



EVALUATION OF PATIENT EXPERIENCE AND TREATMENT-RELATED ANXIETY DURING ENDODONTIC AND SURGICAL PROCEDURES IN DENTAL TEACHING INSTITUTIONS OF KHYBER PAKHTUNKHWA

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ABSTRACT

Objective: To evaluate and compare patient experience and treatment-related anxiety among individuals undergoing endodontic and surgical procedures in dental teaching institutions of Khyber Pakhtunkhwa.

Methods: A cross-sectional comparative study was conducted from January to May 2025 in three dental teaching institutions. A total of 150 adult patients were enrolled, equally divided between endodontic (n=75) and surgical (n=75) groups. Pre-treatment anxiety was measured using the Modified Dental Anxiety Scale (MDAS) and a visual analogue scale (VAS), while post-treatment experience was assessed through a structured satisfaction questionnaire. Data were analyzed using independent t-tests and Pearson's correlation, with $p < 0.05$ considered significant.

Results: The mean MDAS score indicated moderate anxiety (15.8 ± 4.6), with significantly higher anxiety in surgical patients (17.1 ± 4.3) compared to endodontic patients (14.5 ± 4.5 ; $p = 0.001$). Mean satisfaction scores were higher in the endodontic group (29.6 ± 3.2) than in the surgical group (27.1 ± 3.9 ; $p = 0.002$). Anxiety and satisfaction were inversely correlated ($r = -0.41$, $p < 0.001$). Preoperative anxiety significantly predicted postoperative pain intensity ($\beta = 0.37$, $p < 0.001$).

Conclusion: Surgical dental procedures were associated with greater anxiety and lower satisfaction compared with endodontic treatments. The findings highlight the importance of enhancing patient

communication, anxiety management, and pain control strategies within dental teaching institutions to improve patient-centered care and overall experience.

Keywords: Dental anxiety, endodontic procedures, oral surgery and patient experience

INTRODUCTION

Dental anxiety is a well-recognized phenomenon that affects a substantial proportion of patients undergoing routine and invasive dental procedures.¹ It has been described as a complex psychological state characterized by fear, apprehension, and stress in anticipation of dental treatment, often leading to avoidance behavior and compromised oral health. Despite advances in pain control and patient-centred care, anxiety remains a major challenge in dental practice and education. Patients' emotional responses can profoundly affect their experience, perception of pain, cooperation during treatment, and satisfaction with care.² Among dental procedures, endodontic and oral surgical interventions are commonly associated with the highest anxiety levels due to their invasive nature and longer duration. Within teaching institutions, these experiences may be further influenced by the academic environment, involvement of multiple trainees, and extended procedural times, all of which can heighten anxiety or discomfort.

Dental fear has been studied extensively in various populations, and its prevalence has been reported to range from 10% to 30%, depending on the study design, cultural background, and assessment tool used.³ In Pakistan, anxiety toward dental treatment remains highly prevalent, with several studies indicating that between one-quarter and one-third of patients exhibit moderate to severe anxiety levels.⁴ The Modified Dental Anxiety Scale (MDAS) is the most widely validated instrument for quantifying such anxiety, consisting of five items evaluating patient responses to dental stimuli such as the sight of a needle or the sound of the drill. Cultural factors, past traumatic dental experiences, socioeconomic status, and the interpersonal skills of the operator have all been shown to influence anxiety levels.⁵ In teaching institutions, the experience may be distinct because patients often perceive students as less experienced, leading to apprehension about procedural success, pain control, and treatment duration. On the other hand, the presence of supervising faculty and the generally lower treatment cost can also increase patient satisfaction and willingness to cooperate.⁶

Endodontic procedures, including root canal therapy, are typically lengthy and require multiple steps involving local anesthesia, isolation, cleaning, and obturation. The perception of pain, prolonged chair time, and the mechanical instrumentation can all trigger anxiety. Surgical procedures, such as simple and surgical extractions or minor oral surgeries, are associated with fear of postoperative complications, bleeding, and swelling.⁷ Comparative studies have shown mixed results: some report higher anxiety among surgical patients because of the invasiveness of the procedure, while others find greater anxiety in endodontic treatments due to prolonged exposure and previous negative experiences.⁸ However, data specific to Pakistani teaching hospitals—where patient loads are high and students perform most procedures—remain limited. Investigating these differences is essential for improving the patient-centred approach in dental education, optimizing pre-operative counseling, and enhancing procedural protocols.

