Mental Health of Postgraduate Orthodontic Students in India: A Multi-Institution Survey


Abstract: The aim of this study was to evaluate the mental health of postgraduate orthodontic students in India by assessing the extent of three common negative affective states: depression, anxiety, and stress. Three hundred and thirty postgraduate students from thirty-two dental colleges across India anonymously completed the short version of the Depression Anxiety Stress Scale (DASS21). The statistical analysis included summary statistics, nonparametric tests for intergroup comparisons, and logistic regressions to evaluate the influence of age, gender, year of study, and marital status on these mental states. In comparison to the general population, the students experienced mildly elevated levels of depression and anxiety (11±5.1 and 8.2±4.1, respectively) and a moderately elevated level of psychological stress (22±5.2). A moderate or higher level of coexisting symptoms of all three affective states was seen in 15.8 percent of the students. Female students reported a higher level of depression than males and were two and half times more likely to experience depression to a moderate or higher level. First-year students exhibited lower levels in all three states than those in the second and third years and had lower odds than third-year students of developing a moderate or higher level of any of the three affective states. Marriage had a significant buffering potential against all these states. The results clearly indicate a suboptimal level of mental health in these postgraduate students of the specialty and the need to improve their mental resilience and the academic climate.

Submitted for publication 1/11/11; accepted 5/25/11

Dental education is highly challenging and often places heavy demands on the mental resources of its students, stretching their psychological resilience and making them vulnerable to high levels of negative affective states. As early as 1978, Wexler noted certain inherent problem areas in the dental education process that were marked by psychological symptoms such as anxiety, sometimes to panic proportions. As compared to the general population, dental students have been reported to experience increased levels of anxiety and depression, at times approaching levels seen in general medical patients judged psychiatrically ill. Naidu et al. estimated the proportion of dental students with a clinical range of psychological disturbance to be 54.8 percent in males and 44.2 percent in females. A survey in seven European dental schools found a significant proportion of the students were emotionally exhausted and experienced a high degree of psychological distress. Dental students have been found to fare more poorly than a comparison group of medical students. Newbury-Birch et al. reported that depression and anxiety reaching “pathological” levels were found in 14 and 67 percent of final-year dental students, respectively, and 72 percent of them reported experiencing a significant degree of mental stress.

Demographic and psychosocial variables like gender, age, marital status, social support, living arrangement, career choice and satisfaction, emotional intelligence, personality characteristics, and coping strategies are a few of the variables that have been evaluated for their influence on the mental health of students. In general, females have reported a higher level of psychological disturbance than males, though the reverse was true for perceived stress.
among Indian dental students. Married dental professionals have exhibited less depression and stress than those who were unmarried, divorced, or widowed. Living at home with the family was found to provide a protective effect against some dental climate stressors and appeared to be a better measure of social support than marital status. Muirhead and Locker identified social support and proxy measures as significant predictors of dental school stress among Canadian dental students. Further, those who entered dentistry by their own choice and were satisfied with this career choice perceived less stress in the dental climate than those who were forced to be there by parental decisions and were unsatisfied with the career choice. A multinational survey in nine dental schools across seven countries found the student’s emotional intelligence to be the most important independent predictor of perceived stress. The literature appears to be divided on the most stressful factors directly resulting from the dental school curriculum. Higher levels of mental distress have been observed among those in higher years of dental school as compared to those in the lower years. A recent multi-country study found self-efficacy beliefs, assigned workload, and performance pressure to be the main areas of concern for dental students in six European dental schools.

Overall, reports on the mental health of postdoctoral dental students are not encouraging and have consistently highlighted the need for a more favorable academic environment. Whether a similar state of affairs exists for dental postgraduate students is not known. In India, the Master of Dental Surgery (M.D.S.) in Orthodontics and Dentofacial Orthopedics is a three-year postgraduate course with training in both theoretical and clinical arenas. Given the rigorous nature of such programs, it is logical to assume that their influence on the mental health of students would be no different from dentistry itself. As there is a dearth of information regarding this assumption, the current study was undertaken to evaluate the mental health of postgraduate orthodontic students in India by assessing the extent of three common negative affective states: depression, anxiety, and stress.

