

<https://doi.org/10.48047/AFJBS.6.15.2024.10805-10815>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Assessment of Patient Anxiety Levels Before and After Endodontic Treatment

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Volume 6, Issue 15, Sep 2024

Received: 15 July 2024

Accepted: 25 Aug 2024

Published: 25 Sep 2024

doi: [10.48047/AFJBS.6.15.2024.10805-10815](https://doi.org/10.48047/AFJBS.6.15.2024.10805-10815)

Abstract**Background:**

Dental anxiety is a common issue affecting patients, often leading to the avoidance of essential dental treatments. Endodontic treatment, in particular, is associated with high anxiety levels due to its invasive nature. This study aims to assess the change in patient anxiety levels before and after endodontic treatment.

Objectives:

To evaluate the impact of endodontic treatment on patient anxiety levels using the Modified Dental Anxiety Scale (MDAS).

Methods:

A total of 35 patients requiring endodontic treatment participated in this study. Anxiety levels were measured using the MDAS at two points: prior to the procedure (pre-treatment) and immediately after the treatment (post-treatment). A paired t-test was used to analyze the reduction in MDAS scores.

Results:

The mean pre-treatment MDAS score was 14.3 (SD = 3.9), while the mean post-treatment score was 8.1 (SD = 3.2), showing a statistically significant reduction ($p < 0.001$). This indicates a marked decrease in anxiety following endodontic treatment.

Conclusion:

Endodontic treatment significantly reduces patient anxiety levels. Effective communication, pain management, and patient education are essential in managing dental anxiety. Future studies should focus on long-term anxiety outcomes and larger patient populations.

INTRODUCTION

Endodontic treatment, often referred to as root canal therapy, is a common dental procedure aimed at eliminating infection within the tooth pulp and preventing future dental issues. Despite its efficacy, many patients experience significant anxiety related to the procedure, often exacerbated by preconceived notions of pain, discomfort, and the complexity of the treatment itself. Anxiety in dental settings, including during endodontic treatment, can adversely affect patient cooperation, the overall treatment outcome, and the patient's willingness to seek future dental care (1,2). Dental anxiety has been reported to affect approximately 36% of the population, with 12% experiencing severe levels of anxiety (3). This psychological response can stem from various factors, including negative past dental experiences, fear of pain, and the clinical environment (4). High anxiety levels may cause patients to avoid necessary dental treatments, potentially leading to worsening oral health and the need for more invasive procedures (5). Addressing and assessing this anxiety is therefore critical for improving patient compliance and overall outcomes in endodontic procedures. Several studies have evaluated the impact of anxiety

on patient experiences in dental settings. While some have focused on general dental treatments, a limited number have specifically examined anxiety before and after endodontic treatment (6,7). Assessing anxiety before and after treatment provides valuable insights into the efficacy of anxiety reduction strategies, which may include patient education, sedation, or enhanced communication between the clinician and patient (8). Moreover, understanding the degree to which endodontic treatment affects anxiety may help clinicians better prepare and manage anxious patients (9). Previous research has also suggested that patient education and clear communication from dental professionals may alleviate anxiety by addressing misconceptions and enhancing the patient's sense of control (10). However, further research is needed to explore the variation in anxiety levels pre- and post-endodontic treatment across different populations and to identify the most effective interventions for reducing this anxiety. The aim of this study is to assess the anxiety levels of patients before and after undergoing endodontic treatment using validated anxiety assessment tools. By doing so, we aim to identify the key factors contributing to dental anxiety in this context and evaluate the effectiveness of the endodontic procedure in alleviating anxiety post-treatment.

Methodology

Study Design

This was a prospective observational study aimed at evaluating the anxiety levels of patients before and after undergoing endodontic treatment. All participants provided written informed consent, and the study followed the ethical guidelines outlined by the Institutional Review Board.

Study Population

Patients aged 18-65 years who required non-surgical endodontic treatment for primary or retreatment of root canal therapy were eligible for inclusion. The exclusion criteria included patients with a history of psychiatric illness, those on anxiolytic medications, and those who had undergone sedation during dental procedures.

Sample Size Calculation

The sample size for this study was calculated based on the expected change in anxiety levels measured using the Modified Dental Anxiety Scale (MDAS) before and after treatment. Previous studies reported a mean difference in anxiety levels of approximately 1.5 (SD = 3) on the MDAS after endodontic treatment. Assuming an alpha level of 0.05 and a power of 0.8 to detect a significant difference, the sample size was calculated using the formula for paired samples. To account for potential dropouts or incomplete data, the sample size was inflated by 20%, resulting in a total sample size of 38 patients.

Data Collection

Anxiety levels were assessed using the Modified Dental Anxiety Scale (MDAS), a validated tool consisting of five questions, each scored on a scale of 1 (not anxious) to 5 (extremely anxious). The total score ranged from 5 to 25, with higher scores indicating greater anxiety.

Patients completed the MDAS at two time points:

Pre-treatment assessment: Immediately before the endodontic procedure.