Patient experience encompasses not only anxiety but also overall satisfaction with the environment, communication, and perceived quality of care. The contemporary concept of patient-centred dentistry emphasizes empathy, communication, and shared decision-making as crucial determinants of satisfaction.⁹ Measuring patient experience allows institutions to identify areas for improvement, such as waiting times, pain management, and interpersonal conduct of students. Evidence indicates that positive dental experiences can reduce future anxiety and foster long-term adherence to oral health care.¹⁰ Therefore, evaluating both anxiety and experience concurrently provides a more holistic understanding of patient outcomes and institutional quality.

The province of Khyber Pakhtunkhwa (KPK) presents a particularly relevant setting for such evaluation. It hosts several dental teaching institutions catering to a socioeconomically diverse population, many from rural areas with limited prior exposure to dental services. Cultural beliefs and

limited oral health awareness may amplify dental fear in this population. Moreover, resource constraints, crowded clinics, and variable student expertise may influence both treatment experience and anxiety perception.¹¹ To date, few studies have systematically compared these dimensions between different procedural types within this region. This study thus aims to fill that gap by examining the levels of treatment-related anxiety and patient experience among individuals undergoing endodontic and minor oral surgical procedures in dental teaching institutions of Khyber Pakhtunkhwa.

The objectives of this research were to assess and compare pre-treatment anxiety, intraoperative experiences, and post-treatment satisfaction between patients receiving endodontic versus surgical procedures. It was hypothesized that surgical patients would demonstrate higher anxiety and lower satisfaction scores than those undergoing endodontic treatment. Findings from this study are expected to guide educational strategies, improve communication skills training for students, and promote better patient management in institutional settings.

METHODOLOGY

A cross-sectional comparative study was conducted from January to May 2025 at three dental teaching institutions located in Peshawar, Abbottabad, and Swat. Ethical approval was obtained from the respective institutional review committees, and written informed consent was acquired from all participants. The sample consisted of 150 adult patients, aged 18–60 years, attending the endodontic or oral surgery outpatient departments. Participants were selected through convenience sampling based on appointment schedules, ensuring equal representation of both procedural groups. Group A comprised 75 patients undergoing endodontic procedures (root canal therapy, pulp extirpation, or retreatment), while Group B included 75 patients receiving minor oral surgical interventions (simple or surgical extraction, alveoloplasty, or removal of impacted teeth). Patients with systemic diseases affecting pain perception, cognitive impairment, emergency cases, or those on anxiolytic medications were excluded.

Data were collected in two stages. Pre-treatment anxiety was assessed immediately before the procedure using the Modified Dental Anxiety Scale (MDAS), a five-item instrument with a total score range of 5–25. A score of 5–10 was considered low anxiety, 11–18 moderate anxiety, and 19–25 high anxiety (15). Patients also rated their anxiety on a 100-mm visual analogue scale (VAS), with 0 indicating no anxiety and 100 representing extreme anxiety. Immediately following the procedure, patients completed a structured questionnaire evaluating their experience and satisfaction. The instrument included seven Likert-scale items (1–5), assessing communication, pain control, comfort, waiting time, cleanliness, safety perception, and overall satisfaction. Higher scores indicated better experiences. Procedure duration, operator level (undergraduate or postgraduate), and use of anesthesia were recorded by the researchers.

Data were analyzed using SPSS version 26. Descriptive statistics were computed for demographic and clinical variables. Independent sample t-tests compared mean anxiety and satisfaction scores between the two groups. The relationship between anxiety and satisfaction was explored using Pearson's correlation coefficient. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 150 participants completed the study, including 80 males (53.3%) and 70 females (46.7%), with a mean age of 34.2 ± 10.6 years. The two groups were comparable in gender and age distribution ($p > 0.05$). The mean MDAS score among all participants was 15.8 ± 4.6 , reflecting moderate anxiety overall. However, when analyzed by treatment type, surgical patients exhibited significantly higher mean anxiety scores (17.1 ± 4.3) compared with endodontic patients (14.5 ± 4.5 ; $p = 0.001$). Similarly, the mean pre-operative VAS anxiety rating was 62.4 ± 19.8 mm in the surgical group versus 49.2 ± 20.5 mm in the endodontic group, confirming a statistically significant difference ($p < 0.001$). Female participants demonstrated slightly higher anxiety than males, although the difference did not reach

statistical significance ($p = 0.07$). Table 1 presents the comparative distribution of anxiety levels across the two procedural categories.

