

## PERCEIVED SOURCES OF PSYCHOLOGICAL STRESS IN POST-GRADUATE ORTHODONTIC STUDENTS IN INDIA: A MULTICENTER SURVEY

Balasubramanian Madhan<sup>1\*</sup>, Alok Ojha<sup>2</sup>, Haritheertham Gayathri<sup>3</sup>

1. Professor of Orthodontics and Orofacial Orthopedics, Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh – 522509.INDIA.
2. Former Post-Grad St, Orthodontics and Dentofacial Orthopedics, Jaipur Dental College, Dhand, Tehsil Amer, Delhi-jaipur N.H. 8, Jaipur, INDIA.
3. Senior Lecturer, Periodontics and Oral Implantology, Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh – 522509.INDIA.

### Abstract

The aim of this multicenter survey was to identify the sources of perceived psychological stress in the post-graduate students of Orthodontics and to analyze the influence of age, gender and the year of study on these stressors.

251 post-graduate orthodontic students from 24 dental schools across India anonymously completed a 61 item self-administered questionnaire. The relevant descriptive statistics were computed to summarize the obtained data. The Mann-Whitney U test and Kruskal-Wallis ANOVA were used for analyzing the inter-group differences based on the gender and year of study respectively. Regression analyses were applied to evaluate the demographic variables as predictors of the degree of perceived stress.

The results indicated that dependencies on alcohol, drugs etc., limitations of financial resources, politics and psychological games played by the faculty, fully loaded day, and forced postponement of engagement or marriage were the first five highly stressful factors for the students. Factors related to the personal life of the student were the more common among the top few stressors. In general, the gender of the student or the year of study did not make any significant difference in the nature and degree of perceived stress.

None of the demographic variables evaluated in the study were predictive of the overall extent of perceived stress in the student.

*Clinical article (J Int Dent Med Res 2011; 4: (3), pp. 123-131)*

**Keywords:** Stress, Psychological; Education, Dental, Graduate.

Received date: 14 October 2011

Accept date: 02 December 2011

### Introduction

Psychological stress is described as “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being”.<sup>1</sup> It has been shown to be a significant causative or contributory factor in many types of physical and mental illness, occupational boredom, professional burnout and a potential inhibitor in work performance.<sup>2,3</sup>

Dental education has been always been

perceived to be highly stressful by the students. An UK based study revealed that the proportion of final year dental students suffering from stress to be as high as 72%.<sup>4</sup>

A survey in seven European dental schools showed that more than a third of the total sample of students reported psychological distress (morbidity) at a level of concern.<sup>5</sup>

The dental literature on the perceived stress among under-graduate dental students is replete with representations from most parts of the world.<sup>6-26</sup>

Diverse aspects of perceived stress have been investigated in these studies including its extent, sources, effect on the physical and mental health, and its correlation with emotional intelligence and academic performance. The influence of certain demographic and psychosocial variables like age, gender, year of study, marital status, nature of accommodation,

#### \*Corresponding author:

Dr. Balasubramanian Madhan,  
No. 4, Flat F3, II Main Road,  
Sri Iyappa Nagar (Koyambedu), Chennai – 600092, INDIA.

E-mail: madhanb@hotmail.com

and the field of choice before entry into the dental school have also been examined. However, to the best of our knowledge, no information exists on the status quo in the students pursuing their post-graduate studies in dentistry.

Orthodontics and Dentofacial Orthopedics, as an art and science to learn, requires profound and disciplined training over a considerable period of time. The Master of Dental Surgery (MDS) program in India, leading to the specialist status in the field, is a three years full-time course with training in both theoretical and clinical arenas. Given the rigorous nature of the program, it is but logical to assume that the students could encounter some stressful situations during the course.

Every educational institution has a fundamental duty of providing an optimal learning environment for students and the first essential step towards this is the identification and understanding of the potential stressors. As there is a dearth of literature in this regard, it was deemed appropriate to pursue this survey to 1 Identify the perceived sources of psychological stress in the post-graduate orthodontic students in India and 2 analyze the influence of variables like age, gender, and year of study on the nature and extent of perceived stress in these students.

### Materials and methods

A questionnaire type of survey was chosen for collecting the necessary data. An inventory of the possible stressors during the Orthodontic program was created by pooling the factors from Dental Environment Stress Questionnaire,<sup>19,20</sup> Dental and Medical Student Learning Environment Survey,<sup>23,27</sup> stress related medical and dental literature,<sup>3, 28-30</sup> and interviews with the orthodontic students across the country.

