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Academic, socio-economic and institutional factors associated with perceived stress among dental students

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Abstract:

Stress among dental students arises from academic overload, clinical demands, faculty expectations and career uncertainty. Therefore, it is of interest to assess the perceived stress among dental students across government and private dental colleges in North and South India using a cross-sectional questionnaire-based survey with a modified Dental Environment Stress (DES) tool. Mean DES scores indicated slight to moderate stress, with future and personal domains scoring highest, followed by faculty-related and clinical academic stress. Stress levels rose from first to final year, peaking at the transition to clinical training and remaining high during internship. Thus, data shows that identifying dominant stress domains and high-risk subgroups among dental students, guiding targeted curricular reform, counselling and policy interventions.

Keywords: Dental students, stress, dental environment stress (DES), government dental college, private dental college, India, academic stress, socio-economic factors

Background:

Dental education is generally described as a challenging, stressful and sometimes overwhelming learning process. Students are expected to learn a voluminous body of knowledge in biomedical and dental sciences acquire psychomotor skills for carrying out precise clinical procedures and develop communication and professional skills when interacting with patients [1]. The dentistry-specific stressors include a shortage of time and tight scheduling, fear of making irreparable clinical mistakes, dealing with nervous or uncooperative patients and prevention of potential blood-borne infections [2, 3]. Stress in dental students has been found to be associated with anxiety, depression, professional burnout, maladaptive coping behaviours, absenteeism, impaired academic performance and compromised patient care. Cross-sectional international studies conducted in Europe, North America and Asia have repeatedly identified examinations, grade competition, clinical requirements, faculty expectations and financial problems as primary sources of stress. Systematic reviews reveal that the pattern of stress varies by country and institution, emphasizing the need for indigenous data [4, 5]. India hosts one of the largest dental education systems in the world, marked by a preponderance of private colleges along with government institutions, thereby giving a wide range of educational, economic and institutional settings. Many Indian studies have identified examination-related stress, work pressure, fear of failure, inadequate time for leisure and job uncertainty as some of the major sources of stress among dental students. The pilot study carried out in the neo-capital state of Andhra Pradesh revealed that perceived stress was highest on domains related to future career and personal factors and it was higher among third- and final-year students and among students who did not choose dentistry as their first preference [6, 7]. Therefore, it is of interest to compare the academic, socio-economic and institutional factors associated with perceived stress among dental students in government and private dental colleges in North and South India by using a modified dental environment stress questionnaire as the principal measurement instrument.

Materials and Methods:**Study design and setting:**

A cross-sectional, questionnaire-based survey was carried out among undergraduate dental students and interns across selected dental colleges from both North and South India. Both government and private institutions from each region were included in the study, which would thus allow comparative analyses between institutional and regional differences. Colleges were selected based on their accreditation status and willingness to participate; all included urban teaching centers offering a range of clinical services.

Study population and sampling:

The target population consisted of students from all four years of the dental course as well as interns during their compulsory rotatory internship. In India, training for dental takes place over four academic years, followed by a year of internship, according to the Dental Council of India. Students in the first through final years, as well as interns, who were present on the day data was collected, became subjects if they fulfilled the inclusion and exclusion criteria and gave consent. Inclusion criteria were students enrolled in the dental program or internship in one of the participating colleges and the student should have been present on the day of surveying or during follow-up visits. The student had to be willing to give informed consent. The study excluded postgraduate students and those who refused to participate. Within each college, census sampling was adopted to ensure maximum participation. Where attendance was poor on the first days, subsequent visits were made to include absentees to minimize the selection bias.

Ethical considerations:

Ethical approval was obtained from the Institutional Ethics Committees of all participating colleges in North and South India, following submission of a detailed protocol outlining objectives, procedures, potential risks and benefits. The study adhered to the principles of the Declaration of Helsinki for

research involving human participants. Participation was voluntary and respondents were assured of anonymity and confidentiality.

