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Gender differences in stress levels and coping mechanisms among dental students and early-care clinicians: A cross-sectional study from Pakistan

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ABSTRACT

INTRODUCTION: Dental education and practice are inherently stressful, with potential gender-based differences in stress perception and coping strategies. Despite growing concerns about mental health in healthcare training, gender-specific stress trajectories, and coping mechanisms among dental students and professionals remain underexplored, particularly in culturally distinct settings. This study investigates perceived stress levels and coping mechanisms among dental students and early-career clinicians.

MATERIAL AND METHODS: A cross-sectional study was conducted among 77 dental students, graduates, and postgraduates in Pakistan (December 2024–January 2025). Validated tools – the Perceived Stress Scale (PSS-10) and the Brief COPE Inventory – were administered to assess stress levels and coping strategies. The inclusion criteria encompassed current enrollment in dental training, an absence of diagnosed mental health disorders, and informed consent. Data were analyzed to compare stress scores and coping mechanisms across genders and academic stages.

RESULTS: The cohort demonstrated moderately high stress levels (mean PSS: 24.73 ± 4.92). While overall stress did not differ significantly by gender ($p = 0.631$), academic stage analysis revealed significant variations ($F(4,72) = 3.42$, $p = 0.013$) with distinct gender patterns: men showed elevated stress in early academic years, while women peaked during clinical training phases. Coping mechanism analysis revealed statistically significant gender differences in four key domains: spirituality ($p = 0.003$), self-blame ($p = 0.039$), substance misuse ($p = 0.026$), and senior support-seeking ($p = 0.024$).

CONCLUSIONS: The study underscores gender-specific stress trajectories and culturally influenced coping mechanisms in dental education. Targeted interventions are warranted, including substance misuse prevention for men, resilience programs addressing self-compassion for women, and institutional reforms such as mindfulness training and mentorship frameworks. Future research should employ longitudinal designs to validate these findings across diverse populations.

KEYWORDS

stress management, coping behaviors, dental education, gender psychology, mental health

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INTRODUCTION

The demanding nature of medical and dental education is a well-established fact. The rigorous academic workload, combined with extensive clinical training and the constant pressure to perform, creates a challenging environment that can significantly impact students' mental and emotional well-being, often leading to elevated stress levels [1,2]. Stress is understood as a physiological and psychological response to perceived demands or threats, manifesting in various ways, from emotional distress and physical symptoms to changes in behavior [3].

Numerous studies have consistently documented high stress levels among medical and dental students. The contributing factors are multifaceted, including academic overload with constant examinations and long study hours, financial pressures, and the ever--present fear of making mistakes, particularly in clinical settings [4,5]. The often highly competitive atmosphere within these professional programs can further intensify these stressors [6].

Coping strategies refer to the conscious and unconscious efforts individuals use to manage stressful situations [7]. These strategies are often categorized into problem-focused coping, which directly addresses the source of the stress, and emotion-focused coping, which aims to manage the emotional distress associated with the stressor. Examples of coping strategies include seeking support from friends and family, engaging in physical exercise, practicing relaxation techniques, and reframing negative thoughts [8,9].

While stress is a common experience for students in many disciplines, research suggests that the experience and management of stress may differ between genders [10,11]. As a social and cultural construct, a person's gender shapes behaviors and expectations, which can influence both their vulnerability to stress and their preferred coping mechanisms [12].

This research investigates the stress levels and coping mechanisms in Pakistani dental students and early--career clinicians, with a specific focus on gender differences. By exploring these differences, it aims to generate valuable insights to develop effective, tailored strategies to support the mental health and overall well--being of future healthcare professionals. This understanding is crucial for creating a healthier and more sustainable future for the healthcare workforce.

MATERIAL AND METHODS

This cross-sectional study was conducted online over two months (December 2024 to January 2025) targeting dental students and graduates across Pakistan. The survey was administered using a Google Forms questionnaire, which was distributed through professional networks, social media platforms, and student groups affiliated with various dental institutions. Formal ethical approval from an Institutional Review Board (IRB) was not required for this study as per the national regulations and institutional policies. However, the study was conducted in strict accordance with the ethical principles of the Declaration of Helsinki. The first page of the online questionnaire was a detailed digital informed consent form which outlined the study's purpose, assured participants of anonymity and confidentiality, and stated that participation was voluntary. Participants were required to select "I understand the above information and voluntarily agree to participate in this study" before they could proceed to the survey questions.

The study included 77 participants who were either current dental students (from second year to final year), house officers, or postgraduate trainees. The inclusion criteria were 1) enrollment in a Bachelor of Dental Surgery (BDS) program or being a BDS graduate undergoing house job/postgraduate training and 2) voluntary agreement to participate. Individuals who were not directly involved in dental education or training were excluded from the study. A total of 85 questionnaires were distributed and 77 were returned completed (response rate: 90.6%).

