55±5.49	<0.01
P value	>0.05	>0.05	>0.05	>0.05	
Accommodation					
Home(n=159)	4.08±3.85	9.85±4.58	6.97±4.02	5.23±5.24	<0.01
Hostel(n=109)	4.41±4.81	9.41±5.29	8.08±4.14	6.15±5.76	<0.01
P value	>0.05	>0.05	**<0.05***	>0.05	

*p value <0.05= statistically significant

Stress levels according to items and domains:

Table2 shows stress perceived in terms of percentage by the students according to different stressors. Most stressful areas were related to profession, performance and clinics.

In the domain of profession related stressors- insecurity concerning professional future / lack of employment positions was most stressful (94.03%) followed by overloaded feeling due to heavy syllabus (88.81%), number of assignments vs time frame (85.82%) and fear of failing a course/year (84.33%). Late ending days and less number of holidays were mildly stressful for 41.79%.

35.78 students reported moderate stress due to lack of recreational facilities and homely atmosphere at accommodation place.Stress related to examination and viva-voce was shown to be the most stressful contributor (97.01%) for performance domain while moderate stress related to peer competition was reported by 29.10% and parental/staff expectations were considered highly stressful by 18.66% students. For stress related to clinical domain, 94.40% were stressed for managing suitable patients for exam purposes followed by fear of dealing with patients who did not disclose information about having contagious diseases (91.79%). Administrative responses to student needs regarding provision of study and dental materials (88.43%), pressure for payment of fees and imposing extra charges for late fees payment (83.96%) and Indifferent / biased behaviour by professors (83.96%) were major findings in Staff and administration related stress41.04% of respondents were mildly stressful regarding health problems due to stress while 34.62% were moderately stressful for lack of coping due to marital status or family issues.

Table 2: Distribution of various categories of stress among dental students in terms of Percentage

Stress items	Not stressful	Mildly stressful	Moderately stressful	Highly stressful	Total stress
Stress related to Profession					
1. Fear of failing a course/year	15.67	27.24	36.19	20.90	84.33
2. Insecurity concerning professional future / lack of employment positions	5.97	23.13	33.96	36.94	94.03
3. Overloaded feeling due to heavy syllabus	11.19	33.21	33.96	21.64	88.81
4. Number of assignments vs time frame	14.18	38.43	28.73	18.66	85.82
5. Late ending days and less number of holidays	16.42	41.79	26.12	15.67	83.58
6. Neglect of personal life due to time factors	20.90	35.82	22.01	21.27	79.10
Stress related to accommodation place (n=109)					
7. Lack of recreational facilities and homely atmosphere at accommodation place	14.68	35.78	29.36	20.18	85.32
8. Environment not conductive for studying and quality of food	14.68	27.52	36.70	21.10	85.32
Stress related to Performance					
9. Stress related to examination and viva voce.	2.99	27.61	36.57	32.84	97.01
10. Stress related to peer competition for grades	23.88	35.07	29.10	11.94	76.12
11. Parental and staff expectations	20.15	33.58	27.61	18.66	79.85
Stress related to Clinics					
12. Transition from preclinical to clinical work	19.40	44.78	22.76	13.06	80.60
13. Insufficient availability of patients to learn and practice on, either due to less in walking OPD or transfer of patients to PG students	19.03	37.69	24.25	19.03	80.97
14. Patient being late or not showing for appointment	18.28	43.28	20.52	17.91	81.72
15. Patient's attitude towards dentistry and lack of patient co operation in home care	17.16	42.16	27.24	13.43	82.84
16. Fear of dealing with patients who do not disclose correct information related to contagious diseases.	8.21	40.67	30.22	20.90	91.79
17. Lack of knowledge, skills &confidence to deal with medically compromised patients.	16.42	41.79	30.60	11.19	83.58
18. Stress related to completion of quota requirements	16.79	29.10	32.09	22.01	83.21
19. Responsibility for managing suitable patients for exam purposes	5.60	14.55	29.85	50.00	94.40
Staff and administration related stress					
20. Compulsion on attending conferences, seminars & conventions held at places other than your own college	28.36	36.94	20.15	14.55	71.64
21. Atmosphere created by professors and rules & regulations at workplace	17.16	44.40	19.78	18.66	82.84
22. Difference of opinion regarding treatment planning between different professors	19.78	38.06	25.00	17.16	80.22
23. Receiving criticism about work	20.52	37.31	24.25	17.91	79.48
24. Indifferent / biased behavior by professors	16.04	36.57	27.24	20.15	83.96
25. Lack of availability of efficient lab technicians and helper staff	15.30	43.66	25.75	15.30	84.70
26. Administrative responses to student needs regarding provision of study and dental materials (extra financial burden)	11.57	35.82	26.12	26.49	88.43
27. Administrative pressure for payment of fees and imposing extra charges for late fees payment	16.04	35.07	23.51	25.37	83.96
Personal issues due to stress					
28. Health problems (physical like back and shoulder aches as well as mental health issues)	11.19	41.04	28.36	19.40	88.81
29. Difficulties in coping up due to marital problems and family obligation (n=26)	11.54	26.92	34.62	26.92	88.46