Data collection:

Data collection was done using a pre-tested, self-administered, modified dental environment stress (DES) questionnaire adapted for the Indian dental education context. Two google forms were prepared and students of first, second, third, final year and interns were asked to fill them. The results were calculated on the basis of the responses received.

Results:

A total of 1239 dental students participated in the study. 319 students did not mention the gender and of the one who mentioned 33.3% were male and 66.7% were female. On the basis of age, 2 students did not disclose their age. Of the ones who disclosed, 33.15% belong to 18–20 years age group, 58.93% belong to 21–23 years age group and 7.92% belong to 24–26 years age group. On the basis of region, 48.8% are from North region and 51.5% are from South region. On the basis of type of college, 50.5% are from Government College and 49.5% are from Private College. On the basis of year, 3 students did not disclose their year. Of the ones who disclosed, percentage of participation is 20%, 24.1%, 20.6%, 20%, 21.8% and 13.4% from 1st, 2nd, 3rd, 4th-year dental students and interns respectively (**Table 1**). On the basis of region, the mean academic stress score perceived by the dental students was high for North region (3.33 ± 0.78) in comparison to South region (3.01 ± 0.57) and there was a statistically significant difference in academic stress based on region. The mean of stress related to faculty perceived by the dental students was high for South region (3.04 ± 0.64) in comparison to North region (2.88 ± 1.1) and there was a statistically significant difference in stress related to faculty based on region. The mean of stress related to patient perceived by the dental students was high for South region (3.52 ± 1.29) in comparison to North region (3.3 ± 0.83) and there was a statistically significant difference in stress related to patient based on region. The mean of clinical stress perceived by the dental students was high for North region (3.1 ± 0.87) in comparison to South region (3.05 ± 0.4) and there was no statistically significant difference in clinical stress based on region. The mean of social stress perceived by the dental students was high for North region (3.18 ± 1.07) in comparison to South region (3 ± 0.45) and there was a statistically significant difference in social stress based on region (**Figure 1 and Table 2**). On the basis of college type, the mean academic stress score perceived by the dental students was high for Government institutions (3.18 ± 0.61) in comparison to Private colleges (3.01 ± 0.57) but this difference was not statistically significant. The mean of stress related to faculty perceived by the dental students was high for Government institutions (2.98 ± 0.81) in comparison to Private colleges (2.95 ± 0.97) and there was no statistically significant difference in stress related to faculty based on college type. The mean of stress related to patient perceived by the dental students was high for Government institutions ($3.47 \pm$

1.08) in comparison to Private colleges (3.41 ± 1.24) and there was no statistically significant difference in stress related to patient based on college type. The mean of clinical stress perceived by the dental students was high for Private colleges (3.1 ± 0.68) in comparison to Government institutions (3.05 ± 0.53) and there was no statistically significant difference in clinical stress based on college type. The mean of social stress perceived by the dental students was high for Private colleges (3.14 ± 0.85) in comparison to Government institutions (3.04 ± 0.79) and there was a statistically significant difference in social stress based on college type (**Figure 2 and Table 3**). On the basis of year of studying, the mean academic stress score perceived by the dental students was highest for second year students (3.35 ± 0.68), followed by third (3.17 ± 0.59) and final year students (3.17 ± 0.7), followed by first year students (3.05 ± 0.8) and lowest for interns (3 ± 0.62). Also, there exists statistically significant difference based on year of studying for academic stress. The mean stress score based on faculty perceived by the dental students was highest for second year students (3.17 ± 0.9), followed by final year students (3.05 ± 0.8), followed interns (2.95 ± 0.72) and lowest for third (2.81 ± 0.89) and first year students (2.81 ± 1.03). Also, there exists statistically significant difference based on year of studying for stress score based on faculty. The mean patient stress score perceived by the dental students was highest for first year students (4.85 ± 0.65), followed by second year students (4.79 ± 0.8), followed by third year students (2.97 ± 0.77), followed by final year students (2.93 ± 0.76) and lowest for interns (2.64 ± 0.69). Also, there exists statistically significant difference based on year of studying for patient stress (**Figure 3 and Table 4**). The mean clinical stress score perceived by the dental students was highest for final year students (3.15 ± 0.67), followed by first (3.09 ± 0.57) and second year students (3.09 ± 0.53), followed by interns (3.02 ± 0.54) and lowest for third year students (3 ± 0.63). Also, there exists statistically significant difference based on year of studying for clinical stress. The mean social stress score perceived by the dental students was highest for second (3.35 ± 0.79), followed by interns (3.11 ± 0.59), followed by final year students (3.05 ± 0.84), followed by first year students (2.98 ± 0.82) and lowest for third year students (2.92 ± 0.89). Also, there exists statistically significant difference based on year of studying for social stress. The analysis for the Form 1 was also done (**Figure 4 and Table 5**). On the basis of year of studying, the mean academic stress score perceived by the dental students was highest for final year students (3.27 ± 0.59), followed by third (2.98 ± 0.599), followed by interns (2.92 ± 0.91), followed by second year students (2.87 ± 0.62) and lowest for first year students (2.58 ± 0.76). Also, there exists statistically significant difference based on year of studying for academic stress. The mean stress score based on faculty perceived by the dental students was highest for final year students (3.12 ± 0.83), followed by second year students (2.94 ± 0.87), followed by first year students (2.85 ± 1.25) and lowest for third year students (2.78 ± 0.8). Also, there exists no statistically significant difference based on year of studying for stress score based on faculty. The mean patient stress score perceived by the dental students was highest third year students

