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ASSESSMENT OF DENTAL ANXIETY AND PHOBIA IN UNIVERSITY STUDENTS AND DENTAL HYGIENE CLINIC POPULATION IN EAST TEXAS

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Abstract

ASSESSMENT OF DENTAL ANXIETY AND PHOBIA IN UNIVERSITY STUDENTS AND DENTAL HYGIENE CLINIC POPULATION IN EAST TEXAS

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Background. Dental anxiety is a persistent and irrational fear of dentists or dental treatment. It can manifest in a variety of ways, including avoiding the dentist, which can lead to poor dental health and decreased oral health-related quality of life (Murad et al., 2020). Furthermore, DA is an understudied problem in adults and knowledge about its prevalence is lacking as well as about the causes of dental phobia.

Objectives. This study aimed to explore and compare the prevalence and factors of DA and dental phobia between a university population and a dental clinic population in northeast Texas.

Methods. This is cross-sectional quantitative research. Participants included UT Tyler students as well as Tyler Junior College dental hygiene clinic clients. To assess DA, a Qualtrics survey was utilized, which included demographic information, oral health behavior, habits, mental health, diet, and the Modified Dental Anxiety Scale (MDAS). IBM SPSS was used to analyze the data.

Results. 50.3% of UT Tyler students had moderate to high levels of DA, while 44.4% of TJC clinic clients had moderate to high DA. Almost 1 out of 5 (18.2%) of UT Tyler students were extremely dental anxious or phobic, while 12.5% of TJC clinic clients were extremely anxious or phobic about going to the dentist. At UT Tyler, dental anxiety is controlled by factors such as age, gender, brushing frequency, current dental problem, dental efficiency, oral health examination more than a year ago, and mental health. Brushing frequency was found to control dental anxiety in TJC.

Conclusion. This study emphasizes that age is important in university students but education level is important in public service clients. Furthermore, oral cleanliness habits are important for both groups as well as general cognitions in students. The intervention at the community level for DA is recommended.

Key words; dental anxiety, dental phobia, oral health, students, dental hygiene, behavior, mental health, dental anxiety scale

Chapter1: Introduction

In today's world, anxiety, psychological stress, and perception of pain are common problems for any age. In general, anxiety is defined as is a mental state characterized by worry, fear, and apprehension over an impending future event. Fear is an appropriate response to a real threat while anxiety is best viewed as an exaggerated response to a situation that is not likely to occur (APA Dictionary of Psychology, n.d.). Dentistry procedures are often related to pain and anxiety.

Dental anxiety is a persistent and irrational fear of dentists or dental treatment. It can manifest in a variety of ways, including avoiding the dentist, which can lead to poor dental health and decreased oral health-related quality of life (Murad et al., 2020). DA and dental pain are an important factor of medical emergencies in the dental clinic. (Facco & Zanette, 2017). The global prevalence of DA is approximately 15% (Silveria et al., 2021). DA and fear are the potential reasons to avoid dental care (Appukuttan, 2016; Beaudette et al., 2017; Silveria et al., 2021). People who have DA are resistant to dental treatment and preventive measures (Crego et al., 2014). DA and dental phobia vary in severity and may reflect complex psychological problems that have significant effects on the lives of the individuals who suffer. For example, the quality of life for those who suffer may diminish, causing avoidance of the dentist, which leads to poor oral health in general such as increased dental decays (Beaton et al., 2014). National oral health surveillance reports show that prevalence of overall adult, untreated dental caries is about 26% and prevalence of untreated dental caries in younger adults is slightly higher at 29%. The Texas Department of State Health Services (DSHS) reports that adult Texans aged 19 years or older are not receiving enough dental care (Texas DSHS, n.d.). Poor oral health and untreated dental disease are potential reasons for increased anxiety about dental visits and vice versa.

Therefore, it is important to address the underlying factors and causes of DA in order to improve overall oral health.

In general, mental health disorders have their peak incidence during the young adulthood period. For example, anxiety disorders are the most prevalent psychiatric problem among college students with approximately 11.9% of college students suffering from anxiety related disorders (Pedrelli et al., 2015). DA has a strong association with other mental disorders like phobia, depression, and mood disorders. In addition, students who report needing treatment frequently or at every dental check-up also tend to have high dental fear (Pohjola et al., 2016).

Dental anxiety and phobia can cause people to avoid necessary dental treatment, which may result in poorer oral health. It is important to understand the factors of DA and phobia in order to address the community's dental problem (Beaton et al., 2014). Evaluating the level of anxiety of patients can reveal details about attitude towards dental treatment (Al-Omari & Al-Omiri, 2009). According to Seligman (2017), DA is an understudied problem in adults and knowledge about its prevalence is lacking as well as about the causes of dental phobia.

Aim/Purpose of the study

This study aims to explore and compare the prevalence and factors of DA and dental phobia between a university population and in dental clinic populations in northeast Texas.

Research questions

1. What is the prevalence of DA among university students and in a dental clinic population?
2. What are the associated factors that lead to DA?
3. How is oral health related to DA?

Hypotheses

- There will be an inverse association between dental anxiety (High score in MDAS scale) with Oral health behaviors.
- There will be a gender difference in DA.
- There will be an association of mental health (GAD, MDD, Phobia) to DA.
- There will be an inverse association of dental efficiency (ability to talk, eat, chew) to DA.
- There will be an inverse association of good diet profile to DA.

This study answered these questions by assessing the DA using the MDAS Scale.

