

# Psychosocial Impact, Perceived Stress Levels and their Learning Effect among the Undergraduate Dental Students during the Transition from Preclinicals to Clinicals: A Questionnaire-based Cross-sectional Study

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## ABSTRACT

**Introduction:** Dentistry is known as the most challenging and stressful profession. Dental education enhances students' ability to provide high-caliber work in the clinical field. To fulfill this criterion, students are required to develop professional conduct, competencies, and psychological and cognitive abilities in due course of time. The shift from preclinical to clinical is considered one of the most crucial stages for dental undergraduates. During this period, individuals often experience unique emotional and social challenges, leading to stress, anxiety, and depression.

**Aim:** The aim of this study is to assess the perceived stress levels, psychosocial impacts, as well as depression and anxiety levels among dental undergraduates during their transition from preclinical (2<sup>nd</sup> year) to clinical (3<sup>rd</sup> year) practice.

**Materials and Methods:** A cross-sectional questionnaire-based study was conducted among second and third-year dental undergraduates from different dental colleges in South India from February 2022 to June 2022. Two questionnaires, the Dental Environmental Stress (DES) scale (25 items) and the Depression Anxiety Stress Scale (DASS) (21 items), were utilised to measure stress, depression, and anxiety levels. The questionnaire was designed using Google Forms and distributed via WhatsApp. The snowball sampling technique was used, and data from

489 self-selected participants were collected and sent for statistical analysis. Descriptive statistics (mean, 95% Confidence Interval [CI]) were used to identify major stressors and their perceived magnitude. The responses were recorded on a 4-point Likert scale.

**Results:** This study included a total population of 489 participants, with 360 (73.6%) females and 129 (26.3%) males, respectively. According to the DES results, the educational environment and clinical domain were the most stressed domains, with mean values of  $1.7859 \pm 0.47929$  and  $1.7639 \pm 0.43729$ , respectively. The top five stressors identified were lack of relaxation time, fear of failure, financial burden, assigned work, and examinations/grades. The DASS results revealed the highest prevalence of stress ( $15.22 \pm 5.92$ ), followed by anxiety ( $13.39 \pm 6.01$ ) and depression ( $12.60 \pm 8.66$ ).

**Conclusion:** The results of this study indicate that dental undergraduates experience higher levels of perceived stress, psychosocial effects, depression, and anxiety during the transition from preclinical (2<sup>nd</sup> year) to clinical (3<sup>rd</sup> year) practice. Structured student support systems, such as counselling programmes and effective communication skills, can help create an environment that reduces stress and enhances student well-being.

**Keywords:** Anxiety, Depression, Psychological stress, Stressors

## INTRODUCTION

Stress is a bodily response that requires attention due to physical, emotional, or psychological strain. A large body of literature states that professional courses like dental education, which involve course-related stressful experiences, were noted through surveys to be comparatively higher than the general population [1-5]. There is ample evidence stating that dental students experience more stress than medical students, depending on various personal or institutional circumstances. Different individuals have different stressors and stress levels [6-8]. These stressors have detrimental effects on dental students, including physical symptoms (musculoskeletal problems), psychological distress, emotional exhaustion, and burnout [2,3]. Dental undergraduate students have to deal with several factors, such as academic demands, clinical responsibilities, communication skills with patients, peers, and faculty [6,9]. These psychosocial impacts affect perceived stress levels and make it challenging for individuals to cope with the transition from preclinicals

to clinicals. In extreme or long-term circumstances, stress can lead to burnout in vulnerable students' lives. Burnout, characterised by emotional weariness (mental tiredness), depersonalisation (psychological detachment from others), and decreased personal accomplishment, hinders students from demonstrating empathy (an emotional component) and compassion (a behavioural component) in intensive clinician-patient interactions [8]. These factors are vital for successful treatment, patient satisfaction, and the quality and efficiency of medical care. Students studying dentistry also experience significant rates of burnout and its negative impacts, leading to difficulties in patient engagement and communication with friends and colleagues [2,4,5,10].