(2.18 ± 0.68), followed by final year students (1.73 ± 0.77). Also, there exists statistically significant difference based on year of studying for patient stress. The mean clinical stress score perceived by the dental students was highest for final year students (2.88 ± 0.73), followed by third year students (2.81 ± 0.76) and lowest for interns (2.48 ± 0.66). Also, there exists statistically significant difference based on year of studying for clinical stress. The mean social stress score perceived by the dental students was highest for interns (2.51 ± 0.54), followed by third year students (2.46 ± 0.71), followed by final year students (2.43 ± 0.8), followed by second year students (2.26 ± 0.67) and lowest for first year students (2.02 ± 0.44). Also, there exists statistically significant difference based on year of studying for social stress.

Table 1: Distribution of students based on various variables

Variables	n(%)
Gender	
Female	614(66.7)
Male	306 (33.3)
Age (years)	
18-20	410(33.14)
21-23	729(58.93)
24-26	98(7.92)
Region	
North	601 (48.5%)
South	638(51.5)
Type of college	
Government	626(50.5)
Private	613(49.5)
Year of study	
1st	247(20)
2nd	298(24.1)
3rd	255(20.6)
4th	270(21.8)
Intern	166(13.4)

Table 2: Region wise stress distribution

Region wise					
Region		N	Mean	Std. Deviation	P-value
Academic	North	601	3.3328	0.77825	0***
	South	637	3.0074	0.56588	
Faculty	North	601	2.8822	1.09622	0.002***
	South	638	3.0429	0.64052	
Patient	North	336	3.2961	0.83220	0.001***
	South	638	3.5167	1.29305	
Clinical	North	343	3.1036	0.86846	0.287
	South	638	3.0509	0.40031	
Social	North	601	3.1840	1.07479	0***
	South	638	3.0019	0.44897	

Table 3: Stress based on type of college

College-type wise					
College Type		N	Mean	Std. Deviation	P-value
Academic	Govt.	626	3.18	0.61	0.622
	Private	612	3.16	0.78	
Faculty	Govt.	626	2.98	0.81	0.505
	Private	613	2.95	0.97	
Patient	Govt.	518	3.47	1.08	0.392
	Private	456	3.41	1.24	
Clinical	Govt.	521	3.05	0.53	0.195
	Private	460	3.10	0.68	
Social	Govt.	626	3.04	0.79	0.026**
	Private	613	3.14	0.85	