The next chapter will highlight important research on this topic, through already published literature.

Chapter 2: Review of Literature

Oral health in General

Oral health is generally defined as the state of the mouth and associated structures and tissues, and refers to the ability to contain disease, inhibit future disease, and allow normal mastication including its appearance and function (Yewe-Dyer, 1993). Oral health is an integral part of general health (Baiju et al., 2017). Overall health and wellness cannot be achieved without oral health, and both of them are closely linked. A report from the United States Surgeon General states dental or oral disease as a "silent epidemic", and oral health is important to a person's overall health. The mouth is a "mirror of general health and wellbeing" (USDHHS, 2000, 489–90). Dental diseases cause pain and discomfort. They can also affect a person's ability to chew, talk, and smile, as well as influence that person's social roles.

Health-related quality of life is multiplex and multifactorial which includes so many factors like physical, emotional, social, etc. The quality of life can be affected by various health related issues such as diseases, injuries and so forth (Zucoloto et al., 2016). The concept of health-related quality of life has been recognized since 1948 when the World Health Organization (WHO) expanded the definition of health. It has resulted in the paradigm shift from a medical model of health and disease to a biopsychosocial model of health and disease. A person's oral health also indicates general well-being so that he or she can perform normal functions, as well as contribute to society (Baiju et al., 2017). A study conducted on Brazilian dental patients assessed the quality of life and its association to oral health. It concluded that the variables that impact oral health, like age, pain, chronicity of disease, influences the health-related quality of life (Zucoloto et al., 2016).

The American Dental Association (ADA) suggests that brushing, flossing, mouth washing, controlling consumption of sugar, following preventive dental procedures, and regular dental visits play an important role in oral health. And a self-care routine is an important factor for preventive behavior. Assessment of oral health behavior is also an important tool for finding dental problems in communities (American Dental Association, n.d.).

Oral health conditions and associated systemic diseases

The main oral health conditions in the world are: dental caries (tooth decay), periodontal diseases, oral cancers, oral manifestations of Human Immunodeficiency Virus (HIV) (such as Ebstein Barr and candida infection, or Kaposi sarcoma), Oro-dental trauma, cleft lip and palate, and Noma (severe gangrenous disease starting in the mouth, mostly affecting children) (World Health Organization. (n.d.)). Most of these conditions are largely preventable and can be treated in early stages. Oral diseases pose a major health burden for many countries and affect people throughout their lifetime, causing pain, discomfort, disfigurement and even death (World Health Organization, n.d.). There are many studies which establish the association between dental and systemic health. DeStefano et al. (1993) concluded that dental disease is associated with an increased risk of coronary heart disease in young men. There are many oral-systemic disease links, including periodontal diseases and cardiovascular disease, high blood pressure, stroke, diabetes, dementia and respiratory diseases. The connection between oral diseases and mortality from these conditions has been explained by an inflammatory pathway that runs through all the conditions (Sabbah et al., 2019). The study of Pavlic et al. (2021) revealed an increasing association between periodontal disease (gum and peri dental structural disease) and atherosclerosis, over past decades, and this study specified that there is a relationship between

periodontal pathogenic bacteria and atherogenesis. There is also an association of pneumonia and oral health status (Azarpazhooh & Leake, 2006).

Let us flip this causal pathway and think of associations of systemic disease which leads to dental disease. A number of systemic conditions and diseases can affect oral health and physical inability to maintain appropriate oral hygiene (Villa et al., 2022). Systemic conditions which also affect oral health includes: Alzheimer's disease and dementia associated with decayed or missing teeth, stomatitis and overall poor oral status (Hamza et al., 2021), diabetes and risk of periodontal disease (Gaddey, 2017; Kim and Amar, 2008), and osteoarthritis or osteoporosis and increased risk of periodontal disease (Kim et al., 2008). Radiotherapy consequences through cancer treatment, such as salivary gland dysfunction and xerostomia increase the risk of dental caries, which can furthermore lead to serious health complications such as infections and tooth loss (Gupta et al., 2015). Sjögren disease (an auto immune condition affecting glands) and increased risk of dental caries, infections, and difficulty in swallowing also adds risk (Gaddey, 2017). HIV infection also affects oral health because patients with HIV have a higher risk of developing oral candidiasis (yeast infections) as an opportunistic infection (Warrier, 2015). Behavioral and social disorders such as interpersonal violence or elder abuse can also present challenges to the dental clinician because they may impede patient care (Villa et al., 2022).

Previous studies about oral health behavior in universities

Basch et al. (2019) studied various dental health levels and behaviors in a sample of college students, as well as identified barriers to oral healthcare. Nearly a third of the U.S. students had untreated dental health issues. Mostly, their barriers are treatment cost and lack of time for their self-care routine in the mornings. Griner et al. (2021) did a quantitative study

assessing oral health behaviors, and interest in university-based oral health information and services. They concluded that college students may benefit from information and services to promote oral health. A study of Kuwaiti male health science students found that they did not meet the international recommendation of brushing their teeth twice a day, flossing once a day, and using mouthwash. These students had limited knowledge of oral health issues (Al-Ansari et al., 2003). Another quantitative study in the Turkish university population evidenced that preventive behavior in students is at a low level and only 3% of participants using an interdental cleaning tool. Dewald (2016) concluded that there is still a need for dental health education in all college populations and especially in minority and international students. Also, the author states, "What is not known are the dental and oral health habits of college students, this needs to be determined by future research" (Dewald, 2016, 26-37). If a university offers dental services, it should be easily accessible and will be a positive encouragement to maintain oral health for students (Griner et al., 2021). Also, it can provide dental education to the students. Dewald (2016) stated that students are generally risk takers. They do not usually have the proper supervision to monitor their routines. The combination of busy student, risk-taker, and lack of campus dental care is a dangerous triad.