The data collection instrument was a self-administered questionnaire with three sections: demographic information, including age, gender, and current year of study/training; the Perceived Stress Scale (PSS-10), a 10-item scale that measures the degree to which situations in one's life are appraised as stressful; and the Brief COPE Inventory, a 28-item inventory assessing a range of coping behaviors. Individual items on the PSS-10 are rated on a 5-point scale from 0 (never) to 4 (very often). The cumulative score ranges from 0 to 40, with higher total scores indicating a greater level of perceived stress. The standard PSS-10 was slightly modified for contextual clarity (e.g., "academics or clinical responsibilities"). For the Brief COPE Inventory, participants indicated how often they used each strategy on a 4-point scale from 1 ("I haven't been doing this at all") to 4 ("I've been doing this a lot"). Items were grouped into 14 coping domains (e.g., self-blame, substance use, or emotional support) for analysis.

Statistical analysis

The data were analyzed using IBM SPSS Statistics (Version 27). Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to summarize demographic data, stress scores, and coping strategies. An independent samples t-test was used to compare mean PSS scores between genders. A one-way analysis of variance (ANOVA) was used to compare mean PSS scores across different academic years. Independent samples t-tests were also used to compare the mean scores of individual coping strategies between men and women. A p-value of <0.05 was considered statistically significant.

RESULTS

The study included 77 dentistry students and clinicians, including house officers and postgraduate trainees. The study group was comprised of 49.4% men and 50.6% women, as shown in Figure 1.

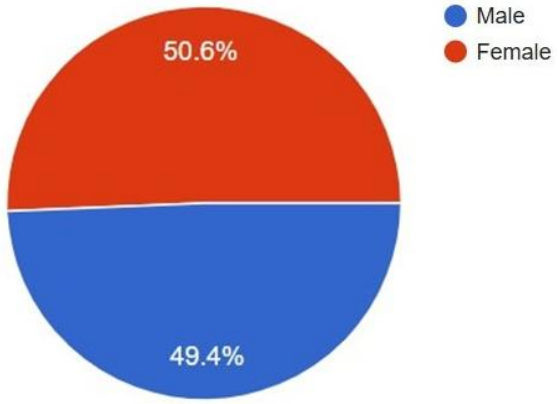

Fig. 1. Percentages of men and women

The overall mean PSS score for the cohort was 24.73 (±4.92). There was no statistically significant difference in the overall mean PSS scores between men (24.99 ± 5.23) and women (24.46 ± 4.64) ($t(75) = 0.483$, $p = 0.631$). However, when analyzed by academic stage, distinct patterns emerged (Table I). Men reported higher stress levels in the early years (second year), whereas women reported higher stress levels during the final year and house-officership. The ANOVA comparing PSS scores across all five academic stages showed a statistically significant difference ($F(4,72) = 3.12$, $p = 0.020$).

The analysis of coping strategies revealed significant gender differences in several domains (Table II). Women had statistically significantly higher mean scores for spirituality ($p = 0.003$) and self--blame ($p = 0.039$). Conversely, men had significantly higher mean scores for substance misuse ($p = 0.026$) and seeking help from seniors ($p = 0.024$). Other differences, such as in developing plans and expres-sing frustration, were not statistically significant.

Table I. Perceived Stress Scale (PSS) score among different groups

Category	Men (PSS), Mean ± SD	Women (PSS), Mean ± SD	Overall PSS, Mean ± SD
Second year	28.00 ± 0.00	22.80 ± 3.11	25.40 ± 3.78
Third year	26.00 ± 2.83	21.25 ± 2.22	23.60 ± 3.21
Final year	24.52 ± 4.12	28.36 ± 4.05	26.44 ± 4.56
House officers	22.83 ± 4.07	25.18 ± 4.90	24.00 ± 4.58
Postgraduates	23.63 ± 3.66	24.75 ± 3.88	24.19 ± 3.72
Total	24.99 ± 5.23	24.46 ± 4.64	24.73 ± 4.92

Table II. Coping mechanism difference among men and women

Coping mechanism	Women (Average ± SD)	Men (Average ± SD)	Mean difference
Spirituality	3.40 ± 0.52	2.79 ± 0.63	0.61
Substance Misuse	1.80 ± 0.79	2.29 ± 0.96	-0.49
Seeking Senior Help	2.20 ± 0.63	2.68 ± 0.75	-0.48
Self-Blame	3.00 ± 0.67	2.58 ± 0.69	0.42
Developing a Plan	2.40 ± 0.70	2.74 ± 0.73	-0.34
Withdrawing from Work	1.80 ± 0.63	2.11 ± 0.74	-0.31
Putting in Extra Effort	2.90 ± 0.72	2.63 ± 0.76	0.27
Positive Reframing	2.50 ± 0.71	2.76 ± 0.72	-0.26
Engaging in Work	2.40 ± 0.70	2.16 ± 0.83	0.24
Expressing Frustration	2.30 ± 0.68	2.08 ± 0.81	0.22
Giving Up	2.00 ± 0.67	1.79 ± 0.79	0.21
Using Humor/Sarcasm	2.70 ± 0.68	2.82 ± 0.73	-0.12
Ignoring the Problem	1.90 ± 0.72	1.84 ± 0.83	0.06
Seeking Emotional Support	2.50 ± 0.71	2.45 ± 0.81	0.05

DISCUSSION

This study provides a detailed analysis of gender-based disparities in stress levels and coping strategies among dental students and early-career clinicians in Pakistan. The findings contribute to the established body of literature on the inherently stressful nature of dental education [1,4,5], while offering novel insights into the distinct psychological trajectories and coping mechanisms employed by men versus women navigating this demanding path.