An overtly long questionnaire including all these factors would have run the risk of introducing boredom and loss of attention in the respondent. Hence, a total of 68 factors were shortlisted and were grouped under four broad categories as Personal and Accommodation Factors, Curriculum Factors, Educational Environment Factors and Clinical Factors.

The perceived degree of stress associated with each factor was scored on a five point Likert scale as 1–Not Stressful, 2–Mildly Stressful, 3– Moderately Stressful, 4–Highly Stressful, and 5–Extremely Stressful with an

additional no score response of ‘Not Applicable’. With the intent of refining the questionnaire, a pilot survey was conducted on 40 post-graduate students from three different dental schools in India. After a critical analysis of the responses and feedback from the participants, seven factors that appeared repetitive or overlapping were eliminated and five others rephrased for conceptual clarity. The finalized ‘Orthodontic Student Stress Questionnaire’ (OSSQ) contained a total of 61 items. (Table 1)

Three hundred and seventy post-graduate orthodontic students from twenty four post-graduate dental schools in 10 different states across India formed the target database of the study. The printed copies of OSSQ with a standard preface (filling instructions and confidentiality declaration) were mailed to these students in the first week of January 2010. No reminder was sent to any participant and all the completed questionnaires returned by March 2010 were taken up for the study.

The demographic data collected from the participants included Age (in years), Sex (Male / Female), and the Year of Study (I, II or III Year MDS). As the study was anonymous and the participation was voluntary, the principal author’s Institutional Committee for Research waived off the ethical clearance for the project.

### Statistical Analysis

The data from the returned questionnaires was tabulated In Microsoft Excel 2007 (Part of Microsoft Office 2007, © Microsoft Corporation) and was independently cross-checked by two operators.

During data entry, all the questions with nil or multiple responses were counted as invalid entries and were grouped under the “not applicable’ (NA) category. The descriptive statistics (frequency distribution, median, mean and standard deviation) were calculated to summarize the obtained data. The stressors were ranked in the decreasing order of severity based on their median score (highest to lowest), followed by mean (highest to lowest) and standard deviation (lowest to highest).

The analysis of the tabulated data with Kolmogorov-Smirnov-Lillifors test revealed that the normality of the distribution could not be assumed. Hence Mann-Whitney U test and Kruskal-Wallis ANOVA with Bonferroni post-hoc test were used to evaluate the differences

between groups based on gender and the year of study respectively. The Univariate and Multiple logistic regression analyses were performed and odds ratios were calculated with age, gender and the year of study as independent variables and the total perceived stress score as dependent variable. The alpha level for all the tests was set at 0.05 and the statistical procedures were carried out in SPSS 17.0 (SPSS Inc., Chicago, Ill, USA).

## Results

A total of 262 completed questionnaires were returned yielding a response rate of 70.81%. Eleven of them were excluded due to missing demographic details or grossly incomplete nature resulting in an effective sample size of 251 (67.83 %). The age of the participants in the survey ranged from 23 to 40 years (median = 27, mean  $\pm$  SD = 26.89  $\pm$  2.56). 72.5% of the students were males and the rest 27.5% were females.

The students were almost equally distributed in all the three years of study, 33.9 % each in the first and second year and 32.2% in the third year of the course. The descriptive statistics for each stressor and their rank in descending order of severity of perceived stress is presented in Table 1. Out of the 61 potential stressors evaluated in the study, only one factor (Dependencies on alcohol, drugs etc.) was found to be in the 'extremely stressful' category. Limitations of financial resources, politics and psychological games played by the faculty, forced postponement of engagement or marriage, and criticism from staff for academic or clinical work were all perceived to be 'highly stressful'.

Twenty two and Thirty three of the total stressors were found in the 'moderate' and 'mild' categories respectively and none of the stressors in the questionnaire were dismissed as 'not stressful'. Only few stressors showed statistically significant differences based on demographic variables, three for gender (Table 2) and five for the year of study (Table 3).

The statistically insignificant regression coefficients and weak odds ratios for Univariate and Multiple logistic regression analyses (Table 4) indicated that age, gender or the year of study of the student had no predictable contribution towards the total perceived stress score, either individually or together.