Oral health status of U.S and Texas

In an oral health surveillance report of the U.S., implied prevalence of dental caries in the 20-34 age years group is 29%. A report by the Surgeon General stated that dental problems is a wide spread concern and included dental caries, periodontal disease and oral cancer as a chronic disease in the older adult population. Ninety-one percent of American adults will already have had tooth decay by the age of 60 (USDHHS, 2000). People of every age in Texas are affected by tooth decay, gum disease, and other oral diseases; 7.5% of Texas children and 11.6% of Texas

adults currently have poor dental health. The main types of problems with teeth and gums are dental caries, periodontitis, and oral cancer (Texas DSHS, n.d.).

According to a report on the burden of oral disease in Texas, in 2018, factors contributing oral disease are sugary beverage consumption, tobacco and alcohol consumption, absence of fluoridation, and food insecurity. Drinks like soda, sports drinks, energy drinks, and 100% fruit juices are main sources of additional sugar in the American diet. Risk of dental caries is associated with beverage consumption and remains consistent at any age, education and whether one uses fluoridated tooth paste or not. Smoking behavior increases susceptibility for oral disease. For example, smokers have twice the rate of edentulism (15%) than non-smokers. Fourteen percent of Texan adults aged 18 or more smoke cigarettes (Texas DSHS, n.d.). And alcohol use is also associated with dental caries, periodontal disease, and edentulism. Concerning public water fluoridation in Texas, only 44% of the water system contains natural or added fluoride. Lastly, food insecurity is a term that means limited availability of nutritious food. The prevalence of this situation is 60% particularly in low-income rural areas. The adult population in northeast Texas region has the highest estimated obesity rates (45.6%) and diabetes rates (17.2%), in the state (Texas DSHS, n.d.).

Texans face many barriers to receiving care. There are financial barriers, as well as cultural, institutional, and informational barriers. Barriers to health care are particularly problematic for people who have low incomes, disabilities, limited English proficiency, and complex health care needs. For example, the northeast region in Texas does poorly on oral health provider supply and oral health outcomes (Texas DSHS, n.d.).

Northeast Texas dental projects

Urban and rural residents of Texas face similar unmet health care needs regarding oral health, although rural residents are affected disproportionately**.** The majority of non-traumatic dental visits occur in rural areas among uninsured working non-Hispanic white adults age 18-44 (Wolfe and Patil, 2019)**.** In order to provide dental care to the underserved, UT Health Science Center at Tyler (UTHSCT) created a Delivery System Reform Incentive Payment (DSRIP) project to increase the dental workforce, integrate dental and medical education, and increase access to dental care. Another east Texas project, the Texas A&M College of Dentistry provides much needed dental care to northeast Texas residents. Usually, 6-8 supervising Texas A&M faculty travel to Tyler with 22 - 58 dental students. Over four thousand patients have been seen by the teams in nine trips between 2015 and 2017 (Jones et al., 2019).

Dental anxiety

Facco and Zanette (2017) stated that anxiety is multiple psychological and physiological phenomena which include a person's conscious state of worry about an unwanted future event, or fear of an actual situation. They write: "Anxiety and fear are closely related, fear is an adaptive response to realistic threat, whereas anxiety is a diffuse emotion and sometimes unreasonable or excessive reaction to current or future perceived threat" (Facco and Zanette 2017, P. 2). Facco et al. (2017) stated that the first report on pathophysiology of DA dates back to mid-twentieth century by Coriat in 1946, and Shoben and Borland in 1954. A DA assessment tool, the Corah Dental Anxiety Scale (CDAS) was developed by Corah in 1969. Also, a visual analogue to assess emotion and feelings was done by Aitken in 1969 (Facco and Zanette, 2017). In 1995, Humphris et al. (2000) developed the Modified Dental Anxiety Scale (MDAS). They concluded that DA and dental phobia are results of previous bad experiences like any other anxiety

disorder, including Post Traumatic Stress Disorder (PTSD). In addition, he stated that anxiety management should include cognitive treatment rather than sedatives or drugs. Humphris et al. (2000) state that the MDAS cutoff score of 19 gave the highest joint values of sensitivity (87.5%) and specificity (89.3%). This study supports the use of the MDAS as a valid tool for identifying DA patients.

According to Minja and Kahabuka (2019) there are so many pathways that can explain DA. It is well known that Pavlovian conditioning is the most common way in which dental fear is transmitted. It affects individuals through the experience of pain during previous dental appointments. The same applies to vicarious conditioning, where a person is indirectly affected by information about others' dental visits without experiencing it directly themselves. It can also affect people who have witnessed somebody else being hurt in a dentist's office. For example, a child may not have been to a dentist yet but has witnessed his/her sibling's traumatic experience at the hands of an elderly dentist. The child may later develop his/her own fear of going to the dentist because he/she has seen how much it upset the sibling. Information about these types of experiences can be passed around by word of mouth, or seen on a child’s show on T.V. In the verbal transmission pathway, a person hears or reads about something dangerous or threatening, irrespective of whether the threat is actually present. In the parental pathway, a parent's own fearful behavior becomes part of his/her child's developmental process and can lead to DA (Minja & Kahabuka, 2019).

