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Dentally Anxious Patients' Perceptions of Oral Health Care

by

Marissa Valastro, RDH, AAS, BS, MS (c)

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science in the Department of Dental Hygiene

Idaho State University

Fall 2023

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of Marissa Valastro find it satisfactory and recommend that it be accepted.

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Graduate Faculty Representative

Human Subjects Committee Approval

September 6, 2023

Marissa Valastro
Dental Hygiene
MS 8048

RE: Study Number IRB-FY2024-23: Dentally Anxious Patients' Perceptions of Treatment Methods

Dear Ms. Valastro:

Thank you for your responses to a previous review of the study listed above. I agree that this study qualifies as exempt from review under the following guideline: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;
This letter is your approval, please, keep this document in a safe place.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

You are granted permission to conduct your study effective immediately. The study is not subject to renewal.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Tom Bailey (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Table of Contents

List of Abbreviations

ACT/ABBT	Acceptance and Commitment Therapy/Acceptance-based Behavioral Therapy
ATQ	Automatic Thoughts Questionnaire
CBT	Cognitive-behavioral therapy
CDAS	Corah's Dental Anxiety Scale
CT/BTP	Cognitive Therapy/Borkovec's treatment package
COREQ	Consolidated Criteria for Reporting Qualitative Studies
DA	Dental Anxiety
DAQ	Dental anxiety questionnaire
DFA	Dental fear and anxiety
DFS	Kleinknecht's Dental Fear Scale
DMFT	Decayed, Missing, and Filled Teeth
GA	General anesthesia
GAD	Generalized anxiety disorder
GAD-Q-IV	Generalized Anxiety Disorder Questionnaire IV
IndHyp	Individualized hypnosis
IV	Intravenous sedation
MDAS	Modified Dental Anxiety Scale
OHIP-14	Oral Health Impact Profile
OHRQoL	Oral health-related quality of life
PSWQ	Penn State Worry Questionnaire
QoL	Quality of life
REBT	Rational Emotive Behavior Therapy

SAI	State anxiety inventory
SNRI	Serotonin-norepinephrine reuptake inhibitors
SSRI	Selective serotonin reuptake inhibitors
STAI	State-trait Anxiety Inventory
STAI-S	State-trait anxiety inventory-state scale
StandHyp	Standardized hypnosis
VAS	Visual Analog Scale
vVAS	Vertical Visual Analog Scale

Dentally Anxious Patients' Perceptions of Oral Health Care

Thesis Abstract – Idaho State University (2023)

The purpose of this study was to identify patients' perspectives on factors that impact anxiety in a dental practice setting. A qualitative, descriptive case study research design was used to identify patients' perspectives on factors that impact anxiety in a dental practice setting. An interview guide that focused on obtaining information about the etiology, contributing factors, management strategies, and experiences of dental anxiety (DA) was used for the semi-structured interviews which were recorded by Zoom. The qualitative responses were coded using the qualitative research analytic platform Dedoose. Twenty-two individuals participated in this study. Seven themes emerged including Avoidance, Supportive Behaviors, Confidence in Provider, Diversion, Enduring, Adaptations, and Benevolence. Participants in this study expressed various coping mechanisms and management strategies to alleviate the symptoms of DA. Multiple opportunities exist for increasing patient-provider trust and patient comfort to reduce DA, and ultimately improve the oral health status of those with DA.

Key Words: dental anxiety, coping mechanisms, triggers, dental practice setting, communication, patient-provider relationship

Dentally Anxious Patients' Perceptions of Oral Health Care

Background

In the United States, 80% of patients struggle with one of three forms of dental anxiety (DA), i.e., mild, moderate, and severe (Kanzigg et al., 2018). A patient with mild DA feels that something is different. A patient with moderate DA focuses on what is happening in the present situation because they feel that something is not right. Patients exhibiting severe DA have a significant reduction in their perceptual ability. Examples of etiologies of DA include traumatic childhood dental experiences, certain dental stimuli, relayed experiences from family or media, and poor oral health literacy (Drown et al., 2018; Kanzigg et al., 2018).

Determining the type of level of DA a patient has can be measured with physiological, behavioral, psychometric, and projective techniques (Lu et al., 2021). Dental anxiety questionnaires are psychometric techniques to assess and measure the level of severity of anxious patients (Appukuttan, 2016; Armfield et al., 2014; Drown et al., 2018). The most reliable and commonly used questionnaires include Corah's Dental Anxiety Scale (CDAS), Modified Dental Anxiety Scale (MDAS), and Kleinknecht's Dental Fear Survey (DFS; Appukuttan, 2016; Kanzigg et al., 2018). CDAS is a simple psychometric questionnaire that consists of four questions regarding different dental situations (Appukuttan, 2016). A resulting score of 15 or more indicates a high level of anxiety. The MDAS is a questionnaire similar to the CDAS; however, it includes a fifth question regarding local anesthesia (Kanzigg et al., 2018). If the MDAS scores at or above 19, the patient is considered to have a high level of DA (Appukuttan 2016; Lu et al., 2021; White et al., 2017). The DFS consists of 27 Likert-scale questions regarding dental situations (Kanzigg et al., 2018). A score over 60 indicates a high level of DFA

(Appukuttan, 2016). A United Kingdom-based study reported that only 20% of practitioners utilize dental anxiety screening tools (Armfield et al., 2014).

Another way to successfully identify DA is by simply asking patients. Drown et al. (2018) reported that during the review of patient's medical histories, 63% of participating dental hygienists "sometimes" to "never" ask patients about DA. If dental anxiety screening questionnaires were used more often, dental practitioners could correctly disclose the degree of anxiety and use these screenings to help reduce the patients' anxiety (Appukuttan, 2016). Furthermore, Armfield and Heaton (2013) stated that identifying anxiety early will promote a greater likelihood of successfully treating the patient.

Drown et al. (2018) conducted a research study that concluded most dental practitioners were unprepared and uncomfortable treating patients who present with DA. The lack of preparedness and stressfulness roots from dental or dental hygiene programs having limited opportunities for students to gain experience or knowledge working with patients with DA (Kanzigg et al., 2018). Drown et al., (2018) also found that 99% of dental hygienists do not use screening tools for DA. The study showed that 67% of hygienists have no knowledge of the DA screening tools. Moreover, Armfield et al. (2014) reported that 56.5% of dentists were not aware of the formal anxiety screening scales.

A study conducted by Höglund et al. (2019) measured dental practitioners' abilities in rating DA in their patients compared to the patient's ratings. There was a moderate-to-low correlation found between the practitioner and patients' ratings. Overall, the practitioner rated the level of DA lower than the patient. Furthermore, the study found a negative impact when the practitioner showed higher confidence in their ability to handle dentally anxious patients (Höglund et al., 2019). The final report of the study concluded that anxiety screening

questionnaires should be utilized more frequently to correctly identify the level of DA in patients and facilitate better management. There could be a correlation between the lack of education of dental professionals and negative dental experiences.

Communication can help or hinder patient care (Fico & Lagoe, 2018). Patients respect dental practitioners when they show efforts toward addressing anxiety and physical discomfort. When the dental practitioner responds to the patient's need, it creates an aspect of positive communication and experience for that patient. Additionally, when there are positive communication experiences, the patient has higher levels of oral health literacy, provider satisfaction, and dental trust (Fico & Lagoe, 2018).

Fico and Lagoe (2018) demonstrated that negative communication between patients and dentists could result in the patient leaving the dental practice because the patient may have felt offended, uncomfortable, or misunderstood. Moreover, patients reported feeling like dentists disregard their feelings, and dental hygienists exhibited judgmental behaviors and language. This study demonstrated that empathetic communication is a vital interpersonal skill that dental practitioners should possess to provide optimal person-centered care (Fico & Lagoe, 2018). Negative communication could be associated with increased anxiety. Guo et al. (2014) identified a direct relationship between oral health literacy and oral health status, with higher levels of literacy corresponding with better status. Furthermore, higher health literacy was found to correspond with better communication between the patient and dentist and the patients were more likely to seek regular dental care.

Dental anxiety can negatively impact a person's oral health because many adults wait to visit a dental office until emergency care is needed, which inadvertently increases their level of DA (Drown et al., 2018; Kanzigg et al., 2018; Khan et al., 2021). The individuals who seek care

based on problem-oriented reasons, rather than prevention-oriented reasons, tend to have poorer oral health and low health literacy (Guo et al., 2014). The impact of poor oral health can cause delayed wound healing and severe oral inflammatory disease, which creates an association with increased risk for systemic diseases, such as diabetes, cardiovascular disease, and respiratory disease (Drown et al., 2018; Guo et al., 2014; Kanzigg et al., 2018). Enhancing the low health literacy of individuals can improve both oral and general health statuses (Guo et al., 2014). A linear progression of further improving patient-dentist communication, regular dental care, levels of anxiety, dental trust, to oral and general health could increase health literacy.

Statement of the Problem

There is a lack of research regarding the perspectives of patients concerning anxiety management techniques that are utilized in a dental practice setting. Research shows that many dental practitioners lack the proper education in DA (Drown et al., 2018). Additionally, patients are likely to avoid care when they are anxious and have previous negative experiences, which could be due to this lack of education (Fico & Lagoe, 2018). Perspectives of dentally anxious patients' regarding how they feel about the treatment strategies chosen for them have not been explored.

Purpose of the Study

The purpose of this study is to identify patients' perspectives on factors that impact anxiety in a dental practice setting. Understanding the patients' perspectives on their coping strategies and preferred management techniques concerning their level of anxiety could potentially determine a guideline for dental practitioners.

Professional Significance of the Study

This study is significant to the American Dental Hygienists' Association (ADHA; 2016) National Dental Hygiene Research Agenda's primary objectives,

- "To give this ability to research activities that enhance the professions' ability to promote the health and well-being of the public" (p. 3).
- "To stimulate progress toward meeting national health objectives" (p. 3).

According to the conceptual research model created by ADHA (2016), the area of research of this study includes the client level category of oral health care, which encompasses research related to all aspects of the dental hygiene process of care. The phase of research under the category of oral health care is new therapies and prevention modalities, specifically treatment and behavioral interventions.

The Healthy People 2030 national health objectives (Office of Disease Prevention and Health Promotion, n.d.) that this study strives to meet include:

1. Increase use of the oral health care system — OH-08, by motivating the patients to regularly visit the dentist to prevent oral diseases, which could further prevent other systemic diseases.
2. Increase the proportion of adults whose health care providers involve them in decisions as much as they want — HC/HIT-03, by working together with the patient to determine the best care of action for their individualized needs.
3. Decrease the proportion of adults who report poor communication with their health care provider — HC/HIT-02, by improving communication between the provider and patient which can lead to better health outcomes.

Research Questions

The following research questions will guide the conduct of this study:

1. What factors contribute to patient anxiety in a dental practice setting?
2. How do patients currently cope with anxiety in a dental practice setting?
3. What interventions would reduce patient anxiety in a dental practice setting?

Definitions

Anxiety

An emotional response creates tension and worry, which results in recurring intrusive thoughts and could lead to the avoidance of stimulating situations (American Psychological Association, 2022). Physical changes may also be apparent with increased blood pressure, sweating, trembling, dizziness, or increased heart rate.

Cope

A conscious and voluntary response to manage or reduce stressful internal and external situations (Algorani & Gupta, 2022).

Dental Practice Setting

A dental practice is an organization acting as an oral healthcare provider for the delivery of oral health preventive and treatment services (National Health Service, 2023).

Factors

Anything that contributes to or triggers a result (American Psychological Association, n.d.-a). Additionally, this could be directly influenced by a phenomenon or another variable. In a dental practice setting, factors that contribute to dental anxiety may be the attire of the dental professional, the sound of dental equipment, the smells of products, and previous traumatic experiences.

Patient

A person receiving or registered to receive treatment in a dental practice setting (MedicineNet, 2021).

Perspectives

The ability to effectively understand oneself and others' perceptions, attitudes, or behaviors and realistically view objects, events, and ideas (American Psychological Association, n.d.-b).

Conclusion

Overall, the most common theme to providing optimum patient care for those suffering from dental anxiety is positive communication. Dentally anxious patients want to be understood and accepted for their ailments and needs over the technical competence of dental practitioners (Armfield & Heaton, 2013). Fico and Lagoe (2018) reported that integrating communication skills training into dental education has been an ongoing effort; therefore, undergraduate dental students still need improvements in their communication skills. Studies have shown the need for both dental and dental hygiene students to be formally trained in proper management techniques concerning dental anxiety (Armfield et al., 2014; Drown et al., 2018). Dental anxiety screening tools should be utilized more to successfully identify the level of DA in patients to aid in the ability to choose the correct patient-centered management strategy (Appukuttan, 2016; Drown et al., 2018). Understanding the patients' points of view is another crucial step in providing patient-centered care (Wang et al., 2017). Previous studies regarding DA focus on the narrative of dental practitioners, not the perspectives of the patients. The purpose of this study is to interview dentally anxious individuals to identify factors that contribute to their anxiety and how they feel dental practitioners could provide comfortable and positive experiences in a dental practice

setting. Providing patient-centered care and positive experiences would reduce anxiety levels and, in turn, would improve the oral health quality of life in these individuals (Khan et al., 2021).

Chapter 2 Review of the Literature

The purpose of this literature review is to provide information regarding how the treatment of DA is currently conducted, examine the techniques used for DA management, and evaluate perceptions of dentally anxious patients. There is a lack of research regarding patient perspectives on what factors impact anxiety in a dental practice setting. Understanding the patient's perspectives of their coping strategies and preferred management techniques with their level of anxiety could determine a guideline for dental practitioners. This review examines the etiology and prevalence of dental anxiety, the approaches and management strategies to treat in medical and dental practice settings, and how patients perceive how management strategies are currently utilized in a dental practice setting. The terms DA and DFA will be used interchangeably within this paper.

The literature search was conducted using PubMed, Google Scholar, and Ebsco Host with the following search terms: anxiety, dental anxiety, management strategies, interventions, prevalence, etiology, dental practitioner, perceptions of patients, dental anxiety questionnaires, oral health status, quality of life, pharmacology, and non-pharmacology management.

Anxiety

General Anxiety

Anxiety can be experienced in day-to-day life when leading up to an encounter with threatening stimuli (Appukuttan, 2016). Characteristics of anxiety disorders may present as anxiety, fear, nervousness, and worry (Szuhany & Simon, 2022). Some everyday life examples of threatening stimuli could be taking exams, making crucial decisions, and working in a stressful environment (Appukuttan, 2016). Szuhany and Simon (2022) conducted a research review of anxiety disorders to examine the epidemiology, diagnosis, assessment, and treatment.

PubMed was utilized to search for a variety of articles concerning anxiety disorders (Szuhany & Simon, 2022). A total of 101 articles were included in this study. The purpose of this research was to summarize current evidence of a variety of anxiety disorders; explicitly, generalized anxiety disorder, social anxiety disorder, and panic disorder with or without agoraphobia. Key discussion points of those anxiety disorders included the clinical presentation, assessment, differential diagnosis, treatment, and prognosis.

Generally, anxiety disorders affect approximately 34% of adults in the United States during their lifetime (Szuhany & Simon, 2022). The estimated onset age for an anxiety disorder to originate is 11 years old and has a higher lifetime prevalence in women than men. Persons with an anxiety disorder have a significantly reduced quality of life and functioning (Szuhany & Simon, 2022). The reduction in quality of life may be attributed to the development or worsening of certain medical conditions, such as cardiovascular, gastrointestinal, and pulmonary diseases, as well as cancer, chronic pain, and migraines. Reduction of functioning may impact social and/or occupational aspects of life. Comorbid conditions may present in conjunction with anxiety disorders (Szuhany & Simon, 2022). Depression, alcohol and substance abuse, psychosis, and suicidality should be evaluated. The clinical presentation of anxiety disorders may show physical signs of palpations, shortness of breath, dizziness, and muscle tension. The disorders may present with similar symptoms, but they also have certain characteristics that help distinguish each disorder (Szuhany & Simon, 2022).

Major limitations to Szuhany and Simon's (2022) study included that the literature was not systematically reviewed nor assessed for quality. Some studies were older, and some had inconsistent findings. Lastly, some studies may have been missed in the literature search. Suggested future research includes clinical trials to evaluate anxiety disorder guidelines for

starting antidepressants at lower doses (Szuhany & Simon, 2022). There is a lack of data concerning relapse rates or recurrence of anxiety disorders.

Providing proper health care anxiety starts with the ability to correctly diagnose and select the most appropriate evidence-based treatment (Szuhany & Simon, 2022). A study conducted by Vermani et al. (2011) showed that the correct diagnosis of anxiety disorders is low. The authors performed a descriptive, cross-sectional study to determine the rate of detection of certain anxiety and mood disorders. This study was conducted in seven primary care clinics within Canada. Of the 840 participants who consented to the waiting rooms of the clinics, 435 subjects met the criteria for this study. The mental health disorders measured were major depressive disorder (27.2%), bipolar disorder (11.4%), panic disorder (12.6%), generalized anxiety disorder (GAD; 31.2%), and social anxiety disorder (16.5%). The Mini International Neuropsychiatric Interview was the interview method selected that measures current and lifetime diagnoses. T-tests, Pearson's goodness-of-fit chi-square statistic, and Fisher exact tests were utilized for the analysis of the data (Vermani et al., 2011).

The major results of the study determined that GAD and major depressive disorder were the most prevalent conditions (Vermani, 2011). This study also measured if the physicians correctly diagnosed the participants. Out of the participants with GAD, 29% were correctly diagnosed. Additionally, the conditions with the highest rates of no detection were bipolar disorder and social anxiety order, 92.7% and 97.8% respectively. Overall, the main discussion consisted of how the study found primary care physicians had a high incidence of misdiagnosis or underdiagnosis (Vermani et al., 2011).

A limitation of the study was not keeping a record of the number of refusals to participate (Vermani et al., 2011). There is a possibility that the willing participants felt that they suffered

from a mood or anxiety disorder, which could persuade them to choose to participate. Another limitation could be found in recruiting in medical waiting rooms because of the potential bias toward attaining patients with more severe illnesses and symptoms. Data was not collected regarding whether the participants had received care for their diagnosis or if they were previously diagnosed, resulting in a limitation. Future research should focus on the development of a short, simple, and self-administered diagnostic instrument for mental health disorders (Vermani et al., 2011). Increasing access for patients to be treated for psychological problems by their primary care physicians is another recommendation.