Materials and Methods

The short version of the Depression Anxiety Stress Scales (DASS21) described by Lovibond and Lovibond is a synthesized version of the original forty-two-item survey that measures the level of depression, anxiety, and stress in an individual. The structure of the DASS is similar to the tripartite model of Clark and Watson, which conceptualizes depression and anxiety as having unique distinguishing features and some common symptoms as well. During the testing of the scale a new factor emerged that referred to difficulty in relaxing, nervous tension, irritability, and agitation. This difficulty was labeled “stress” by virtue of perceived similarity to the symptoms of tension or stress described by Hans Selye.

The DASS21 has seven items for each of the three scales. (The survey is available at www.psy.unsw.edu.au/dass/ or from the corresponding author.) Items 3, 5, 10, 13, 16, 17, and 21 form the Depression scale and assess dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest or involvement, anhedonia, and inertia. The Anxiety scale (items 2, 4, 7, 9, 15, 19, and 20) measures autonomic arousal, skeletal musculature effects, situational anxiety, and subjective experience of anxious affect. The Stress scale (items 1, 6, 8, 11, 12, 14, and 18) quantifies the difficulty in relaxing, nervous arousal, and being easily upset or agitated, irritable or overactive, and impatient. The respondents rate the extent to which they have experienced the symptoms over the previous week on a four-point rating scale. The sum of the scores obtained from the seven items in each scale is multiplied by 2, and the scale severity is interpreted as shown in Table 1. The DASS severity labels used here characterize the full range of scores in the population, so “mild,” for example, means that the person is above the population mean and not that he or she has a mild level of a psychiatric “disorder.” The instrument has been tested and found to possess excellent internal consistency (reliability) for the depression (0.91 to 0.97), anxiety (0.81 to 0.92), and stress (0.88 to 0.95) scales and, for the whole scale (0.96), very good convergent validity and acceptability to good discriminant validity. Also, the

<table>
<thead>
<tr>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
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<tbody>
<tr>
<td>Normal</td>
<td>0-9</td>
<td>0-7</td>
</tr>
<tr>
<td>Mild</td>
<td>10-13</td>
<td>8-9</td>
</tr>
<tr>
<td>Moderate</td>
<td>14-20</td>
<td>10-14</td>
</tr>
<tr>
<td>Severe</td>
<td>21-27</td>
<td>15-19</td>
</tr>
<tr>
<td>Extremely severe</td>
<td>28+</td>
<td>20+</td>
</tr>
</tbody>
</table>

instrument is simple in language and requires less than ten minutes of administration time.

Participants were a convenience sample of 425 students pursuing their Master of Dental Surgery in Orthodontics and Dentofacial Orthopedics in India. To be truly representative of the pan-Indian scenario, the sample was derived from thirty-two dental schools (seven public and twenty-five private) across fourteen states in India. With the exception of the fee structure and some minor variations in caseload, the curriculum was nearly the same in all these institutions. Printed copies of the DASS21, along with a standard preface explaining the purpose of the study and filling instructions, were mailed in the first week of June 2010. The details collected from the students included age (in years), gender (male/female), year of study (I, II, or III), and marital status (married/unmarried). The students were asked for the history of any systemic disease, prolonged systemic medication, or major life event they had experienced in the past six months, and those who responded positively were excluded from the study. The names of students and institutions were omitted to maintain anonymity. No reminder was sent to any participant, and all usable forms returned by July 2010 were included in the analysis. One person in each surveyed dental school personally facilitated the data collection process. The principal author’s Institutional Ethics Committee had earlier waived ethical clearance for the study on account of its anonymous nature and voluntary sample participation.

The completed and returned questionnaires were coded in order of receipt. The data were tabulated and independently cross-checked by two operators. Summary statistics were calculated for the whole sample and the group-wise data based on the demographic variables. Two group comparisons (for gender and marital status) were performed with the Mann-Whitney test, and comparisons based on year of study were drawn with Kruskal-Wallis ANOVA. Binary logistic regressions were carried out and odds ratio estimated to evaluate the influence of the demographic variables on each affective state. The dependent variable was represented dichotomously as the presence or absence of a moderate or higher level of the symptom. Age (as two groups: <27 years and ≥27 years), gender, year of study, and marital status were the independent variables. All the tests were two-tailed with significance set at p<0.05. PASW18 for Windows (SPSS Inc., an IBM Company, Somers, NY, www.spss.com) was used for the data management and analysis.

Results

A total of 342 completed questionnaires were returned, yielding a response rate of 80.5 percent. Twelve were excluded on account of a positive history of systemic disease/medication or major life event in the past six months, leaving an effective sample size of 330 (77.6 percent). The age of the participants ranged from twenty-four to thirty-four years with a median of twenty-seven and a mean of twenty-six (±1.8). The distribution by demographic factors is shown in Figure 1.

