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Evaluating the stress and its association with stressors among the dental undergraduate students of Kanpur city, India: A cross-sectional study

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Abstract:

BACKGROUND: Dental education can be a critical wellspring of stress among dental students, and studies have observed higher levels of stress among dental students than in the all-inclusive community. The present study aims to evaluate the perceived stress among dental undergraduate students, the sources of stress, and an association of perceived stress with sociodemographic characteristics and various stressors.

MATERIALS AND METHODS: A cross-sectional study was conducted among 380 undergraduate dental students (from 1st year to final year) in a private dental college, Kanpur. A self-administered questionnaire was used to collect data regarding sociodemographic profile, perceived stress using Perceived Stress Scale-14, and academic, psychosocial, and environmental stressors. Data were analyzed using IBM SPSS Statistics-Version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY, USA: IBM Corp.).

RESULTS: The mean perceived stress score was 30.25 ± 1.914 . The median perceived stress score was 30. Statistically significant ($P < 0.001$) values were found for higher age group and year of studying Bachelor of Dental Surgery (BDS) were important sociodemographic determinant of stress. Vastness of academic curricula, frequency of examination ($P < 0.05$), and fear of failure/poor performance in examinations were important academic determinants of stress. High parental expectations and family problems were important psychosocial stressors. Accommodation away from home was an important predictor of stress ($P < 0.001$).

CONCLUSION: This study revealed that there are various sociodemographic (age and year of study in BDS), academic (curricula, frequency of examination, and performance level) determinants and predictors of stress (type of accommodation), along with psychosocial stressors (parental expectation and family problems). Dental colleges should develop stress management programs to promote gender and social equity and strategies to improve psychological support services. The stress management programs reported either helped to reduce the number of stressors or enhance stress coping skills, using relaxation techniques such as deep breathing, yoga, and stress management programs.

Keywords:

Dental student, depression, stress, stressors

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Introduction

Any intrinsic or extrinsic stimulus that evokes a biological response is known as stress. The compensatory responses to these stresses are known as stress responses. Based on the type, timing, and severity of the applied stimulus, stress can exert various actions on the body ranging from alterations in homeostasis to life-threatening effects and death.^[1] Medical education can produce significant psychological stress on undergraduates. An extensive level of psychological morbidity has been reported among medical students ranging from stress, relational issues, and self-destructive ideation to psychiatric disorders, and they tend to have greater psychological distress than the overall public.^[2]

Dental education can be a critical wellspring of stress among dental students, and studies have observed higher levels of stress among dental students than in the all-inclusive community.^[3] A large body of literature examining stress in undergraduate dental students has revealed a significant increase in stress that intensifies with student's year of study.^[4] Stress is an aftereffect of certain external physical or mental variables that influence a person's physical and mental prosperity.^[5] According to a report of the global congress in dental education (2008), "dental education is regarded as a complex, demanding, and often stressful pedagogical exposure. It involves acquisition of required academic, clinical, and interpersonal skills during the course of learning." Practicing dentistry requires clinical and patient management skills, characteristics that also add to the stress perceived by the students.^[6]

Cooper *et al.* reported that the dental profession was ranked the most stressful when compared to other health-care professions.^[3] Previous investigators have found that 10% of dental students suffered from severe emotional exhaustion, 17% complained about a severe lack of accomplishment, and 28% reported severe depersonalization symptoms.^[7] Stress may hurt the learner's expert viability by diminishing attention, reducing concentration, impinging on basic leadership aptitudes, and reducing the ability to forge good clinician-patient relationships.^[8]

In India, the term of the Bachelor of Dental Surgery (BDS) program is of 4 calendar years with progression examination toward the finish of every year, followed by 1-year rotatory internship in the dental colleges which is governed by the Dental Council of India. During the first 2 years of BDS course, students are taught the basic sciences and preclinical dentistry, though the later years are devoted for bestowing clinical training. Several studies identified the major academic stressors among dental college students to be examinations, competition

for grades, fear of failing the year, and inadequate time for relaxation.^[9] The present study was done to evaluate the perceived stress among dental undergraduate students, the sources of stress, and an association of perceived stress with sociodemographic characteristics and various stressors.

Materials and Methods

This cross-sectional study was conducted on 380 undergraduate dental students in Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India, from the 1st year to final year were studying in this college. The sample size was calculated using the following formula:

$$N = \frac{4pq}{L^2}$$

where N = is the sample size, P = Prevalence (62%), q = (1 - p), L = is the permissible error in the estimation of P = 0.05.

$$N = 4 \times 0.62 \times 0.38 / 0.05 \times 0.05.$$

The estimated sample size was 376.9 which was rounded off to a final sample of 380. The study participants were recruited by random sampling method. The response rate was 95%.