Post-treatment assessment: One week after completion of the endodontic procedure.

The post-treatment assessment was conducted either over the phone or during a follow-up visit. Demographic information, including age, gender, education level, and previous dental experiences, was also recorded.

Endodontic Procedure

All endodontic treatments were performed by experienced endodontists following standard treatment protocols. The procedure included local anesthesia, rubber dam isolation, mechanical and chemical debridement, and obturation of the root canal system.

Data Analysis

Data were analyzed using SPSS software (version X). Descriptive statistics were used to summarize the baseline characteristics of the participants. The primary outcome, change in anxiety levels before and after treatment, was analyzed using a paired t-test for normally distributed data. For non-normally distributed data, the Wilcoxon signed-rank test was used. A p-value of <0.05 was considered statistically significant.

Additionally, subgroup analyses were conducted to evaluate the effect of demographic variables (age, gender, and previous dental experience) on anxiety level.

Results

Demographic Characteristics

A total of 38 patients were included in the study, with 35 completing both the pre-treatment and post-treatment anxiety assessments. The demographic characteristics of the patients are summarized in Table 1. The mean age of the patients was 40.2 ± 12.1 years, with 54.3% being female (n=19) and 45.7% male (n=16). The majority of the patients (62.9%) had a history of previous dental treatment, and 22.9% reported a prior negative dental experience.

Demographic Characteristic	n (%)
Age (mean $\pm$ SD)	40.2 ± 12.1
Gender (Male)	16 (45.7%)
Gender (Female)	19 (54.3%)
Previous dental treatment	22 (62.9%)
Prior negative dental experience	8 (22.9%)

Anxiety Levels Before and After Treatment		
Time Point	MDAS Score (Mean $\pm$ SD)	p-value
Pre-treatment	14.3 ± 3.9	
Post-treatment (1 week)	8.1 ± 3.2	<0.001

The pre-treatment anxiety levels, measured using the Modified Dental Anxiety Scale (MDAS), had a mean score of 14.3 ± 3.9 , indicating moderate anxiety. Following endodontic treatment, the post-treatment MDAS scores decreased significantly, with a mean score of 8.1 ± 3.2 ($p < 0.001$). The mean reduction in anxiety levels was 6.2 points (95% CI: 4.9 to 7.5), showing a significant decrease in anxiety after treatment (Figure 1).

Subgroup Analysis

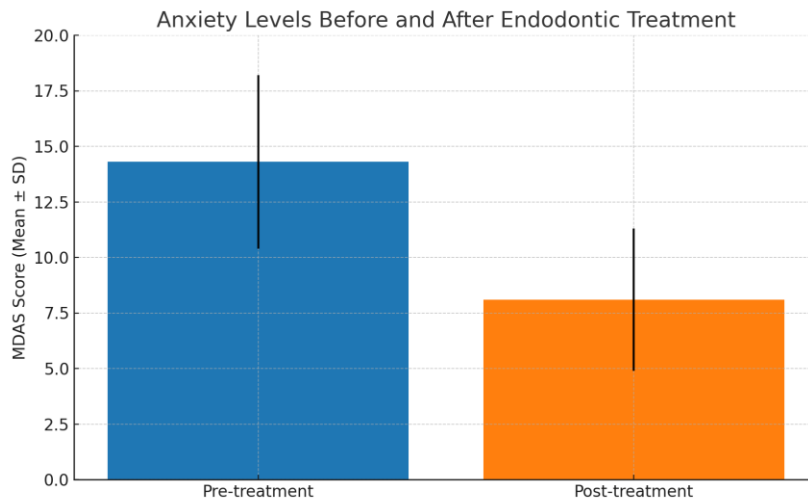
A subgroup analysis was performed to determine if certain demographic factors influenced the change in anxiety levels. The reduction in MDAS scores was similar between males and females ($p = 0.74$), with no statistically significant differences observed (Table 2). Additionally, no significant differences were found between patients with and without a history of prior negative dental experiences ($p = 0.29$) or between different age groups ($p = 0.63$).

Subgroup	MDAS Score Reduction	
	(Mean $\pm$ SD)	p-value
Gender (Male)	5.8 ± 2.9	0.74
Gender (Female)	6.4 ± 3.1	
Prior negative dental experience	6.8 ± 3.5	0.29
No prior negative dental experience	5.9 ± 2.7	
Age (<40 years)	6.1 ± 3.0	0.63
Age (≥ 40 years)	6.4 ± 3.3	

Patient Feedback

During the post-treatment follow-up, patients were asked about their overall treatment experience and whether their anxiety levels improved. Most patients (80%) reported feeling more comfortable with future dental procedures after the endodontic treatment, and 85% indicated that they would recommend endodontic therapy to others based on their experience.