When undergraduates enter clinics, they must apply their basic and preclinical knowledge to their clinical training. While studies have focused primarily on stress with less emphasis on depression and anxiety, it is important to recognise that all three are interrelated [1,2,6-8]. To date, the DES and DASS questionnaires have been

employed individually to assess stress levels and psychosocial impacts. Therefore, the novelty and aim of the present study is to analyse depression, anxiety, and stress by adapting a combined questionnaire (DES and DASS) among dental undergraduates during their transition from preclinical to clinical phase.

## MATERIALS AND METHODS

A cross-sectional questionnaire-based study was conducted among dental undergraduate students at different dental schools in South India from February 2022 to June 2022. The study protocol was approved by the Institutional Ethical Committee (IECVDC/22/UG01/OP/Q/54).

**Inclusion criteria:** The study included second and third-year dental undergraduate students who were willing to participate.

**Exclusion criteria:** First-year students, final-year students, interns, and postgraduate students were excluded from the study to align with the study's objectives. Unwilling participants were also excluded.

**Sample size calculation:** The sample size was calculated using the single population proportion formula, assuming a 95% Confidence Interval (CI), a standard normal variable (Z-score) of 1.96, a margin of error of 3%, and a precision of 5%. Considering a target population of approximately nine hundred students, it was determined that a minimum of 489 subjects were required for the study. The sample size calculation formula used was  $n_0 = z^2 pq / e^2$  (where n is the sample size, z is the level of confidence, p is the prevalence, q is 1-p, and e is the margin of error). In this case, p was assumed to be 0.016<sup>5</sup>.

### Study Procedure

**Questionnaire:** The study tools used in the present study were the Modified DES questionnaire (25 items) [4,11] and the Modified Depression Anxiety Stress Scale (21 items) [12].

**Questionnaire:** The questionnaire consisted of a total of 49 items divided into seven sections. The first section was confined to the demographic details, with three questions. The second, third, fourth, fifth, and sixth sections each comprised five questions about the participants' opinions on different domains of stressors related to the modified DES. The questions were selected from the original DES questionnaire, which as previously mentioned, originally included 38 questions. Only the questions that were relevant for second and third-year students were chosen. The seventh section of the questionnaire contained twenty-one items from the DASS. The questions from both the DES and DASS questionnaires were rephrased for better understanding by the study participants.

The DASS, developed by Lovibond SH and Lovibond PF, was used to assess the core symptoms of depression, anxiety, and stress and has also been used to evaluate patients' responses to treatment [12]. The DASS-21 is a condensed version of the original 42-item survey, consisting of seven items for each of the three scales designed to measure negative emotional states [12].

A panel of experts checked the face validity of the modified questionnaire, and the approved questionnaire was then circulated among ten undergraduate students from three different dental colleges to assess its validity and clarity. This pilot test helped refine the items in the questionnaire through rephrasing. The validity of the questionnaire was assessed using Cronbach's alpha value, which was found to be 0.924, indicating good internal consistency.

**Data collection:** A validated questionnaire was randomly sent to students at different institutes via Google Forms. Participants accessed the form by clicking the provided link, where they were prompted to read and accept the informed consent before answering the questionnaire. A snowball sampling technique was used to collect information, with participants encouraged to share the questionnaire with as many students as possible. Participants were assured that their identification and data would be kept confidential.

Responses for the modified DES questionnaire were evaluated using a four-point Likert scale (0=not stressful to 3=very stressful). In the case of the DASS-21 questionnaire, it consisted of three self-reported measures for evaluating depression, anxiety, and stress. Each measure included seven items and was evaluated on a Likert scale ranging from 0 to 3 [13]. The scale values were interpreted as follows:

- 0-Did not apply to me at all,
- 1-Applied to me to some degree or some of the time,
- 2-Applied to me to a considerable degree or a good part of the time,
- 3-Applied to me very much or most of the time.

The scores for relevant items were added together to generate depression, anxiety, and stress scores. Recommended cut-off scores for conventional severity labels were graded as shown in [Table/Fig-1]. Scores on the DASS-21 questionnaire needed to be multiplied by two to calculate the final scores, as it is a modified version of the DASS-42.