Valdes-Stauber and Hummel (2021) performed a cross-sectional and comparative study to evaluate any associations between DA and other forms of anxiety. The study was conducted in two metropolitan dental offices in Germany. A variety of psychometric tools, such as the Big-Five Inventory, Loneliness Scale-Short version, Generalized Self-Efficacy, Subclinical Anxiety, Negative Assessment Scale, State-Trait-Anxiety-Inventory, and Index of Dental Anxiety and Fear were used to create psychosomatic profiles. There was a total of 156 participants, 57% of whom were women, and the average age was 51 years old (Valdes-Stauber & Hummel, 2021). Additionally, multiple anxiety scales were used to measure anxiety and DA. The main objectives of the study focused on forming medical, socio-demographic, and personality-related profiles; finding differences between the profiles who receive routine dental care versus acute dental problems; finding correlations between certain personality traits; finding associations between different anxieties; and finding prognostic factors for dental fear and different anxieties (Valdes-Stauber & Hummel, 2021). Assessment of the objectives was using descriptive statistics, parametric t-test for unpaired samples, and chi-square test for the nominal values, a correlation matrix, bivariate regression models, and multivariate linear regression models, respectively.

Valdes-Stauber and Hummel (2021) found the study sample to be older, more educated, more open, healthier, and have lower DA when compared to the general population.

The study identified that 45.8% of participants had a traumatic experience during childhood and 35.9% during adulthood (Valdes-Stauber & Hummel, 2021). The personality traits with the highest values were neuroticism and openness. Overall, dental fear was measured low, 1.7 out of 5. Fear of rejection or negative evaluation of others was moderately high with 33% of participants. There was a high correlation between loneliness and all forms of anxiety (Valdes-Stauber & Hummel, 2021). The dental treatment group who attended more dental appointments had higher levels of anxiety. Dental fear and other anxieties have a significant association. One of the few prognostic factors found was the association between higher scores of neuroticism and stronger dental fear (Valdes-Stauber & Hummel, 2021). Self-efficacy was found to have a negative association with subclinical and current clinical anxiety.

The participants who reported receiving routine dental care versus the participants who attended due to an acute problem were found to have no significant difference (Valdes-Stauber & Hummel, 2021). Neuroticism was not associated with anxiety but showed an association with DA. Comparatively, loneliness and self-efficacy were significantly associated with anxiety. Valdes-Stauber and Hummel (2021) surmised that dental fear is dependent on emotional liability, which is conditioned by the negative experiences that individuals have during dental treatment.

The limitations of the study included the narrow scope of the participants because the area in which they were recruited was a well-positioned and healthy middle class (Valdes-Stauber & Hummel, 2021). Furthermore, the sample size was also too small to conduct structural equation modeling. Mediators were not hypothesized, which could have led to the reason behind

adverse biography and psychological conditions having no association with anxiety within this study sample, compared to the literature. Future studies suggested would be to investigate an association between DA and factors related to the detriment of health, as well as investigation of alleviation of anxiety in individuals with DA and other psychological burdens (Valdes-Stauber & Hummel, 2021).

Dental Anxiety

Dental anxiety is the fear and reaction to threatening stimuli associated with the dental environment, leading to a major barrier to dental care (Drown et al., 2018; Khan et al., 2021). Khan et al. (2021) conducted a quantitative research study using a correlational approach to examine whether there is an existing relationship between DA and quality of life (QoL). The authors discussed contributing factors to DA being low socio-economic status, younger age, female gender, low education, previous traumatic experiences and/or hearing second-hand accounts of other's traumatic experiences. A questionnaire was administered to the participants to determine DA, QoL, and oral health status (Khan et al., 2021). The Dutch versions of the dental anxiety scale and the short dental anxiety inventory were used to measure DA. Additionally, a visual analogue scale (VAS) was employed to measure pain scores and the oral health-related quality of life (OHRQoL) was assessed via the Oral Health Impact Profile (OHIP-14). The DFS was used to measure the level of dental fear and the community periodontal index of treatment needs measured the periodontal status when determining which patients could be considered for this study. A total of 118 patients were enrolled, which involved 52 males and 56 females. Each participant had a thorough oral examination to record an assessment of functioning and dental caries with the Decayed, Missing, and Filled Teeth (DMFT) index.

The results of the study found a correlation between oral health ratings and DMFT (Khan et al., 2021). There were significant associations found between OHIP-14 and DMFT with DA, as well as, between DMFT and OHRQoL. The results from the OHIP-14 determined that lower OHRQoL was related to higher levels of DA (Khan et al., 2021). Furthermore, this study observed that higher DFS scores were seen among females, young adults, and those with low education levels and/or low socioeconomic status. Higher scores also demonstrated worse periodontal status (Khan et al., 2021).

Failure to maintain good oral hygiene negatively impacts individuals by further decreasing OHRQoL while successively increasing DA (Khan et al., 2021). Moreover, the frequency of treatment sought is based on the level of the fear of dental treatment (Jeddy et al., 2018). The higher the fear means fewer visits that result in long-term implications in maintaining oral health. Appukuttan (2016) explained when patients suffer from DA, they are fearful of something terrible happening during dental treatment which stops them from visiting the dentist until there is an acute emergency. Often, acute emergencies require complicated and potentially traumatic treatment, which further exacerbates fear and avoidance of future visits. Moreover, phobic avoidance of dental treatment procedures due to serious DA harms dental health (Khan et al., 2021). A small sample size was a limitation of this study.

A vicious cycle is formed that has a negative effect on DA, oral health, and QoL (Silveira et al., 2021). When a person has poor oral hygiene, it leads to an increased incidence of oral diseases and even pain, which further exacerbates their fear of experiencing more pain if they visit the dentist. Avoiding the dentist then creates more complications within their oral health, leading to more, possibly invasive, needed dental treatment. The patient may then require a vast array of DA treatment methods to help them complete their dental appointment (Silveira et al.,

2021). Overall, poor oral health results from a lack of proper dental care, which ultimately leads to a deteriorated QoL (Muneer et al., 2022). Treatment should be based on person-centered assessment to avoid the rejection of dental treatment. Understanding the appropriate interventions based on the person-centered assessment will help reduce anxiety and promote a positive impact on proper oral hygiene maintenance and routine care.

Razzak and Demirsoy (2022) also conducted a study concerning the effect of DA on patients' OHRQoL. Research was gathered from 258 participants at the Oral, Dental, and Jaw Health Education Practice and Research Center in Turkey to develop a descriptive, cross-sectional study. The ages of the participants ranged from 18 to 47, with 52% males and 48% females. The MDAS and OHIP-14 surveys were distributed to each participant (Razzak & Demirsoy, 2022). Data analyses included t-tests, one-way ANOVA, LSD multiple comparison tests, and the Pearson's Correlation Analysis.

The participants in this study visited this clinic due to various oral health-related concerns (76%) and others came for routine care (22%; Razzak & Demirsoy, 2022). The average score from the MDAS was 11.67, indicating moderate DA. The OHIP-14 scores range from zero to 56; lower scores indicate better OHRQoL; higher scores show a negative impact on oral health. The study showed the average score was 16.72. Females reported having higher DA than males on the MDAS, but there were no significant differences between gender and OHRQoL. No significant differences were found between age groups and DA or OHRQoL. However, individual MDAS scores demonstrate younger participants had higher DA (Razzak & Demirsoy, 2022). No significant differences were found between marital status or educational background and DA. High negative effects of poor oral health were indicated, according to the mean of 53.27

on the OHIP-14, which affects the QoL. A negative correlation was found signifying that lower OHRQoL is associated with higher DA (Razzak & Demirsoy, 2022).

The consensus of the study conducted by Razzak and Demirsoy (2022) was the negative relationship between higher dental anxiety and lower OHRQoL. Avoidance of dental care was also found to be correlated to DA and OHRQoL. Patients who avoid dental care only seek care when they are in severe pain. Routine care was significantly associated with OHRQoL. Moreover, trust will also be enhanced between the provider and the patient, which reflects confidence and overall treatment experiences. Further research on oral health and QoL will increase awareness and lead to the elimination of oral health disparities (Razzak & Demirsoy, 2022). No limitations were reported for this study.

Prevalence

Silveira et al. (2021) conducted a global study using systematic review and meta-analysis methods of population-based studies to estimate the prevalence of DFA. This study's sample consisted of 31 eligible publications with a total of 72,577 adults ages 18 and above. Fixed- and random-effect models were used to calculate the pooled estimates of the prevalence of DFA.

Combining all the literature, a wide range of 4.2% to over 50% of adults suffer from DFA (Silveira et al., 2021). Numerous factors create this wide range of prevalence. Such factors could emanate from cultural, social, and economic differences; characteristics of age, gender, and previous experiences; instruments evaluating DA; and environment or socioeconomic conditions (Silveira et al., 2021). Other differences between studies could be reflective of the design and instruments used. Any DFA, consisting of any level of fear, was found to be 13.8%; high DFA, consisting of moderate to severe, was 11.2%; and extreme DFA, consisting of the most severe category of anxiety, was 2.6%. Additionally, Silveira et al. (2021) measured the prevalence

between genders resulting in 18.6% of women who had high DFA and 2.8% having severe DFA, compared to men who had 9.2% and 2.5% of high and severe DFA, respectively. Age was taken into consideration as well; however, the analysis did not show any significant differences. Younger and older adults demonstrated a prevalence of almost 14% for DFA (Silveira et al., 2021). Khan et al. (2021) discussed that there is a higher prevalence of DA associated with some sociodemographic data. Low educational level and low socioeconomic status showed higher results of DFA. Low income, poor oral health literacy, and the lack of knowledge of one's oral health are also associated with the prevalence of increased DA (Kanzigg et al., 2018).

A descriptive, cross-sectional study was conducted by White et al. (2017) which assessed missed dental appointments due to DA within general, endodontic, and periodontal offices. Using convenience sampling, patients 18 years and older were identified for this study based in Framingham, Massachusetts. Individuals who did not provide consent, could not read or write in English, and did not fully answer the questionnaires were excluded from the study. There were 200 participants from the general dental, 99 from the endodontic, and nine from the periodontal offices. The MDAS, incorporated into the questionnaire, was utilized to measure the level of DA with each participant (White et al., 2017). Demographic and open-ended questions, regarding missed appointments and DA, were also included in the questionnaire. STATA statistical software analysis 11.2 was utilized for the analysis of quantitative data (White et al., 2021). ANOVA and Fisher's Exact Test assessed the differences in age and gender across the three dental offices. Binary outcomes assessed the MDAS scores to enumerate the prevalence associated with the three dental offices. Gender and age were assessed to find any associations using univariate and multivariate linear and logistic regression models (White et al., 2017).

Analyzing the qualitative data from the open-ended questions created themes to identify the participants' answers, which then were coded accordingly.

The total study population's mean MDAS score was 10.19 (White et al., 2017). The prevalence estimates of high and moderate to high DA were measured at 6.82% and 19%, respectively, for the total study population. Females are 3.19 times greater to have higher DA compared to males. The qualitative analysis determined that 8.4% of respondents missed dental appointments because of their DA. The top five common themes found, starting with the most common, include previous negative dental experience, fear of dental experience, cost of treatment tied with fear of bad news, and gag reflex (White et al., 2017). Comparatively, the three types of dental offices showed no statistically significant difference in the prevalence of high DA, which could suggest that the type of dental treatment may not be a contributing factor to DA. The higher percentage found with moderate to high DA suggests that a substantial portion of dental patients could suffer from any form of anxiety, therefore, benefiting from anxiety-reducing methods.

Limitations of this study include a low sample population, especially from the periodontal office (White et al., 2017). Drawing conclusions and comparing data between three dental offices poses a challenge when an office does not show significant involvement from the population. Young adults and elderly populations may have been underrepresented. Participants were not asked whether their appointment was the first time being at that office, which could indicate skewed results if a new patient may be more anxious than established patients. Generalizing results is difficult due to the population being located within one community. Causality is not shown within cross-sectional study designs. Self-reported data could likely introduce bias into the results of the study if participants were not honest with their answers.

White et al. (2017) suggested examining for correlations between gender, age, socioeconomic status, and DA using longitudinal studies, as well as correlations between DA assessments and patient outcomes. Reaching out to a larger segmented population could provide more high DA data since research suggests most individuals with high DA avoid the dental office.

Etiology

Selecting the appropriate management strategy for patients with DA first involves understanding the origin (Drown et al., 2018). A quantitative study conducted by Jeddy et al. (2018) estimated the prevalence, extent, and factors that influence dental anxiety in India. The participants considered for this study were required to be above 18 years of age, willing to take the survey, and able to read and understand the questions asked in the survey. A structured questionnaire was developed to assess the anxiety level of dental patients (Jeddy et al., 2018). A chi-square test was used to analyze the frequency and reason for the visit, while the independent samples *t*-test and Pearson's correlation coefficient analyzed the mean score.

The study population was comprised of 299 participants, of which 54.8% were male and 45.2% were female (Jeddy et al., 2018). The results for more than half of the sample population before the dental visit showed 64.2% to be anxious and fearful, while 21.1% were calm and relaxed. Analysis of the frequency of visits showed a reduction in anxiety in patients who visited more than three times compared to the participants with less frequent visits (Jeddy et al., 2018). Previous bad dental experiences, reported at 33.3%, were the highest etiology for DA in this study. Research from Appukuttan (2016) and Drown et al. (2018) also reported that previous traumatic experiences and negative experiences relayed from anxious family members or peers are two common causes of DA. Traumatic experiences typically originate from a dental practice setting; however, there may also be an association of DA with victims of past sexual abuse

(Armfield & Heaton, 2013). Other reasons for the participants to choose from in the study by Jeddy et al. (2018) were an unempathetic dentist (19.8%), negative information from others (19.8%), and unknown (27%).

The reason for DFA chosen by the participants reported fear of pain (79.7%), dental injection (10.4%), the sound of the drill/suction (8.3%), and the sight of blood (6.3%; Jeddy et al., 2018). Appukuttan (2016) also found fear of pain, blood, needles, and sounds/smells give rise to DA. Additionally, betrayal, being ridiculed, fear of the unknown, depersonalization, mercury poisoning, radiation exposure, and choking or gagging are other contributing factors to DA. Jeddy et al. (2018) assessed which type of dental treatment causes the most anxiety in their questionnaire. The highest anxiety-inducing procedure was dental extraction (46.4%), root canal treatment (37%), restorations (12.5%), sealing (4.2%), and 1.6% reported all procedures induced anxiety. Jeddy et al. (2018) found that the higher the frequency of dental visits, the lower the DA will be among patients. Furthermore, higher DA was found in emergent patients compared to patients visiting for cosmetic reasons. No limitations were reported in this study (Jeddy et al., 2018).

A cross-sectional study was conducted that used a quantitative survey to measure the factors that influence DA (Muneer et al., 2022). This study was based on the Dental OPD of Avicenna Dental College in Lahore, Pakistan. The sample size consisted of 522 respondents, 276 males and 246 females. The participants ages ranged from 20 to over 65 years. Kuppuswamy Status Scale and the MDAS were used to measure socioeconomic status and DA respectively (Muneer et al., 2022). The chi-square test analyzed data to determine any associations between the MDAS and other variables.

A score of more than 10 denotes DA (Muneer et al., 2022). Female gender was significantly associated with moderate to severe DA; 5% of females scored above 10 on the MDAS. Comparatively, 67% of males scored 10 and above on the MDAS. An association was found with MDAS scores 10 and above and professional education (67%) and graduate education (77%; Muneer et al., 2022). People with primary or middle school educations and those with no formal education showed MDAS scores 10 and above at 58%, 66%, and 70% respectively. A significant association of increased DA was found with a higher rate of education. DA was found in the upper class (50%), upper middle class (70%), lower middle class (68%), upper lower class (74%), and lower class (90%); however, the chi-square value was insignificant (Muneer et al., 2022).

The female gender was demonstrated to be associated with DA, as in other studies (Muneer et al., 2022). This study did not meet the trend of lower education levels equating to increased DA, rather higher education levels were associated with DA. Awareness of treatment modalities could be attributed to this increased fear (Muneer et al., 2022). Lower socioeconomic status had the highest association with DA, which is consistent with similar studies. Typically, the cost of treatment is attributed to higher DA.

A major limitation to this study was the lack of more diverse data, on socioeconomic and education levels, from recruiting patients presenting to the hospital (Muneer et al., 2022). The researchers distributed the questionnaires that could create bias by over- or under-estimating responses and the way they answered the respondents' questions concerning the questionnaire. Factors that aggravate DA, how to control DA, and increase accessibility are recommended in future studies (Muneer et al., 2022). Additionally, more widespread studies with these factors will ensure a more representative sample of a population.

Approaches

Armfield and Heaton (2013) conducted a review of non-pharmacological techniques used to assist anxious individuals when receiving dental care. The authors also provided evidence-based research for various approaches and the rationale for managing patients' anxiety. The review discusses the nature of dental fear and the importance of first understanding a patient's fear to determine the management approach (Armfield & Heaton, 2013). Many studies have reported the most common reason for avoidance of dental care is due to previous negative experiences, supporting the analysis from Jeddy et al. (2018). However, Armfield and Heaton (2013) reported the most common reason for a person to avoid dental care is how the dental environment is perceived. Other aspects could lead to avoidance, such as social phobia, obsessive-compulsive disorder, or panic disorder with or without agoraphobia (Armfield & Heaton, 2013). Current evidence suggests that various other comorbid psychological conditions may be indicated in dentally anxious patients.

Various guidelines were discussed for management approaches (Armfield & Heaton, 2013). The Seattle System has categorized four different groups of fearful patients, which are fearful of specific stimuli, fearful of medical catastrophe, generalized dental anxiety, and distrustful of dental personnel (Milgrom et al., 2009).

The fearful of specific stimuli group means the patients can identify which aspect(s) of dentistry they fear the most (Milgrom et al., 2009). Any part of the dental treatment process may trigger their dental fear, such as injections, the sound/sight/smell from drills/handpieces, and the association of pain to dental procedures. Treatment recommendations for this category as stated by Armfield and Heaton (2013) were gradual exposure, relaxation strategies, and systematic

desensitization. Patients in this category could extinguish their fear over time if they have an increasing number of positive experiences.