For the overall sample, the level of depression and anxiety symptoms was found to be mildly higher than the population norms (11±5.1 and 8.2±4.1, Tables 2 and 3, respectively) and that of psychological stress was moderately elevated (22±5.2, Table 4). The distribution of the sample according to the severity categories is shown in Figure 2. The comorbidity pattern of moderate or higher level of the affective states (Figure 3) shows that 15.8 percent of the sample exhibited all three symptoms at significantly higher levels than the general population. While the gender-based differences were not significant for the anxiety and stress scales, females were found to exhibit a higher level of depression symptoms than males (12.54 vs.10.33, p<0.05, Table 2). Married students and first-year students had lower scores on all three scales as compared to the unmarried and the second/third-year students (Tables 2 through 4).

The results from logistic regression analysis (Table 5) were in general supportive of those from the univariate analysis. Females were two and a half times more likely to experience depression at a moderate or higher level than were males (OR 2.449, p<0.001). Students younger than twenty-seven years were at lesser odds (0.28, p<0.001) of exhibiting moderate or higher levels of anxiety than those who were twenty-seven years or older. The first-year and married students were less likely to show a moderate or higher level in all three states than their third-year and unmarried counterparts.

Discussion

Elevated levels of psychological disturbances among health professions students predispose them to physical and mental illness and adversely affect their academic performance in a vicious cycle. More importantly, such disturbances may spill over into the clinical setting, resulting in a suboptimal level of
patient care. As it has been said, “We cannot relieve the suffering of others if we, ourselves, are suffering.” Hence the need for mental health assessment among orthodontic residents is twofold: to improve the educational system and to ensure efficient patient care delivery. In this study, the DASS21 was used to assess the severity of three common negative affective states among postgraduate orthodontic students in India.

The results revealed that the level of depression symptoms among these students was mildly higher than the general population (Table 2). However the frequency distribution showed as much as 9.7 percent of them in the severe range (Figure 2). Lack of any similar study on postgraduate dental students has ruled out the possibility of direct comparison of these results. Data available for undergraduate dental students and dental practitioners have shown wide variation, probably due to the inherent sample characteristics and the differences between the instruments used for evaluation. In a study by Newbury-Birch et al., depression reaching “pathological” levels was noted in nearly 15 percent of the dental students. A survey among randomly selected American Dental Association member dentists estimated the rate of depression to be 9 percent while, strikingly, only 15 percent of them were receiving treatment. Ahola and Hakanen found depression to be a significant causal factor for burnout in dentists with an adjusted odds ratio of 2.2. With a high incidence among dentists, proven ill effects on the personal and professional fronts, and a common tendency to not seek treatment, it becomes imperative to educate dental professionals and students to recognize depression and motivate them to seek treatment when needed.

As compared to depression, a slightly higher percentage of the students in our study reported anxiety to a severe and moderate level (12.7 percent and 26.1 percent, respectively; Figure 2). But the overall median and mean scores still indicated only a mild increase in symptoms with respect to population norms (Table 3). The prevalence of a pathological level of anxiety among dentists and final-year dental students has been reported to be 16 and 67 percent, respectively. A study on Lithuanian dentists found nervousness to be the most prevalent mental complaint (89.2 percent) and the most chronic of all the reported mental disorders. In general, specialists...
have reported less anxiety than general and head dentists, probably due to more workload control and higher self-confidence gained by their higher qualification.27-29

A majority of the students in our study (60.6 percent) exhibited stress symptoms at moderately higher levels than the general population (Figure 2): 1.2 percent of the students reported stress in the extremely severe range and 22.4 percent in the severe category. Such a high level of occupational stress is consistent with earlier reports regarding general dental practitioners and dental students.1-5,7,26-29 A survey of perceived sources of psychological stress among 251 postgraduate orthodontic students in India (60 percent of whom formed part of the sample in this study) found dependencies on alcohol, drugs, etc., limitation of financial resources, and politics and psychological games played by the faculty to be the three most highly stressful factors.30 While it is known that a high proportion of the dental students and dentists were drinking alcohol at excessive levels7,31 and that alcoholism has been shown to be stress-related,32 the pervasiveness of this habit among postgraduate dental students remains uncharted. Similar to predoctoral students in North America,33 financial pressures seemed to be the most stressful non-academic factor for the postgraduate students in our study. With the highest fee structure among all the postgraduate dental programs in India and the need for a more extensive and expensive armamentarium,
it is not surprising that orthodontic students find this burden difficult to handle. Noting a similar situation in the United States, Isaacson already sounded the alarm regarding its implications for the future of the profession. Faculty-related factors have time and again surfaced as elements that dental students say are highly stressful. As the relationship with faculty assumes greater importance during the postgraduate course, it is plausible that unfavorable student-faculty interactions like psychological games played by faculty members create more strain on the mental health of postgraduate students.