DASS scale	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34

**[Table/Fig-1]:** DASS cut-off scores (Lovibond SH and Lovibond PF (1995). Manual for the Depression Anxiety and Stress Scales. (2<sup>nd</sup> Ed.) Sydney: Psychology Foundation) [12].

## STATISTICAL ANALYSIS

Microsoft Excel (Microsoft) was used for data processing and generating data charts. The International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp) was used to analyse the data. Descriptive statistics, including mean and 95% confidence intervals, were used to identify major stressors and their perceived magnitude. Pearson's chi-square test and one-way Analysis of Variance (ANOVA) were used to measure the differences between different years of study.

## RESULTS

**Demographic profile:** A total of 489 students participated in the study, resulting in a response rate of 100%. The mean age of the students was 20.39±1.19 years. The majority of the participants were females (n=360, 73.6%). The socio-demographic details are depicted in [Table/Fig-2].

Gender	Year of degree		Total n (%)
	Second year n (%) / n	Third year n (%) / n	
Female	174 (48.3%)	186 (51.7%)	360 (73.6%)
Male	64	65	129 (26.3%)
Total	238	251	489 (100%)

**[Table/Fig-2]:** Demographics of the study participants.

### Mean stress values by different stressors in dental undergraduates:

The major stress domains reported were the educational environment (1.7859±0.47929), followed by the clinical (1.7639±0.43729), academic (1.6779±0.49722), personal (1.6525±0.43392), and living (1.6406±0.47265) domains, respectively [Table/Fig-3]. In the educational environment domain, the highest stressors recorded were moving away from home, food and accommodation issues. In the academic domain, examination and grades, and the amount of assigned work were the major stressors. In the clinical domain, completing the given quota, student-patient relationships, and interaction with the staff were the highest stressors recorded [Table/Fig-4].

Domain	Second year (Mean±SD)	Third year (Mean±SD)	Total score (2 <sup>nd</sup> year+3 <sup>rd</sup> year) (Mean±SD)	p-value
Educational environment	1.7762±0.483	1.7975±0.47554	1.7859±0.47929	0.626
Clinical work	1.7723±0.44585	1.7538±0.42752	1.7039±0.43729	0.643
Academics	1.6742±0.48841	1.6824±0.50875	1.6779±0.49722	0.856
Personal factor	1.6554±0.44171	1.6489±0.42529	1.6525±0.43392	0.868
Living accommodation	1.6176±0.46674	1.6683±0.47929	1.6406±0.47265	0.238
Total (sum of all domains)	1.71914±0.4648	1.73226±0.46327	1.72±0.464074	0.656

[Table/Fig-3]: Descriptive statistics of DES questionnaire.

\*One-way ANOVA test

Rank	Gender		Year of study	
	Male	Female	Second year	Third year
1	Financial burden	Strict rules and regulation	Examinations and grades	Time factor
2	Fear of late settlement in life	Clinical competitiveness	Lack of courage in decision making	Balance clinical and academics
3	Expectations vs reality of dental school	Examination grades	Difficulty in completing the work	Quota
4	Not able to balance clinical and academic work	Student staff relationship	Fear of being failed and caught up	the transition from preclinical to clinical
5	Student staff relationship	Financial burden	Rapport between seniors	Fear of communicating with patients

[Table/Fig-4]: Top five major stressors derived from each variable by their mean values.

The second-year undergraduate students reported difficulty in completing the assigned work (1.8±0.4), the amount of assigned preclinical work (1.5±0.003), and strict rules by management (1.2±0.31). This study also found moderate stressors in the non-academic domains, such as a lack of home atmosphere, peer relationship issues, and the disparity between expectations and reality of the dental college. No significant difference was observed between the second- and third-year students in any domain (p-value=0.05).

**DASS results:** Based on the data acquired and categorised according to DASS criteria, the overall scores for anxiety were 13.39±6.01, followed by depression with 12.60±8.66, and stress with a value of 15.22±5.92. In terms of severity, anxiety was the most prevalent condition, with more than one-fourth of the students displaying high scores in this aspect. The distribution of the DASS scores is depicted in [Table/Fig-5].