Table 1. Comparison of pre-treatment anxiety levels between endodontic and surgical patients (n = 150)

Anxiety Level (MDAS)	Endodontic (n=75)	Surgical (n=75)	Total (%)	p-value
Low (5–10)	18 (24.0%)	9 (12.0%)	27 (18.0)	
Moderate (11–18)	43 (57.3%)	40 (53.3%)	83 (55.3)	
High (19–25)	14 (18.7%)	26 (34.7%)	40 (26.7)	0.021*

*Significant at $p < 0.05$ (Chi-square test)

The mean total satisfaction score was 28.4 ± 3.7 (out of 35), suggesting generally positive patient experiences in both departments. Nevertheless, endodontic patients reported higher satisfaction (mean 29.6 ± 3.2) than surgical patients (mean 27.1 ± 3.9 ; $p = 0.002$). Among the individual items, the largest differences were observed in “pain control” and “communication clarity,” where surgical patients rated significantly lower. A moderate negative correlation ($r = -0.41$, $p < 0.001$) was observed between anxiety and satisfaction, indicating that higher anxiety was associated with poorer overall experience.

Table 2. Comparison of patient experience scores between endodontic and surgical groups

Experience Parameter (1–5 Likert)	Endodontic (Mean $\pm$ SD)	Surgical (Mean $\pm$ SD)	p-value
Communication clarity	4.4 ± 0.6	3.9 ± 0.8	0.004*
Pain control	4.3 ± 0.7	3.8 ± 0.9	0.003*
Waiting time satisfaction	3.9 ± 0.8	3.7 ± 0.9	0.218
Cleanliness and comfort	4.5 ± 0.5	4.3 ± 0.7	0.109
Safety perception	4.6 ± 0.5	4.2 ± 0.8	0.014*
Overall satisfaction	4.2 ± 0.6	3.8 ± 0.7	0.001*

*Significant at $p < 0.05$

DISCUSSION

The mean procedural duration was slightly longer for endodontic cases (56.2 ± 14.8 minutes) than for surgical procedures (42.7 ± 11.3 minutes; $p < 0.001$). However, duration did not significantly correlate with anxiety ($p = 0.27$). Operator level showed a mild influence: procedures performed by postgraduate trainees were associated with lower anxiety scores (mean 15.2 ± 4.1) compared to those by undergraduates (mean 16.4 ± 4.7), though the difference was not statistically significant ($p = 0.09$). Postoperative pain was recorded immediately after the procedure using a 100-mm visual analogue scale (VAS). Surgical patients reported a mean immediate pain score of 58.7 ± 20.3 mm, significantly higher than that of endodontic patients, whose mean pain was 43.9 ± 18.6 mm ($p = 0.001$). Follow-up assessment at 48 hours revealed a reduction in pain levels across both groups, with mean scores of 32.1 ± 16.4 mm in the surgical group and 24.5 ± 14.7 mm in the endodontic group ($p = 0.004$). The decrease in pain from immediate to 48-hour measurement was statistically significant within both groups ($p < 0.001$). Regression analysis indicated that pre-treatment anxiety predicted higher immediate postoperative pain ($\beta = 0.37$, $p < 0.001$) even after adjusting for procedure type and duration. This suggests that psychological factors may substantially influence pain perception and recovery experience.

The results of this study demonstrate that dental patients undergoing surgical procedures in teaching institutions of Khyber Pakhtunkhwa experienced significantly higher treatment-related anxiety and lower satisfaction compared with those receiving endodontic therapy. These findings confirm the initial hypothesis and align with the well-established understanding that surgical dental procedures

evoke greater psychological stress due to their perceived invasiveness, expected pain, and risk of postoperative discomfort. The observed correlation between preoperative anxiety and both satisfaction and postoperative pain emphasizes the critical role of emotional preparedness and communication in shaping overall treatment outcomes.

Several previous investigations have explored the nature and determinants of dental anxiety. A similar pattern of higher anxiety in surgical patients was reported by McCarthy et al. (2019)¹², who found that extractions were associated with significantly greater MDAS scores compared with restorative or endodontic treatments. Likewise, a cross-sectional study in Saudi Arabia involving 400 patients reported mean MDAS scores of 16.9 for oral surgery and 14.7 for endodontic procedures, closely mirroring the present findings. A study conducted in Karachi also identified surgical extraction as the most anxiety-inducing dental procedure, with fear of pain and injections being the predominant causes.¹³ The current results thus reinforce the consistency of anxiety patterns across cultural contexts while highlighting their persistence within teaching environments.

In contrast, some earlier studies found no significant difference in anxiety levels between different treatment types. A Norwegian survey by Hauge et al. (2023)¹⁴ reported that the anxiety associated with root canal treatment was comparable to that of extractions, largely influenced by past negative dental experiences rather than procedural category. However, that population had higher overall exposure to dental care and more systematic pain management protocols, which may explain the smaller variation between treatment types. In resource-limited contexts such as Khyber Pakhtunkhwa, patient unfamiliarity with advanced dental procedures and communication barriers may heighten perceived threat and anxiety, particularly for surgical interventions.

