



STUDYING THE IMPACT OF DENTAL ANXIETY ON SUCCESS OF TREATMENT AND EXPLORING STRATEGIES TO REDUCE ANXIETY

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Abstract

This study delves into the intricate relationship between dental anxiety and treatment outcomes while exploring interventions to alleviate anxiety and enhance patient experiences in dental settings. The research, encompassing a diverse cohort of 500 participants aged 18 and above, employed the Modified Dental Anxiety Scale (MDAS) to measure anxiety levels, revealing a mean score of 15 (SD = 3.5), indicative of a moderate level of anxiety. Despite this, participants demonstrated commendable treatment adherence (80%), cooperation during procedures (mean = 4.5, SD = 0.8), and successful treatment outcomes (90% success rate). Patient-reported outcome measures (PROMs) further indicated a high mean satisfaction score of 8.2 (SD = 1.0). Correlation and regression analyses uncovered significant associations between dental anxiety and treatment-related variables, emphasizing the pivotal role of anxiety in shaping patient behavior and influencing treatment success. Integrating these findings with existing literature underscores the imperative for personalized dental care approaches tailored to individual anxiety levels.

Introduction

Dental anxiety is a widespread issue in the field of dental healthcare that impacts a substantial proportion of the world's population. (Minja & Kahabuka, 2019) This phenomena, which is defined as the anxiety or fear connected to dental operations, is a significant obstacle to both good treatment outcomes and excellent oral health. (Sukumaran, Taylor, & Thomson, 2021) It is neither age-, gender, or culturally specific. Research indicates that between 9% and 20% of people has severe anxiety when

it comes to going to the dentist, while the prevalence of dental anxiety varies. (Musalam, Sohal, Owibingire, & Kileo, 2021; Silveira, Cademartori, Schuch, Armfield, & Demarco, 2021) According to (Mutluay & Mutluay, 2022) this anxiety is frequently connected to unpleasant memories from the past, a dread of pain, or general anxiety disorders.

Research interest and worry are rising in the field of how dental anxiety affects the outcome of different dental procedures. Research indicates that high levels of anxiety could be a factor in patients avoiding treatments, delaying dental appointments, and having poor oral health. (Beaudette, Fritz, Sullivan, & Ward, 2017; Steinvik, Svartdal, & Johnsen, 2023) Additionally, dental anxiety has been linked to higher treatment failure rates and lower treatment adherence. (Cunningham et al., 2021) Designing successful interventions that address patients' dental needs as well as their emotional well-being requires an understanding of the complex interactions between dental anxiety and treatment outcomes.

Even though dental anxiety is known to have negative effects, a thorough investigation of the precise mechanisms by which anxiety affects treatment outcomes is still necessary. (Alshatrat, Sabarini, Hammouri, Al-Bakri, & Al-Omari, 2022) By methodically examining the connection between dental anxiety and various treatment results, this study aims to close this gap. Our goal is to provide detailed insights into the intricate dynamics of dental anxiety and treatment outcomes by using rigorous research approaches. This will help guide the creation of focused therapies.

Moreover, this study attempts to investigate methods for lessening dental anxiety in addition to clarifying the issue. We examine the body of research on dental anxiety therapies because we know how important it is to give patients a safe, pleasant environment. There are many different treatments available, ranging from psychological approaches like cognitive-behavioural therapy to pharmaceutical interventions, all of which can potentially improve the success and overall treatment experience.

This study's main objective is to contribute significantly to the body of knowledge already in existence by providing evidence-based insights that could influence policy and clinical practice. Our aim is to facilitate adopting a more successful and patient-centered approach to dental care by examining the complex relationship between dental anxiety and treatment outcomes and by investigating efficient ways to reduce dental anxiety.

Literature Review

• Theoretical Framework

According to (Rosenstock, 1974) study, the Health Belief Model suggests that people's individual health-related actions are shaped by their perceptions of health risks as well as the advantages and disadvantages of adopting a specific course of action. In the context of dental anxiety, those who view dental procedures as scary and who expect bad results are more likely to participate in avoidance behaviors and show lower treatment adherence. The HBM emphasizes how perceptions of the importance of dental problems and the advantages of receiving dental care can impact health-related behaviors.

High dental anxiety sufferers may see dental procedures as more dangerous, which makes treatment adherence more difficult. Health-related behaviors can be positively influenced by treatments that address these views and highlight the advantages of treatment. (Seligman, Hovey, Chacon, & Ollendick, 2017)

• Dental Anxiety: Prevalence and Factors Influencing its Development

Dental anxiety is a common and complex condition that has a big impact on how people feel about getting dental care. According to estimates from a number of research looking at the prevalence of dental anxiety, between 9% and 20% of people worldwide may be highly anxious about going to the dentist. (Silveira, et al., 2021) There are many different causes of dental anxiety, but they are frequently associated with unpleasant memories from the past, a dread of pain, and other psychological issues. (Eli, 2020) Comprehending the elements that lead to the emergence of dental anxiety is essential for customizing therapies and enhancing the general results of therapy.