		Second year N (%)	Third year N (%)	p-value
Depression	Normal	52 (40.6%)	76 (59.4%)	0.808
	Mild	65 (41.4%)	92 (63.06%)	
	Moderate	50 (40.7%)	107 (59.1%)	
	Severe	52 (40.6%)	48 (58.4%)	
	Extremely severe	12 (54.5%)	44 (55.0%)	
	Mean scores	12.54±6.89	12.69±6.7	
	Total mean value	12.60±8.66		
Stress	Normal	112 (40.3%)	166 (59.7%)	0.131
	Mild	31 (46.3%)	36 (53.7%)	
	Moderate	34 (35.1%)	63 (64.9%)	
	Severe	14 (60.9%)	9 (39.1%)	
	Extremely severe	12 (52.9%)	11 (47.8%)	
	Mean score	14.91±8.04	15.64±8.64	
	Total mean value	15.22±5.92		

Anxiety	Normal	38 (42.2%)	52 (57.8%)	0.924
	Mild	20 (37%)	34 (63.0%)	
	Moderate	74 (40.9%)	107 (59.1%)	
	Severe	35 (42.3%)	48 (57.8%)	
	Extremely severe	36 (45%)	44 (55%)	
	Mean score	13.22±7.21	13.411±7.01	
	Total mean value	13.39±6.01		

[Table/Fig-5]: Descriptive statistics of DASS scores.

\*Chi-square test

**Year of study:** All three conditions (anxiety, depression, and stress) were commonly reported in the third-year students, followed by the second-year students. Statistically, the three variables were higher in the third year and decreased gradually in the second year.

## DISCUSSION

According to the Dental Council of India, undergraduate dental education follows a five-year curriculum. The first two years of the course focus on fundamental, medical, and dental sciences, while the next three years involve rigorous clinical training and theoretical study to develop diagnostic abilities for effective treatment planning. The clinical years are considered the most important time in a dental professional's life, as the experience gained during this period will be evident in their future clinical practice.

During the transition from the second year to the third year, the authors analysed data from several dental institutions and found significant statistical variances, as revealed by the findings. The present study identified the clinical and educational environmental domains as major stressors. Within each of the five domains, stressors such as lack of relaxation time, fear of failure or being caught up, responsibilities and financial burden, amount of assigned work, and examination and grades were identified as major concerns among dental undergraduate students. However, third-year undergraduates specifically reported lack of relaxation time and the amount of assigned quota as their highest stressors.

These findings are consistent with a study by Shehada MR et al., which concluded that clinical factors, academic work, and the educational environment were the major domains of stress [6]. Interactions with patients and learning clinical procedures were identified as major clinical stressors [6]. They also noted that the difference in clinical and educational environment stressors may be due to faculty factors and inadequate technical capacity when dealing with a large number of students.

In the present study, second-year undergraduates expressed examination stress, lack of decision-making, completing quotas, and interaction with faculty as major stressors during preclinicals. Other studies have also reported similar stressors, including staying far from home, lack of relaxation time, and moving away from home [1,2,6]. In the academic domain, 56% of the study participants (undergraduate students) identified examinations and grades as the major stressor, which is consistent with findings from other studies [7,8,10,14]. Ahmad MS et al., also reported that undergraduate students faced issues with examinations, grades, and the fear of failing during preclinical examinations [15]. They confront it because being medical subjects requires enough time to study, which indirectly affects relaxation time. Students were also concerned about adjusting to the environment and the college rules and regulations. Bakar NA et al., also found a high prevalence of academic-related stress. They provided sufficient evidence showing an increase in psychological stress along with the year of study, with second-year students experiencing more stress [3]. They also stated that mental well-being is better than not having mental health disorders, as their population norm showed lower mental well-being, which aligns with the present study. However, during