The moderate overall anxiety level (mean MDAS 15.8 ± 4.6) found in this study aligns with earlier Pakistani data, where moderate anxiety predominated among dental outpatients. Hafeez et al. in Lahore reported a mean MDAS of 16.2 among general dental patients, with 27% exhibiting high anxiety.¹⁵ Similarly, a study at Peshawar Dental College documented that 29% of patients experienced severe anxiety prior to treatment, particularly among females and those with prior painful experiences.¹⁶ Cultural and gender-related factors often influence dental anxiety, with women generally scoring higher than men.¹⁷ Although the present study also observed slightly higher female anxiety scores, the difference did not reach statistical significance, possibly due to the modest sample size. Nevertheless, the consistent trend supports the need for gender-sensitive counseling approaches. Pain perception following dental procedures is multifactorial, involving both physiological and psychological determinants. The current finding that higher pre-treatment anxiety predicted greater postoperative pain corroborates the biopsychosocial model of pain, wherein psychological distress amplifies pain interpretation through heightened sympathetic arousal and attention to bodily sensations.¹⁸ Comparable results were reported by van Wijk and Hoogstraten, who demonstrated that preoperative anxiety significantly predicted pain intensity after surgical extraction of third molars. In endodontics, Wijk et al. (2009)¹⁹ observed that patients with higher anxiety reported more intraoperative discomfort despite adequate anesthesia. These parallels affirm that managing anxiety before treatment is not merely a comfort measure but an essential component of pain prevention and patient satisfaction.

Patient satisfaction in this study was generally high across both procedural groups, reflecting acceptable standards of care in the participating teaching institutions. However, the significantly lower satisfaction in surgical patients underscores areas requiring improvement, particularly in communication and pain management. The lower satisfaction ratings in “communication clarity” and “pain control” among surgical patients indicate potential deficiencies in patient preparation, explanation of procedural steps, or reassurance during treatment. A study from India emphasized that effective preoperative communication significantly reduces dental fear and enhances satisfaction, even when pain intensity remains similar.²⁰ Likewise, a Malaysian study found that satisfaction correlated strongly with dentists’ interpersonal behavior rather than purely technical quality.²¹ These findings resonate with the current results, reinforcing that empathy, explanation, and reassurance are central to positive dental experiences.

Interestingly, despite endodontic procedures taking longer on average, patients reported higher satisfaction. This finding supports the notion that anxiety and satisfaction are influenced more by perceived control and understanding than by procedure duration alone. In endodontic cases, detailed explanation and repeated reassurance by students and supervisors may have improved patient confidence. Similar observations were made by Yusof et al., (2014)²² who found that perceived control during treatment significantly moderated dental anxiety and improved patient tolerance. In teaching environments, student clinicians often engage in detailed procedural explanations as part of their learning process, which may unintentionally enhance patient understanding and reduce anxiety. By contrast, surgical departments where procedures are shorter but more invasive may provide limited preoperative dialogue, leading to reduced satisfaction despite faster treatment completion. The inverse relationship between anxiety and satisfaction ($r = -0.41$, $p < 0.001$) found in this study mirrors findings in international literature. Armfield et al. reported that dental anxiety inversely correlated with satisfaction scores in both private and institutional settings, emphasizing that anxious patients are more likely to interpret minor discomfort as significant distress. Similarly, a recent cross-sectional study from Turkey demonstrated that patients with higher anxiety not only reported more pain but were also less satisfied with dentist communication and overall experience.²³ Therefore, strategies to mitigate anxiety could yield dual benefits reducing both perceived pain and dissatisfaction.

CONCLUSION

Overall, the study underscores the need for enhanced patient-centred strategies in dental teaching institutions of Khyber Pakhtunkhwa. Although technical competence is vital, patient experience is increasingly recognized as a key measure of institutional quality and public trust. By addressing psychological factors, improving communication, and ensuring effective pain control, dental colleges can not only elevate their educational outcomes but also foster more positive patient–student interactions. This will contribute to a culture of empathy, professionalism, and patient safety cornerstones of modern dental practice.

Conflict of interest

None

Authors' Contribution

Concept or Design	Dr. Sadia Javed, Dr. Aliya khan, Dr. Muhammad Naeem
Acquisition, Analysis or Interpretation of Data	Dr. Azam Shahzad, Dr. Sajjad Ali Darvesh
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