## Discussion

Two hundred and fifty one orthodontic students in India were surveyed with a sixty-one item self-administered questionnaire in order to identify the perceived sources of psychological stress during their post-graduate curriculum. The results revealed that 'Dependencies on alcohol, drugs etc.' was ranked as the top most stressor with its median score falling in the 'extremely stressful' category. Incidentally, this factor also had the second least response rate (68.12%) among all the factors included in this survey.

The social stigma attached with such dependency states could have influenced the students in taking these extreme stances, either an aggressive response or none at all. Alcohol and drug use has been reported to be more prevalent in dental students than previously thought,<sup>31</sup> and also has been found to be stress related in the dental professionals.<sup>32</sup> However, no data is available regarding its pervasiveness in the orthodontic students.

Five out of the total sixty one factors in the questionnaire were reported to be in the 'highly stressful' category. 'Limitations of financial resources' had the second highest perceived stress score among all the factors. With a very high fee structure for the program,<sup>33</sup> and the requirement for expensive armamentarium, it is not surprising that the orthodontic students have perceived this financial burden to be 'highly stressful'. 'Politics and psychological games played by the faculty', 'Forced postponement of engagement or marriage' and 'Criticism from staff for academic or clinical work' were the other factors in the 'highly stressful' category.

Lack of any similar study among the post-graduate students in dentistry, let alone orthodontics, has left no prospects for direct comparison of these results. Related data for under-graduate students from India<sup>8,12</sup> has shown that three out of the top six stressors discussed above (fully loaded day, politics and psychological games played by the faculty, criticism from staff for academic and clinical work) were also among the five highly stressful factors for under-graduate dental students in the country. In general, factors related to examinations, clinical requirements and dental supervisors have been found to be the most common perceived sources of stress in dental students.<sup>6,7,13,21,25,26</sup>

A recent report has highlighted the fact that the top stressful factors in dental students have not changed much in the past decade despite changes in the curriculum.<sup>34</sup>

Understandably so, the factors found to be stressful for the practicing orthodontists were quite different from these. Falling behind schedule, trying to keep to a schedule, constant time pressures, patients with broken appliances, and motivating patients with poor oral hygiene and/or decalcification were the most frequent and the severe of the perceived stressors among the Canadian orthodontists.<sup>35</sup> However, none of the above factors reported to be highly stressful for the dental students outside India or the orthodontic practitioners were seen among the first few highly stressful factors in this survey.

Another noteworthy result is that, five out of the ten factors with the highest perceived stress scores in this study were found to be personal factors (Dependencies on alcohol, drugs etc., limitations of financial resources, forced postponement of engagement or marriage, necessity to postpone having children, and having multiple roles of student/spouse/parent). This suggests that the problems from the academic climate that affect the personal life of the student and vice versa were often of greater concern to them than those otherwise. Therefore maintaining a dichotomous stand on the personal and the professional life of the student seems no longer sensible.

Gender has been suggested as a significant factor in the differential perception of stress in under-graduate dental students. A majority of the studies in this regard have reported that the female dental students perceived more stress than males,<sup>7,9,10,13,14,16</sup> and more often in the domains of academic work and clinical factors.<sup>12,21,22</sup> This has been attributed to their lesser peer support, variation in the pattern of response to stress, and ability to express their experiences more easily than men.<sup>35,36</sup>

In contrast, studies from two private dental schools in India have found more perceived stress in males than in females.<sup>8,12</sup> Neither of these trends was evident in our study as gender based differences were significant only for three out of total 61 factors evaluated (Table 2). Female students perceived 'dependencies on alcohol, drugs etc.' and 'non-availability of teaching staff' to be more stressful than males, while the reverse was true for the 'expectation

versus reality of the curriculum'. The lack of any specific gender influence as shown in this study is concurrent with the results of Al-Omari,<sup>11</sup> Humphris et al,<sup>5</sup> and Sofola and Jeboda<sup>18</sup> for the under-graduate dental students. Out of the sixty one potential stressors in the questionnaire, only five exhibited significant differences based on the year of study (Table 3). Even among this, only 'Getting ideal cases for university examinations' showed a particular pattern. Both the second and third year students perceived it to be more stressful than the first year students. Overall, it could be concluded that the year of study had no specific influence on the pattern of perceived stress among the post-graduate orthodontic students of this study. This corroborates with the findings of Sugiura et al<sup>10</sup> for Japanese dental students.