Dental anxiety associated factors

According to Minja and Kahabuka (2019), DA, fear, and phobia refer to different things depending on the situation, despite being terms that are used interchangeably. Whenever we are confronted with a threatening stimulus, we experience dental fear or a "fight-or-flight" response.

In contrast, DA is a reaction to an unknown danger. Dental phobia is a much stronger fear than dental fear or DA.

Sociodemographic

People with a low level of education are more likely to experience DA. Individuals from lower-income groups consistently experienced higher burdens of untreated dental decay and poorer self-rated oral health (Minja & Kahabuka, 2019), which associated with DA.

Oral health status

DA is more prevalent in individuals with poor oral health status than their counterparts with good oral health status. In clinical observations, these patients have more decayed and missing teeth than restored teeth. People with DA have trouble visiting the dentist, according to population studies. In addition, individuals with DA may modify their eating habits and avoid hard-to-chew foods and foods that trigger sensitivity (Minja & Kahabuka, 2019).

Cultural issues

Culture and social norms have a role in modifying individuals' perceptions of dental fear and anxiety. For example, in some Asian and African countries, where the cultures emphasize greater self-control, along with emotional restraint and compliance with social rules, people are more likely to report higher levels of fears/anxiety (Minja & Kahabuka, 2019).

Habits dealing with mouth and teeth

Data from 2019 reveal that nearly 14 of 100 U.S. adults, aged 18 years or older, currently smoke cigarettes (34.1 million). More than 16 million Americans live with a smoking-related disease. Currently, smoking behavior is greatest among the 25-44 age group (Centers for Disease Control and Prevention. (2021)). There is a strong association between smoking and alcohol use and oral cancer. Alcohol consumption has a great impact on carcinogenesis of oral cancer

induced by smoking (Pelucchi et al., 2006). As was written before, smoking and the demise of dental health are related.

In addition, Research has shown that cigarette smoking may increase the risk of certain anxiety disorders during late adolescence and early adulthood. In a Finnish study, researchers found that those who use tobacco regularly or have problems related to alcohol use were more likely to have high dental fear than those who use tobacco occasionally or not at all, or consume alcohol less (Pohjola et al., 2016).

Mental health of university students

Pedrelli et al. (2015) emphasized that mental health disorders have their peak incidence during the young adulthood period. For example, anxiety disorders are the most prevalent psychiatric problem among college students with approximately 11.9% of college students suffering from anxiety related disorders. A related anxiety, social phobia manifests itself in children at a young age (on average between 7 and 14 years old), while panic disorder, generalized anxiety disorders (GAD), and PTSD tend to manifest later in life. Solmi et al. (2021) have concluded that 65.5% of mental disorders occur before 25 years of age and that 73.3% of anxiety occurs in those aged 25 or younger. These facts lead to a recommendation to update the current mental health system which should structure itself around the age of 18 years. Lastly, Halonen et al. (2018) mention that there is a high level of DA in people who have mental disorders like phobia, depression, mood disorder.

University students and dental anxiety

Muhammad and Rajan (2020) conducted a study to evaluate DA in undergraduate dental students in Riyadh Elm University, Saudi Arabia. They found that university students have a moderate level of anxiousness. Female, undergraduate, and preclinical (year before hospital

rotation) students showed more anxiousness than males. Public level dental education was recommended. Al-Omari and Al-Omiri (2009) conducted a study to explore the sources of DA and its influence with gender on perceived anxiety. The study concluded that dental students scored low in DA but medical students had more anxiety about dental treatment. Female students had higher DA. Most anxiety emerged from thinking about drilling teeth and anesthetic injection according to the authors, and they elaborate the need for further studies to investigate various factors dealing with anxiety.

Amir et al. (2018) investigated DA according to educational level in university students using the MDAS. They concluded that the lack of dental health education may be the reason for high level anxiety among non-dental students. Also, women demonstrated greater total DA than men, with a significant difference between the two genders. In addition, nursing students scored high on the DA scale. Caltabiano et al. (2018) determined the prevalence of DA before and after treatment in a sample of patients from a students' clinic. They found more DA in females and younger patients. There was a significant reduction of anxiety from pretreatment to post treatment. Also, they found that time length and complexity of the dental procedure plays a role in anxiety level. For example, there was reduction of post operative DA in less complex procedures.

Students who brush their teeth once a day or less often, use tobacco regularly, or have a poor attitude towards nutrition are more likely to experience dental fear than those who brush their teeth twice a day or more often and have better attitude towards nutrition. Students who report needing treatment frequently or at every dental check-up are also at risk of experiencing high dental fear (Pohjola et al., 2016).

Dental anxiety as a barrier

Beaudette et al. (2017) analyzed the relationships between oral health, nutrition, and dental fear and anxiety. Their study emphasized that oral health status can influence food and nutrient intake. Individuals with fewer teeth have been found to have lower intake of some essential nutrients, such as vitamin C, compared to individuals with more teeth. Furthermore, fear can be a reason patients avoid dental treatment; some evidence suggests that periodontal surgery might cause subjects the greatest anxiety compared to other types of dental surgery. Tan et al. (2021) discussed dental fear as an important barrier for seeking treatment and also explained that DA reduces the effectiveness of the treatment and negatively affects the patient/dentist relationship. These authors showed that most students are anxious about local anesthesia injections and teeth drilling and also found that female participants are more anxious than male participants. They concluded that despite improvements in dental technology and dentistry, DA remains an obstacle that clinicians face. More studies need to be done to determine how DA affects the frequency of dental visits.