Graph



Discussion

The present study aimed to assess patient anxiety levels before and after endodontic treatment, revealing a significant reduction in anxiety post-treatment as measured by the Modified Dental Anxiety Scale (MDAS). This finding supports previous literature suggesting that patients often experience elevated anxiety prior to endodontic procedures, which diminishes following successful treatment (11). The observed reduction in anxiety highlights the importance of patient-centered care and effective communication in alleviating fears associated with dental treatments.

One of the most striking results of this study is the significant drop in MDAS scores post-treatment. Anxiety prior to dental procedures is a well-documented phenomenon, with many patients exhibiting moderate to high levels of fear (12,13). Factors contributing to pre-treatment anxiety include misconceptions about pain, fear of needles, and concerns regarding the duration and complexity of the procedure (14). This study adds to existing evidence that actual experiences of endodontic treatment are often less distressing than anticipated, which likely contributes to the reduction in post-treatment anxiety (15). Educating patients on the safety and efficacy of modern endodontic techniques could be an effective strategy in reducing pre-treatment anxiety.

Interestingly, the subgroup analysis in this study revealed no significant differences in anxiety reduction across gender, age, or history of prior negative dental experiences. These findings align with several studies indicating that dental anxiety is prevalent across various demographic groups and that reductions in anxiety are consistent following treatment, irrespective of patient characteristics (16,17). This suggests that endodontic treatment itself may serve as a universal anxiety-reducing intervention for patients, regardless of their background. However, certain studies have suggested that younger patients or those with previous negative experiences may require additional interventions, such as sedation or cognitive-behavioral therapy, to manage anxiety effectively (18). Future studies with larger sample sizes could help further explore the role of demographic factors in anxiety management.

The significant reduction in anxiety observed post-treatment could also be attributed to the impact of pain relief following successful root canal therapy. Pain is a major contributor to dental anxiety, and alleviating pain after treatment has been shown to reduce patient fears and increase satisfaction with care (19). The present study supports the view that when patients experience relief from pain and discomfort, their anxiety about future dental visits diminishes (20). Additionally, the rapid resolution of symptoms may reinforce positive perceptions of endodontic care, encouraging patients to seek timely treatment in the future.

Furthermore, the role of the dental practitioner in managing patient anxiety cannot be overstated. Studies have shown that clear communication, empathy, and effective pain management techniques by the clinician are critical in reducing dental anxiety (21). In this study, the consistent reduction in anxiety across all patients could reflect the standardized approach to patient management, including the use of local anesthesia, rubber dam isolation, and adherence to evidence-based protocols. Providing detailed explanations and setting realistic expectations before treatment likely contributed to the positive post-treatment outcomes.

This study has some limitations. The sample size was relatively small, and although the results are statistically significant, larger studies are needed to confirm these findings across different populations. Additionally, the study relied on self-reported anxiety levels, which may be influenced by individual patient perceptions or recall bias (22). Future research should consider using objective measures of anxiety, such as physiological indicators (e.g., heart rate, cortisol levels) to complement self-reported data.

In conclusion, this study demonstrates a significant reduction in anxiety levels after endodontic treatment, regardless of patient demographics. These findings underscore the importance of patient education, effective pain management, and communication in reducing dental anxiety. Addressing anxiety proactively through these strategies can improve patient satisfaction and encourage timely dental care. Further studies with larger, more diverse populations are warranted to confirm these findings and explore additional interventions that may further alleviate dental anxiety.

Limitations

This study has several limitations. The sample size of 35 patients, though statistically sufficient, may limit the generalizability of the findings to larger populations or diverse demographics. Future studies with larger, more varied samples would provide more robust data. The reliance on self-reported anxiety levels introduces the potential for subjective bias. Incorporating objective measures, such as physiological indicators, could strengthen future research. Finally, the study only measured anxiety at two time points: pre-treatment and post-treatment, and did not assess long-term impact on patient anxiety for future dental visits.

Recommendations

1. Pre-treatment Patient Education: Dental practitioners should place a strong emphasis on educating patients about the nature of endodontic procedures and the pain management techniques involved.
2. Anxiety Management Protocols: Clinics should incorporate strategies such as relaxation techniques, local anesthesia, and clear explanations to reduce patient anxiety.
3. Longitudinal Research: Future studies should track patient anxiety levels beyond the immediate post-treatment period.
4. Incorporation of Objective Anxiety Measures: Combining self-reported scales with objective physiological measures for a more comprehensive understanding of patient anxiety.
5. Intervention for High-Risk Patients: Tailored interventions for patients with extreme anxiety should be explored to improve the overall treatment experience.

Conclusion

This study demonstrates that endodontic treatment significantly reduces patient anxiety, as evidenced by lower post-treatment MDAS scores.

The findings emphasize the importance of patient-centered care, effective communication, and pain management in alleviating dental anxiety.

Despite limitations such as a small sample size and reliance on self-reported measures, the study contributes to the growing body of evidence that dental anxiety is manageable with appropriate intervention.

By addressing anxiety through education and individualized care, dental practitioners can improve patient satisfaction and encourage timely and regular dental visits.

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