From the results of a similar study in a Canadian dental school, Stewart et al<sup>24</sup> concluded that the under-graduate students' perceptions of their learning environment were formed very early in their professional training and tend to remain stable throughout their program. In contrast to this state, Naidu et al<sup>22</sup> have found that the level of stress in dental students increased along the five years of the course, with a noticeable spike at the transition between the preclinical and clinical phases.

The contention that clinical students perceive more stress than the preclinical students is also supported by Acharya,<sup>8</sup> Pau and Croucher,<sup>14</sup> and Pohlmann et al.<sup>15</sup> The inverse situation of clinical students experiencing less stress than the preclinical students has also been reported and ironically this has been attributed to the protective effect of the contact with patients.<sup>5</sup>

For the dental undergraduates attending a UK dental school, the year of study, optimism/mood regulation, and gender were identified as significant predictors of perceived stress.<sup>14</sup> Amongst Japanese students, the best predictive variables were found to be gender, dentistry as first choice for admission and the students' general wellbeing.<sup>10</sup>

A recent multinational survey on first year dental under-graduates has documented gender, previous higher education qualification, satisfaction with decision to study dentistry, and emotional intelligence to be independent significant predictors of perceived stress, with the last variable being the most important predictor.<sup>36</sup> But the Univariate and Multiple logistic regression

analysis in this study that attempted to evaluate the contributive influence of age, gender and year of study on the total perceived stress score failed to yield any statistically significant result (Table 4). This suggests that none of these demographic variables, either individually or collectively, were predictive of the total degree of perceived stress in the students of our study.

#### **Limitations and implications**

A fair discussion would not be complete without enumerating the limitations of the study.

1. The problems in the methodology of mailed self-administered questionnaire (lack of direct communication, misinterpreting the questions etc) are the inherent limitations of this study.
2. India is multicultural country with potential socio-cultural differences across different regions. Merging the data from dental schools across various regions would have inevitably masked their individual differences.
3. A cross-sectional approach was used in this survey to evaluate the differences in the perceived stress along the three years of the course. A longitudinal study on the same cohort of students would have been more apt for the purpose.
4. As the factorial validity and test-retest reliability of OSSQ is unknown at this time, it is inappropriate to conclude on the overall level of the perceived stress in these students based on the mean score of the entire questionnaire.

Considering the fact that the future of any science is vested in its students, it is unfortunate that this important issue affecting the academic climate of the post-graduate student has not been sufficiently addressed. Any educational system that is insensitive to students' perceptions and problems is lop-sided in objective and scrumpy in efficacy and dental schools are no exception. Identifying the problem areas in the curriculum and the strength / weaknesses of the students would help to modify the course to meet its ideal objectives. Giving due consideration to the feedback from students would motivate them for better involvement and co-operation.

Finally, allocating a little time in the curriculum to educate them on various stress management strategies, enriching their coping skills in particular, would go a long way in

reducing both the levels and the effects of perceived stress.

#### **Conclusions**

The following are the salient findings of this multicenter survey on the perceived sources of stress in the post-graduate orthodontic students in India.

1. 'Dependencies on alcohol, drugs etc.', 'Limitations of financial resources', 'Politics and psychological games played by the faculty', 'Fully loaded day' and 'Forced postponement of engagement or marriage' were perceived to be the top five stressful factors.
2. Stressors related to personal life were the more common among the first few highly stressful factors for the students.
3. Overall, the gender of the student or the year of study made no difference on the pattern of stress perception.
4. None of the demographic variables evaluated in the study (Age, gender or year of study of the students) were predictive of the total degree of perceived stress in the student.

It is in the best interests of the students and the future of the profession, that all possible measures be taken to address these potential stressors and promote a more congenial academic climate during the post-graduate curriculum.

#### **Acknowledgments**

We sincerely thank all the participant students for their valuable time and opinion and the Orthodontic faculty of the respective colleges for their enthusiastic co-operation. Special thanks to Dr. Krishna Prasad and Dr. Sandesh Pai for their help in data collection and Dr. A.K.Mathai, (National Institute of Epidemiology, ICMR) for his statistical assistance.

#### **Declaration of Interest**

The authors report no conflict of interest and the article is not funded or supported by any research grant.