The pilot study was conducted on 30 participants whose data were excluded from the final sample. The pilot study was helpful in determining the feasibility of the study and to get acquainted with the study protocol.

Approval from the Ethical Committee of the Institute was obtained. The purpose of the study was explained and informed consent was obtained from the participants. The students who consented to participate in the study were included and were asked to complete self-administered questionnaire consisting of the sociodemographic profile, 14-item perceived stress scale (PSS) developed by Cohen *et al.*,^[10] and sources of stress. A total of 15 sources of stress were listed and grouped as academic, psychosocial, and environmental stressors. The sociodemographic characteristics of stress were age (in years) – more or <20, sex – male or female, schooling – public or private, medium of education – English or others, year of study – 1st through 4th, type of student – day scholar or hosteller, batch – additional or regular, and parent's occupation – doctors or others. For these data, odds ratio and P value were calculated. Sources of stress were: (a) academic stressors – vastness of academic curriculum, frequency of examination, competition with the peer group, fear of failure or poor performance in examination, and lack of recreation; (b) psychosocial

stressors-high parental expectation, loneliness, family problem, financial problem, relation with opposite sex; and (c) environmental stressors-traveling between college and home, accommodation away from home, quality of food in mess/home, living conditions in hostel/home, living conditions in hostel/home, and adjusting with roommates/neighbors.

The 14-item PSS version was chosen due to its notable good psychometric properties and the evidence of its validity, i.e., the items are easy to understand and the response alternatives are easy to grasp also the questions are generalized, hence free-of-content specificity to any subpopulation.

Cohen *et al.* developed the PSS to measure the degree to which individuals perceive their lives as unpredictable, uncontrollable, and overwhelming. The PSS consist of 14-item scale that includes questions about participants' stressful thoughts or feelings related to situations in their life within the last month. Each item is rated on a five-point answer scale ranging from 0: "never" to 4: "very often." The total PSS scores were computed by reversing the scores on the seven positive items and then adding the responses to all 14 items for each participant. Questions 4, 5, 6, 7, 9, 10, and 13 were the positively stated items. The PSS scores ranged from 0 to 56, with the higher scores indicating higher levels of perceived stress and the lower scores indicating lower levels of stress. A total of 15 sources of stress were listed and grouped as academic, psychosocial, and environmental stressors. Data were analyzed using IBM SPSS Statistics-Version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY, USA: IBM Corp.) Descriptive statistics included calculation of percentages. The mean scores of perceived stress were calculated. Data distribution was assessed for normality using Shapiro–Wilk test. Logistic regression analyses were carried out to assess determinants of stress. Pearson's correlation was applied to test the correlation between perceived stress score and academic, psychosocial, and environmental stressors. Odds ratio and 95% confidence intervals were calculated. All values were considered statistically significant for a value of $P < 0.05$.

Results

Three hundred and eighty undergraduate dental students were enrolled in the study. Figure 1 shows out of 380 participants, 279 were female respondents (73.42%) and 101 (26.58%) respondents were male. Majority of the undergraduates studied in private schools (80.26%) and English was the most common medium of education (87.89%). Hostellers (88.42%) were more than day scholars (11.58%). 98.68% of respondents were single. The mean perceived stress score was

30.25 ± 1.914 . The median perceived stress score was 30. The mean perceived stress score in males was 29.75 ± 1.802 , and among the females BDS students, it was 30.43 ± 1.929 . Table 1 shows the sources of stress. Table 2 shows the sociodemographic characteristics of stress, logistic regression analysis shows that higher age group ($P < 0.001$) and year of studying BDS ($P < 0.001$) are important sociodemographic determinant of stress. Schooling ($P = 0.190$), medium of education ($P = 0.829$), being a hosteller ($P = 0.258$), batch ($P = 0.006$), father's occupation ($P = 0.533$), and mother's occupation ($P = 0.110$) had no major influence on stress level. Logistic regression was used to obtain the odds ratio in the presence of more than one explanatory variables, i.e., age group and year of study.