Table 4. Summary statistics and group-wise comparisons for the Stress scale

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>95% CI</th>
<th>Median</th>
<th>SD</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22.20</td>
<td>21.54-22.86</td>
<td>22</td>
<td>4.51</td>
<td>0.33</td>
<td>ns</td>
</tr>
<tr>
<td>Female</td>
<td>21.49</td>
<td>20.52-22.45</td>
<td>22</td>
<td>5.93</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Year of study‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year I</td>
<td>19.51</td>
<td>18.47-20.55</td>
<td>20</td>
<td>5.37</td>
<td>0.52</td>
<td>I vs II**</td>
</tr>
<tr>
<td>Year II</td>
<td>22.79</td>
<td>21.95-23.63</td>
<td>23</td>
<td>4.95</td>
<td>0.42</td>
<td>I vs III**</td>
</tr>
<tr>
<td>Year III</td>
<td>23.32</td>
<td>22.40-24.24</td>
<td>24</td>
<td>4.35</td>
<td>0.46</td>
<td>II vs III**</td>
</tr>
<tr>
<td>Marital status†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>22.15</td>
<td>20.71-23.59</td>
<td>22</td>
<td>6.48</td>
<td>0.72</td>
<td>*</td>
</tr>
<tr>
<td>Unmarried</td>
<td>23.86</td>
<td>23.03-24.68</td>
<td>24</td>
<td>6.59</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>22.00</td>
<td>21.00-22.00</td>
<td>22</td>
<td>5.20</td>
<td>0.29</td>
<td></td>
</tr>
</tbody>
</table>

†Mann-Whitney U test; ‡Kruskal-Wallis ANOVA
*p<0.05; **p<0.001; ns=non-significant

Adverse experiences in childhood, depression and anxiety disorders in childhood and adolescence, sociocultural roles with related adverse experiences, and psychological attributes related to vulnerability to life events and coping skills have been cited as the likely factors for this gender disparity. However, gender-based differences in anxiety and stress levels as reported by studies on dental students and dentists could not be corroborated in the current sample.

The levels of depression, hostility, and anxiety among dental students have been reported to increase with time during their coursework, with overall stress levels specifically spiking in the period of transition into clinical training.4,10 An analogous trend was noted in our study, with first-year students exhibiting lower scores for all three scales than the second- and third-year students (Tables 2 to 4). As compared to the third-year students, the odds of first-year students experiencing a moderate or higher level of these affective states was nearly half for anxiety and less than one-fifth for depression and stress (Table 5). This could be explained on two grounds. First, the timing of the survey corresponded to four months from the beginning of the academic year. Hence, the students in the first year would have had very little exposure to the professional environment and its attendant mental demands. Further, most of them would be in the preclinical phase of the curriculum, thereby not yet facing the taxing clinical workload.

Another interesting result of this study was that the married students showed fewer symptoms and the dental and medical professions and the population at large.7,12,26,39 The levels of depression, hostility, and anxiety among dental students have been reported to increase with time during their coursework, with overall stress levels specifically spiking in the period of transition into clinical training.4,10 An analogous trend was noted in our study, with first-year students exhibiting lower scores for all three scales than the second- and third-year students (Tables 2 to 4). As compared to the third-year students, the odds of first-year students experiencing a moderate or higher level of these affective states was nearly half for anxiety and less than one-fifth for depression and stress (Table 5). This could be explained on two grounds. First, the timing of the survey corresponded to four months from the beginning of the academic year. Hence, the students in the first year would have had very little exposure to the professional environment and its attendant mental demands. Further, most of them would be in the preclinical phase of the curriculum, thereby not yet facing the taxing clinical workload.