The group who is fearful of medical catastrophe includes individuals who fear they will experience a medical emergency during their dental treatment (Milgrom et al., 2009). Certain medical factors contribute to this category of DFA. Allergies or 'reactions' to local anesthetics, due to epinephrine or similar vasoconstrictor, may induce symptoms of autonomic arousal, which includes heart palpitations, shortness of breath, and more (Armfield & Heaton, 2013). If the patient does experience those symptoms, it will increase their anxiety the next time they have to receive an anesthetic in anticipation of re-experiencing the symptoms. Sometimes the patients may ask for an anesthetic without epinephrine to avoid autonomic arousal, but that could lead to pain during treatment without adequate anesthesia. A rubber dam and the feeling of many instruments in the patient's mouth may make them feel claustrophobic or as if they are choking (Armfield & Heaton, 2013).

Addressing this type of fear includes providing education, gradual exposure, a referral to an allergist, concrete explanations rather than vague reassurances, and relaxation skills (Armfield & Heaton, 2013). Education about the nature and effects of epinephrine can help the patient understand the context of their symptoms. A thorough medical history will determine the need for a referral to an allergist to completely rule out the allergy, which can be very effective in managing the patient's anxiety. Vague reassurances such as telling the patient an allergy to anesthesia is rare are not calming (Armfield & Heaton, 2013). The patients in this category prefer to have their concerns taken seriously. Gradual exposure can be used by administering a small amount of an anesthetic with epinephrine, and if there are autonomic arousal symptoms, the patient can use relaxation skills to learn to control the symptoms (Armfield & Heaton, 2013).

Combining gradual exposure and relaxation techniques is useful for patients who fear choking or suffocating, (Armfield & Heaton, 2013).

The category generalized dental anxiety is defined as anticipatory significant anxiety of dental treatment (Milgrom et al., 2009). Generally, all patients with this fear will fear all aspects of dentistry not just one; they believe everything is terrible. Typically, the night before dental treatment these patients will have difficulty sleeping due to worrying about the procedure, how they will behave, and if the dental staff have negative feelings toward them. Following treatment, these patients will feel physically and/or emotionally exhausted (Armfield & Heaton, 2013).

Reassurance is an excellent approach to alleviating worry for these patients (Armfield & Heaton, 2013). Gradual exposure to the dental setting and starting procedures the patients perceive as 'easy' is the first step recommended. Then implementing relaxation strategies while gradually exposing them to increasingly invasive procedures will help them gain control of their anxiety (Armfield & Heaton, 2013).

Patients who are argumentative or suspicious toward dental practitioners are in the distrust of dental personnel category (Milgrom et al., 2009). These patients do not feel in control of their treatment compared to past experiences with dental providers taking advantage of them. They do not feel their treatment is person-centered and worry that dental practitioners think negatively of them. This category of DFA does not present fearful symptoms compared to the previous categories; however, the patients present as confrontational from the fear of loss of control or self-esteem (Armfield & Heaton, 2013). The necessary approaches for this category were described by Armfield and Heaton (2013): to be informative in each process throughout treatment, ask permission before performing any procedure, present all options to the patient as part of the treatment plan, and allow the patient to decide which plan to pursue.

Efficacy of Approaches

Appukuttan (2016) wrote a literature review discussing the various strategies to manage dental anxiety. The purpose of this review was to provide literature evidence about the strategies utilized to identify and manage dentally anxious persons. Appukuttan (2016) identified the importance of dental practitioners understanding that identifying and alleviating a person's dental anxiety will have a positive impact on their quality of life and oral health outcomes. Hoffman et al. (2022) also conducted a systematic review pertaining to various current management strategies for adults with DA. PubMed, Medline Ovid, Cochrane, Scopus, and CINAHL were search engines utilized that incorporated the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and the PICO framework to select published articles on DA management. Respectively, adults with anxiety, management strategies for anxiety, management versus no intervention, and lower DFA were the PICO guidelines (Hoffman et al., 2022). All articles included in this study were published after 2011, only consisted of studies containing adults, and were required to review or evaluate DA management strategies. Concluding the analysis and exclusion of all articles found, Hoffman et al.'s (2022) study consisted of 54 articles.

Psychotherapeutic management strategies included communication skills, relaxation techniques, guided imagery, biofeedback, hypnotherapy, acupuncture, distraction, enhancing control, systematic desensitization, and cognitive-behavioral therapy (CBT; Appukuttan 2016; Hoffman et al., 2022). These management techniques are used to mollify the emotional, cognitive, behavioral, and physiological aspects of DA (Appukuttan, 2016). Psychotherapeutic interventions may take multiple visits to maintain a treatment response; however, it is effective

over a long-term basis, which enables patients to return for care, compared to pharmacological interventions being effective on a short-term basis (Appukuttan, 2016).

Psychotherapeutic interventions such as distraction, relaxation, and/or enhancing control are used with mild to moderate anxiety (Armfield & Heaton, 2013). Distraction techniques divert the individual's attention from what is inducing anxiety (Appukuttan, 2016). Music is a distraction technique that can improve a dentally anxious patient's experience because it reduces blood pressure, heart rate, respiratory rate, and cardiac output (Gupta & Ahmed, 2020). The quantitative pilot study conducted by Gupta and Ahmed (2020) measured the physiological and psychological impacts music had on dentally anxious patients during minor oral surgery. The 50 adult participants were recruited at the Birmingham Dental Hospital. Each participant rated their DA on a scale from zero to 10, with 10 being the highest. Heart rate recordings were taken at several selected intervals throughout the procedure to measure the effects of DA from listening to instrumental music with earth sounds (Gupta & Ahmed, 2020). The ages of the participants ranged from 20 to 80 years old, with 68% females and 32% males. The results found that 92% of participants had a reduction in DA by 50% (Gupta & Ahmed, 2020). Approximately 90% of participants requested to listen to music during future visits. Forty-eight percent of participants reported that the music made it easier to communicate with the dental staff (Gupta & Ahmed, 2020). This study demonstrated that the highest level of anxiety was reported at the delivery of anesthesia. Then gradually decreased throughout, even at the extraction of the tooth. Anxiety is an emotional response that stimulates the cortisol stress hormone and the sympathetic nervous system (Gupta & Ahmed, 2020). Music decreases sympathetic activity leading to the reduction in stress and physiological activity. Suggested future studies would be to further the research on the effect of music during anxiety-triggering procedures (Gupta & Ahmed, 2020). Additionally,

using control and intervention groups to compare the data is suggested. No limitations were reported for this study.

Relaxation techniques include muscle and breathing exercises that are designed to reduce autonomic arousal-related symptoms (Appukuttan, 2016; Szuhany & Simon, 2022). Muscle relaxation therapy stimulates psychological and physiological responses by lowering the heart rate, respiratory rate, and blood pressure, which subsequently reduces stress and anxiety (Park et al., 2019). A randomized control trial study was conducted to investigate if muscle relaxation therapy effectively alleviated dental anxiety for up to three months post-intervention (Park et al., 2019). Participants were recruited in a dental clinic in Incheon, Republic of Korea, for periodontal treatment. The patient inclusion parameters included being between the ages 35-59 and measuring a score of 13 or more on the CDAS. The intervention and control group consisted of 34 randomly assigned patients per group. Five patients dropped out of the study, which led to a total of 63 patients who completed the trial (Park et al., 2019). At the baseline, four weeks, and three months of the study, the CDAS and a depression questionnaire were administered (Park et al., 2019). Additionally, blood pressure and heart rates were recorded at each scheduled interval.

Park et al. (2019) adopted a muscle relaxation program to implement into the study. First, the participants were advised to wear comfortable clothing but no glasses or footwear. The participants would each sit in a quiet, dimly lit room used for the patient to sit in a comfortable chair and listen to the scripted muscle relaxation therapy through the headset. During the recording, eyes must be closed to imagine a peaceful scenery while breathing deeply (Park et al., 2019). Data analysis consisted of the Wilcoxon rank-sum test, a chi-square test, or a Fisher's exact test with the intention-to-treat method. The only significant variable between the control and intervention group at baseline was systolic blood pressure; the intervention had significantly

higher results (Park et al., 2019). The CDAS score for the intervention group decreased from baseline at 13.7 to 9.9 at 4 weeks, then 9.6 at three months. The intervention group had a significantly greater decrease in DA compared to the control group at both the four-week and three-month intervals. Depression, systolic and diastolic blood pressure, pulse rate, and salivary cortisol levels also significantly decreased in the intervention group versus the control group (Park et al., 2019). The results determined that muscle relaxation therapy effects can last for up to three months.

The study demonstrated that the intervention groups continuously had decreased results for all variables, whereas the control group had experienced a temporary decrease in DA at 4 weeks; however, the DA levels increased at three months (Park et al., 2019). Progressive muscle relaxation therapy is significantly associated with the relief of DA. Consequently, depression is a negative emotional state that is shown in patients with high DA, which could occur from subjective stress from past traumatic experiences (Park et al., 2019). This relaxation therapy appeared to have a positive effect on the emotional state of individuals leading to subsequently reducing DA and depression. Additionally, stress was effectively reduced based on the results from the decreased cortisol levels, which led to the patients feeling more relaxed. The participants were recruited from a single dental clinic, this constitutes a limitation to this study (Park et al., 2019). Psychological parameters were self-reported, which may have been subjective. Future suggested studies are to extend the duration of the effects of progressive muscle relaxation therapy (Park et al., 2019).

Relaxation breathing may benefit all levels of anxiety (Armfield & Heaton, 2013). Using the diaphragm when breathing reduces tension in the chest and allows for more oxygen per breath (Appukuttan, 2016). A study conducted by Biggs et al. (2003) measured the effect on DA

from deep diaphragmatic breathing and focused attention methods. The 272 participants, ranging from ages 17 to 79 years old, were recruited within a private practice dental office. Pre- and post-treatment questionnaires were administered to deduce levels of anxiety using a modified version of the CDAS (Biggs et al., 2003). There were three groups the participants were randomly assigned to, diaphragmatic breathing group, focused attention group, and control group, with 88, 94, and 90 participants respectively.

The data collected from the pre-treatment questionnaire demonstrated a significant correlation between higher CDAS scores and zero to five visits in the last 10 years to a dentist (Biggs et al., 2003). Moreover, the most anxious participants most likely had the least number of visits. The control group participants who used their anxiety reduction method and met the criteria of highest DA and fewest visits to a dentist within 10 years showed a significant reduction in DA. Otherwise, there were no other significant results within this study. Important to note, however, was that the control group showed higher main values (mean=3.82) compared to the breathing or focusing groups (mean=3.52 and 3.51 respectively), even though it is not statistically significant (Biggs et al., 2003). From the post-test questionnaire, 68 participants reported that the breathing technique helped, whereas 20 reported it did not help (Biggs et al., 2003).

No significant difference in anxiety reduction was indicated between any of the three groups (Biggs et al., 2003). It is unclear as to why there are no differences, the participants in the intervention groups relied solely on their concentration rather than with the use of audio-taped guidance. The lack of practice could have led to the ineffectiveness of the intervention. Ten participants forgot to try the intervention, and two found it difficult to perform during their dental treatment (Biggs et al., 2003). Four participants may have perceived the intervention methods to

interfere with their normal coping method because they reported preferring to use other methods. The highest reported effective techniques for reducing anxiety included nitrous oxide, mental distraction, concentrated or modified breathing, moving or focusing on a body part, and listening to music or watching television. Overall, Biggs et al. (2003) found some support for the effectiveness of breathing and focusing techniques. Future studies could measure the effectiveness of the breathing and focusing techniques during specific dental procedures to measure if they would be more beneficial when used with higher anxiety-provoking procedures (Biggs et al., 2003). Also, it is important to investigate how to increase patients' mastery of anxiety reduction techniques without assistance from equipment, such as headphones for meditation music, to measure the effectiveness when performed properly. The limitation of this study was the use of only one private practice (Biggs et al., 2003).

Armfield and Heaton (2013) listed communication skills as a subcategory of enhancing trust and control. Building rapport and trust with good communication skills is the best way to begin relationships between patients and dental practitioners (Appukuttan 2016; Armfield & Heaton, 2013). Proper communication skills include providing moral support, being informative about the procedures, seriously acknowledging the patient's concerns, and providing control of the procedures to the patients (Appukuttan 2016; Armfield & Heaton, 2013). Patients feel a loss of control when they do not understand the treatment procedure; therefore, Hoffman et al. (2022) recommended explaining the procedure and discussing expectations, concerns, and safety measures.

Another way to enhance control is through the tell-show-do technique (Appukuttan, 2016). This behavior-shaping technique reduces uncertainty because the information described (tell) and demonstration of what will occur (show) increases predictability for the patient. When

the patient can comprehend what is going to happen and that it is not threatening, the dental provider can perform the procedure (do) the exact way described and demonstrated. Verbal and nonverbal communication skills, positive reinforcement, and the tell-show-do technique should be used in combination (Appukuttan, 2016).

An online survey study conducted in the United States discovered the perceptions of patients' experiences between their dentist and dental hygienist regarding positive and negative communication (Fico & Lagoe, 2018). Participants included in the study must have had a regular dental provider to contribute. There was a total of 267 participants with 151 females and 106 males between the ages 18 to 74 years. The questionnaire included questions concerning prior dental experience, communication experiences with both providers, satisfaction, anxiety, oral health literacy, dental mistrust, and utilization of dental health services (Fico & Lagoe, 2018). Open-ended questions were analyzed with latent content analysis and constant comparative methods. McNemar's test, independent samples *t*-tests, and chi-square tests were also used for analyses of differences and outcomes.

Negative communication was found to be significantly greater with dentists, at 19.9% compared to hygienists, at 7.2% (Fico & Lagoe, 2018). However, it was different for positive communication, 46.1% of participants reported positive communication experience with dentists versus 20.2% with hygienists. Both providers showed significantly greater respondents reporting positive rather than negative communication experiences. The reason behind those who chose negative communication experiences was that dentists disregarded the patients' concerns or feelings (45.3%; Fico & Lagoe, 2018). Hygienists were found to judge the patients' dental efforts or conditions (26.3%), which is the most frequently reported response for negative communication. Additionally, hygienists were found to have used inappropriate communicative

styles (26.3%). Managing patients' anxiety or physical discomfort was the most frequent response for positive communication for dentists (41.5%) and hygienists (38.9%). Negative communication with dentists was associated with higher levels of medical mistrust (Fico & Lagoe, 2018). There were no significant findings associated with or without negative communication with hygienists. Positive communication with dentists was associated with higher levels of oral health literacy, provider satisfaction, and lower levels of medical mistrust (Fico & Lagoe, 2018).

Evaluating patients' perspectives of the providers' positive communication determined that addressing anxiety or physical discomfort was the most critical aspect of providing patient-centered care (Fico & Lagoe, 2018). Positive experiences were reported more frequently than negative experiences in this study. Impactful knowledge can still be gained from the results of the negative interactions with the self-reflection of the practitioners. For example, the patients who feel judged may be misinterpreting the hygienists' education efforts when presenting factors that contribute to poor oral health (Fico & Lagoe, 2018). Dentists are potentially misperceiving when the patients ineffectively express their DA, which results in an emphasis on the dentists' perceived lack of concern.

The most effective ways to communicate with dentally anxious patients should be further researched including accounting for negative communication experiences and expanding on existing dental communication measures (Fico & Lagoe, 2018). Additional future research should determine the association between communication and dental mistrust in terms of oral health outcomes. Longitudinal studies will determine relationships between positive/negative communication, oral health literacy, medical mistrust, anxiety, and satisfaction (Fico & Lagoe, 2018). Limitations of this study included only using dichotomous measures rather than offering a

more refined viewpoint (Fico & Lagoe, 2018). Also, participants might have been biased when deciding to opt-in to a survey measuring dental communication.

Cognitive-behavioral interventions may be necessary with higher levels of anxiety (Armfield & Heaton, 2013). Systematic desensitization/exposure therapy, cognitive restructuring, or hypnosis are complicated approaches but are better able to treat higher anxiety. Cognitive restructuring is a strategy that alters one's negative cognitions and enhances their control over negative thoughts (Appukuttan, 2016). Systematic desensitization/exposure therapy involves encouraging the discussion of the patient's anxiety, teaching relaxation techniques, and gradually exposure to the dental practice setting. Gradually repeating exposure to the source of anxiety reduces those triggered fear responses (Szuhany & Simon, 2022). One study discussed that cognitive and behavioral therapies designed for a dental practice setting can effectively reduce DA (Spindler et al., 2015).

A single-center parallel-group study was conducted with 102 dentally anxious patients in a private dental clinic in Denmark (Spindler et al., 2015). The patients were 24 years old and above and 73.3% were female. The structured fear assessment interview was the basis used for the interviews in this study (Spindler et al., 2015). The interview method was designed to address the patient's fear cognitively, interpersonally, and behaviorally. The interviews were centered around establishing contact and trust with the patients and a preliminary treatment plan. Each session lasted approximately 45 minutes, and some participants needed more than one session. The CDAS was used to measure the level of DA for each participant (Spindler et al., 2015). Additionally, the DFS was used to measure avoidance, physical discomfort, fear of dental procedures, and the overall level of DA. The participants were randomized into the waiting list control group and the immediate intervention group (Spindler et al., 2015). The first round of

questionnaires was completed by each patient at home. The second round was delivered the week before their first appointment. The participants also completed the questionnaires at the end of each intervention session. The last set of questionnaires was delivered and completed two years following the study. Differences between participant demographics and DA were analyzed using chi-square, Student's *t*-test, or Fisher's *t*-test accordingly (Spindler et al., 2015). The pre- and post-intervention and follow-up questionnaires per group were analyzed via repeated measures ANOVA.

Exposure was the CBT administered for this study (Spindler et al., 2015). The exposure session targeted the specific fearful dental treatments that were individually identified by the participants. This therapy is used to desensitize the patients and habituate the situation at their own pace. A sense of control can be found when gradually exposing the patients to their fear. Patients were allowed one to two exposure sessions (Spindler et al., 2015). After each interview and exposure session, the patient was evaluated to determine the next course of action for treatment.