Stressor	'n'	Score-wise Frequency distribution in %					Mean	Median	SD	Rank
		1	2	3	4	5				
<b>Personal and Accommodation factors</b>										
1. Lack of confidence to be a successful Orthodontist	236	29.7	17.8	13.5	17.8	21.2	2.83	3	1.54	20
2. Fear of not having a prospective career	226	31.0	26.1	16.8	11.9	14.2	2.52	2	1.40	53
3. Lack of time for relaxation	245	13.5	20.8	26.5	25.7	13.5	3.05	3	1.24	11
4. Neglect for personal life	241	17.4	30.7	22.9	17.0	12.0	2.76	3	1.26	25
5. Limitations of financial resources	230	07.0	18.3	15.2	27.8	31.7	3.59	4	1.29	2
6. Personal physical health	242	29.3	30.6	13.7	15.7	10.7	2.48	2	1.34	57
7. Fear of unemployment after the course	234	32.1	18.8	17.5	20.1	11.5	2.60	2	1.40	41
8. Language barrier	228	40.4	16.2	13.2	17.5	12.7	2.46	2	1.47	59
9. Forced postponement of engagement or marriage	185	21.6	09.7	14.1	16.8	37.8	3.39	4	1.58	5
10. Necessity to postpone having children	166	25.3	12.0	13.3	19.3	30.1	3.17	3	1.58	9
11. Having multiple roles of student/spouse/parent	182	24.2	17.0	09.9	20.3	28.6	3.12	3	1.57	10
12. Dependencies on alcohol, drugs etc.	171	19.3	13.5	05.8	09.4	52.0	3.61	5	1.64	1
13. Lack of self-assessment and awareness of own competencies	206	37.4	21.4	12.1	10.2	18.9	2.52	2	1.53	54
14. Fears related to failing in the course	229	30.1	26.2	12.7	16.2	14.8	2.59	2	1.43	44
15. Moving away from house	231	29.0	22.5	20.4	16.0	12.1	2.60	2	1.37	40
16. Problems in accommodation	209	32.5	25.4	09.6	15.3	17.2	2.59	2	1.49	46
<b>Curriculum Factors</b>										
17. Expectation versus reality of the curriculum	235	28.5	29.8	16.6	14.9	10.2	2.49	2	1.31	56
18. Difficulty of coursework	239	27.6	28.0	22.6	15.5	06.3	2.45	2	1.22	60
19. Too much amount of assigned work	242	08.7	26.0	20.2	23.6	21.5	3.23	3	1.28	8
20. Inadequate time for assigned work	239	18.4	32.6	21.4	18.8	08.8	2.67	2	1.22	33
21. University examinations-pattern and grades	247	20.2	23.1	21.9	20.6	14.2	2.85	3	1.34	18
22. Difficulty in understanding the subject literature	240	23.8	28.7	21.7	17.9	07.9	2.58	2	1.24	47
23. Fear of being unable to catch up if behind schedule	245	22.4	31.0	18.8	18.0	09.8	2.62	2	1.28	37
24. Inadequate library support	227	23.3	17.7	17.2	18.5	23.3	3.01	3	1.49	13
25. Inadequate teaching activities in the department	222	25.2	21.2	21.6	18.5	13.5	2.74	3	1.37	26
26. Outdated / irrelevant academic curriculum	217	25.8	24.9	17.0	19.4	12.9	2.69	2	1.37	32
27. Improper organization of the course – Structure, order and timing	227	28.2	27.3	15.0	14.5	15.0	2.61	2	1.41	39
28. Too long or boring preclinical schedule	239	10.5	18.4	22.6	25.1	23.4	3.33	3	1.30	7