Another interesting result of this study was that the married students showed fewer symptoms and...
less likelihood of experiencing a moderate or higher level of any of the three states than their unmarried colleagues (Tables 2 to 5). Marriage seems to be a potential source of social support for most adults with beneficial effects on health.\(^{40}\) Two contending hypotheses exist to explain the reduced levels of mental stress in married individuals.\(^{41}\) The selection hypothesis purports that it is the more emotionally mature individual who marries and therefore is inherently more advantaged in terms of mental health. The protection/support hypothesis attributes this positive effect to the ability of a spouse’s emotional support to offset daily tensions. Noting that the stressors of medical school were more severe for single students and that the stress levels of formerly single students declined after marriage, Coombs and Fawzy\(^ {41}\) supported the protection/support hypothesis. However, Musser and Lloyd\(^ {13}\) evaluated the relationship between marital status and stress among 298 dental students and noted a significant influence on only three of the thirty-two sources of stress. Being both an effective barrier against stress and a potential stressor in itself,\(^ {40,42}\) further investigations are warranted to clarify the role of marriage and marriage-related issues on the mental health of dental students.

A few methodological limitations of the study require special mention. As the Indian norms for the instrument are not available, the original norms proposed by Lovibond and Lovibond\(^ {16,17}\) were used. These were derived from a sample consisting largely of college students similar to this study.\(^ {16}\) Though the influences of gender, occupation, education, and age on DASS scores have been shown to be very modest\(^ {20}\) and the reliability and validity have been reported to be similar across different racial groups,\(^ {22}\) the limitations of using non-native population norms cannot be ignored. Another shortcoming is the use of a cross-sectional approach to evaluate students’ mental health across three years of the course. Further, variations in the fee structure and caseload for students across these dental schools could have clouded the effect of these factors. Lastly, the study is not free from the limitations inherent to the methodology of the mailed questionnaire (lack of control over non-response, misinterpretation of the items by the respondent, non-availability of interviewer for clarifications, etc.).

Figure 2. Frequency distribution of the study sample according to the severity categories
One important applied limitation of the study arises from its anonymous means of data collection, which prevented evaluation of the effect of adverse mental health on the academic and clinical performance of the students. Also, this precluded the possibility of identifying the dental students in need of timely professional help.
Recommendations and Conclusions

It is vital that interventional measures to improve students’ mental health should target both internal factors and the academic climate. Professional psychological evaluation of the students during their admission to the course and when required would be an effective proactive measure. Wexler’s suggestion for having an in-house mental health professional in the dental school is becoming increasingly relevant. Informal peer, faculty, and professional support programs are as essential as formal programs to mitigate the effects of perceived stress. Being the strongest aspect of clinical education, all efforts should be made to establish a highly supportive student-faculty relationship. Making feedback-based curriculum changes would contribute to students’ feeling they have some control over their environment, thereby reducing the stress arising out of perceived helplessness and a skewed power equation. Areas like difficult patient encounters, practice management, etc. that are directly related to professional stress should be given due curricular importance. The prohibitive cost of graduate orthodontic education is another important factor that needs to be addressed and hopefully regulated.

Forced postponement of marriage should be avoided, and students should be encouraged to develop a good social support system. As a certain amount of mental strain is inevitable in the dental climate, students should be adequately educated to identify any symptoms at the earliest sign. Formal and informal assistance must be extended to students to develop healthy and effective stress management skills like relaxation training (including meditation and yoga), hypnosis, time management, support-group meeting, cognitive modification, etc. Peer mentoring programs have been found to be effective in helping students deal with stress, especially during entry into dental school and at the transition from the preclinical to the clinical phases. Finally, students must be motivated to break away from the self-denial and self-neglect modes, the common side effects of medical training, and seek appropriate professional help when deemed necessary.

The following are the salient findings of this study:

1. The orthodontic postgraduates experienced mildly elevated levels of depression and anxiety and a moderately higher level of stress than the general population. Also, 15.8 percent of the students showed a moderate or higher level of coexisting symptoms of the three affective states.
2. Female students reported a higher level of depression symptoms than males and were two and half times more likely to experience depression to a moderate or higher level.
3. First-year students exhibited lower levels of all three states than those in the second and third years. Also, they had lower odds than the third-year students of developing a moderate or higher level of any of the three affective states.
4. Marriage appears to have a significant buffering potential against all these mental states.

Overall, the results reflect a suboptimal level of mental health among postgraduate orthodontics students in India and the need for a more favorable academic environment. As teachers and specialists in our field, the primary responsibility rests with us: “If we do not take care of our residents, who else will?”

Acknowledgments

We sincerely thank all the participating students for their valuable time and opinion and the orthodontic faculties of the respective colleges for their enthusiastic cooperation.

REFERENCES