the transition from preclinicals to clinicals, undergraduate students began to develop more concerns about the scope of dentistry and information on higher studies. In the present study, the stressors were more focused within the clinical domain, such as interactions with patients, the decision-making process, completing assigned quotas within a given period, and balancing theoretical subjects. Other major stressors recorded included the time factor and lack of a home atmosphere. This data suggests that the dental curriculum is demanding, requiring expertise and multitasking ability, according to Malinta QU et al., [16]. Sarkar S et al., have stated that completing clinical quotas, comparisons with other professions, balancing theoretical examinations with clinicals, and getting introduced to the vast nine subjects required for graduation were the highest stressors recorded, which aligns with our study results [17]. The shift from preclinical to clinical appears to be a more demanding stress feature for third-year undergraduates. Several studies have also shown similar patterns of stress during this transition [3,4,5,10]. In contrast, a Malaysian study reported that the clinical domain was a moderate stressor for undergraduate students compared to clinical years [2]. In the present study, faculty and administration were among the top five major stressors; however, these were also identified as top concerns in other studies [2,4,5]. This raises concerns about student-faculty communication and interpersonal relationships in various dental colleges. In the current study, when comparing these "pentagon of domains," major stressor scores were reported in the workload. The present data showed a higher occurrence of stress among dental students compared to clinical students during the preclinical phases. According to Ahad A et al., this can be attributed to a higher risk of depression and anxiety among dental students [18]. Therefore, in this study, alongside the DES questionnaire, the DASS-21 scale was also incorporated to assess the relationship between depression, anxiety, and stress. It was evident that dentistry was not the first choice for the majority of undergraduate students in India [19,20]. This condition was attributed to various factors such as limited attempts, financial situations, age considerations, and more [16,17]. In the present study, when assessing the DASS, dental students showed a significant presence of mild and moderate depression and anxiety, which aligns with Ahad A et al., who reported a higher prevalence of stress leading to depression and anxiety among Indian dental students. They also found that over 60% of students joined the BDS program because they had no other choice, and 69% were compelled by their parents' will. In the present study, students expressed mild depression, which appeared slightly higher compared to medical undergraduates when using DASS-21 or DASS-42 [4]. A Turkish and Indian study comparing medical and dental undergraduates also discovered a higher incidence of depression and anxiety among dental students [15,20].

Anxiety is a psychophysiological signal indicating the initiation of the stress response. This potentially debilitating condition is reported to be predictive of reduced performance. The present study found a significant incidence of anxiety among dental undergraduates (45% among second-year students and 55% among third-year students), which is consistent with previous results from Indian and Turkish studies using DASS-21 or DASS-42 [18,21]. When compared to second-year undergraduates, third-year undergraduates experienced higher stress, which is in line with another study [19]. Reasons for this stress could be the sudden transition from preclinicals to clinicals, where students are required to complete assigned clinical work within a stipulated time frame and manage exam schedules [22]. Second-year students were shown to be less prone to anxiety compared to third-year students, which is consistent with previous findings. This could be attributed to the limited time period and extensive workload that third-year students face, as they have to improve their hands-on experience while simultaneously preparing for university examinations [18].

## Limitation(s)

Response bias is a limitation of this study since there is a lack of actual interaction with the participants. Questionnaires usually have a low response rate because responding to them can be tedious compared to one-to-one verbal interaction.

## CONCLUSION(S)

The findings of the present study imply an increasing level of stress, accompanied by significant levels of depression and anxiety, among undergraduate dental students during the transition from preclinicals to clinicals. The educational and clinical domains had the highest mean scores for psychological impact. Lack of relaxation time, completing assigned quotas, and student-teacher-patient relationships were identified as the major stressors overall. Preclinical (2nd year) students experienced considerable levels of anxiety, while clinical (3rd year) students exhibited the highest levels of stress and depression. Dental students often face a substantial amount of stress. To mitigate this buildup and its negative consequences, it is crucial to consider these findings. Implementing organised student support systems, such as counseling services and mentorship programmes, can help create an environment that reduces stress and enhances student well-being. The results should assist dental educators in understanding the stressors and concerns that students encounter. Future multicentre studies with a more clinical approach, such as conducting interviews and sessions, are recommended to achieve more significant results at a national level.

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