Our data reveal a critical nuance: while the overall perceived stress levels between male and female participants were statistically similar, their stress profiles diverged significantly across the different academic stages. Male participants reported higher stress levels during the initial years of dental college. This early peak could be attributed to the challenges of adapting to a new, highly competitive academic environment, performance anxiety, or societal pressures to quickly establish competence and resilience in a professional course [6,12]. Conversely, female participants exhibited a significant increase in stress during the final year and house-officership. This shift aligns with the transition into heightened clinical responsibilities, patient management, and the pressure of impending independent practice. It may also be influenced by gendered societal expectations, where women often simultaneously navigate career advancement and anticipatory pressures related to personal and family obligations [10,11]. This pattern is consistent with studies suggesting that stress in male-dominated fields is often amplified for women as they progress into more advanced, high-stakes clinical roles [5].

The most pronounced gender differences emerged in the realm of coping mechanisms. Men demonstrated a tendency toward externalized and problem-focused strategies. Their significantly higher use of seeking help from seniors is a positive, adaptive strategy that leverages social resources for practical solutions. However, this was coupled with a significantly greater reliance on substance misuse, a mal-adaptive coping mechanism that poses serious risks to personal health and professional conduct [8]. This finding underscores a critical area for intervention, suggesting that while men are proactive in seeking external solutions, they may lack healthy outlets for stress relief.

In contrast, women displayed a clear preference for internalized and emotion-focused coping. The significantly higher use of spirituality is a notable finding, particularly within the Pakistani sociocultural context. This can be a profound source of comfort and resilience, serving as a protective psychological factor. However, this adaptive strategy was counterbalanced by a significantly higher tendency for self-blame. This internalization of stress, where individuals attribute challenges to personal failings, is a known risk factor for chronic anxiety, burnout, and diminished self-efficacy [9,12]. The combination of high self-blame and the observed (though not statistically significant) trend toward higher scores in putting in extra effort and giving up suggests a potential cycle of perfectionism and emotional exhaustion among female trainees.

These findings have direct and pressing implications for educational institutions and healthcare policy-makers. A one-size-fits-all approach to student well-being is insufficient. Gender-tailored interventions are necessary. For male students, initiatives should focus on promoting healthy alternatives to substance use, such as structured sports, mindfulness training, and peer support groups. Mentorship programs can be formalized to channel their propensity for seeking guidance into sustained, positive relationships. For female students, support systems should aim to reduce the burden of self-blame and perfectionism. This could include resilience-training workshops that teach self-compassion, cognitive-behavioral techniques to challenge negative self-appraisals, and clear institutional policies that support work–life balance. Furthermore, the strong inclination toward spirituality presents an opportunity for culturally congruent interventions, such as designated quiet rooms for meditation or facilitated faith-based support groups, which could be integrated into student support services.

Limitations and future directions

Several limitations of this study must be acknowledged. The cross-sectional design provides a snapshot in time and cannot establish causality or trace the evolution of stress and coping within individuals. The sample size, though adequate for overall gender comparisons, limits the power for more complex subgroup analyses across all five academic stages. The use of an online, convenience sample may have introduced self-selection bias and limits the generalizability of the findings to the population of dental trainees in Pakistan. Finally, while the modified PSS-10 showed good internal consistency in our sample, its use without extensive prior validation requires caution.

Future research should employ longitudinal designs to track the same cohort of students throughout their training, providing a dynamic view of stress trajectories. Mixed-methods studies, incorporating qualitative interviews, would be invaluable for deeply exploring the sociocultural and personal factors that underpin the coping preferences identified here. Expanding this research to include multiple centers across different regions of the country would also enhance the generalizability of the findings.

CONCLUSIONS

This study demonstrates that the journey through dental training in Pakistan is marked by distinct gender-specific experiences. While the overall burden of perceived stress is similar, men and women face their greatest challenges at different stages and employ

fundamentally different strategies to cope with it. Men in their early years and women in their final clinical years represent critical windows for intervention. Addressing these patterns through targeted, gender--sensitive support systems is not merely beneficial but essential. By promoting adaptive coping mechanisms, discouraging maladaptive ones such as substance use and self-blame, and creating a supportive institutional culture, we can foster the resilience and well-being of the future dental workforce, ultimately enhancing the quality of patient care they will provide.

Authors' contribution

Study design – Q.J. Hayat, M.A. Sardar
Data collection – Q.J. Hayat, M.A. Sardar, Z. Khan, U. Noureen
Data interpretation – Q.J. Hayat, Z. Khan
Statistical analysis – Q.J. Hayat, M.A. Sardar
Manuscript preparation – Q.J. Hayat, Z. Khan, U. Noureen
Literature research – Q.J. Hayat, Z. Khan, U. Noureen

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