Causes of Dental anxiety

Beaton et al. (2014) collected applicable articles and explored causes and consequences of dental fear, anxiety and dental phobia. The causes of dental fear, anxiety or phobia are related to exogenous factors such as direct observing from traumatic experiences, vicarious learning through significant others or the media, and endogenous factors such as genetic inheritance and personality traits. A genetic, dental fear/anxiety trait in twins was shown with monozygotic twins being more similar compared with dizygotic twins. This heritability was also shown to be higher in girls than in boys. In aspect personality traits, dental anxiety is experienced by highly neurotic or introverted individuals. Silveira et al. (2021) stated that oral disease is a concern worldwide. The purpose of

their study was to estimate the prevalence of dental fear in adults, including older adults. Dental fear and dental phobia are widespread in adults worldwide with an overall prevalence of 15.3%, and high DA is 12.4% present and severe DA is 3.3% present. Women were more susceptible to these fears than men. They suggested that psychological intervention is essential.

The next chapter outlines the methods of my research.

Chapter 3: Methods

Study design

This study is a quantitative cross-sectional study. Dental anxiety/phobia were quantitatively assessed in university students and from a Texas Junior College (TJC) dental hygiene clinic.

Participants and settings

This study is conducted in two different settings: The University of Texas at Tyler (UT Tyler), and a dental hygiene clinic embedded in TJC Texas. The inclusion criteria are those who are 18 years or older. The exclusion criteria are: those who are 17 years or younger and who are not providing consent.

The first setting is with the student population of UT Tyler. It is one of thirteen institutions in the UT system. It consists of a 5 colleges and 3 schools such as the College of Arts and Sciences, College of Education and Psychology, College of Engineering, School of Health Professions, School of Nursing, Soules College of Business, and The Ben and Maytee Fisch College of Pharmacy. In 2019 -2020, the university consisted of 9,781 students on both undergraduate and graduate levels. Of these, 3,678 were male students (37.6%) and 6,103 were female students (62.4%). The University provides medical care with the university clinic but no dental services (*About the University of Texas at Tyler | |Texas Colleges, Universities*. (n.d.)). TJC is the largest community college in Texas. The school has approximately 600 full-time and part-time faculty members and serves over 12,000 students annually. The TJC dental clinic is in Robert M. Rogers Nursing and Health Sciences. It provides preventive dental services such as cleanings, exams, X-rays, and sealants. These services are provided by dental hygiene students

under the supervision of a general dentist and registered dental hygienists (*Dental Studies | Tyler Junior College*. (n.d.)).

Sample size

Using G power software, and using options like 2 tail testing (X^2, F, T tests) and *a priori* for calculating sample size, the sample size ranged from 134 to 400. The investigator originally hoped to capture at least 200 responses. In reality she received 610 responses, over 200% larger than originally planned.

Data collection and sampling

Non probability convenience sampling was used to select participants in both settings. In the clinical setting, the survey was conducted using Qualtrics online survey software. The survey was available in both English and Spanish languages. The Spanish version will be translated and back translated to check for accuracy. The investigator hoped to gather 50 of these responses, in reality received 40.

In the university setting, data was collected by using Qualtrics online survey software. Email addresses of participants were accessed by the Department of Public Health's administrative assistant in order to send the Qualtrics survey link to students.

Data tool and measures

On the questionnaire (Appendix A, B), the demographic section included age, sex, race, education level and international student status. The oral health section included dental insurance coverage, brushing frequency, flossing frequency, mouth wash use, dental visit history, and last dental cleaning. The mental health section collected general anxiety disorder information, major depressive disorder information, and information on any other phobia. DA data was collected using the Modified Dental Anxiety Scale (MDAS).

The MDAS scale was used to assess DA by a Likert scale, with non-anxious responses scored 1, slightly anxious responses scored 2, and so on. The sum of all answers ranged from 5 to 25. A score of more than 19 indicated highly anxious or dental phobic, and those who score 11 to 19 indicate moderate to severe DA (White et al., 2017).

Data analysis

The data from paper questionnaires were entered directly into SPSS. The Excel spreadsheet from Qualtrics and clinic questionnaires from patients were uploaded into IBM-SPSS statistical software to analyze. Inaccurate, corrupted, duplicated, or incomplete data were marked and excluded from analysis. The next steps include analyzing quality, verifying, cleaning, and data analysis.

First data will be analyzed by descriptive statistics. Nominal data like gender, race, international status, and dental insurance were analyzed in percentages. Ordinal data, like rating of oral health, brushing frequency and flossing frequency, were analyzed in range, mode, percentage, rank and order. With continuous data like age, skewness was checked and means, range, and standard deviations determined.

Age and gender were analyzed for associations with dental anxiety levels. The MDAS was be calculated for each participant as a continuous variable and as a binary variable (MDAS score $\geq$19). Using the continuous MDAS score as an indicator of dental anxiety, prevalence across oral health habits were enumerated with 95% confidence intervals. The prevalence of moderate to high levels of anxiety (MDAS score 11-15) were determined as a percentage of the entire study population. Correlations were found among the continuous variables.

For more advanced analysis, the dependent variable was DA from the MDAS score, independent variables were demographic, oral health, mental health data. The MDAS scores

were analyzed by using Analysis of Variance (ANOVA). Finally, two- four models were constructed to identify the factors that predicted DA, controlling for possible confounders, using multiple regression analysis.