Association of stress levels among demographic variables according to items: (Table 3)

Type of student: Seven out of twenty-nine stressors showed significant association between stress and type of student (UG/PG) with p value <0.05 (stressor no. 4,5,6,8,10,17,20). Lack of knowledge or skills to treat medically compromised patients and compulsion of attending conferences were highly significant stress contributors (p=0.000).

Accommodation place: Extra financial burden was seen to be significantly associated with accommodation place. (Stressor number 26)

Marital status: Two out of twenty-nine stressors were associated with marital status of participant. (Stressor number 17,19)

Type of college: Stressor number 9, 13,15,26,27were significantly associated with the type of college (government/self-finance). The students in private college were most stressful for getting less number of patients in opd to practice. Also fear of examination and viva was one of the major stress contributors for postgraduate students.

Gender of participant: Fear of failing a course/year, Stress related to examination and viva voce, Stress related to peer competition for grades and Stress related to completion of quota requirements was seen more with females and the association was statistically significant(p value < 0.05).

Table 3: Association of demographic variables with different stressors using One-Way ANOVA

Demographic variable	Stressor Number	P Value
Student	4	0.002
	5	0.004
	6	0.001
	8	0.045
	10	0.011
	17	0
	20	0
Accomodation		
	26	0.047
Marital Status	17	0.044
	19	0.034
College	9	0.006
	13	0
	15	0.018
	26	0.029
	27	0.004
Gender	1	0.035
	9	0.035
	10	0.001
	18	0.038

DISCUSSION

The main objective of this study was to identify the contributors of stress among dental undergraduate and postgraduate students. This study was chosen as the information obtained could furnish an opportunity to alleviate stress by modification of teaching curriculum or environment, as well as embracing policies for stress management and providing resources to help lower the stress in dental education. This study is unique as it aimed to evaluate the contributors of stress among both undergraduate as well as postgraduate students simultaneously and considered the association with various demographic variables.

Many tools have been used to assess stress among students like DES, PGWB(Psychological General Well Being)[3] index, MBI (Maslach Burnout Inventory)[4], PSSI (Psychosocial Stress Inventory) [5] and BSI (Brief Symptom Inventory) [6] in several studies but among them the most used is the DES.The study tool used here was the modified DES questionnaire because it is most widely used tool in many similar types of studies as it is most pertinent to dental setting stressors [7-9].

The 29 items in the questionnaire were divided into six domains: Profession related stressors (item 1-6), Accommodation stressors (item 7-8), Performance stressors (item 9-11), Clinical stressors (item 12-19),

Staff and administration related stressors (20-27) and Personal stressors (28-29) for clarity of presentation of items which was in accordance with the studies done by [2,7, 9].