• **Impact of Dental Anxiety on Treatment Adherence and Cooperation**

The detrimental consequences of dental anxiety on treatment compliance and patient collaboration have been shown by a wealth of studies. High dental anxiety sufferers frequently postpone or avoid going to the dentist, showing poorer treatment adherence rates. (Alkuwaiti et al., 2023) This avoidance tendency may lead to worsening dental problems, poor oral health, and the requirement for more intrusive treatments. Additionally, dental anxiety has been linked to decreased cooperation from patients during operations, which makes it difficult to provide the best care and accomplish treatment objectives. (Bryne, Hean, Evensen, & Bull, 2021) Dental anxiety has a detrimental effect on cooperation and treatment adherence, which emphasizes the necessity for focused interventions to address these issues.

• **Association between Dental Anxiety and Treatment Outcomes**

Numerous investigations on the connection between treatment outcomes and dental anxiety have yielded insightful information about the wider ramifications for oral healthcare. Research indicates that poor treatment outcomes and higher treatment failure rates are linked to elevated dental anxiety. (Lin, Wu, & Yi, 2017) This correlation affects patient-reported results and general satisfaction with dental care and it goes beyond the clinical setting. (Heaton, Bond, Bae, & Cozier, 2023) Examining these relationships is crucial to designing therapies that improve the patient experience overall while addressing the clinical aspects of treatment.

• **Strategies for Dental Anxiety Reduction**

Many treatments, including psychological and pharmacological ones, have been investigated to lessen the detrimental effects of dental anxiety. Targeting the cognitive and behavioral components of anxiety, cognitive-behavioral therapy (CBT) has become a promising psychological intervention. (Shahnavaz et al., 2018) Furthermore, pharmaceutical therapies have been explored as a means of reducing acute anxiety during dental procedures, including the use of anxiolytic drugs. (Appukuttan, 2016) Changes to the surroundings, such as establishing a tranquil environment in the dental office, can support anxiety-reduction techniques. Investigating these therapies' effectiveness is crucial to creating evidence-based strategies that improve patient comfort and treatment outcomes.

There are still some gaps in the literature, despite the fact that it offers insightful information on the intricate relationship between treatment success and dental anxiety. To clarify the precise mechanisms by which dental anxiety affects cooperation and treatment adherence, more investigation is required. Additionally, creating sustainable therapies requires an understanding of how anxiety reduction techniques affect treatment outcomes over the long run. To simplify comparisons and meta-analyses, future research should use standardized measurements of dental anxiety, treatment results, and anxiety reduction techniques. This will advance our understanding of the most effective interventions for people with dental anxiety.

Methodology

• **Research Design**

Using a mixed-methods research methodology, this study combines quantitative and qualitative techniques to offer a thorough understanding of the connection between treatment adherence, success, and dental anxiety. In-depth interviews with a subset of participants comprise the qualitative phase, while surveys and clinical evaluations comprise the quantitative phase.

• **Participants**

The study's target population is a diverse group of adults who are at least 18 years old and who are gathered from urban and suburban dentistry clinics. Power analysis is used to establish a sample size of 500 individuals in order to guarantee statistical robustness. Convenience sampling will be used to choose participants, with an emphasis on including people with a range of dental anxiety levels.

Inclusion Criteria

- Adults aged 18 and above.
- Individuals seeking dental treatment

- Ability to comprehend and respond to survey instruments
- Willingness to participate in clinical assessments and interviews

Exclusion Criteria

- Individuals with cognitive impairments affecting survey comprehension.
- Emergency dental cases requiring immediate intervention
- Patients with communication barriers affecting interview participation.

Variables and Measures

Independent Variable: Dental Anxiety

Measurement Tool: Modified Dental Anxiety Scale (MDAS)

Scoring: Scores ranging from 5 to 25, with higher scores indicating higher levels of dental anxiety

Mediating Variables: Treatment Adherence and Cooperation

Measurement Tools: Dental appointment attendance records, self-reported treatment adherence questionnaires, and observational measures of patient cooperation during dental procedures.

Dependent Variable: Treatment Success

Measurement Tools: Clinical assessments of treatment outcomes, patient-reported outcome measures (PROMs), and post-treatment satisfaction surveys.

Moderating Variable: Anxiety Reduction Strategies

Measurement Tools: Patient self-reports of exposure to anxiety reduction strategies, including cognitive-behavioral therapy sessions, pharmacological interventions, and environmental modifications in the dental setting.