The IMI group's DA was shown to have significantly reduced compared to the WL group between pre-intervention to postexposure (Spindler et al., 2015). According to the DAS, both groups had significant reductions after completion of treatment. There was not a significant difference in levels of DA between post-intervention and 2-year follow-up for both groups, which indicates that this CBT benefits patients for up to at least two years (Spindler et al., 2015). The overall percentage of participants who demonstrated significant improvement was 59.3% to 64.4%. There was not a significant relationship found between pre-intervention DAS scores and treatment outcomes. High DA was not associated with the reason behind the participants who dropped from the study, this indicates that a brief CBT intervention may be sufficient for all

levels of fear (Spindler et al., 2015). Dental clinics that have specially trained dentists in CBT may increase accessibility to all fearful patients without the need to refer patients to local clinics instead.

There are some limitations to this study (Spindler et al., 2015). The study was not blind due to advising the WL group might have to wait for their treatment. Moreover, there was not a control group included that did not receive the exposure therapy. Since each participant had an individualized treatment plan, some received more treatment sessions than others, which may have influenced the results (Spindler et al., 2015). The large dropout rate, mostly due to financial reasons may have influenced the results. Allowing the patients to complete the questionnaires at home is a potential limitation of this study because there was no supervision to assist with questions (Spindler et al., 2015). Additionally, answers might have been different because the participants were not within the feared setting. Suggested future studies included research on individual factors that influence levels of fear, trust in the dental practice, and who would be less likely to benefit from this type of intervention (Spindler et al., 2015). Understanding how to distinguish what specialized treatments the patients need is another important aspect of research.

Guided imagery is a mind-body technique that removes the focus of the dental procedure by the person imagining they are in a pleasant or relaxing place (Appukuttan, 2016; Armfield & Heaton, 2013). The dental practitioner would help the patient achieve a state of relaxation by guiding their attention through relaxation, visualization, and positive suggestion (Appukuttan, 2016). Scripts can be used to help the dental practitioner create a descriptive scenario if the patient cannot choose their mental image. Guided imagery is effective in treating distress and other disorders such as social anxiety and attention-deficit/hyperactivity disorder (Gonzales et al., 2010).

The randomized, single-blind, quasi-experimental study conducted by Gonzales et al. (2010) was performed at the Wright-Patterson Medical Center in Ohio. The study included 44 participants, 26 men and 18 women, who were between 18 to 71 years old. The participants were randomized into the control or guided imagery group. The purpose of the study was to determine the effect of guided imagery in patients undergoing same-day surgical head and neck procedures (Gonzales et al., 2010). Guided imagery could be used as a cost-effective adjunct for postoperative outcomes depending on the findings. The Amsterdam preoperative anxiety and information scale along with the vertical visual analog scale (vVAS) were used to assess the anxiety levels of each participant. Data was analyzed using the chi-square test, independent samples *t*-tests, Mann-Whitney *U*, and Wilcoxon rank test (Gonzales et al., 2010).

A CD player and headphones were provided to the guided imagery group to listen to the guided imagery exercise CD for 28 minutes (Gonzales et al., 2010). The control group did not receive a CD player with the intervention, but they were allotted 28 minutes of privacy. All participants reassessed their anxiety level with the vVAS before being transferred into surgery. The guided imagery CD was not played again at any other point within this study (Gonzales et al., 2010). Data regarding the participants' postoperative pain was collected at one and two hours following the surgery. The vVAS was used again to rate the pain level. Patient satisfaction was collected at the two-hour point using a five-point Likert scale.

There were no significant differences found in the demographics of the groups (Gonzales et al., 2010). At the baseline measurement, anxiety levels between the control and guided imagery groups were not significantly different. However, at the repeat measurement, a significant difference can be found between the groups. The guided imagery group had a significant decrease between the initial and repeat levels of anxiety, due to the guided imagery

intervention (Gonzales et al., 2010). Since the control group did not have an intervention, the results showed no difference between the initial and repeat anxiety scores. There was a significant difference between the control and guided imagery groups at one hour of pain measurement (Gonzales et al., 2010). Additionally, at the two-hour pain measurement, the guided imagery group was significantly lower compared to the control group. Patient satisfaction data did not show a significant difference between groups, likely due to each participant being very satisfied with their anesthesia experience (Gonzales et al., 2010).

Guided imagery is a promising intervention to implement immediately before a procedure (Gonzales et al., 2010). This intervention does not require the practitioner to be specially trained and the patient can learn on their own with the use of aids such as the CD in this study. Limitations included the trend of preemptive analgesia, noises and/or distractions found in pre-operative and operative rooms, surgical delays, staff availability, and room turn-over times (Gonzales et al., 2010). Most of these limitations are not feasible to control because they are real-world conditions that occur in medical settings. Double-blind studies are typically desired over single-blind approaches; however, the nature of this study makes it difficult to perform a double-blind study. Future studies with a tighter controlled environment when using guided imagery are needed before making definitive recommendations (Gonzales et al., 2010). There is a lack of studies involving using guided imagery within dental practice settings and with the adult population.

Biofeedback is another mind-body technique that uses devices that collect physiological data to monitor the sympathetic nervous system (Morarend et al., 2011). Respiratory rate and electroencephalographic biofeedback have been shown to reduce general and preoperative anxiety levels. Morarend et al. (2011) conducted a randomized, controlled, single-center study to

determine if anxiety and pain would decrease in dentally anxious patients with the use of the respiratory rate biofeedback device. Dentally anxious patients scheduled for dental treatment, which included administration of an inferior alveolar local anesthetic injection, at the University of Iowa Family Dentistry Predoctoral Student Clinic were recruited for this study. The participants selected were also required to have scored 13 or higher on the CDAS. Random assignment divided the patients into the control group (41) and the intervention group (40). Both groups completed the CDAS, VAS, and Dental Injection Sensitivity Survey pre- and post-injection (Morarend et al., 2011). The VAS assesses the levels of anxiety on a scale ranging from one (no anxiety) to 10 (severe anxiety). The intervention group was mailed a post-survey three weeks following treatment to measure if there were any lasting effects from the biofeedback device (Morarend et al., 2011). There were 30 males and 51 females with ages that ranged from 22 to 69 years old (Morarend et al., 2011). The CDAS scores were not significantly different between the groups, both had scores within the severe anxiety range. Both treatment groups had a significant decrease in anxiety after the completion of the injection. Many participants within the intervention group had verbally mentioned during their treatment that the biofeedback device helped and requested to use this at future appointments (Morarend et al., 2015).

Limitations to this study include the additional contact time the intervention group had with the operator could have led to a better experience compared to the control group (Morarend et al., 2015). One examiner for this study could have also been a limitation because it could be argued that the study was not blinded and could constitute bias. Furthermore, the response rate for the follow-up survey was very low to the point where it was inconclusive and could not be used. Morarend et al. (2015) recommended that future studies should find a better approach to measuring the lasting effects of biofeedback devices. Additionally, studies should apply this

intervention technique to other areas of dentistry, such as oral facial pain, periodontal disease, and wound healing.

Hypnosis induces relaxation to alleviate pain, anxiety, and stress (Appukuttan, 2016). Furthermore, hypnosis is effective in reducing problems with excessive gag reflexes. A person's perceptions, feelings, thinking, and behavior are influenced to evoke an intended effect (Armfield & Heaton, 2013). Glaesmer et al. (2015) conducted a controlled trial study to measure the effect hypnosis has on dentally anxious patients who were having a tooth extraction. Patients were recruited in a private practice dental office in Gera, Germany who were treatment planned for tooth removal. The 102 patients, 18 and older, were split into the control group, which received treatment but not hypnosis, and the intervention group which received treatment with hypnosis, resulting in 51 for each group (Glaesmer et al., 2015). Data collected prior to the commencement of the study included demographics, level of anxiety, and attitude toward hypnosis as a medical intervention. The participants were asked to use the VAS at three different intervals, before, during, and after treatment. Differences in data were analyzed with descriptive statistics, chi-square tests, *T*-tests, and a Mann and Whitney *U* test (Glaesmer et al., 2015).

Hypnotherapy can be induced live or with audio recordings (Glaesmer et al., 2015). Hypnosis was administered in this study to the intervention group via a CD player and headphones. Following treatment, this group had an additional question to measure the effect hypnosis had on DA. The VAS before treatment measured the mean level of anxiety for the control group at 4.8 and the intervention group at 5.5 (Glaesmer et al., 2015). The mean level of anxiety during treatment for the control group was 3.6 and the intervention group was 2.7. The mean level of anxiety following treatment for the control group was 2.0 and the intervention group was 1.4. This data determines that there was a significant difference between the control

and intervention groups during treatment; however, there was no significant difference between the groups before or after treatment (Glaesmer et al., 2015). Moreover, the use of hypnosis was shown to considerably reduce anxiety in patients during treatment (over 80%). The intervention group answered whether they would use hypnosis again or not with future dental treatment in which 60.8% would, 29.4% probably would, 7.8% were ambivalent, and 2% refused. Non-invasive adjunct interventions, like hypnosis, that focus on stimulating relaxation during dental treatment are worthwhile to use for dentally anxious patients (Glaesmer et al., 2015).

Limitations to the study conducted by Glaesmer et al. (2015) included that the VAS is not a complex instrument for measuring DA, it was used due to economic reasons. Additionally, the level of pain was not assessed. Since the study used hypnosis with patients only receiving dental extractions, it is not clear if hypnosis would apply to other dental treatments (Glaesmer et al., 2015). A larger sample size with more than one practice involved is also a limitation.

Auricular laser puncture is a painless non-invasive therapy that uses a low-intensity laser beam to stimulate acupuncture points (Hendrata et al., 2018). At the Oral and Maxillofacial Surgery Clinic of Cipto Mangunkusump Hospital, Jakarta, a single-blinded, randomized, controlled trial study was conducted with patients experiencing DA. Patients were recruited who were 17 to 65 years old, undergoing tooth extraction, and scored above three on the VAS (Hendrata et al., 2018). Psychiatric disorders were assessed using the mini-international neuropsychiatric interview. Any participants with a history of mental disorders, lesions on the earlobe, or earlobe infections, and those who were pregnant were excluded from the study. The 36 total participants were randomly allocated into the intervention and control groups, 18 each (Hendrata et al., 2018).

All participants completed the state anxiety inventory (SAI) questionnaire that assesses the current level of anxiety they are experiencing (Hendrata et al., 2018). The SAI was completed prior to the procedure, 30 minutes after the auricular laser puncture or laser puncture sham, and then after dental treatment. The laser puncture for the intervention group targeted the depressing, tranquilizer, and master cerebral points (Hendrata et al., 2018). The control group used the same location points, but the laser pen appliance was not activated. Independent sample t-tests were used for the analysis of the data. Demographic characteristics of the participants showed no significant difference (Hendrata et al., 2018). A significant difference was found between the treatment and control group SAI scores before the intervention. Both groups had significant decreases in SAI scores after the intervention. The intervention group had a more effective reduction in anxiety by almost three times compared to the control group, even though the control group showed a significant decrease as well (Hendrata et al., 2018).

The auricular laser puncture modulates the autonomic nervous system, which then suppresses the sympathetic nervous system (Hendrata et al., 2018). GABA and serotonin levels are increased from the laser puncture, which results in the reduction of anxiety. A questionnaire was provided at the completion of treatment to measure the patient's perceptions of the laser puncture therapy (Hendrata et al., 2018). One item measured the beliefs of how useful the intervention was in which 30.6% of patients believed it was extremely useful, 47.2% quite useful, 13.9% slightly helpful and 8.3% did not find it helpful. Extreme comfortability of the intervention was found with 27.8% of patients, 58.3% were quite comfortable, and 13.9% were uncomfortable. Patients who would undergo this therapy again were reported at 77.8%, 8.3%, and 13.9% were hesitant or said no, respectively. Overall, Hendrata et al. (2018) found auricular laser puncture therapy was useful and comfortable, and reduced anxiety before patients undergo

tooth extraction. A limitation of this study was the small sample size (Hendrata et al., 2018). More studies on the effects of acupuncture in patients with DA should be investigated.

Nonpharmacological management of DA for patients undergoing local anesthesia includes aromatherapy (Karan, 2019). General anesthesia (GA) cannot be used with patients who have certain allergies or other contraindications. Moreover, GA or sedation carries some risks; therefore, when aromatherapy can be implemented it is more ideal and safer. Linalool is a component of lavender oil and has been shown to reduce blood pressure (Karan, 2019). The gamma-aminobutyric acid receptors are stimulated, which promotes the reduction in anxiety levels. Lavender oil effectively relieves anxiety disorders compared to lorazepam, an anti-psychotic medication (Karan, 2019).

Karan (2019) conducted a randomized controlled clinical trial study to determine the effects of lavender oil as an inhalation agent to reduce DA and other vital signs. Participants included in this study were recruited if a score of at least two was recorded on the Dental Anxiety Questionnaire (DAQ) and if they were not already taking psychotropic medication or psychiatric treatment. The total number of participants recruited was 126 with ages that ranged from 18 to 37 years old, 76% were females. The pre-and post-operative tests used were the DAQ, MDAS, and State-Trait Anxiety Inventory-State Scale (STAI-S; Karan, 2019). The STAI-S measures patients' current level of anxiety. The VAS was also used to measure pain in the randomized control and intervention groups (Karan, 2019). The intervention group that received the lavender oil was also administered a two-item satisfaction questionnaire following the study. The 100% lavender oil was administered to the intervention group for three minutes in a separate room before surgery. The vital signs for each patient were recorded pre-operatively, at the extraction of the wisdom tooth, and post-operatively (Karan, 2019). Analysis of the data was

used with the chi-square test, Man-Whitney *U* test, Pearson product-moment correlation coefficient, Wilcoxon rank, and Friedman's two-way ANOVA.

The pain levels between the two groups did not show significant differences (Karan, 2019). The DAQ, MDAS, and STAI-S showed significant correlations for the anxiety levels of the patients. Comparing just the MADS and STAI-S results in the initial and final anxiety levels showed no significant difference between the control and intervention groups. However, there was a significant decrease from pre-operative to post-operative when the groups were assessed within themselves. The intervention group showed a significant decrease in systolic blood pressure in the post-operative measurement compared to the pre- and intra-operative measurements (Karan, 2019). There was also a significant decrease in respiratory rate found in the intra-operative measurement within the intervention group. In contrast, the control group had a significant increase in respiratory rate in the intra-operative measurement. Heart rate was significantly decreased within the control group in the post-operative measurement compared to the pre- and intra-operative measurements (Karan, 2019).

There were no significant differences in the demographic characteristics within this study (Karan, 2019). Both groups had a reduction in anxiety levels which could be attributed to proper care and communication between everyone involved in the procedure. The vital signs showed differences between groups in which the lavender oil was shown to decrease vital signs between the intra- and postoperative measurements. The decrease in systolic blood pressure is indicative of decreasing anxiety levels within the intervention group (Karan, 2019). The decrease in respiratory rate with the intervention group with the intra-operative measurement is indicative of the relaxation of the patients. The decrease in heart rate in combination with the fluctuation of blood pressure in the control group may create syncope. This study suggests that lavender oil

inhalation produces sedative effects, especially for anxiety-related tension found in patients (Karan, 2019).

A limitation of this study included not obtaining double-blinded randomization due to the inability to mask the lavender oil scent (Karan, 2019). A control scent is suggested for future studies regarding lavender oil or a study employing different scents on the same patients at different times.

Pharmacological management may be used when all non-pharmacological management strategies are found to be ineffective (Husack & Ouanounou, 2023). Pharmacological interventions such as conscious sedation, oral sedation, and GA are used in dental practice. Husack and Ouanounou (2023) wrote an article about different pharmacological management for patients with DA. Nitrous oxide with oxygen analgesia is a form of conscious sedation and is a safe and rapid way to promote relaxation with minimal effects on the respiratory and cardiovascular systems (Husack & Ouanounou, 2023). Mild to moderate anxiety indicates the use of this pharmacological method. Adverse effects are very minimal, nausea and vomiting, and they can be avoided by fasting before this management. Some contraindications include patients who have an upper respiratory infection, nasopharyngeal obstruction, claustrophobia, severe COPD, and the first trimester of pregnancy (Husack & Ouanounou, 2023).

Oral sedation is indicated in patients who are moderately to severely anxious (Husack & Ouanounou, 2023). Benzodiazepines are the typical medication prescribed for patients who need oral conscious sedation. This medication produces an anxiolytic and sedative effect. Some disadvantages to benzodiazepines are the absorption rate, inability to titrate, and the onset being delayed (Husack & Ouanounou, 2023). A reversal agent should be available in the event of oversedation. Oral sedation can be combined with nitrous oxide for patients with moderate to

severe anxiety. When the oral sedation level is not desirable, adding nitrous oxide can allow for the desired level of sedation.

Intravenous sedation (IV) is a sedative drug that is administered through the parenteral route (Husack & Ouanounou, 2023). Moderate conscious sedation is desired but deeper levels could also be attained with more specialty training. Three people are required to monitor and assess the patient throughout the procedure. An advantage to this pharmacological management is the rapid onset with increased efficacy (Husack & Ouanounou, 2023). Moderate to severe DA is indicated for the use of IV sedation. Reversal agents are required to be available in case of oversedation.

Wannemueller et al. (2011) conducted a study to assess the comparative effectiveness of brief CBT, standardized hypnosis (StandHyp), individualized hypnosis (IndHyp), and GA with dentally anxious patients. Participants included in this study had to score above the cut-off for dental phobia, not take any anxiolytic medications, and not have dental treatment within the year. Out of the 137 participants, 47 were males and 90 were females, and the mean age was 38.5 years (Wannemueller et al., 2011). Participants were recruited at the Dental Clinic of August Hospital, Bochum, Germany, and were split into four treatment groups that consisted of 14 to 29 patients. The Hierarchical Anxiety Questionnaire, CDAS, Dental Cognitions Questionnaire, Revised Iowa Dental Control Index, State-Trait Anxiety Inventory (STAI), and Subjective Ratings of Treatment Effectiveness and Treatment were all questionnaires included in this study (Wannemueller et al., 2011). Univariate ANOVA tests were used to analyze data. Due to the high drop-out rate, 77 total completers, intent-to-treat analysis was used with the last CDAS score being carried forward.