Ethical considerations

The UT Tyler and TJC IRB committee granted permission for this study. Voluntary status of participation was protected by informed consent and disclosure (APPENDIX A & B) as participation was voluntary and no penalties or consequences happened on refusal to participate. To maintain the confidentiality of participants, IP addresses and location details were removed from the data. Data and documents were password-protected and uploaded to MS OneDrive for extra protection. Paper documents were kept in locked desk drawers in locked offices in the Department of Public Health.

The next chapter discusses the results.

Chapter 4

Results

The data were collected from November 4 to November 18, 2022, at UT Tyler and from November 7 to December 12, 2022 in Tyler Junior College. It was expected that 134-400 participants would be involved. Instead, the researcher received 570 responses at UT Tyler and 40 responses at TJC. After excluding incomplete data, 508 responses were recorded for UT Tyler and 32 responses for TJC considered for further analysis 89.1% and 80.0% of all responses, respectively.

The MDAS score is slightly skewed towards the left side but has been modified in both datasets using square root transformation methods in order to yield normal distribution. The average MDAS score is 12.80 for UT Tyler (minimum 5.00 and maximum is 25.00). The Average MDAS Score in TJC clients for 11.47 (minimum 5.00 and maximum score is 24.00).

Descriptives of Demographics

Age

The minimum age of the participant at UT Tyler is 18 and TJC is 19. The maximum age at UT Tyler is 69 and TJC is 73. The average age of the UT Tyler participants is 27.43 years and TJC is 35.5 years.

Gender

The majority of responders in both UT Tyler and TJC are female. At UT Tyler, 73.6% of responders are female, 24.4% are male, and 2% are other genders. At TJC, 75% of responders are female and 25% are male.

Race

The majority of participants at UT Tyler and TJC are white. At UT Tyler, 70.3% of participants are white, 14.2% are Hispanic, 8.9% are Asians, 3.1 % are Black, and 3.5% are another race. This is compared to TJC where 68.8% are White, 21.9% are Hispanic, 6.3% are Black, and 3.1 % are Asian.

Grade and education level

At UT Tyler, the highest education level of responders are masters students (27.5%), followed by seniors (20.1%) and juniors (19.1%). Freshmen make up 17.3% of respondents, sophomores make up 10.8%, and doctorate-level students make up 5.7%. At TJC, 59.4% have a high school diploma, 21.9% have a Bachelor's degree, 9.4% have a graduate-level degree and 9.4% have less than a high school diploma.

International students

At UT Tyler, 3.5% of participants are international students.

Oral health behavior

Dental insurance

At UT Tyler, 43.7% of students have their parents plan for dental insurance, 19.3% do not have any type of dental insurance, and 12.0% are covered by a college plan. At TJC, 53.1% of the respondents have no dental insurance, 31.3% have job-based insurance, 9.4% have parent-based insurance, and 6.3% have college-based insurance plans.

Dental problems

In the UT Tyler sample, 30.1%% of participants responded that they have dental problems. In the TJC sample, 25.0% of participants responded that they have a dental problem. At UT Tyler, 24.4% of participants responded that their dental problem affected their chewing,

eating, and talking ability. At TJC, only 9.4% responded that their problem affected their chewing, eating, and talking ability

Oral hygiene habits

In the UT Tyler survey, it was found that 35.8% of students were brushing their teeth once a day, 25.4% were not using flossing in their routine, 33.3% were not using mouthwash in their routine. In contrast to these results, 68.8% of responders at TJC responded they are brushing twice a day, 46.9% responded that they are flossing at least once a day, and 25% responded that they are not using any mouthwash in their routine**.**

Seventy-one percentage of UT Tyler students reported that their last dental examination was less than a year ago, and 69.0% responded that their last dental cleaning was less than a year ago. Students at UT Tyler give their general health an average rating of 7.91 out of 10, and their oral health an average rating of 7.53. The average rating for general health in TJC is 8.19, the average oral health rating of the TJC is 7.63.

Diet habits

At UT Tyler, 36% of students reported that they consume sweets/candy every day, 50.6% reported that they drink dairy products every day, and 45.1% reported that they consume sugar-containing drinks every day. Of the TJC clients, 31.3% reported consuming sweets or candy daily, 37.5% reported consuming dairy products daily, and 37.5% reported consuming sugar-containing drinks and juices daily.

Smoking and alcohol

About 11% of UT Tyler students responded that they smoke cigarettes and 45.7% responded that they drink alcohol. At TJC 15.6% of clients reported that they smoke cigarettes and 62.5% said that they consume alcohol.

Mental health

At UT Tyler, 37.8% of students responded that they have been diagnosed with general anxiety, depression, or phobia. By comparison, about 31% of TJC clients responded that they have been diagnosed with anxiety, depression, or phobia.

Inferential statistics UT Tyler

MDAS Score by demographics UT Tyler

Table 1 shows demographic tests with MDAS. The relationship between age and dental anxiety is such that decreasing age is significantly associated with increasing dental anxiety. That is, younger people tend to have more anxiety than older people (P value = 0.00). And female students have higher dental anxiety scores than male students, with a mean MDAS score of 13.25 vs. 11.23 for males and a P-value < 0.001 (see Figures 1 and 2).

Sophomores and Juniors have significantly higher dental anxiety scores than students in other grade levels. Doctorate level students has the lowest DA. The P value is 0.035. Also, Students who have a college insurance plan are more likely to have higher scores of dental anxiety(P value = 0.006).