In this study Likert scale was used to rate the stress related to each item.The advantage of using Likert scale is that they are the most universal method for survey collection as they are easily understood and hence, they result in higher response rate.[10]This could be one of the reason for higher response rate of 92.3% in our study.

Our study mentions that the most stress provoking items were related to profession, performance and clinical work which is supported by work of Acharya *et al.* [7], Kaipa et al [11].

In our study, items 1-6 in the questionnaire accounted for stress related to profession where it was noted that the most remarkable stressor among 94% respondents, was insecurity concerning professional future or lack of employment positions followed by overloaded feeling due to heavy syllabus.The possible reason for this can be rapid growth in the population of dentists and their preference to settle in urban set up which has led to an imbalance in their distribution and lack of job opportunities which are solely concentrated in private sectors where there is enormous competition and limited earnings. According to a study by Yadav *et al.* [12] in 2016, India has 310 dental colleges, of which 268 are private and 42 are government colleges, with 26,000 undergraduate and 5400 postgraduate dentists graduating every year. This finding and explanation was supported by Kaipa *et al.*[11] and Shaik *et al.*[13] Dentist population ratio in urban areas is 1:10,00 and in rural area is 1:50,000 according to reports of 'The Hindu' in 2019.India's overall dentist to population ratio is 2.7 lakh registered dentists for a population of 134 crore which is about one dentist for 5,000 people, well above the WHO recommended ratio of one for 7,500.

Items 7-8 in the questionnaire depicts stress related to accommodation place and it was noted that stress was mild to moderate and there was significant difference in mean score of stress between hostelites/Paying guests and those residing at home (p<0.05) (table1). Our results are in accordance with Shekhon *et al.* [9]. Higher stress among hostelites and paying guests could be due to difficulty faced by students to adapt to new environment, lack of self-dependence and an atmosphere that lacks homely feel.

In this study, items 9-11 comprised of stress related to performance where stress related to examination and viva voce were found to be major stressor among all the participants and is in support of previous studies [9, 11, 14, 15].The can be due to the pattern of dental education system in India that focuses more on scoring marks and passing the exams rather than focusing on actual learning and what and how much has been imbibed. Less efforts are directed towards skill development.

Our study had items 12-19 considering the stressors related to clinics where it was found that, stress for managing suitable patients for exam purposes was the highest stressor (94%). In most of the clinical subjects, the current exam guidelines demands the need for specific type of patients(for example: ideal class 2 cavities having intact marginal ridges in conservative dentistry) and the press or to manage such ideal patients creates anxiety and stress among students and this makes them fearful during exams.The exam requirements needs to be relaxed and the students should be trained to manage any kind of patient in dental examination rather than patients pertaining to specific types as in clinical practice after graduation ideal cavity and ideal patients hardly exist [8-11].

Apart from this, one peculiar finding in our study was the fear among students to deal with patients who do not disclose correct information regarding contagious diseases. Dentistry demands working in close contact with the oral cavity of the patients which harbours a number of micro-organisms that are responsible for spread of contagious diseases (for example: TB, Hepatitis B, SARS CoV2). Working with high speed instruments spreads aerosols and sharp instruments causing pricking injury, might transmit the disease. Hence, treating patients who do not reveal proper medical history of contagious diseases either due to lack of knowledge that they might spread it to others or due to fear of getting refrained from required treatment and secluded by the society, imposes a great threat to well-being of dental students. Also, the reason for this stress can be the extra financial burden and the leave of absence due to illness that student might face due to infection from contagious disease [12-16].