Table 3 shows the academic, psychosocial, and environmental determinants of stress. Logistic regression analysis shows that academic stressors are the most important reason for increased stress among undergraduate dental students. Vastness

Table 1: Sources of stress

| Sources of stress | Number of respondents Yes, n (%) |
|--|----------------------------------|
| Academic stressors | |
| Vastness of academic curriculum | 180 (47.4) |
| Frequency of examination | 12 (3.2) |
| Competition with the peer group | 10 (2.6) |
| Fear of failure or poor performance in examination | 130 (34.2) |
| Lack of recreation | 48 (12.6) |
| Psychosocial stressors | |
| High parental expectation | 271 (71.3) |
| Loneliness | 38 (10) |
| Family problem | 20 (5.3) |
| Financial problem | 51 (13.4) |
| Relation with opposite sex | 0 (0) |
| Environmental stressors | |
| Traveling between college and home | 19 (5) |
| Accommodation away from home | 8 (2.1) |
| Quality of food in mess/home | 16 (4.2) |
| Living conditions in hostel/home | 197 (51.8) |
| Adjusting with roommates/neighbors | 140 (36.8) |

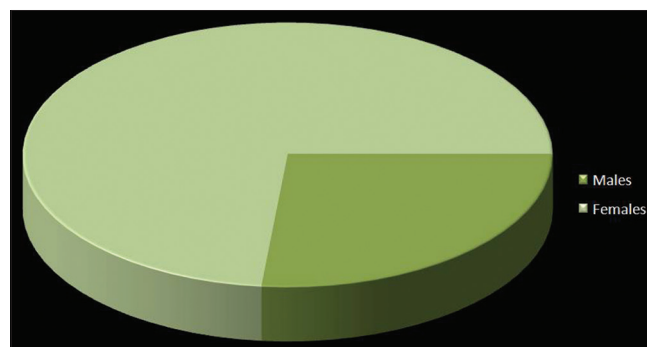


Figure 1: Gender-wise distribution of respondents

Table 2: Sociodemographic characteristics of stress

| Sociodemographic characteristics | OR (95% CI) | P |
|----------------------------------|---------------------|------------|
| Age (years) | | |
| ≥20 | 1.615 (0.635-4.110) | <0.001 (S) |
| ≤20 | | |
| Sex | | |
| Female | 3.212 (0.729-4.156) | 0.123 |
| Male | | |
| Schooling | | |
| Public | 0.512 (0.188-1.395) | 0.190 |
| Private | | |
| Medium of education | | |
| Others | 1.180 (0.264-5.281) | 0.829 |
| English | | |
| Year of studying BDS | | |
| 1 st year | 0.966 (0.234-3.987) | <0.001 (S) |
| 2 nd year | | |
| 3 rd year | | |
| Final year | | |
| Day scholar/hosteller | | |
| Hosteller | 3.235 (0.423-4.733) | 0.258 |
| Day scholar | | |
| Batch | | |
| Additional | 1.066 (0.3-3.783) | <0.006 |
| Regular | | |
| Father's occupation | | |
| Doctor | 1.394 (0.491-3.962) | 0.533 |
| Others | | |
| Mother's occupation | | |
| Doctor | 0.419 (0.144-1.217) | 0.110 |
| Others | | |

S: $P < 0.05$ statistically significant, OR: Odd's ratio, CI: Confidence interval, BDS: Bachelor of Dental Surgery

Table 3: Academic, psychosocial, and environmental determinants of stress by logistic regression

| Stressor | OR (95% CI) | P |
|---|---------------------|------------|
| Vastness of academic curriculum | | |
| Yes | 0.867 (0.522-1.441) | <0.001 (S) |
| No | | |
| Frequency of examination | | |
| Yes | 1.012 (0.563-1.820) | 0.05 (S) |
| No | | |
| Fear of failure/poor performance in examination | | |
| Yes | 2.943 (1.515-5.719) | <0.001 (S) |
| No | | |
| Lack of recreation | | |
| Yes | 0.906 (0.522-1.341) | 0.584 |
| No | | |
| High parental expectation | | |
| Yes | 0.717 (0.335-1.536) | <0.001 (S) |
| No | | |
| Loneliness | | |
| Yes | 1.205 (0.531-2.733) | 0.655 |
| No | | |
| Family problem | | |
| Yes | 0.830 (0.416-1.656) | 0.002 (S) |
| No | | |
| Financial problem | | |
| Yes | 0.454 (0.219-0.939) | 0.033 |
| No | | |
| Accommodation away from home | | |
| Yes | 0.727 (0.318-1.661) | <0.001 (S) |
| No | | |

S: $P < 0.05$ statistically significant, OR: Odd's ratio, CI: Confidence interval

of academic curriculum ($P \leq 0.001$), frequency of examination ($P = 0.05$), and fear of failure/poor performance in examination ($P \leq 0.001$) were important determinants of stress. High parental expectation ($P \leq 0.001$) and family problem ($P = 0.002$) were important psychosocial stressors. Under environmental stressors, accommodation away from home (<0.001) was an important predictor of stress.