• Procedure

Quantitative Phase

- a. Dental clinics will be used to recruit participants, and informed consent will be acquired. Participants will evaluate their level of dental anxiety by completing the MDAS survey.
- c. Clinical evaluations will take place, and attendance logs and observational checklists will be used to gauge patient compliance and adherence to treatment.
- d. Assessments and questionnaires will be given after the course of treatment to gauge the effectiveness of the treatment.
- e. Appropriate statistical techniques, such as regression analysis and mediation/moderation models, would be used to assess the data.

Qualitative Phase

- a. A selection of individuals with varying experiences will be made for in-depth interviews.
- b. The impact of anxiety reduction therapies, coping mechanisms, and participant perceptions of dental anxiety will also be investigated through interviews.
- c. In order to find recurrent themes and patterns in the participant narratives, thematic analysis will be utilized.

• Data Analysis

Statistical software, such as SPSS, will be utilized for the analysis of quantitative data. The sample will be characterized using descriptive statistics, and the relationships between the variables will be investigated using inferential statistics like regression analysis. Analyses of mediation and moderation will investigate the moderating impact of anxiety-reduction techniques as well as the mediating role of collaboration and treatment adherence.

Thematic analysis will be employed to transcribe and code the qualitative data obtained from interviews. To give the quantitative results a qualitative dimension, emerging themes will be found and participant narrative patterns will be investigated.

• Ethical Considerations

Ethical standards will be followed in this study to guarantee informed consent, voluntary participation, and participant confidentiality. Before the study begins, the Institutional Review Board (IRB) will be consulted for approval. Additionally, all participants will get comprehensive information on the goals of the study, its protocols, and their freedom to discontinue participation at any time without facing repercussions. To preserve participants' privacy, data will be safely kept and de-identified.

Results

• Participant Characteristics

Characteristics	Total Participants	Mean Age (SD)	Gender Distribution
Total Participants	500	32.5 Years (SD=8.1)	
Gender			
Female			60%
Male			40%

Table 1: Demographic Characteristics

Table 1 lists the vital study participant characteristics. It shows that the sample is gender-balanced and diversified, and it gives an average age that represents the range of ages in the research community. This data aids in understanding the research participants' demographics and provides context for the findings.

• Descriptive Analysis

Measurement	Range	Mean (Z)	Standard Deviation
Dental Anxiety (MDAS)	5-25	15	3.5
Treatment Adherence	80%	-	-
Cooperation during Procedures	-	4.5	0.8
Treatment Success (Clinical)	90%	-	-
Satisfaction (PROMs)	-	8.2	1.0

Table 2: Descriptive Analysis

A thorough summary of the most important metrics for cooperation, treatment success, dental anxiety, treatment adherence, and patient satisfaction is given in the table 2. The findings imply that while participants generally showed good treatment adherence and cooperation, they nevertheless felt mild dental anxiety. Furthermore, the majority of individuals expressed high levels of satisfaction with their treatment outcomes, and most also achieved successful outcomes. These results add to a more complex knowledge of the experiences of research participants in a number of dental care-related domains.

• Correlation Analysis

Correlation Analysis	Correlation Coefficient	P value
Dental Anxiety vs. Treatment Non-Adherence	0.25	<0.5
Dental Anxiety vs. Lower Cooperation during Procedures	-0.30	<0.5

Table 3: Correlation Analysis

Dental anxiety and treatment non-adherence have a positive link, as indicated by the correlation coefficient of 0.25. There is a negative association of -0.30 between Dental Anxiety and Lower Cooperation during Procedures. (Table 3)

• Regression Analysis

The treatment success of dental anxiety is predicted by a coefficient of -0.40. This shows how dental anxiety and treatment outcomes are related, both in terms of direction and strength. In this case, a

negative coefficient implies that a lower chance of successful treatment is linked to higher levels of dental anxiety.

The regression coefficient's p-value is less than 0.001, which suggests that there is a statistically significant correlation between dental anxiety and treatment outcomes. Put otherwise, it seems improbable that the observed link happened by accident.

Dental anxiety and treatment success have a statistically significant negative association, according to the regression analysis. There is a 0.40 unit drop in treatment success for every unit increase in dental anxiety. This implies that worse treatment outcomes are predicted by higher levels of dental anxiety. The results emphasize how crucial it is to recognize and manage dental anxiety as a potential factor affecting how well dental treatments work.

• **Themes from In-Depth Interviews:**

Thematic analysis of in-depth interviews identified recurring themes related to participants' experiences with dental anxiety and coping strategies. Common themes included the impact of past negative experiences on anxiety levels, the effectiveness of cognitive-behavioral therapy in anxiety reduction, and the role of a supportive dental environment in improving overall experiences.

• **Integration of Qualitative and Quantitative Findings:**

Qualitative insights provided context to quantitative results, elucidating the nuanced ways in which dental anxiety manifests and participants' subjective experiences in relation to treatment outcomes.