Table 1: *MDAS score by Demographics: UT Tyler*

	N	Descriptive n (%)	Means (MDAS) [E]	P-Value [D]
Age [A]	508	b= -0.13	27.43	0.00**
Gender [B]	498			<0.001**
Male		124 (24.4%)	11.23	
Female		374 (73.6%)	13.25	
Race [C]	508			0.694
White		357 (70.3%)	13.00	
Hispanic		72 (14.2%)	12.62	
Asian		45 (8.9%)	12.28	
Black		16 (3.1%)	11.06	
Others		18 (3.5%)	12.11	
Grade levels [C]	508			0.035**
Freshman		88 (17.3%)	13.13	
Sophomore		55 (10.8%)	13.93	

Junior		97 (19.1%)	13.80	
Senior		102 (20.0%)	12.22	
Master		137 (27.0%)	12.27	
Doctorate		29 (5.7%)	10.83	
International student [C]	508			0.841
Yes		18 (3.5%)	12.83	
No		490 (96.5%)	12.79	
Dental insurance status [C]	508			0.006**
College plan		12 (2.4%)	15.17	
Parent's plan		222 (43.7%)	13.20	
Others		165 (32.5%)	11.56	
No Insurance		98 (19.3%)	13.57	
Prefer not to say		11 (2.2%)	13.82	

** Statistically significant P<.05
* Moderately significant P = .05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

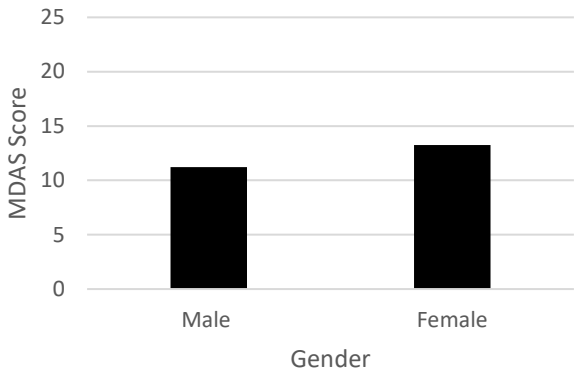

Figure 1 *Mean MDAS SCORE by Gender*

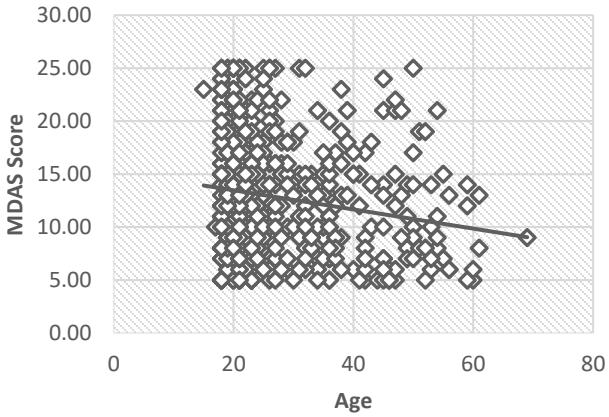

Figure 2 *Scatter Plot of MDAS Score by Age*

MDAS Score by Oral Health behavior UT Tyler

Brushing less frequently is associated with a higher mean DA score of 18.62, and the P-value is <0.001. Participants who reported no flossing, yielded a mean DA score of 14.66 and a P-value of <0.001 (see Figures 5 and 6).

Students who reported that their last dental examination was more than a year ago had greater DA scores (mean score 14.01; P value = 0.002) than those who reported less than a year (see Figure 3). As well, students who reported that their last oral prophylaxis (dental cleaning) was more than a year ago had greater DA scores (mean score 14.14; P value = 0.001) than those who reported less than a year (see Figure 4) .

A negative association was found between self-rating of general health and the DA Score. A lower self-rating of general health is associated with a higher DA score (b=-0.15; P value <0.001), and a lower self-rating of oral health is also associated with a higher DA score (b=-0.14; P value <0.001) (see Figures 7 and 8).