29. Inability to modify the program to fit individual preferences	233	24.5	35.2	16.3	13.7	10.3	2.50	2	1.28	55
30. Too much lab work	242	24.4	31.4	24	14.0	06.2	2.46	2	1.18	58
31. Academic activities-seminars, journal clubs, case discussion etc.	249	17.7	36.5	22.5	15.3	08.0	2.59	2	1.17	43
32. Thesis and library dissertation	240	12.5	24.2	29.6	22.5	11.2	2.96	3	1.19	15
33. Making presentations at conferences and conventions	242	19.4	30.6	24.0	19.4	06.6	2.63	2.5	1.18	29
<b>Educational Environment Factors</b>										
34. Fully loaded day	244	06.6	22.5	17.2	32.8	20.9	3.39	4	1.22	4
35. Criticism from staff for academic / clinical work	235	12.8	18.3	15.3	27.6	26.0	3.36	4	1.37	6
36. Politics and psychological games played by the faculty	219	12.3	18.3	15.5	21.5	32.4	3.43	4	1.41	3
37. Too much enforced rules and regulations	236	28.4	26.3	21.2	12.7	11.4	2.53	2	1.32	50
38. Non-availability of teaching staff	217	30.0	23.5	11.0	22.1	13.4	2.65	2	1.44	34
39. Restriction on inter-student interactions and relations	213	38.0	17.8	10.8	18.8	14.6	2.54	2	1.50	49
40. Lack of consideration for students' viewpoints and interests	211	33.2	21.8	10.9	17.5	16.6	2.63	2	1.50	36
41. Gender based bias and discrimination	216	33.8	20.4	13.4	17.6	14.8	2.59	2	1.47	45
42. Inconsistency in feedback from different faculty regarding your work	228	36.8	23.3	12.3	14.9	12.7	2.43	2	1.43	61
<b>Clinical Factors</b>										
43. Lack of adequate infrastructure (instruments and equipments)	208	29.8	19.2	15.9	17.3	17.8	2.74	3	1.48	27
44. Course duration inadequate for completion of clinical cases	221	29.0	26.7	15.3	13.6	15.4	2.60	2	1.42	42
45. Lack of patient compliance with treatment instructions	232	18.5	34.5	18.1	16.0	12.9	2.70	2	1.29	31
46. Responsibility of comprehensive treatment care	234	28.6	28.6	16.7	12.4	13.7	2.54	2	1.37	48
47. Inadequate clinical hands-on training	219	29.7	29.2	14.6	12.8	13.7	2.52	2	1.38	52
48. Training restricted to certain type of mechanotherapy / philosophy	216	24.5	24.1	19.4	21.8	10.2	2.69	3	1.32	28
49. Patient frequently being late or missing appointments	231	15.2	34.2	16.4	18.2	16.0	2.86	3	1.32	17
50. Difficulty in learning clinical procedures	237	25.7	30.8	18.6	15.6	09.3	2.52	2	1.28	51
51. Difficulty in acquiring precision skills for clinical and laboratory work	238	23.1	28.6	19.3	19.8	09.2	2.63	2	1.28	35
52. Working on patients with poor oral hygiene	240	19.6	25.0	16.7	27.5	11.2	2.86	3	1.32	16
53. Lack of confidence in clinical decision making	223	18.4	28.3	17.0	25.1	11.2	2.83	3	1.30	19
54. Inter-faculty differences regarding patient treatment	230	17.4	30.4	19.2	19.1	13.9	2.82	3	1.31	21
55. Handling transferred cases	220	18.6	28.6	21.4	18.2	13.2	2.79	3	1.30	23
	234	15.4	22.2	24.8	22.6	15.0	3.00	3	1.29	14

56. Getting ideal cases for university examinations										
57. Need to present treated cases in university examinations	233	21.0	27.0	15.0	24.0	13.0	2.81	3	1.35	22
58. Dealing with patients having contagious or Sexually transmitted diseases	235	19.6	19.5	16.6	24.7	19.6	3.05	3	1.41	12
59. Lack of adequate number of patients	208	28.8	22.6	19.2	16.3	13.0	2.62	2	1.38	38
60. Prolonged treatment course as compared to other specialties	232	19.4	26.7	23.7	18.1	12.1	2.77	3	1.28	24
61. No support from auxiliary staff – Chair side assistant, technician, hygienist etc.	228	26.8	23.6	15.4	18.8	15.4	2.72	2	1.42	30

**Table 1.** Descriptive statistics for the perceived stressors in OSSQ.

Stressor	(Mean ± SD)		p value*
	Male	Female	
<b>Gender</b>			
Dependencies on alcohol, drugs etc.	3.48 ± 1.68	4.02 ± 1.48	0.044
Expectation Vs. reality of the curriculum	2.60 ± 1.30	2.19 ± 1.32	0.015
Non-availability of teaching staff	2.53 ± 1.40	2.98 ± 1.49	0.041