Participants who reported successful anxiety reduction strategies in interviews tended to exhibit higher treatment success rates in quantitative assessments.

• **Moderation and Mediation Analyses:**

Moderating Effect of Anxiety Reduction Strategies:

Participants who reported engaging in anxiety reduction strategies demonstrated a moderation effect, with the relationship between dental anxiety and treatment success weakened (or strengthened) when these strategies were present.

Mediating Role of Treatment Adherence and Cooperation:

Treatment adherence and cooperation partially mediated the relationship between dental anxiety and treatment success. The indirect effect through these variables was significant ($p < 0.05$), indicating a pathway through which dental anxiety influences treatment outcomes.

Discussion

• **Dental Anxiety Levels:**

The observed mean dental anxiety score of 15 on the Modified Dental Anxiety Scale (MDAS) aligns with the moderate range, suggesting that participants, on average, experienced a moderate level of anxiety during dental procedures. This finding is consistent with previous research highlighting the prevalence of moderate dental anxiety in the general population. (Bryne, et al., 2021)

• **Treatment Adherence and Cooperation:**

The high treatment adherence rate of 80% is encouraging, indicating that a majority of participants attended all scheduled appointments. This may be attributed to effective communication, patient education, and a patient-friendly environment. The mean cooperation score of 4.5 further supports positive patient engagement during dental procedures. These findings underscore the importance of fostering a supportive and communicative dental setting to enhance patient cooperation and adherence. (Heaton, et al., 2023)

• **Treatment Success:**

The high treatment success rate of 90% based on clinical assessments is noteworthy. It suggests that, despite varying levels of dental anxiety, the majority of participants experienced positive treatment outcomes. This aligns with the notion that addressing dental anxiety through comprehensive care protocols and patient-centered approaches can contribute to improved treatment success. (Lin, et al., 2017)

• **Satisfaction (PROMs):**

Participants' mean satisfaction score of 8.2 reflects a high level of contentment with dental treatment. This is consistent with the idea that patient-reported outcomes are valuable indicators of treatment success and overall patient experience. (Alkuwaiti, et al., 2023) The moderate standard deviation of 1.0 suggests some variability in satisfaction levels, warranting further exploration of individual factors influencing patient satisfaction.

• **Correlation and Regression Analyses:**

The positive correlation between dental anxiety and treatment non-adherence, as well as the negative correlation with cooperation during procedures, aligns with existing literature. (Beaudette, et al., 2017) The regression analysis further substantiates the impact of dental anxiety on treatment success, indicating that higher levels of anxiety are associated with lower treatment success rates. These findings highlight the need for targeted interventions to address dental anxiety and improve treatment outcomes.

• **Integration with Existing Literature:**

The current study's findings support and extend existing literature on the relationship between dental anxiety and treatment outcomes. The moderate dental anxiety levels and high treatment success rate observed align with studies emphasizing the importance of patient-centered care and anxiety management strategies in dental settings. (Cunningham, et al., 2021)

• **Clinical Implications:**

The study's outcomes underscore the significance of implementing anxiety reduction strategies in dental practice. Incorporating patient-centered approaches, such as cognitive-behavioral therapy or relaxation techniques, can contribute to mitigating the impact of dental anxiety on treatment adherence and success. Additionally, creating a supportive and communicative environment within dental clinics may further enhance patient cooperation and satisfaction.

• **Limitations and Future Directions:**

It is essential to acknowledge the limitations of the study, such as potential self-report biases and the reliance on a single anxiety assessment tool. Future research could explore additional factors influencing treatment outcomes and employ a longitudinal design to assess the long-term impact of anxiety reduction interventions.

Conclusion

In conclusion, this study investigated the impact of dental anxiety on treatment outcomes and explored strategies to enhance patient experiences within dental settings. The findings revealed a moderate level of dental anxiety among participants, with a mean Modified Dental Anxiety Scale (MDAS) score of 15. Despite this anxiety, the majority of participants demonstrated high treatment adherence, cooperation during procedures, and successful treatment outcomes, as indicated by a treatment success rate of 90%. Patient-reported outcome measures (PROMs) reflected a high mean satisfaction score of 8.2.

The correlation and regression analyses underscored the significant influence of dental anxiety on treatment-related variables. Higher dental anxiety was associated with increased treatment non-adherence, decreased cooperation during procedures, and a negative impact on treatment success. These results highlight the importance of addressing dental anxiety as a critical factor in achieving optimal treatment outcomes and patient satisfaction.

This study underscores the intricate relationship between dental anxiety and treatment outcomes and emphasizes the importance of patient-centered, anxiety-reducing interventions in dental practice. By understanding and addressing the multifaceted nature of dental anxiety, oral healthcare providers can foster improved treatment adherence, cooperation, and overall satisfaction among patients, ultimately enhancing the quality of dental care delivery.

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