The CBT group had one 60-minute session and one 50-minute session (Wannemueller et al., 2011). Psychoeducation, progressive muscle relaxation, and a relaxation CD to be listened to at home were included in this therapy. The desired effect was to learn relaxation and coping thoughts to replace dysfunctional thoughts that cause anxiety. The psychology unit of the hospital implemented the CBT (Wannemueller et al., 2011). StandHyp used a CD containing standard hypnotic suggestions to be used one week before dental treatment (Wannemueller et al., 2011). The CD was listened to again thirty minutes before the first dental treatment, which continued throughout treatment. In IndHyp, a CD about hypnosis was given to patients to listen to one week before dental treatment (Wannemueller et al., 2011). The dentists hypnotized the patients in the dental chair 20 minutes before treatment, and the first 10 minutes of treatment, by using relaxation suggestions and imagery for patients to focus their attention. The imagery consisted of a pleasant activity chosen by the patient. GA uses propofol and analgesics intravenously to attain sedation, which is maintained throughout dental treatment (Wannemueller et al., 2011).

All groups were similar in the demographic and dental characteristics areas (Wannemueller et al., 2011). No significant indications were demonstrated with the data collected at the beginning of the study. CBT showed greater improvement compared to the other groups. No other differences were found with separate group comparisons. At the beginning of the study (M1), the CBT group scored significantly lower on the Dental Cognitions Questionnaire when compared to the StandHyp group (Wannemueller et al., 2011). At the end of treatment, the GA and StandHyp groups scored higher than the CBT and IndHyp groups. At M1, the CBT group also scored lower on the STAI questionnaire.

Largely, CBT resulted in the highest improvement in dental phobia and was the most efficacious treatment (Wannemueller et al., 2011). The DAS scores at the end of treatment showed only 35% of patients were considered markedly anxious in the CBT group compared to 80% in the StandHyp group and 70% in the GA group. Comparing the two hypnosis groups, individualized was more successful than standard; however, it is unclear as to why (Wannemueller et al., 2011). StandHyp is not a recommended treatment for dental phobic patients as per the results of this study. IndHyp, however, was similarly successful as CBT, but CBT was more accepted than IndHyp. The lack of differences in treatment conditions and formalized randomization are considered the major limitations (Wannemueller et al., 2011).

Management of Anxiety

Medical Practice Setting

There is no systematic consensus guideline to determine the type of treatment for managing anxiety; it is based on evidence and judgment (Szuhany & Simon, 2022). After the consideration of all factors contributing to anxiety disorders, pharmacotherapy, and psychotherapy are the first-line treatment interventions. Benzodiazepines used to be the first-line pharmacotherapy treatment; however, several disadvantages have been found including relapse, abuse, and other side effects (Simon et al., 2020). The current standard of treatment for pharmacotherapy options consists of selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs). Before selecting therapy, psychiatric history, comorbid medical conditions, and risks about effects or contraindications of the medications should be taken into consideration.

Qian et al. (2017) conducted a study with 205 patients with GAD to investigate early improvement at eight weeks with the use of SSRI escitalopram and SNRI venlafaxine. The

escitalopram group consisted of 104 patients and the venlafaxine group consisted of 101 patients, with the mean age of 44.33 and 44.93 respectively. The Hamilton anxiety rating scale and Hamilton depression rating scale were used to evaluate the severity of the disease at multiple intervals (Qian et al., 2017).

The positive predictive values for the escitalopram group showed 85.19% early improvement at week one and 53.75% at week two (Qian et al., 2017). The negative predictive values were 67.53% and 79.17% at week one and two, respectively. Pertaining to the venlafaxine group, week one positive and negative predictive values of early improvement were 84.62% and 65.33% respectively. The positive and negative predictive values at week two were 59.21% and 88% respectively. Approximately 46.15% of patients achieved remission and 28.85% achieved response from escitalopram treatment at week eight. Twenty-five percent were non-responders to the treatment. The venlafaxine group showed 47.53% achieved remission and 28.71% achieved response, whereas 23.76% did not respond at week eight. The efficacy between both groups was not significant (Qian et al., 2017).

The early improvement found at week one suggests that remission will be achieved at week eight and treatment is sufficient to continue (Qian et al., 2017). If early improvement was not found at week two, this suggests a poor treatment outcome for patients at week eight. An alternative strategy should be sought if early improvement is not found by week two due to the likely lower chance of remission according to this study. Generalization of results is limited due to only 24.51% of males were included in this study (Qian et al., 2017). Additionally, severe physical or mental disease comorbidities were excluded. Future research should include the comorbidities to create a clinical guide for these patients. Longer studies were recommended for these medications because this study was short-term at only eight weeks (Qian et al., 2017).

First-line psychotherapy intervention includes evidence-based CBT for generalized anxiety disorders (Simon et al., 2020). CBT promotes skills that reduce anxiety through psychoeducation, cognitive reconstructing, and exposure. Additional first- or second-line psychotherapies consist of relaxation therapy, worry behavior control, and self-monitoring (Simon et al., 2020).

A randomized, controlled trial was conducted with 71 participants with GAD to test the efficacy of three CBT management methods at Babes-Bolyai University, Romania (Stefan et al., 2019). Ages ranged from 20 to 51 years, 60 were women and 11 were men. The participants were randomized into three treatment groups. Each group had 20 treatment sessions lasting 50 minutes.

Borkovec's treatment package model includes applied relaxation and Beck's cognitive therapy methods (CT/BTP; Stefan et al., 2019). The CT/BTP was implemented in this study along with rational emotive behavior therapy (REBT), both of which focus on the modification of dysfunctional thoughts. Acceptance and commitment therapy/acceptance-based behavioral therapy (ACT/ABBT) was the third CBT implemented in this study because this therapy focuses on the relationship to dysfunctional thoughts (Stefan et al., 2019). These methods are directed toward dysfunctional automatic thoughts, which are closely related to symptoms of anxiety.

The CT/BTP group had 13 patients complete full treatment (Stefan et al., 2019). The REBT group had 12 completers, and the ACT/ABBT group had 14 completers. The Generalized Anxiety Disorder Questionnaire IV (GAD-Q-IV) and the Penn State Worry Questionnaire (PSWQ) were used to measure the primary outcomes of the participants who completed this study (Stefan et al., 2019). Secondary outcomes were measured using the Automatic Thoughts Questionnaire (ATQ). The initial evaluation included all 71 participants and was analyzed using

the intent-to-treat approach (Stefan et al., 2019). The repeated measures ANOVA, one-way ANOVA, and the Hedges' g index were also used for analyses.

The demographic and pretreatment variables were not significantly different between each group (Stefan et al., 2019). GAD-Q-IV scores were not found to be significantly different from PSWQ or ATQ scores between the groups in the pretreatment measure. Pre- and post-treatment showed significant main effects for all questionnaire scores with all 71 participants (Stefan et al., 2019). Measuring the completers only (39) also showed significant main effects of pre- and post-treatment on all outcomes. The results demonstrate that CT/BTP, REBT, and ACT/ABBT were correlated with changes in GAD symptoms and dysfunctional automatic thoughts (Stefan et al., 2019). PSQW scores showed a correlation with changes in dysfunctional automatic thoughts and worry in each group. This study did not find if one of the interventions is superior to the other because there was no significant difference found regarding reducing GAD and worry between each CBT intervention. Changes were found in all three groups that demonstrate the reduction of dysfunctional thoughts from pre- to post-treatment, which is positively associated with changes in GAD symptoms and worry. The decision on which CBT to choose would rely on patient preferences or psychotherapists' availability since they all had similar effective results (Stefan et al., 2019).

A smaller sample size and limited statistical power are limitations of this study (Stefan et al., 2019). Lack of posttreatment evaluation was also considered a limitation. Stefan et al (2019) recommended investigating more detail into which patients respond better to which CBT treatment approach.

Dental Practice Setting

There is no monotherapy for managing patients with DA due to the etiology being multifactorial (Appukuttan, 2016). Psychotherapeutic and pharmacological interventions can be utilized separately or in combination depending on the needs of the patient (Appukuttan, 2016). The recommended clinical practice guideline for psychotherapeutic therapy of anxiety disorders is CBT (Szuhany & Simon, 2022). CBT intervention is the most accepted psychological treatment for anxieties deriving from a specific situation or phobia, making it a therapy to effectively reduce DFA (Appukuttan, 2016).

An initial step in preventing all levels of DA in patients starts with the ambiance of the dental office (Appukuttan, 2016). The interactions between the patient and staff, the atmosphere, the sounds and smells, and the duration of wait time all play a role in establishing a positive or negative ambiance. Avoidance of bright lights, cooler temperatures, wall decor, and access to books and magazines are some methods to reduce anxiety in the dental environment (Appukuttan, 2016). Aromatherapy is found as an alternative method because it positively affects one's sense of smell (Appukuttan, 2016). Furthermore, the dentist and dental hygienist must establish a good relationship with the patient through communication skills, building rapport, and enhancing trust and control (Appukuttan, 2016).

Dental anxiety questionnaires, or different attempts to gather information regarding DA, should occur during the clinical history (Armfield et al., 2014). The MDAS can help assess the anxiety level of patients and provide person-centered care by choosing the correct way to manage DA (White et al., 2017). Utilizing anxiety screening tools could help with establishing trust and rapport with dentally anxious patients, encouraging routine care, and optimizing their

oral health (White et al., 2017). Therefore, DA will be regulated, which could effectively encourage the regulation of the QoL for these patients (Razzak & Demirsoy, 2022).

Kanzigg et al. (2018) conducted an embedded mixed-methods research utilizing a multiple choice, Likert-scale, and free-response survey. The purpose of the study was to measure North Carolina dental hygienists' knowledge, attitudes, and confidence levels for treating DA (Kanzigg et al., 2018). To establish content validity, the survey was pilot tested by six practicing dental hygienists. Data was collected with an Excel spreadsheet, and the authors identified descriptive statistics to evaluate frequencies and distributive findings. Analyzing the knowledge-based questions, the bivariate analysis using the Mantel Baenszel row mean score test was used. There were 153 dental hygienists that responded with 68% yielding an associate degree, 25% a bachelor's, and 6% a master's degree. An additional demographic question measured the number of years the participants have been practicing; 30% were less than 10 years and 24% were over 30 years (Kanzigg et al., 2018).

Dental anxiety levels treated weekly by dental hygienists showed that over 30% reported treating mostly patients with mild DA (Kanzigg et al., 2018). Not many participants reported screening their patients for DA issues; 80% reported never or rarely using the DA questionnaires. The reason behind the lack of use of the questionnaires is due to 60% of participants are unfamiliar with these screening tools. The study found that 17% of the dental hygienist participants used the CDAS, 3% the MDAS, and 9% the DFS questionnaires (Kanzigg et al., 2018). The study also measured the confidence the hygienists felt in treating patients with DA and in their education. Although the participants felt confident in the care they provided, the survey showed that 43% of the participants understood the full range of signs and symptoms of DA. Approximately, 58% of participants reported that their education prepared them for treating

mild DA, 38% for moderate DA, and 22% for severe DA (Kanzigg et al., 2018). Having the ability to properly diagnose and regulate DA could be a way to effectively regulate the patient's QoL as well (Razzak & Demirsoy, 2022).

Kanzigg et al. (2018) recommended increased curricular content and/or continuing education to increase the hygienists' skills in treating dentally anxious patients. The survey Kanzigg et al. (2018) utilized could be used in future studies in larger populations.

Patients' Perspectives of Anxiety in A Dental Practice Setting

Wang et al. (2017) recognized a gap regarding the patients' preferences and perceptions of dental anxiety. A qualitative study was developed to explore the triggers and what reduces those triggers to DFA in dentally anxious adults. The participants were found through a purposive sampling of self-identifying dentally anxious adults via a poster invitation or the snowballing technique (Wang et al., 2017). To quantify the level of DA, the MDAS was utilized, which also confirmed the selection of participants. There was a total of 14 participants divided into two focus groups and three individual interviews for the participants too reluctant to participate within a group (Wang et al., 2017). The participants were between the ages of 18 to 49, of which 11 were women and three were men. The focus groups lasted two hours and the interviews were one hour. Additionally, the focus groups and interviews were audio-recorded, anonymized, and transcribed. Thematic analysis was the strategy utilized to analyze each transcript (Wang et al., 2017). A map was created to show the analysis of the codes-to-theory model involving all four authors. Validity was demonstrated by considering any potential bias of the authors during the analysis and member-checking with one participant from each focus group. Four themes were identified in the interviews that dentally anxious individuals would

prefer when being treated in a dental setting; preparedness, teamwork, reinforced trust, and a tailored treatment plan (Wang et al., 2017).

The participants reported they would prefer to be prepared for the treatment (Wang et al., 2017). They would prefer more information concerning the treatment process, rather than the dental practitioner simply working in their mouths. One participant suggested having pamphlets or something to take home describing the proposed treatment would be useful in case they do not fully comprehend the explanation (Wang et al., 2017). This supplemental information about a treatment procedure will help them answer questions that they had not thought of or think of something new to ask, making them feel more comfortable before the procedure. The theme, preparedness, is similar to the enhancing control strategy. Appukuttan (2016) explained that making the treatment as comfortable as possible will result in advising the patient on what to expect and the safety measures will be taken into consideration. The tell-show-do technique is a way of enhancing control because there is a verbal explanation of the procedure, then there is a demonstration, and then the procedure is performed (Appukuttan, 2016). Discussing the treatment procedure in advance, and possibly giving informative pamphlets, will help ensure the patient has enough time to process the information. Then, it could be beneficial to utilize the tell-show-do technique prior to and throughout treatment (Wang et al., 2017).

Teamwork to the participants means being part of the decision-making process (Wang et al., 2017). Being involved in the treatment plan process increases the feeling of control, therefore, reducing anxiety toward the treatment. Fico and Lagoe (2018) reported that positive communication between the dental provider and dentally anxious patients resulted in increased oral health literacy and lower levels of mistrust. Armfield and Heaton (2013) further explained that generally distrustful patients would prefer a thorough discussion concerning all possible

treatment options and the consequences of each. Additionally, it is best to, again, explain the details far in advance rather than in the middle of treatment.

Building a patient-provider relationship reinforces the trust of the patient, increasing their confidence in accepting the recommended treatment (Wang et al., 2017). Giving the patient the ability to pause the procedure for breaks can enhance the patient's sense of control (Armfield & Heaton, 2013). Utilizing exact dental terms, rather than understating by replacing 'anxiety-triggering' words, allows for more trust from the patient (Wang et al., 2017). However, after stating some anxiety-triggering words, it might benefit the dental practitioner to then explain the procedure in a way for the patient to understand if they are still not comprehending. Acknowledging the patients' anxiety and reassuring the patients to lessen embarrassment enhances the relationship and reinforces trust (Wang et al., 2017).

Detailing the specifics of every detail of the treatment plan can reduce anxiety (Wang et al., 2017). The patients want to understand if the procedure will cause discomfort during or after, the cost, and the timeline regarding how many appointments it will take to complete. When there are any discussions between the dental practitioner and the patient, the patients want to be shown sympathy and understanding (Wang et al., 2017). Referring to the importance of communication skills, i.e., effective listening, demonstrating empathy, and the use of appropriate tone of voice, are key factors when treating anxious patients (Armfield & Heaton, 2013).

Abrahamsson et al. (2002) also conducted a study concerning the viewpoints of patients with DA. Specifically, this study focused on their DFA and experiences in their dental care. There were 18 participants, 12 of whom were female and six males. The ages ranged from 22 to 61 years. The CDAS was implemented to measure each participant's DA. A qualitative interview guide was developed to use when conducting the interviews (Abrahamsson et al., 2002). The

interviews were audio-taped and lasted between 50 minutes to 90 minutes. Open-ended questions focused on describing DFA, experiences, coping strategies, and consequences. Overview analysis and line-by-line coding were used to analyze data.

Three main themes were identified in the analysis; existential threat, vulnerability, and unsupportive dentist (Abrahamsson et al., 2002). The existential threat had a dimension, the threat of violence, that described strong fears of something unpredictable happening. The threat of loss of autonomy and independence was another dimension that described the rising fear in anticipation of the day the patient receives treatment; they also typically have trouble sleeping. Vulnerability describes the traumatic life history of the patients' DFA and an anxiety-prone personality (Abrahamsson et al., 2002). Patients who reported a history of general anxiety or other strong fears were placed in the anxiety-prone personality dimension. Dental fear within the patients' families constructed negative perceptions about dental care, which is another dimension of vulnerability (Abrahamsson et al., 2002). The last theme, unsupportive dentists, had three descriptive categories. Perceived lack of empathy and respect was due to patients expressing those feelings toward dentists. Doubt about the dentists' skills was composed of distrust and lack of knowledge from dentists. Lastly, the perceived lack of support from the dental team resulted from patients being so frightened that the dental team was seen to be in collaboration with the dentist (Abrahamsson et al., 2002).

Most of the patients in this study reported their DFA began in childhood from a traumatic experience (Abrahamsson et al., 2002). Several participants reported their DFA began in adulthood from a traumatic experience outside of dental care and others had a history of general anxiety. Many patients expressed their biggest factor was the perceived lack of empathy and respect (Abrahamsson et al., 2002). Unpredictable events and the lack of control felt by patients

are other strong factors. Although some of the patients reported receiving empathy from dental assistants, they still felt a lack of support possibly due to their perception of the assistant depending on the patient-dentist relationship (Abrahamsson et al., 2002). Negative behavior from the dentist is seen to be a significant factor for the patients involved in this study. Preventing DFA will be achieved with good patient-to-provider relationships.

Future studies should investigate coping strategies and personal resources that dentally anxious patients can access (Abrahamsson et al., 2002). Additionally, it investigates factors on provider behavior and its relation to the prevention and treatment of DFA. No limitations were reported in this study (Abrahamsson et al., 2002).