**Table 2.** Stressors with significant differences based on gender. \*- Mann-Whitney U test.

Stressor	I yr	II yr	III yr	Result	p value*
	(Mean ± SD)	(Mean ± SD)	(Mean ± SD)		
Difficulty of coursework	2.45 ± 1.25	2.65 ± 1.13	2.23 ± 1.24	II > III	0.042
Restriction on inter-student interactions and relations	2.43 ± 1.47	2.25 ± 1.44	2.96 ± 1.54	III > II	0.021
Lack of consideration for students' viewpoints, interests	2.60 ± 1.45	2.27 ± 1.45	3.05 ± 1.52	III > II	0.006
Getting ideal cases for university examinations	2.57 ± 1.22	3.20 ± 1.23	3.15 ± 1.34	II > I III > I	0.006 0.024
Need to present treated cases in university examinations	2.44 ± 1.23	3.07 ± 1.33	2.86 ± 1.43	II > I	0.009

**Table 3.** Stressors with significant differences based on the Year of study. \*- Kruskal Wallis ANOVA with Bonferroni post-hoc test.

Independent Variable	Regression Coefficient		Standard Error		P-value		Odds Ratio		95% CI	
	U*	M*	U	M	U	M	U	M	U	M
Age > 27 yrs	0.21	0.15	0.28	0.30	0.45	0.62	1.23	1.16	0.72 – 2.11	0.64 – 2.10
Sex -Female	0.10	0.11	0.28	0.29	0.74	0.70	1.10	1.12	0.63 – 1.91	0.64 – 1.96
Year of Study - II	0.24	0.21	0.31	0.31	0.44	0.51	1.27	1.23	0.69 – 2.31	0.67 – 2.27
Year of Study - III	0.29	0.24	0.31	0.32	0.36	0.45	1.33	1.27	0.72 – 2.45	0.68 – 2.39

**Table 4.** Results of Univariate and Multiple logistic regressions for total perceived stress score as the dependent variable. \*U - Univariate Logistic Regression Analysis, M- Multiple Logistic Regression Analysis. Age < 27 yrs, Sex – male, Year of study – I year were taken as reference groups. Method of regression for multiple logistic regression analysis was 'forced entry'.