Lack of recreation ($P = 0.584$), loneliness (0.655), and financial problem ($P = 0.033$) were not found to be significant predictors of stress. There was a significant positive correlation between academic ($r = 0.27, P < 0.001$), psychosocial ($r = 0.137, P < 0.001$), environmental stressors ($r = 0.088, P < 0.001$), and perceived stress.

Discussion

A number of personal and institutional factors may contribute to the worsening of medical students' mental health. Recent research discussed that medical schools provide a toxic psychological environment where academic pressure, workload, financial hardships, and sleep deprivation are stressors factors.^[11]

Basudan *et al.* conducted a study to measure the occurrence and levels of depression, anxiety, and stress in undergraduate dental students using the Depression, Anxiety, and Stress Scale-21, and they found that despite excluding participants currently undergoing psychological management, the levels of these conditions were relatively high.^[12]

Halboub *et al.* reported that reduction and/or relief of stress among dental students will reflect positively on persistence and academic achievement, which will lead to better management and care of patients.^[13]

Brahmbhatt assessed the prevalence of perceived stress and find out sources of stress among undergraduate medical students. He found the mean PSS mean score 27.53 ± 7.01 . The mean PSS score was higher among female medical students than male students.^[14]

Shaik evaluated the factors affecting stress among undergraduate and postgraduate dental students of Andhra Pradesh, India. It was found that students perceived more stress from domains related to the future prospects (2.53 ± 0.97) and personal factors (2.35 ± 0.66) followed by stress associated with faculty (2.12 ± 0.78)

and clinical/academic factors (2.12 ± 0.55). Shah M evaluated the perceived stress, sources of stress and their severity, and to assess the determinants of stressed cases among medical undergraduates in a Pakistani medical school. It was found that most common sources of stress were related to academic and psychosocial concerns. "High parental expectations," "frequency of examinations," "vastness of academic curriculum," "sleeping difficulties," "worrying about the future," "loneliness," "becoming a doctor," and "performance in periodic examinations" were the most frequently and severely occurring sources of stress.^[15] Results obtained from the present study showed that vastness of academic curriculum, frequency of examination, and fear of failure/poor performance in examination were important determinants of stress.

Satheesh conducted a study to determine the problem of perceived stress among undergraduate medical students and to identify the probable factors responsible for it. He concluded that the school where the students pursued their education, medium of education, and marital status had no influence on stress.^[16] The present study showed that schooling, medium of education, being a hosteller, lack of recreation, father's occupation, and mother's occupation had no influence on stress level.

A study conducted by Saipanish showed that the prevalence of stress was highest among 3rd-year medical students, and the most prevalent source of academic stress was the test/examination.^[17]

Brahmbhatt *et al.*, in their study, found that high parental expectations and loneliness were the major factor in stressed cases.^[9] In the present study, it was found that high parental expectation and family problem were important psychosocial stressors, while accommodation away from home was an important predictor of stress as environmental stressors.

Garg *et al.* reported in their study that stress among medical students is a dynamic process as the stressors keep changing with the year of study and constantly changing expectations of the students and the system.^[18] A study conducted by Melaku showed that stress was a significant problem among medical students and had a negative impact on their academic performance. Year of study, income, and substance use were associated with stress.

A high prevalence of stress among dental students may cause impairment to undergraduate dental students, including poorer in academic performance, dropout, substance abuse, and suicide. The huge impact of stress on undergraduate dental students indicates a need for stress management programs in dental education.

Conclusion

Students from all fields of education are exposed to stress; research needs to be done to study the academic environment, examination pattern, and the impact of these factors on the development of stress. Academic factors are the most important stressors; hence, there is a need for targeted measures to decrease the burden of stress. Academic institution's environment and teaching protocol need to be adaptive and flexible, respectively, for the students. Student welfare program, full-time availability of counselor (psychiatric social worker and or clinical psychologist to be precise), sports and extracurricular activities, and community camps with mandatory and universal participation can be stress busters. Finally, incorporating stress management programs into the curriculum, healthy dietary and lifestyle habits, regular study habits, adequate examination preparations, and reduced expectations from parents and/or teachers would definitely help students fight out stress.

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Conflicts of interest

There are no conflicts of interest.

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