Summary of Chapter 2

Anxiety and dental anxiety have been shown to correlate and both have many adverse effects on a person's health. Understanding the patient's point of view is a crucial step in providing person-centered care. Furthermore, the way a patient receives care can negatively affect their oral health and quality of life as was discussed in the literature review. Ultimately, dental practitioners need to be aware of the many interventions and the way to decide which one is best for the patient to start reducing the prevalence of DA. Previous studies regarding DA focus on the narrative of dental practitioners, not the perspectives of the patients. There is a need to study dentally anxious individuals to identify factors that contribute to their anxiety and how they feel dental practitioners could provide comfortable and positive experiences in a dental practice setting.

Chapter 3 Methodology

The purpose of this study is to identify patients' perspectives of factors that impact anxiety in a dental practice setting. Understanding patients' perspectives of their coping strategies and preferred management techniques in relation to their level of anxiety could potentially assist in creating a guideline for dental practitioners.

The following research questions will guide the conduct of this study:

1. What factors contribute to patient anxiety in a dental practice setting?
2. How do patients currently cope with anxiety in a dental practice setting?
3. What interventions would reduce patient anxiety in a dental practice setting?

Research Design

Qualitative research consists of many methods that help to understand how people interpret experiences and make sense of meaning in their lives (Merriam & Tisdell, 2016). This qualitative study used a case study approach among dentally anxious persons to provide in-depth knowledge of a bounded system (Merriam & Tisdell, 2016). Dental anxiety is the focus of this study, which means it is chosen as the bounded system. The analysis of dental anxiety will provide a description of how dentally anxious patients interpret their experiences and provide meaning behind their needs or actions. The MDAS was utilized to measure the level of dental anxiety of each participant. The reason for selecting this particular qualitative methodology is due to the lack of focus in the literature regarding the patients' perceptions of their dental anxiety. Most studies embody the perspectives of dental anxiety through the dental practitioners (Wang et al., 2017).

The Consolidated Criteria for Reporting Qualitative Studies (COREQ) was utilized as a framework for the development of the methods of this study. The checklist consists of 32 items

measuring the quality assessment of the study (Tong et al., 2007). There are three domains of the list, which include the research team, study design, and analysis and findings.

Research Context

The study was conducted in an online environment. The participants scheduled a Zoom video call session to contribute to the study. An online setting is beneficial to all participants because it gives them a sense of comfort in being in their own homes while discussing their perceptions of possible anxiety-inducing questions. Before the COVID-19 pandemic, researchers preferred in-person interviews; however, since the pandemic, the use of virtual communication tools has been effective as an alternative data collection (Sah et al., 2020). Additionally, the participants were able to schedule a time at their convenience. Each session was recorded and saved in an encrypted account. The participants selected a pseudonym for identification, to maintain confidentiality and anonymity.

Research Participants

Qualitative studies can have sample sizes consisting of one to as many as 30 participants (Mertler, 2022). This study had 22 participants and one pilot study interview. The interviews were finished when saturation was met and no new information was being gathered (Merriam & Tisdell, 2016).

Sample Description

Purposive sampling in qualitative studies specifically selects a group of people for a specific purpose (Mertler, 2022). Homogeneous sampling is a purposive sampling technique that selects sample individuals or sites that possess similar characteristics. The characteristic that this sample population commonly possessed was moderate to high dental anxiety. Additionally, snowball sampling was utilized to contact dental hygienists to identify additional patients with

dental anxiety. Also, participants were asked to refer any other individuals known to have dental anxiety.

Inclusion criteria included individuals who are 18 years of age or older and score a minimum of 11 on the MDAS questionnaire indicating they experience moderate to high dental anxiety. Exclusion criteria included individuals who were younger than 18 years of age and scored below 11 on the MDAS questionnaire.

Human Subjects Protection

After approval from the Human Subjects Committee was granted, I emailed the informed consent document to each participant accepted for review before their interview (Appendix A). The participants were informed that their identity would be kept confidential and anonymous by using a pseudonym for identification. Additionally, they were informed that the study is completely voluntary and are allowed to withdraw at any point during the study.

Data Collection

Instruments

The MDAS questionnaire, shown in Appendix B, was utilized as the screening method to determine the level of DA of each participant. The questionnaire consists of five items that measure emotional reactions to imagined dental situations (Humphris et al., 1995). The items are rated from one (no anxiety) to five (extreme anxiety). The sum of the questionnaire can be a minimum of five to the highest of 25. A score between 11 to 18 indicates moderate dental anxiety and a score of 19 or higher indicates high dental anxiety (Muneer et al., 2022). The study conducted by White et al. (2017) described the moderate to high DA score as 15 and higher. For this study, a cut-off score of 11 was implemented. Humphris et al. (1995) conducted a study that verified the validity and reliability of the MDAS. Compared to the CDAS, the MDAS is

recommended because the answering scheme is more consistent, this allows the items to be compared and improves validity. The extra item concerning local anesthetic injection was added to the MDAS because it is a big concern for most patients. The data collected for the study found good statistical properties for a cut-off point for dental phobia. Further evidence was provided that presented the reliability and validity of the MDAS (Humphris et al., 1995). The Cronbach's alpha coefficient for the reliability of the MDAS was 0.7. The concurrent validity was evaluated between the CDAS and MDAS with a correlation coefficient of 0.85 ($P<0.001$; Humphris et al., 1995).

An interview guide was developed and followed for each interview, see Appendix C. Interview methods are used to obtain specific kinds of information (Merriam & Tisdell, 2016). When a study cannot observe behavior or peoples' interpretations, interviewing is an appropriate method of doing so. Moreover, interviews are necessary when exploring the reasoning of past events. The interviews for this study were conducted individually rather than in groups due to the possible sensitivity of the topic. The individual semi-structured interviews continued until saturation was reached and no new information was being presented. The semi-structured method was chosen to allow flexibility in how the researcher responds to the participants' answers at hand (Merriam & Tisdell, 2016). The interview guide was reviewed for content validity by content experts. A pilot interview was conducted to ensure questions are logical, suggestions can be taken into consideration, and to ensure controlling bias. When the interviews were scheduled, the interview guide and interview guidelines were sent via email along with the Zoom link to access the interview session. Attached in Appendix D are the interview guidelines that were created based on this study.

Procedure and Protocols

Snowball sampling is a common form of purposeful sampling that recruits key participants (Merriam & Tisdell, 2016). The participants and dental offices and/or practitioners were asked to refer me to other subjects known to experience DA to accumulate more information-rich cases. I, as a temporary dental hygienist, was able to personally introduce this research study to a variety of dental offices during the duration of this study to enable the possibility of attaining more participants. Other dental offices were asked to assist in the recruitment of participants via e-mail. A sample of the office recruitment e-mail is provided in Appendix E. When potential participants contact me or the dental offices with their interest in this research study, the participant recruitment email will be sent, provided in Appendix F, which also includes the MDAS to measure their level of DA. The participants were asked to complete the MDAS to verify their inclusion in the study. The participants who scored 11 or higher were contacted via email to select a day and time at their convenience for the individual, semi-structured interview. After approval from the Human Subjects Committee was granted, an informed consent, the interview guideline, and the interview guide were emailed to each participant.

There were approximately 22 individual interview sessions conducted and recorded via Zoom that spanned over three weeks. Each Zoom recording was auto-captioned with closed captioning, downloaded into a Word document, and verified for accuracy. The recordings are only accessible to me and the co-investigators. The transcriptions were codified into themes for analysis. Demographics concerning age, gender, and residency were collected after the interviews.

Limitations

Limitations to this study are the small sample size and that results cannot be generalized to the entire population of people with DA. However, qualitative studies are meant to focus on obtaining rich data to understand how people interpret their experiences (Merriam & Tisdell, 2016).

Proposed Statistical Analysis

Following the completion of the transcription, the co-investigators and I collaborated to perform an analysis of the data. The classic analysis strategy was used to identify themes (Krueger & Casey, 2015). The analysis was completed using an online qualitative data analysis software, Dedoose (Dedoose Version 7.0.23, 2023), to consolidate the data into codes. Coding creates symbolic single words or short phrases to designate various aspects of data to be easily retrieved (Merriam & Tisdell, 2016). Once data were reduced into codes or themes, the next step involved describing the main features of those codes (Krueger & Casey, 2015). Connections were made between the collected data and research questions. Then, data was interpreted to find similarities and contradictions to the research questions that could provide challenges or guidance to practices. This approach is appropriate for this study because it provides the most beneficial way to systematically organize data, describe coded themes, and interpret themes of interview studies. This strategy helps to integrate the data with interpretation from the researchers.

Validity

Investigator triangulation was used to enhance the validity of this study by using multiple investigators to independently collect and analyze the data (Merriam & Tisdell, 2016). When the results of each investigator meet the same conclusion, the study can be considered valid. The co-

investigators and I independently used Dedoose qualitative analysis software to evaluate the transcripts for codes and themes, which were then compared for validity.

Member checking was also utilized to enhance the validity of the study. After the conclusion of each interview, the participant received the transcript to review and verify its accuracy (Merriam & Tisdell, 2016; Mertler, 2022). The participants were asked to review the accuracy of the investigators' interpretations to ensure validation of the analysis. The participants should be able to recognize their experience within the interpretation (Merriam & Tisdell, 2016). Member checks help to limit misinterpretations and bias from the investigators (Mertler, 2022).

The last strategy utilized to validate the study was reflexivity. All detailed notes and observations from the interviews were utilized to intermingle preliminary interpretations (Mertler, 2022). Reflexivity helps the investigators explain their biases and assumptions (Merriam & Tisdell, 2016). Furthermore, this strategy allowed the reader to understand how the investigator arrived at their interpretation.

Researcher Positionality

I may be projecting my personal life experiences with anxiety and an understanding of what these subjects may experience with DA onto the data. I believe that more sympathy should be taken into consideration toward dentally anxious patients from dental practitioners because the highest reported etiology is due to traumatic experiences at the dental office (Jeddy et al., 2018). As a registered dental hygienist who works at many different offices, observations can be made about how different dental practitioners treat their patients with or without DA. Additionally, as someone aware of anxieties, I am very receptive toward those patients and try to provide a positive experience to help alleviate some symptoms.

To avoid influencing bias, leading questions were avoided when developing the interview guide (Merriam & Tisdell, 2016). Additionally, to practice maintaining a neutral position and avoiding bias, a pilot interview was conducted. Member checking helps to identify any biases or misinterpretations of what was observed in the study (Mertler, 2022). Analyzing the data could influence bias by deciding which information to incorporate and which to exclude (Merriam & Tisdell, 2016). Data that is contradictory to my personal views was not avoided by incorporating all data collected into the results of the study.

Summary of Chapter 3

Implementing an interview method is necessary to attain rich information relating to the purpose of this study, anxiety impacting factors on dentally anxious persons. The research participants must have moderate to high DA to be involved in this study. The information that was gathered will help dental practitioners understand what these participants feel and appropriate ways to treat their anxiety to help both parties have positive interactions. Throughout the individual semi-structured interviews, I remained neutral and asked open-ended, non-leading questions to avoid bias. Investigator triangulation, member checking, and reflexivity ensure the validity of the study.

Results and discussion will be reported in the form of a manuscript to be submitted for publication in the *Journal of Dental Hygiene*. The remaining sections of the thesis reflect the manuscript specifications outlined in the author guidelines located at https://www.adha.org/wp-content/uploads/2023/02/JDH_Author_Guidelines_Rev11-2022.pdf.

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Appendix A – Informed Consent Form

Human Subjects Informed Consent Form

Idaho State University Department of Dental Hygiene

Dentally Anxious Patients' Perceptions of Treatment Methods

Marissa Valastro, RDH, AAS, BS

What is the Research?

You have been asked to participate in a research study about your perspective towards contributing factors concerning dental anxiety, current coping mechanisms, and interventions that would reduce dental anxiety. The Human Subjects Committee at Idaho State University has approved this research project.

Procedures

If you agree to participate in this study, you agree to the following procedures:

- Complete the Modified Dental Anxiety Scale sent via email to measure the level of dental anxiety. A score of moderate to severe dental anxiety is required to participate in this study.
- Before formally agreeing to participate in this study, a written informed consent will be sent to you via email on a password protected, private e-mail account. Upon agreeing to participate, the informed consent document will be signed and returned to the investigator via email.
- To protect your confidentiality, a pseudonym will be chosen by you to be used throughout the course of the interview, and during any further transcripts or documentation. You will be asked to download the Zoom app on your personal computer or tablet. An email will be sent that is linked to a calendar and you will be asked to identify the best possible time for you for the individual interview. A Zoom invitation will be sent out with the designated interview time and a specific meeting link to join the discussion.
- You will participate in an individual, semi-structured interview with a moderator and investigator(s). The interview will last approximately 45 to 60 minutes and questions will pertain to your experience with dental anxiety. Zoom will record the discussion and then will be downloaded to a password protected computer. Only the primary investigator and the thesis committee members will have access to the recording.
- Participants will use only pseudonyms on the audio recording, and the camera will be turned off during the interview. Every effort will be taken to keep the recordings confidential. You will be asked to not use specific dental office names. Instead, you can say "my" or "a" dental office". The interview will be auto captioned with closed captioning and verified for accuracy. At the completion of the study, all transcripts and recordings will be sent to Idaho State University, to be held in the Idaho State University

secured storage for seven years. At that point, all material to the study will be destroyed by Idaho State University following university protocol.

- A summary of your statements will be sent to you to review. A copy of the results of the study will be sent to participants upon request.

Why Have I Been Asked to Take Part?

You have been asked to participate because you have important insights as a person who has experience with dental anxiety. Your perspectives on what could be useful in reducing dental anxiety can provide valuable information.

Voluntary Participation

This discussion is voluntary—you do not have to take part if you do not want to. Your participation, if you do not take part, is separate from the investigator's course requirements, it will not have any effect if you decline to participate. If any questions make you feel uncomfortable, you do not have to answer them. You may leave the Zoom meeting at any time for any reason.

Risks and Benefits

There are no risks in the participation of this study. There are no personal benefits for taking part in this research. Your insights and that of others may be helpful to dental practitioners and other dentally anxious persons as they seek insights on this topic.

Privacy and Confidentiality

This discussion will be audio and audiovisual recorded to ensure that we have accurately captured the comments of each individual. The recording will only be available to the research team. The recordings will be stored in a secure location and will be erased when the analysis is complete. Your privacy will be protected by the use of a pseudonym. Pseudonyms will be used in the individual interview and on all reports, and the discussion will be kept strictly confidential.

Questions

If you have any additional questions about the study, you may contact the primary investigator or faculty members.

Investigator

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I have read the information in the consent form. I have been given an opportunity to ask questions, and any questions I had have been answer to my satisfaction. I have been given a copy of the informed consent form.

I give my consent for the results of the research to be published or discussed using my pseudonym. No information will be included that will reveal my identity.

I HAVE REVIEWED THIS CONSENT FORM AND UNDERSTAND AND AGREE TO ITS CONTENTS.

Printed Name Date

Signature

Adapted from Krueger and Casey, 2015, p. 134

Appendix B – Modified Dental Anxiety Scale

CAN YOU TELL US HOW ANXIOUS YOU GET, IF AT ALL, WITH YOUR DENTAL VISIT?

PLEASE INDICATE BY INSERTING 'X' TO THE RIGHT OF THE SELECTED ANSWER

1. **If you went to your Dentist for TREATMENT TOMORROW, how would you feel?**

Not Anxious __ Slightly Anxious __ Fairly Anxious __ Very Anxious __ Extremely Anxious __

2. **If you were sitting in the WAITING ROOM (waiting for treatment), how would you feel?**

Not Anxious __ Slightly Anxious __ Fairly Anxious __ Very Anxious __ Extremely Anxious __

3. **If you were about to have a TOOTH DRILLED, how would you feel?**

Not Anxious __ Slightly Anxious __ Fairly Anxious __ Very Anxious __ Extremely Anxious __

4. **If you were about to have your TEETH SCALED AND POLISHED, how would you feel?**

Not Anxious __ Slightly Anxious __ Fairly Anxious __ Very Anxious __ Extremely Anxious __

5. **If you were about to have a LOCAL ANAESTHETIC INJECTION in your gum, above an upper back tooth, how would you feel?**

Not Anxious __ Slightly Anxious __ Fairly Anxious __ Very Anxious __ Extremely Anxious __

Instructions for scoring (remove this section below before copying for use with patients)

The Modified Dental Anxiety Scale. Each item scored as follows:

Not anxious = 1

Slightly anxious = 2

Fairly anxious = 3

Very anxious = 4

Extremely anxious = 5

Total score is a sum of all five items, range 5 to 25: Cut off is 19 or above which indicates a highly dentally anxious patient, possibly dentally phobic.

Appendix C – Interview Guide

Interview Guide

Opening	1. Tell us your pseudonym for this research and when was your last dental or dental hygiene visit? 2. What was completed during that appointment? 3. Describe your feelings of those experiences.
Introduction	4. How long have you experienced dental anxiety?
Transition	5. What, if anything, contributed to your original feeling of dental anxiety?
Key	6. What dental and/or dental hygiene procedures create anxiety for you? 7. What other factors contribute or cause anxiety in the dental office setting?
	8. What strategies have you used in the past to help with your dental anxiety? 9. Have any of those strategies been successful? If not, why not?
	10. How do you typically cope with your dental anxiety now?
	11. How do you inform the dentist or dental hygienist that you have dental anxiety? 12. What responses have you received from them?
	13. What additional strategies might you try to use to help you reduce your dental anxiety? 14. What specifically could the dentist and/or dental hygienist do to help you reduce your dental anxiety?
Ending	15. Is there anything else you would like the researchers to know about this topic?

Appendix D – Interview Guidelines

Thank you for participating in this online Zoom interview. If you find that you are unable to attend, please call or text me (518-307-6972) as soon as possible so that I can arrange for another date to conduct the interview. To have an organized meeting please adhere to the following guidelines:

1. Make sure that you are using a computer or tablet with a camera, but your video will be turned off and you will choose a pseudonym to be shown.
2. Use a reliable internet connection.
3. You will receive a Zoom invitation that includes a link three days prior to the meeting. Please click the link to join the meeting 10 minutes prior to the start time of the meeting, this will allow for any trouble shooting if technical issues arise.
4. When asked what name you would like to be identified as, use your pseudonym.
5. Please keep the discussions related to the questions, the moderator will step in if the conversation is getting off track.