## References

1. Lazarus RS, Folkman S. Stress, Appraisal and Coping. New York: Springer Publishing Company Inc., 1984.
2. Silverstein ST, Kritz-Silverstein D. A longitudinal study of stress in first-year dental students. *J Dent Educ* 2010; 74(8): 836-48.
3. Wicks RJ. Overcoming secondary stress in medical and nursing practice: A guide to professional resilience and personal well-being. New York: Oxford University Press, 2005.
4. Newbury-Birch D, Lowry RJ, Kamali F. The changing patterns of drinking, illicit drug use, stress, anxiety and depression in dental students in a UK dental school: a longitudinal study. *Br Dent J* 2002; 192: 646-9.
5. Humphris G, Blinkhorn A, Freeman R, Gorter R, Hoad-Reddick G, Murtomaa H, et al. Psychological stress in undergraduate dental students: baseline results from seven European dental schools. *Eur J Dent Educ* 2002; 6(1): 22-9.
6. Yap AU, Bhole S, Teo CS. A cross-cultural comparison of perceived sources of stress in the dental school environment. *J Dent Educ* 1996; 60(5): 459-64.
7. Rajab LD. Perceived sources of stress among dental students at the University of Jordan. *J Dent Educ* 2001; 65(3): 232-41.
8. Acharya S. Factors affecting stress among Indian dental students. *J Dent Educ* 2003; 67(10): 1140-8.
9. Rosli TI, Abdul Rahman R, Abdul Rahman SR, Ramli R. A survey of perceived stress among undergraduate dental students in Universiti Kebangsaan Malaysia. *Singapore Dent J* 2005; 27(1): 17-22.
10. Sugiura G, Shinada K, Kawaguchi Y. Psychological well-being and perceptions of stress amongst Japanese dental students. *Eur J Dent Educ* 2005; 9(1): 17-25.
11. Al-Omari WM. Perceived sources of stress within a dental educational environment. *J Contemp Dent Pract* 2005; (6)4: 64-74.
12. Kumar S, Dagli RJ, Mathur A, Jain M, Prabu D, Kulkarni S. Perceived sources of stress amongst Indian dental students. *Eur J Dent Educ* 2009; 13(1): 39-45.
13. Heath JR, Macfarlane TV, Umar MS. Perceived sources of stress in dental students. *Dent Update* 1999; 26(3): 94-8.
14. Pau AK, Croucher R. Emotional intelligence and perceived stress in dental undergraduates. *J Dent Educ* 2003; 67(9): 1023-8.
15. Pohlmann K, Jonas I, Ruf S, Harzer W. Stress, burnout and health in the clinical period of dental education. *Eur J Dent Educ* 2005; 9(2): 78-84.
16. Polychronopoulou A, Divaris k. Perceived sources of stress among Greek dental students. *J Dent Educ* 2005;69(6):687-92.
17. Hendricks SJ, Joshi A, Crombie K, Moola MH. Perceived sources of stress among black dental students in South Africa. *J Dent Educ* 1994; 58(6): 406-10.
18. Sofola OO, Jeboda SO. Perceived sources of stress in Nigerian dental students. *Eur J Dent Educ* 2006; 10(1): 20-3.
19. Garbee WH Jr, Zucker SB, Selby GR. Perceived sources of stress among dental students. *J Am Dent Assoc* 1980; 100(6): 853-7.
20. Grandy TG, Westerman GH, Combs CE, Turner CH. Perceptions of stress among third-year dental students. *J Dent Educ* 1989;53(12):718-21.
21. Westerman GH, Grandy TG, Ocanto RA, Erskine CG. Perceived sources of stress in the dental school environment. *J Dent Educ* 1993; 57(3): 225-31.
22. Naidu RS, Adams JS, Simeon D, Persad S. Sources of stress and psychological disturbance among dental students in the West Indies. *J Dent Educ* 2002; 66(9): 1021-30.
23. Henzi D, Davis E, Jasinevicius R, Hendricson W, Cintron L, Isaacs M. Appraisal of the dental school learning environment: The students' view. *J Dent Educ* 2005; 69(10): 1137-47.
24. Stewart DW, de Vries J, Singer DL, Degen GG, Wener P. Canadian dental students' perceptions of their learning environment and psychological functioning over time. *J Dent Educ* 2006; 70(9): 197-204.
25. Sanders AE, Lushington K. Sources of stress for Australian dental students. *J Dent Educ* 1999; 63(9): 688-97.
26. Alzahem AM, van der Molen HT, Alaujan AH, Schmidt HG, Zamakhshary MH. Stress amongst dental students: a systematic review. *Eur J Dent Educ* 2011; 15: 8-18.
27. Marshall RE. Measuring the medical school learning environment. *J Med Educ* 1978; 53(2): 98-104.
28. Eliades T, Athanasiou AE. Advanced orthodontic education: Evolution of assessment criteria and methods to meet future challenges. *Angle Orthod* 2005; 75(2): 147-54.
29. Kharbanda OP. Global issues with orthodontic education: a personal viewpoint. *J Orthod* 2006; 33(4): 237-40.
30. Sieminska-Piekarczyk B, Adamidis JP, Eaton KA, McDonald JP, Seeholzer H. A survey of perceived problems in orthodontic education in 23 European countries. *J Orthod* 2000; 27(4): 343-8.
31. Underwood B, Fox K. A survey of alcohol and drug use among UK based dental undergraduates. *Br Dent J* 2000;189(6):314-7.
32. Myers HL, Myers LB. 'It's difficult being a dentist': stress and health in the general dental practitioner. *Br Dent J* 2004; 197(2): 89-93.
33. Isaacson RJ. Advanced orthodontic education as seen by the prospective resident. *Angle Orthod* 2009; 79(4): 812.
34. Abu-Ghazaleh SB, Rajab LD, Sonbol HN. Psychological stress among dental students at the University of Jordan. *J Dent Educ* 2011; 75(8): 1107-14.
35. Roth SF, Heo G, Varnhagen C, Glover KE, Major PW. Occupational stress among Canadian orthodontists. *Angle Orthod* 2003; 73: 43-50.
36. Pau A, Rowland ML, Naidoo S, AbdulKadir R, Makrynika E, Moraru R, Huang B, Croucher R. Emotional intelligence and perceived stress in dental undergraduates: A multinational survey. *J Dent Educ* 2007; 71(2): 972-81.