Table 4: Stress based on year of student

		Mean	Std. Deviation	P-value
Academic	First year	3.046	0.8011	0***
	Second year	3.35	0.68334	
	Third year	3.166	0.59474	
	Final year	3.174	0.6991	
	Intern	3.002	0.61881	
Faculty	First year	2.813	1.03177	0***
	Second year	3.167	0.8954	
	Third year	2.809	0.8943	
	Final year	3.049	0.8024	
	Intern	2.947	0.72066	
Patient	First year	4.85	0.6542	0***
	Second year	4.791	0.79803	
	Third year	2.972	0.77266	
	Final year	2.926	0.75681	
	Intern	2.636	0.685	
Clinical	First year	3.086	0.5654	0.048**
	Second year	3.088	0.53058	
	Third year	3	0.63137	
	Final year	3.152	0.66746	
	Intern	3.022	0.54294	
Social	First year	2.976	0.81503	0***
	Second year	3.355	0.79055	
	Third year	2.921	0.89359	
	Final year	3.058	0.83855	
	Intern	3.111	0.58985	

Table 5: Stress based on year of student

Year-wise (Form1)					
Year of studying		N	Mean	Std. Deviation	P-value
Academic	First year	100	2.5775	0.7577	0*
	Second year	67	2.8652	0.62486	
	Third year	50	2.9832	0.59946	
	Final year	61	3.271	0.59317	
	Intern	38	2.9211	0.91183	
Faculty	First year	100	2.85	1.25025	0.267
	Second year	68	2.941	0.8716	
	Third year	50	2.78	0.79642	
	Final year	61	3.123	0.82994	
Patient	Third year	50	2.1796	0.6847	0.002***
	Final year	61	1.7262	0.76907	
Clinical	Third year	50	2.8136	0.75636	0.018**
	Final year	61	2.88	0.72758	
	Intern	40	2.4755	0.65738	
social	First year	23	2.0178	0.442	0.027**
	Second year	68	2.2566	0.66501	
	Third year	50	2.4596	0.70648	
	Final year	61	2.4344	0.80098	
	Intern	38	2.5118	0.54172	

Discussion:

The present comparative study thus shows that the dental students of India perceive stress in many domains and the overall trend is from mild to moderate, but with a high level of concern about the future prospects and personal issues. These findings are in concurrence with previous studies conducted in India and abroad, which listed career uncertainty, financial pressure and personal pressures as prominent factors contributing to stress in dental students [8-10]. This represents a gradual increase in stress from the early to the later years at school and peaks at the point of transition to clinical training, which is also reflected in reports from other Indian and international dental schools. The third-year students often face the twin demands of familiarizing themselves with direct patient care and fulfilling clinical requirements along with maintaining

academic performance, which may increase the perceived level of stress [11].