This meeting and your privacy will be kept confidential. You have the ability to leave the meeting at any time for any reason.

Appendix E – Office Recruitment E-Mail

Hello,

My name is Marissa Valastro, I am a graduate dental hygiene student at Idaho State University. I am conducting a study with my thesis advisors, Leciel Bono and Dr. JoAnn Gurenlian, on the perspectives of dentally anxious persons toward the management strategies that would reduce their anxiety in a dental practice setting. I would like to recruit moderately to severely dentally anxious persons who would participate in a 45-60-minute interview via Zoom. If you have a patient in your practice whom you think would be willing to participate in the study, please have them email me at marissavalastro@isu.edu and I will send an email providing more details. All participants in the study will be entered in a drawing to win one $50 Amazon gift card.

If you have any questions about this research, please contact either myself or my thesis advisor Leciel Bono (lecielbono@isu.edu).

Thank you for helping with this graduate thesis research!

Sincerely,

Marissa Valastro, RDH, AAS, BS, MSDH student

marissavalastro@isu.edu

Appendix F – Participant Recruitment Letter

Hello,

My name is Marissa Valastro, I am a graduate dental hygiene student at Idaho State University. I am conducting a study with my thesis advisors, Leciel Bono and Dr. JoAnn Gurenlian, on the perspectives of dentally anxious persons toward the management strategies that would reduce their anxiety in a dental practice setting.

You are being invited to participate in a research study about your perspective on dental anxiety and management strategies. Attached below is the Modified Dental Anxiety Scale. This scale measures levels of dental anxiety ranging from mild to moderate to severe. If the score from the scale is in the moderate to severe range, and you would like to participate in this study an interview will be scheduled at your convenience through Zoom. You will be asked to select a pseudonym to protect your confidentiality. The interview will be recorded and transcribed. The research project has been approved by the Idaho State University Human Subjects Committee.

To participate in this study, and informed consent will be sent to you prior to your interview, as well as the interview guidelines. The interview will take approximately 45 to 60 minutes. If you are interested in completing the Modified Dental Anxiety Scale and participating in this research study, please reply to this email.

All participants in the study will be entered in a drawing to win one $50 Amazon gift card.

If you have any questions about this research study, please contact either myself or my thesis advisor Leciel Bono (lecielbono@isu.edu).

Thank you for helping with this graduate thesis research!

Sincerely,

Marissa Valastro, RDH, AAS, BS, MSDH student

marissavalastro@isu.edu

*The Modified Dental Anxiety Scale will be attached in the email.

Dentally Anxious Patients' Perceptions of Oral Health Care

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Conflict of interest declaration. The authors have no conflicts to declare.

IRB #: IRB-FY2024-23

NDHRA: NDHRA priority area, **Client level: Oral health care** (new therapies and prevention modalities).

Manuscript Abstract

Purpose

The majority of adults in the United States struggle with mild, moderate, or severe DA in the United States. The purpose of this study was to identify patients' perspectives of factors that impact anxiety in a dental practice setting. Understanding the perspectives of the patients with DA may help oral health professionals gain greater insight into their needs, and how to provide an improved experience for these patients.

Methods

A qualitative, descriptive case study research design was used to identify patients' perspectives of factors that impact anxiety in a dental practice setting. To determine eligibility for this study, participants were screened using the Modified Dental Anxiety Scale (MDAS) and had to have moderate DA to qualify for the study. An interview guide that focused on obtaining information about the etiology, contributing factors, management strategies, and experiences of DA was used for the semi-structured interviews which were recorded by Zoom. The qualitative responses were coded using the qualitative research analytic platform Dedoose. The co-investigators systematically reviewed the codes using the classic analysis strategy and journal notes to identify themes and subthemes.

Results

Twenty-two individuals participated in this study. Most individuals reported having DA from early childhood throughout their adult life. Participants reported their primary method for managing DA was to avoid attending their dental appointments. Seven themes emerged including Avoidance, Supportive Behaviors, Confidence in Provider, Diversion, Enduring, Adaptations, and Benevolence.

Conclusion

Participants in this study expressed various coping mechanisms and management strategies to alleviate the symptoms of DA. Multiple opportunities exist for increasing patient-

provider trust and patient comfort to reduce DA, and ultimately improve the oral health status of those with DA.

Key Words: dental anxiety, coping mechanisms, triggers, dental practice setting, communication, patient-provider relationship

Introduction

Dental anxiety (DA) is a multifaceted disorder, due to the involvement of somatic, cognitive, and emotional behavior responses, that are triggered by the thought of and during dental treatment.[1] Between 50% and 80% of adults struggle with mild, moderate, or severe DA in the United States.[2] Most contributing factors found to influence DA are female gender, low education, low socio-economic status, and younger age.[3] Approximately 20% of dentally anxious patients do not regularly seek dental care while 9% to 15% avoid care altogether.[2] Etiologies that induce DA include traumatic childhood experiences within a dental practice, influences from family or media, certain psychological conditions, certain dental stimuli, low income, and poor oral health literacy.[1,4] Examples of dental stimuli are fear of pain, dental injection, sounds and smells, the sight of blood, fear of needles, fear of the unknown, and depersonalization.[5,6]

Dental anxiety is considered a barrier to dental care for those who suffer from this condition, which may lead to the worsening of those individuals' oral health because of the correlations found between DA, oral health, and quality of life.[7] Neglect in dental care negatively affects a person's oral health, which ultimately leads to the deterioration of a person's quality of life as well.[8] Poor oral hygiene results in an increased incidence of oral diseases that may lead to more invasive treatment.[7] Dentally anxious patients have been shown to avoid dental care until the pain is exacerbated enough to seek emergency treatment.[7] Quality of life is affected by DA and poor oral health by negatively impacting social interactions and relationships, work performance, sleep, self-esteem, and self-confidence.[5] Dental practitioners can help decrease the prevalence of dental anxiety by understanding how and why this disorder occurs.

Various techniques can determine the level of DA someone suffers from; physiological, behavioral, psychometric, and projective.[9] Dental practices tend to favor psychometric techniques using questionnaires or screening tools to measure the level of severity of DA.[4,5,10] For example, the Modified Dental Anxiety Scale (MDAS) contains five questions about different

dental situations, including a question about local anesthesia.[1] However, Drown et al.[4] reported that DA screening tools are seldom used. Drown et al.[4] conducted a study to assess what dental hygienists know, how they feel, and how they provide dental care to dentally anxious patients. Of the 355 dental hygienists who participated in the study, 99% were found not to incorporate screening tools.[4] Additionally, 67% did not know those screening tools and 63% of dental hygienists would sometimes to never ask patients about DA when reviewing medical histories, which is a much simpler way of identifying.[4] Armfield et al.[10] assessed 246 dentists' responses to how they identify and manage patients with DA. One question measured if the dentists were aware of the anxiety screening scales or not, and 56.6% were found to have no awareness.

Studies have shown dental practitioners are unprepared to treat dentally anxious patients because there is no formal training in management techniques.[1,4,10] Further, dental practitioners tend to underrate a patient's DA, when compared to the patient's rating.[11] Implementing an anxiety screening questionnaire would provide more frequent and correct diagnoses, that would facilitate better management. Additionally, there is no formal training for dental practitioners in proper communication skills about managing DA leading to patients feeling offended, uncomfortable, or misunderstood.[12] Patients report dental practitioners portray disregard for their feelings or exhibit judgmental behaviors. These negative experiences could result in the patient avoiding dental care long-term.[12] Poor communication between the dental practitioner and the patient could result in a negative experience and the patient avoiding dental care long term.[12] Dentally anxious patients would rather have dental practitioners understand and accept their ailment over technical competence.[13]

There are various management strategies that could be used to help alleviate DA. Psychotherapeutic interventions focus on either behavioral or cognitive adaptation.[5] Behavioral therapy uses learning to alter undesirable behavior. Muscle and/or breathing relaxation used in conjunction with guided imagery and possibly a physiological monitoring technique are involved in behavioral therapy. Cognitive strategies restructure negative cognitions and teach control

over negative thoughts.[5] Combining cognitive and behavioral therapies is the most accepted way to treat any situational anxiety because it changes both negative thoughts and behaviors concerning the anxiety. If non-pharmacological management strategies are still not effective in alleviating DA, pharmacological management may be necessary.[14] Nitrous oxide with oxygen analgesia is a pharmacological strategy shown to reduce mild to moderate DA. Prescribed oral sedation, such as benzodiazepines, and intravenous sedation are recommended to treat moderate to severely anxious dental patients.

Although strategies exist for screening and providing care for patients with DA, improvements are needed in the utilization of these tools and techniques. Understanding the perspectives of the patients with DA may help oral health professionals gain greater insight into their needs, and how to provide an improved experience for these patients. Therefore, the purpose of this study was to identify patients' perspectives on factors that impact anxiety in a dental practice setting. The following research questions guided the conduct of the study: What factors contribute to patient anxiety in a dental practice setting? How do patients currently cope with anxiety in a dental practice setting? What interventions would reduce patient anxiety in a dental practice setting?

Methods

A qualitative, descriptive case study research design was used to identify patients' perspectives on factors that impact anxiety in a dental practice setting (IRB: FY2024-23). The COREQ Checklist was utilized in creating and evaluating the study design.

A purposive sample of patients with DA were invited to participate in the study. Patients were required to have moderate DA to qualify for the study and be 18 years or older. Exclusion criteria included individuals who were less than 18 years of age and those with mild DA. Snowball sampling was the method used to acquire the study participants by asking dental practitioners and participants to refer those they know who exhibit DA. The participants came from the eastern coast of the United States.

To determine eligibility for this study, participants were screened using the Modified Dental Anxiety Scale (MDAS). This screening tool includes five questions measuring the level of DA one possesses on a scale of one to five with one indicating not anxious and five indicating extremely anxious. Topics include how one would feel if they went to the dentist for treatment tomorrow, sitting in the waiting room, having a tooth drilled, about to have teeth scaled and polished, and about to have a local anesthetic injection. Scores on the MDAS range from 5 to 25 with five indicating mild DA, 11 equaling moderate DA, and 19 signaling severe DA.[8,15] The MDAS has demonstrated high reliability and excellent completion of scale items with an internal consistency of 0.957.[16] The concurrent validity was evaluated between the Corah's Dental Anxiety Scale and MDAS with a correlation coefficient of 0.85 ($P<0.001$).[15] To qualify for the study, participants were required to score at least an 11 on the MDAS indicating moderate DA.

The interview guide (Table I) was developed based on a semi-structured method, which focused on obtaining information about the etiology, contributing factors, management strategies, and experiences of DA.[17] The interview included five elements: an opening question, introductory questions, transition questions, key questions, and an ending question asking participants if there was anything they would like the researchers to know about this topic. The interview guide was validated by two experts in qualitative research, as well as conducting a pilot interview.

The individual interviews lasted approximately thirty minutes. The principal investigator (PI) conducted each interview with a co-investigator serving as an observer. The interview protocol was followed to ensure no biases were introduced to enhance methodological rigor. The PI evaluated each transcript to ascertain the key concepts were represented and that participants were allowed to restate main ideas to further support non-bias.[17]

Each interview and closed-caption transcript was recorded by Zoom and saved to a Zoom encrypted password-protected account. Only the PI had access to the recordings. The PI was responsible for verifying the accuracy of the transcripts. Each participant was provided an

opportunity to review their responses for accuracy. Interviews were conducted until saturation was reached.

Following each interview, the PI completed journaling and summarized notes. The qualitative responses were coded and grouped into parent and child codes related to the participants' feedback using the qualitative research analytic platform Dedoose.[18] The co-investigators systematically reviewed the codes using the classic analysis strategy and the journal notes to identify themes and subthemes.[19] Validity was established by pilot testing the interview, triangulation, and saturation. Member checks also helped to ensure that the researchers' interpretation of the data was accurate.[19,20]

Results

Twenty-two individuals participated in this study. Sixteen (72.7%) were female and six (27.3 %) were males. The age range of the participants was from 18-71 years with an average age of 42.7 years. The majority of participants (n=18, 81.8%) were from New York, two (9.2%) were from Florida, one was from New Jersey (4.5%), and one was from Massachusetts (4.5%). Six participants (27.3%) presented with moderate DA with scores ranging from 11 to 18 on the MDAS while 16 participants (72.7%) had severe DA with scores ranging from 19 to 25 on the MDAS.

Participants were asked to describe how long they experienced DA. Most individuals reported having DA from early childhood throughout their adult life. Three participants noted their DA began in their mid-forties. When asked what triggers contributed to the original feeling of DA, participants described either a poor interaction with a dental provider or a bad experience during a dental procedure. For example, Jill described,

> *So I was in this appointment, and the dentist gave me one shot of novocaine in each of the 3 areas. One shot that was it, and then proceeded to take my teeth out. I expressed discomfort and pain. And he told me that he hoped he wasn't around when I gave birth*

because I was being a baby, like basically I mean, it was incredibly insulting. I felt very powerless.

Steve explained,

So, it was a precursor to getting braces for an overbite and they were taking out the 4 bicuspids just to create room to get everything aligned. So, I went to the regular dentist, and when I got there, they numbed up the bottom, but then, I remember, he hooked the needle, like he turned it into a fishhook, and went through like the palate on the top of my mouth. And that was a new level, a new experience. And he said I should be numb, and he started the extractions. They had a nurse, or a hygienist hold my head and then he had a knee on my chest, and I mean he was really pulling and yanking and driving and grinding, and he got the 4 of them out, and I'll just never forget at the end he says, 'Wow! If I knew they had roots like that, I would have sent him to an oral surgeon.' And I think just sitting through that hour and a half of trying to get those teeth out, it just kind of set in stone that I wasn't thrilled to be there. And yeah, I'd say by the time we got the braces off about 3 and a half years later, I pretty much didn't go back to a dentist.

Participants were also asked to identify what dental and dental hygiene procedures create anxiety and what other factors contribute to DA in the office setting. Dental hygiene scaling, administration of local anesthesia, and restorative procedures were techniques that precipitated DA for many participants. Sensory issues such as smells, noises, taste, and sensations as well as waiting too long in the reception area appeared to increase anxiety. Table II summarizes procedures and provider actions associated with DA.

As participants described experiences related to dental procedures that contribute to DA and strategies that help manage DA, seven themes emerged including Avoidance, Supportive Behaviors, Confidence in Provider, Diversion, Enduring, Adaptations, and Benevolence.

Strategies Used to Help with DA

Participants were asked to identify what strategies they used to help with DA in the past. Two themes emerged from these questions: Avoidance and Supportive Behaviors.

Participants reported their primary method for managing DA was to avoid attending their dental appointments. Many respondents stated that they avoided the dental office on average for two to six years while one individual indicated not attending a dental practice for 10 years or more and another for 20 years. These avoidance behaviors were associated with bad experiences in dental practice settings. Illustrating this issue was Dale, “So I skipped going to the dentist for a good 5 years to avoid that and my first one back after that I had 8 different cavities that all needed to be done.”

Other than avoidance, participants described coping strategies that enabled them to complete dental and dental hygiene appointments successfully. These strategies were supportive behaviors that created protective mechanisms to assist them in reducing their DA sufficient to finish a procedure and/or schedule a follow up appointment as needed. Several subthemes became evident such as Preventive, Medication, Breathing, and Sensory. Several participants noted that if they performed excellent oral hygiene care, they were preventing oral disease and would not require extensive dental or dental hygiene procedures. As Dani noted,

> I'll be real honest. Avoid what causes you to have a cavity. I'm very religious about [going to the dentist] every 6 months, I avoid any food that might be sticky. I'm very extreme about brushing teeth. I floss. Then I water pick, and then I brush my teeth.

Other participants relied on medications to reduce their anxiety. Xanax and valium were prescribed, and nitrous oxide-oxygen analgesia was used in-office to alleviate anxious feelings. As Rick expressed, “I would not be getting services if it wasn't for nitrous. I can't imagine, if that wasn't available to me, or I couldn't afford to pay for it out of my pocket.” Some participants preferred breathing exercises as an alternative to medication. For example, Caroline explained that she performs breathing exercises, “Usually when I'm in the car before I go in; in the parking

lot before I go into the waiting room." Lastly, several participants related the use of sensory strategies to deflect the noises of the office and help them focus on reducing their DA. Jim described, "Just through my headphones to kind of drown out some of the outside noise" while Brad stated he,

"Listens to my own music and then I can adjust the volume if it's getting to a point where my anxiety is going through, I can either hear or really feel like what's happening to try to distract me."

Coping with DA Now

As interviews continued, participants were asked to describe how they coped with DA presently. Three themes emerged from this discussion including Confidence in the Provider, Diversion, and Enduring.

Many of the participants related that their DA improved as they developed trust and confidence in their oral health providers. As Tess indicated, "I have a very good oral surgeon that I've been going to for over 25 years. So I knew that when he told me it was gonna be okay, I kinda trusted that it would be, and he was right." Anna confirmed this perspective, "I found a dentist that I can talk to, and that talks to me, and it's been better having one that I trust."

Other participants indicated they used a variety of diversionary tactics as coping strategies to manage their DA. These strategies include humor, fidgeting in the dental chair, distractions, and positive thoughts. For example, Bex stated, "I purchased an anxiety ring which is like a fidget spinner that you wear as jewelry. That helps a lot in the chair." Chad offered, "I get a little jokey. I try to make light of it and have fun with it."

Some participants described doing their best to survive each dental appointment hoping to contain their DA. As Jim expressed,

> Yeah, when I don't go. I'm not nervous about it. But it's always in the back of my mind that I know I need to go. I need to be going on a consistent basis. So it's just something I just force myself to do and get over. I just force myself to get through it.

Informing Providers of DA

Participants were asked to identify how they inform oral health providers of their DA. Most participants were honest about their dental fear. Some preemptively apologized for their anxiety while others tried to be nonchalant about their DA. Some participants indicated they did not inform the providers at all because they believed the providers should have intuited their anxieties. When asked how providers responded to being informed about their DA, there were more positive responses than negative reactions. The general positive responses demonstrate understanding, compassion, support, and a willingness to accommodate participant needs. As Laura reported,

> I was right up front with them when I started as a patient, I just said, ‘Look, I'm really uptight, I don't want anything to hurt.’ And they were really good about it. They said, ‘Okay, don’t worry. We'll give you whatever you need.”