Item number 21-27 accounted for stress related to college staff and administrative department which showed that stress related to administrative responses for student needs like provision of dental and study materials (extra financial burden) was highest. This can be explained by the fact that the cost of studying professional course like dentistry is high. The administrative department of some private colleges fails to meet the demands of the students and as a result they have to spend on materials, instruments and books in addition to more fees of private colleges that leads to extra expenditure.Some parents finance their children through bank loans which give the students the anxiety about the financial resources. Also, stipend in internship is not provided by most of the private colleges which could ease the financial crisis. Regarding the stress related to professors, stress related to biased behavior by them (83.96%) and rules and regulations at work place(82.84%) were considered major stressors which can

be considered a result of 'corporal' mindset that continues to exist in India by the legacy of Britishers. Items 28-29 were related to stress due to personal issues that showed that physical and mental issues and coping with marital life both were mildly stressful.

Comparison of stress among demographic variables:
Regarding the demographic variables (table 1), the stress among females was found to be more than the stress among males (p<0.05) which is supported by study by Kaipa et al [11] but was contrary to results of study by Kumar et al [16] and Acharya *et al* [7]. Stress among students residing at hostel was found to be significantly higher than those residing at home that has been already explained earlier. There was a significant difference in mean stress scores among UG students and PG students that was found in mildly stressful category(p<0.05).

Association of stress levels among demographic variables:
Seven out of twenty-nine stressors (item number 4,5,6,8,10,17,20) were found to be associated with course of students which was statistically significant. The type of stress varied according to course of student. Stress related to lack of confidence to deal with medically compromised patients was found to be more in UG students which can be explained by lack of knowledge and training in this field as compared to PG students. Whereas the compulsion on attending conferences and seminars was more stressful for PG students.
Stress related to item number 9,13,15,26,27 were found to be associated with type of college (government/self-finance). Stress related to insufficient availability of patients was more in students from self-finance college due to less OPD than government colleges. Also, undergraduates get less number of patients to practice on as maximum patients get allotted to PG students. It was observed that the stress related to administration was found to be more in students from self-finance colleges than that of government colleges which may be due to the extra expenditure that they need to spend on materials not provided by college and burden of fees payment.
Gender was found to be associated with stressor number 1,9,10,18. Overall females exhibited more stress than males in each item which may be explained by the fact that have a hormonal system that reacts differently to stress and causes them to react more emotionally and become more exhausted. Therefore a stress reduction plan should be implemented with special attention toward female dental students.
Hence, from the present study an overview of stressors has been obtained and strategies to alleviate this stress have to be undertaken for the betterment of the students. The existing educational system needs to be re-considered towards creating a more student friendly environment that encourages collaborative learning and interpersonal support among students [17]. Several stress management strategies have been implicated to help students deal with stress related to dental environment [18].According to survey by Shekhon et al [19]the stress management techniques most accepted by students are planning, active coping, positive reframing, use of TV/ music/ internet/ hobby, emotional and instrumental support.

SUGGESTIONS
The dental education system should consider following strategies to deal with stress of students:
- Parents should be counseled prior related to the ill effects of pressuring their children in joining an educational program without considering their choice and for academic excellence.
- Efforts should be made to identify vulnerable individuals early for improving their emotional and professional well-being.
- Measures such as changes in length and type of curriculum, small group assignments, student-centered methodologies, reduction of educational costs, individual counseling, formative assessment of student rather than summative assessment, faculty incorporated advising systems, quota reduction and increasing co-curricular activities should be implemented.
- Advocating health promotion policies to ensure a future supply of effective dentists.
- Providing ample amount of job opportunities and a respectable pay.

LIMITATIONS OF THE STUDY:
- It was a cross sectional study that investigated the students only at a given point of time and does not give longitudinal information regarding fluctuations in sources of stress over a period of time.

CONCLUSION
It was concluded that dental students do face a considerable amount of stress and most remarkable stressors were insecurity concerning professional future or lack of employment positions, stress related to examination and viva voce and stress for managing suitable patients for exam purposes. Dental schools need to adopt strategies for stress management and provide students with apt resources to alleviate

stress. Effective succor from teaching staff, institutional administrators and families is crucial for dental students to cope up with stressful environment. Standardized stress management protocol should be included into our reforming curricula.

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