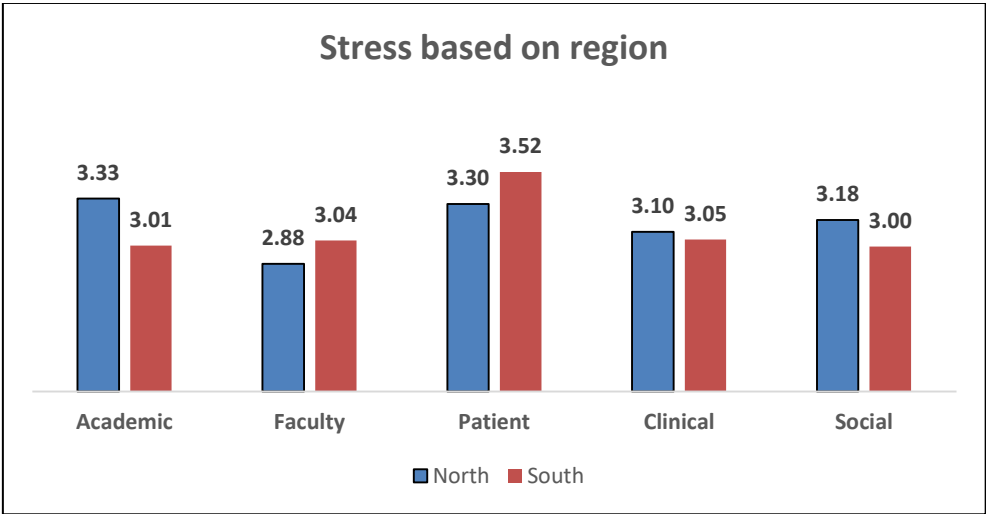


Figure 1: Stress based on region

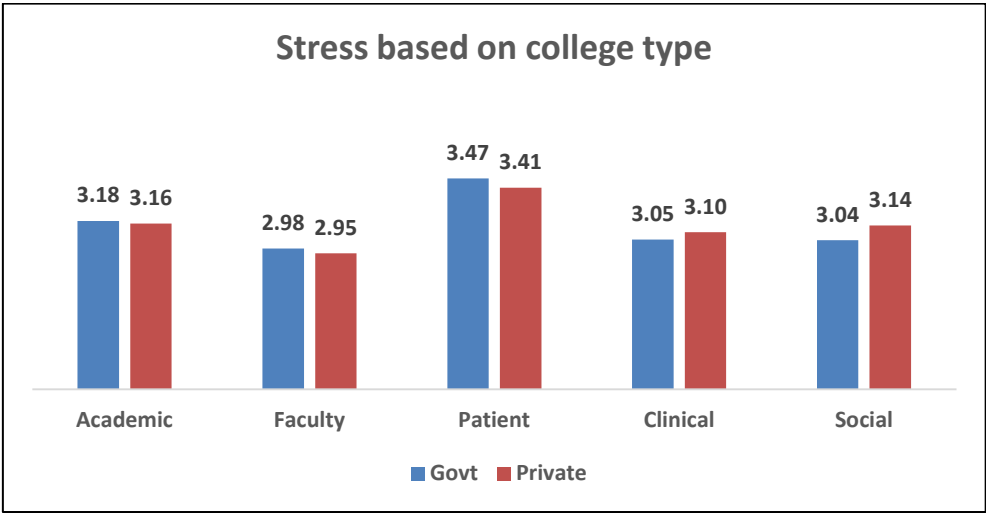


Figure 2: Stress based on college type

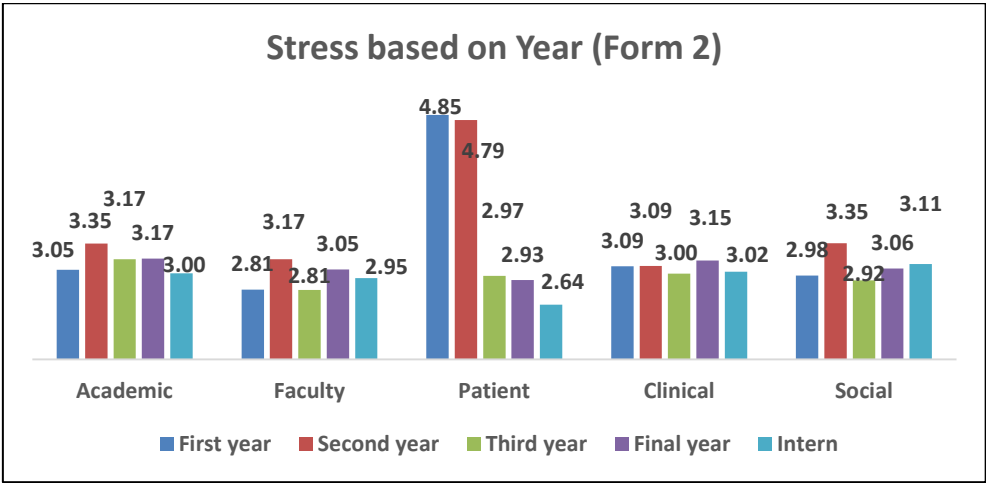
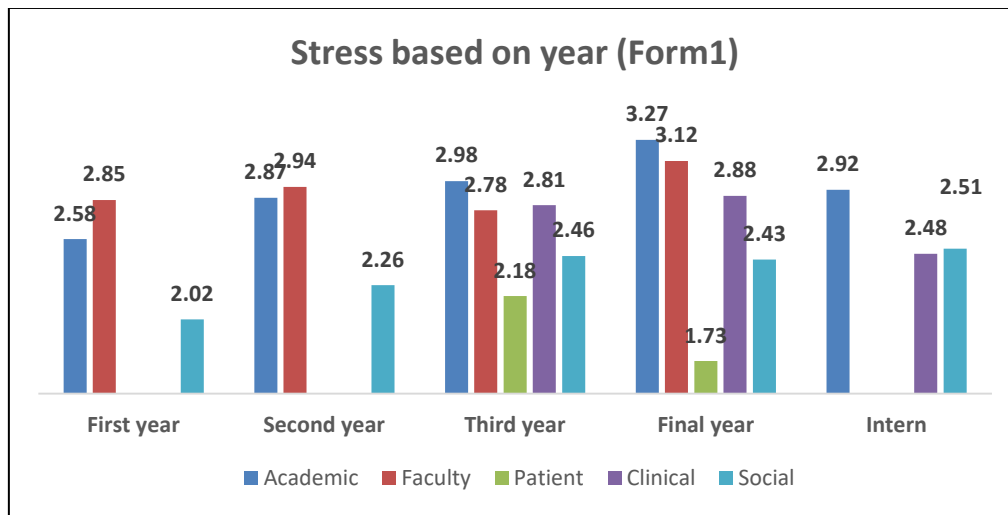


Figure 3: Stress based on year of student (Form 2)**Figure 4:** Stress based on year of student (Form 1)

The future career-related stressors that persisted among final-year students and interns reflect concerns about job security and postgraduate opportunities in a competitive and dynamic dental labor market [12]. Differences between government and private colleges highlight the role of institutional context. The higher clinical academic and future-oriented stress of students in government colleges might be due to heavier patient loads, crowded clinical environments and uncertain career pathways in the public sector. On the other hand, students enrolled in private colleges report higher personal and faculty-related stress, probably emanating from high tuition fees, family investment in their education, perceived pressure for high grades and greater scrutiny by faculty in smaller or more commercially oriented institutions [13]. Regional issues, or North-South differences, are less striking; however, they do indicate that stress profiles could vary according to educational culture, clinical exposure, language and socioeconomic background. These findings should be interpreted with caution because of possible confounding variables; nevertheless, regionally sensitive strategies would be important in designing stress-reduction programs [14]. Associations between stress and motivation for entering dentistry reinforce the need for appropriate career counselling and realistic expectations. Students who choose dentistry as a first preference and who report intrinsic motivation seem to handle the implicit pressures of dental education better. On the other hand, those who enter dentistry when unsuccessful for medicine may be at greater risk from stress and disappointment concerning perceived long-term outlook [15].

Limitations:

Limitations of this study include its cross-sectional design, which does not enable causal inferences and possibilities of selection bias due to differential response rates among the participating colleges and regions. Self-reported measures are also prone to social desirability and recall bias, despite stating

guarantees of anonymity and confidentiality. While samples from several colleges were taken, generalizability to other dental institutions throughout India is limited, especially rural or recently developed colleges. These limitations notwithstanding, the study represents one of the most comprehensive comparative overviews on stress among dental students based on academic year, region and type of institution; and identifies modifiable factors that may inform targeted interventions at the student, faculty and institutional level.

Conclusion:

Dental students across North and South India experience mild to moderate stress, with future and personal concerns being the most prominent stressors. Stress levels rise progressively from first year to internship, peaking at the transition to clinical training and vary notably between government and private colleges. Thus, targeted curricular reform, mentorship, accessible counselling and financial support, particularly in private institutions, are essential to reduce stress and promote student wellbeing.

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