On the other hand, Erica experienced a negative response from a provider about her DA. When discussing treatment with her dentist, his impatience with her was heightening her DA so much so that she stated she may need a prescription for Xanax, to which the dentist replied, "you're gonna have to bring me some just to deal with you."

Additional Strategies Participants Use to Reduce DA

When participants were asked what additional strategies they might try to use to help reduce DA, the theme Adaptations arose. These additional approaches included asking questions of the practitioner to better understand the procedures that would be performed, avoiding coffee in the morning so they weren’t already stimulated, scheduling morning appointments so that the appointment is completed earlier in the day, attending appointments routinely rather than avoiding oral health care, advocating for oneself better, and using comfort remedies. As Charlotte noted, “I've thought about bringing a weighted blanket in or having something different for my hands or asking to bring my dog in kind of like a therapy dog.”

Provider Strategies to Reduce DA

Participants were asked what oral health care providers could do to help alleviate their DA. Benevolence was the theme that developed. Examples of this theme included clinicians who offered suggestions for alleviating DA; provided distractions such as talking through a procedure, music or headphones; provided reassurance, understanding, and compassion; and, administered nitrous oxide-oxygen analgesia, topical anesthetic or local anesthesia, warm blankets, or a therapy dog for comfort. As Chad reported, “The music kind of helps drone out everything, and the dental hygienist, as long as they're nice and talkative and stuff like that, I think that's great.” Harvey affirmed, “Just always being open to working with me, not getting frustrated with me and with the stuff that happens, being willing to get through it together. Telling me that it's okay, reassuring me. So that's always good.”

Final Thoughts

At the conclusion of the interview, participants were offered an opportunity to provide final thoughts to the researcher. Some individuals offered additional impressions of their experiences receiving oral health care. For example, Laura expressed how she feels at the end of an appointment, “Happy. Thrilled. I'll see them in 3 months. I'm like, ‘Oh, that wasn't so bad. Why am I so stressed out about this all the time?’ Dentistry has come a long way.” A different perspective was provided by Steve.

> So my temperature drops. I get cold. I get shaky. Fidgety. I'm anxious. I'm sick to my stomach. Dry mouth. Just not feeling great. It's an interesting conundrum where the fear is having something major be wrong but it's preventing you from going to prevent the thing from being wrong. A self-fulfilling cycle of fear where you don't go on a routine. So you're not getting taken care of to prevent issues. And then when you go and you have issues, they find more issues.

Many participants emphasized to the researchers that anxiety is real. Mara stressed, “I am not an anomaly. I think there are more people like me. I suspect there are people who don't go to

the dentist because of that." Further, they wanted DA to be taken seriously and believed that oral health professionals were not well educated in this area. As Emily stated, "I don't feel like it's talked enough through the dentist and the dental hygienist and anyone else who's in the office. I don't feel like they're prepared or not necessarily trained for that type of interaction with the patient." Further, she noted that providers should be more attuned to the body language of the patient.

> Oh, hey! I noticed you're gripping the handles of the chair pretty hard. You okay? Are you feeling any pain? Just kind of like being more aware of what's going on with your patient, besides just their teeth by taking in their full posture and everything.

Discussion

The findings of this study provided an opportunity to gain a broader perspective on DA. Many participants felt strongly that they wanted dental providers to recognize that DA is a real condition that requires diagnosis and warranted treatment considerations. However, there are underlying considerations that influence the recognition and management of DA. For example, many participants reported they do not inform oral healthcare providers of their anxieties. The participants believe that oral healthcare providers should be able to identify their anxiety through the physical reactions they manifest. This problem could be resolved if patients were more forthcoming about their fears; however, they need to recognize that healthcare providers are not clairvoyant, nor should they be expected to be. While oral health professionals can be empathetic and attuned, they still may not be readily aware of a person's DA if they are not overt in presenting anxiety-related symptoms.

In addition, this situation of recognition of DA is compounded by the fact that a percentage of oral healthcare providers lack knowledge regarding DA, including identification and management.[1,4,10] An Australian-based study found that there is limited undergraduate training for dentists concerning DA.[10] There was a higher percentage of those who found that they received fair to poor education.[10] Furthermore, 20% of the participating dentists do not

screen their patients for DA and additional evidence shows dentists do not properly rate DA without the use of an anxiety screening scale.[10,11] Diagnosing DA is the first step in helping a patient manage their anxiety and create effective therapeutic interventions.[10] Individualized care is needed as every patient's DA is expressed differently and strategies are not one size fits all.

Another interesting finding of this study was women tended to be more expressive of their fears and more readily open to discussing them. Men appeared to be more reserved due to the mindset that they should be strong, or it would be embarrassing to show fear. These sentiments were noted as cultural representations of gender identity.[7,21]

A compelling aspect of this study is that participants expressed their need for validation and understanding but reported how they rarely received those experiences in the dental practice. This finding was similar to a study by Wang et al.[22] whose participants wanted their dentists to show patience, understanding and sympathy throughout the treatment process and work towards developing a relationship of trust working together to manage their DA. Establishing effective, positive patient-provider communication on both ends is the key to building a trusting relationship and is pivotal to managing DA and person-centered care.[23,24]

Based on the results of this study, oral healthcare providers contributed to the prevalence of DA by perpetuating negative experiences through a lack of communication. Others have noted that providers' actions are a contributing factor leading to a barrier to dental care.[12,25,26] Most individuals in this study also felt that the provider did not have adequate communication skills when they addressed pain and were offended by comments made about their DA. The negligence in communication and provider acknowledgment of DA contributes to an increased prevalence of DA, mistrust, and avoidance of care.[3, 25] Multiple individuals reported their negative experiences within a dental practice setting led to avoidance of care at some point in their lives. These findings align with previous research that feelings of negative communication contribute to DA and delay access to care.[12,23,26]

Those who do not avoid oral healthcare endure through their DA because they recognize the importance of their oral health. Van der Zande et al.[25] conducted a qualitative study that found their participants were only motivated to attend their dental appointments based on the importance of oral health. The cycle of fear dentally anxious people experience continues when they start avoiding oral healthcare. Avoidance leads to problem-oriented visits and typically more invasive treatment.[7,21] Dentally anxious patients are more likely to have higher scores on the decayed, missing, and filled teeth index.[3] These troublesome consequences that arise from avoidance could be prevented if oral healthcare providers focus on reducing avoidance behaviors for this population.[21] For providers to reduce or eliminate this cycle of fear, proper education regarding the identification and management of DA and communication skills is needed. Patients will be more apt to pursue routine oral healthcare once they establish a trusting relationship and efficient coping strategies.[23] Figure I demonstrates a cycle of dental fear.[27,28] This model can be modified to reflect the primary factors of why the cycle begins, shown in Figure II. Deterring the start of this cycle of fear begins with focusing on the oral healthcare providers.

Opportunities exist to better prepare oral health professionals to assist patients with DA. Curriculum content can be modified to include screening tools to assess for DA, as well as coping strategies appropriate for levels of DA. For those practitioners who are in the workforce, continuing education programs should be offered that address these same principles. Within these curriculum/continuing education programs, individuals should learn strategies for improving the office environment so it is less threatening including the use of calming music, headphones, aromatherapy, therapy dogs, and weighted blankets.[29,30] Some offices now offer patients a menu of calming services that they can choose before attending their appointment, so they already are anticipating a more relaxed environment and experience to allay some of their fears. In addition, the health history form should specifically address DA, signs and symptoms, and treatment currently used so the oral care providers are informed and can converse with the

patient about their condition.[10] When possible, having a more secluded treatment room available to patients with DA is an option to allow privacy for patients who are embarrassed by their DA or uncomfortable by hearing the treatment being performed on others. Individuals with higher levels of DA may require advanced strategies to reduce anxiety such as cognitive behavior interventions or pharmacological management.[13] However, pharmacological interventions should only be incorporated when all non-pharmacological strategies are exhausted.[14]

There are limitations to this study. The purposive sample and size for this study precludes generalizability to the entire population of people with DA. However, qualitative studies are meant to focus on obtaining rich information to understand how people interpret their experiences.[17] Another limitation was having the PI conduct the semi-structured interviews. A pilot interview was implemented to ensure the researcher maintained neutrality during the interview in a calm, relaxing manner and remained non-reactive in non-verbal body language. Steps were taken to control researcher biases, such as pilot-testing the questions, member checks, and using an ending question that allows participants to restate their position on the matter.

Further research is needed to examine gaps in dental and dental hygiene curricula related to DA and where modifications could be made to improve provider skills in screening and effectively managing DA in dental practice settings. Additional research related to methods for increasing awareness of the impact of dental clinician behavior on patient DA and strategies for changing behavior is essential.

Conclusion

This qualitative study investigated participants' perceptions of dental anxiety. Participants in this study expressed that DA is real and that collaboration between the patient and the provider is key to helping alleviate the symptoms of DA. Avoidance of dental treatment was cited as a primary coping strategy hindering individuals from achieving optimal oral health.

Multiple opportunities exist for increasing patient-provider trust and patient comfort, reducing DA, and ultimately improving the oral health status of those with DA.

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Table I: Interview Guide

Opening	1. Tell us your pseudonym for this research and when was your last dental or dental hygiene visit? 2. What was completed during that appointment? 3. Describe your feelings of those experiences.
Introduction	4. How long have you experienced dental anxiety?
Transition	5. What, if anything, contributed to your original feeling of dental anxiety?
Key	6. What dental and/or dental hygiene procedures create anxiety for you? 7. What other factors contribute or cause anxiety in the dental office setting?
	8. What strategies have you used in the past to help with your dental anxiety? 9. Have any of those strategies been successful? If not, why not?
	10. How do you typically cope with your dental anxiety now?
	11. How do you inform the dentist or dental hygienist that you have dental anxiety? 12. What responses have you received from them?
	13. What additional strategies might you try to use to help you reduce your dental anxiety? 14. What specifically could the dentist and/or dental hygienist do to help you reduce your dental anxiety?
Ending	15. Is there anything else you would like the researchers to know about this topic?

Table II: Dental Anxiety Created in a Dental Practice Setting

Dental and Dental Hygiene Procedures	Provider Actions

Every Single Procedure
Restorations
Extractions
Scaling
Local Anesthesia
  Injections
  Fear of needles
X-rays
Flossing
	Inconsistency

Waiting Room
  Waiting too long
  Hearing others
	Personal Space
	  Having hands in mouth

Sensory
  Smell
  Too Sterile
  Drilling of bone
  Sights
  Operatory looks like a medieval torture chamber
  The instruments
  Lighting is strong on the eyes
  Noise
  High-pitched whine from drilling
  Scaling
  Suction
  Sensation
  Scaling/scraping on bone
  Sharp instruments are uncomfortable in gums
  Metal against teeth
  Feeling the pressure during scaling
  Chair feels claustrophobic
  If something falls onto tongue
  The grit
  Vibration of polisher
  Taste
  Plastic from sensor
  Blood
	Lack of information
	  Poor communication
	  Not being able to vocalize during procedure

Anticipation of Pain	Not recognizing signs of anxiety
Openness of operatories Everyone will hear	Rushing procedures or patients when they are not ready
The Dental Unit AKA “The Chair” Positioning back too far	Telling patients not to think about it, relax, or to take calming breaths
Cost	Speaking in dental terms
The Thought of Going	Fear that Provider will break a tooth
	Anticipation that provider will find a cavity

Figure I[27,28]

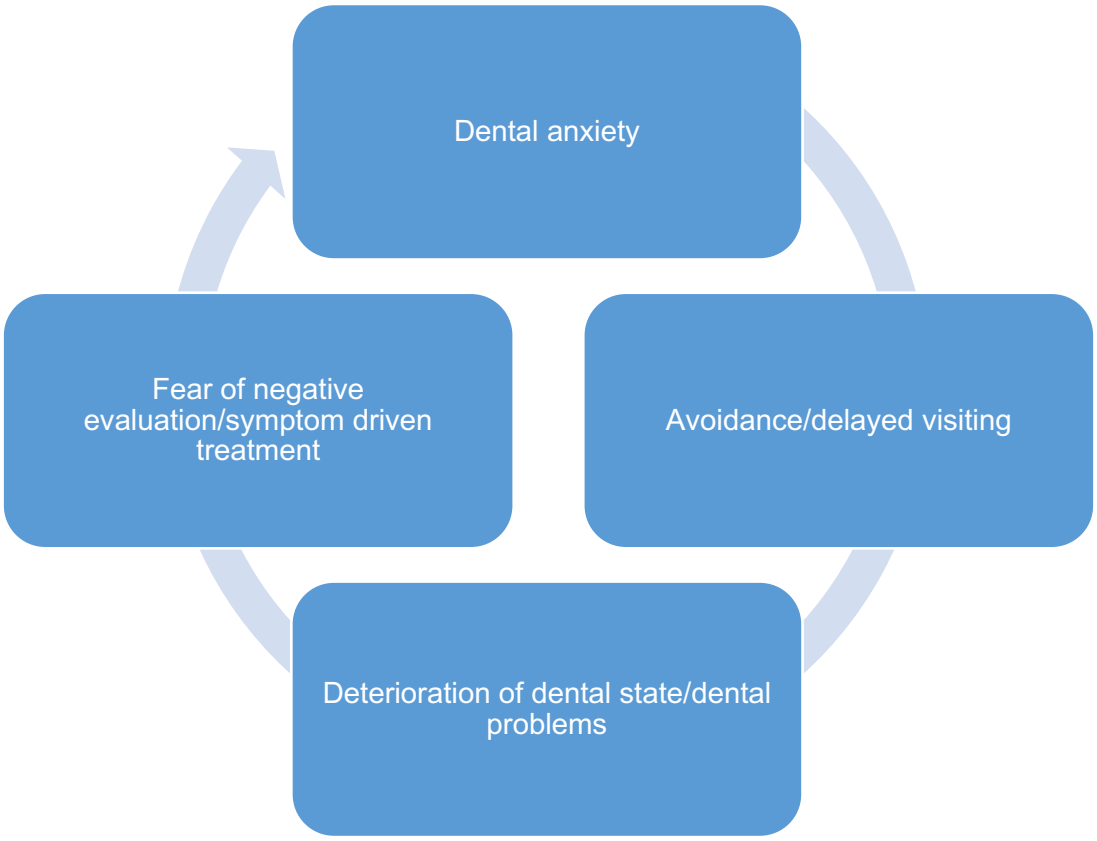
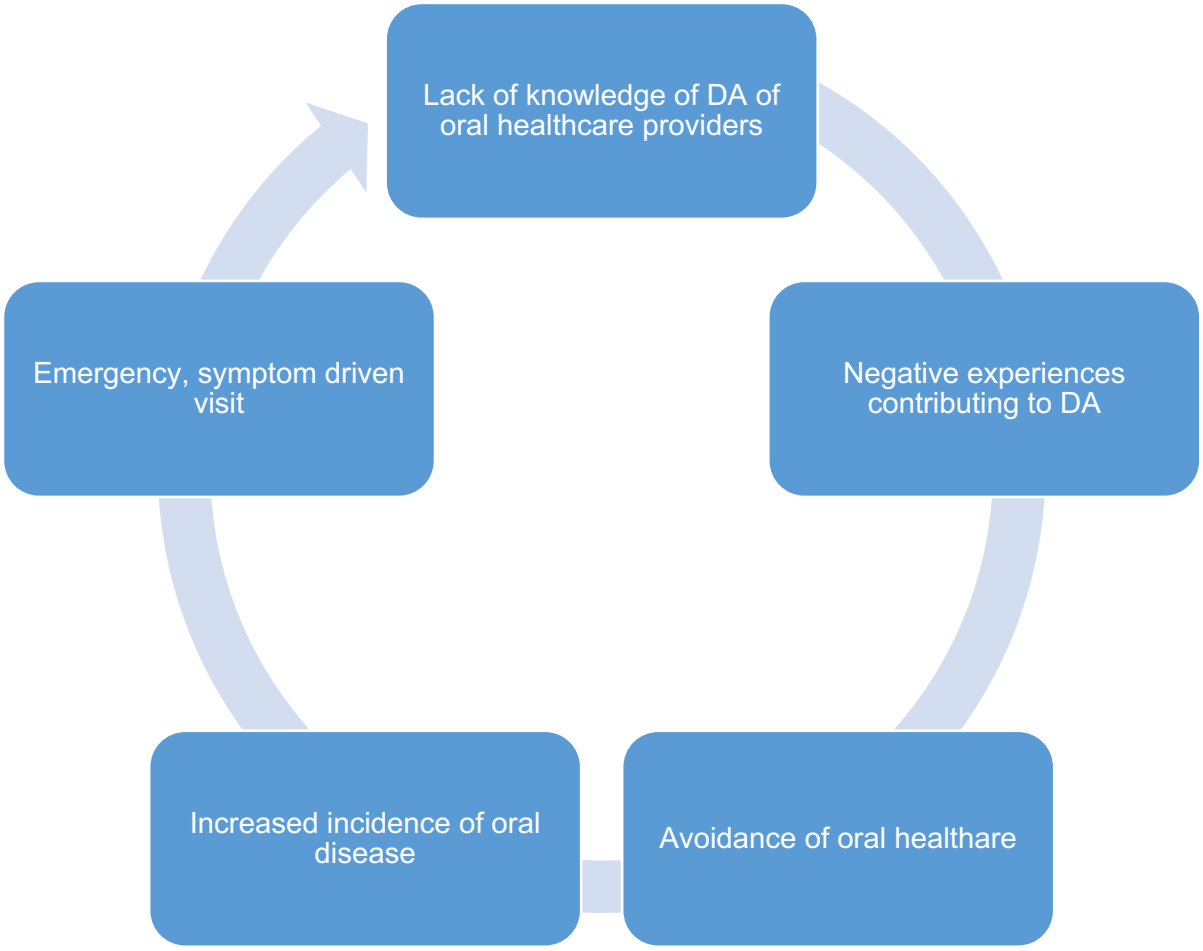


Figure II


Lack of knowledge of DA of oral healthcare providers
Negative experiences contributing to DA
Avoidance of oral healthare
Increased incidence of oral disease
Emergency, symptom driven visit