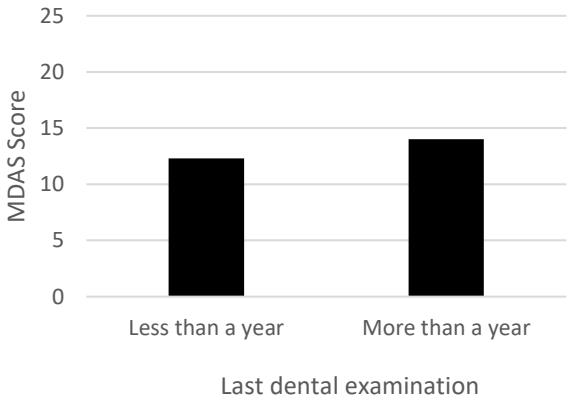

Figure 3 *Mean MDAS Score by last dental examination*

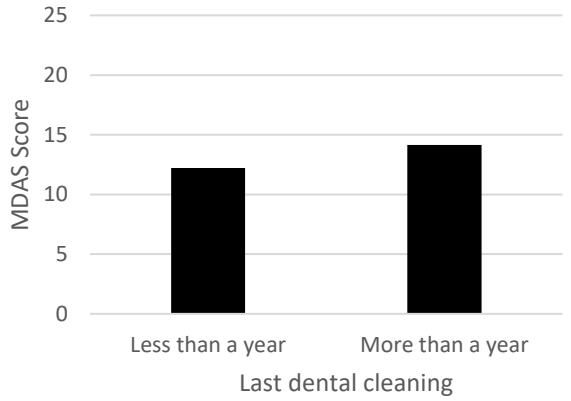

Figure 4 *Mean MDAS Score by last dental cleaning*

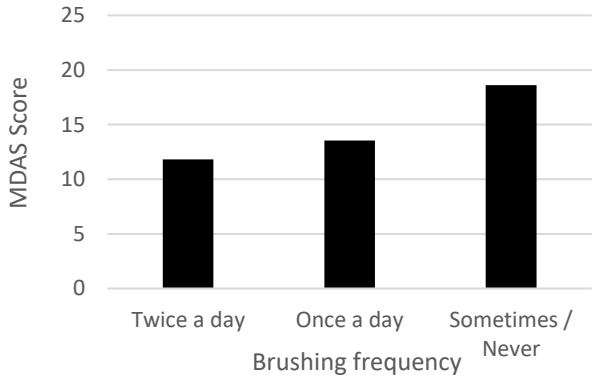

Figure 5 *Mean MDAS SCORE by Brushing frequency*

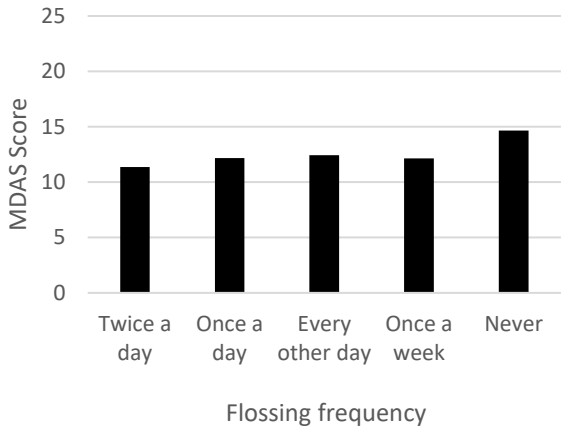

Figure 6 *Mean MDAS SCORE by Flossing frequency*

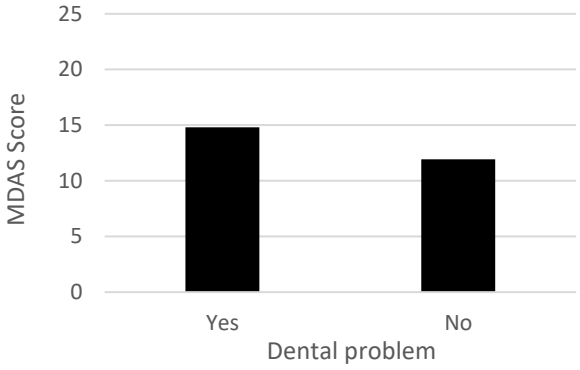

Figure 7 *Mean MDAS SCORE by Dental problem*

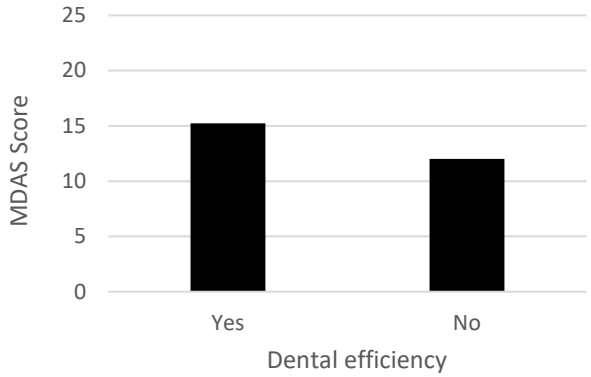

Figure 8 *Mean MDAS SCORE by Dental efficiency*

Table 2: *MDAS score by oral health behavior: UT Tyler N=508*

	Descriptive n (%)	Means (MDAS)[E]	P- Value [D]
Brushing frequency [C]			<0.001**
Twice a day	299 (58.9%)	11.83	
Once a day	183 (36.0%)	13.56	
Sometimes/ Never	26 (5.1%)	18.62	
Flossing frequency [C]			<0.001**
Twice a day	28 (5.5%)	11.36	
Once a day	111 (21.9%)	12.16	
Every other day	104 (20.5%)	12.43	
Once a week	136 (26.8%)	12.13	
Never	129 (25.4%)	14.66	
Mouthwash frequency [C]			0.780
Twice a day	76 (15.0%)	12.30	
Once a day	122 (24.0%)	12.81	
every other day	61 (12.0%)	12.74	
Once a week	80 (15.7%)	12.53	
Never	169 (33.3%)	13.16	
Do you currently have any dental problem? [B]			<0.001**
Yes	153 (30.1%)	14.80	
No	355 (39.9%)	11.94	
Has a dental problem affected your eating/ chewing/ talking ability? [B]			<0.001**
Yes	124 (24.4%)	15.23	
No	384 (75.6%)	12.01	
Last dental examination [B]			0.002**

Less than year	361 (71.1%)	12.30	
More than year	147 (28.9%)	14.01	
Last dental clean (Scaling)[B]			0.001**
Less than year	353 (69.5%)	12.21	
More than year	155 (30.5%)	14.14	
Rating general health	b=-0.15	7.91	<0.001**
Rating Oral health	b=-0.14	7.53	<0.001**

** Statistically significant P<.05
* Moderately significant P =.05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

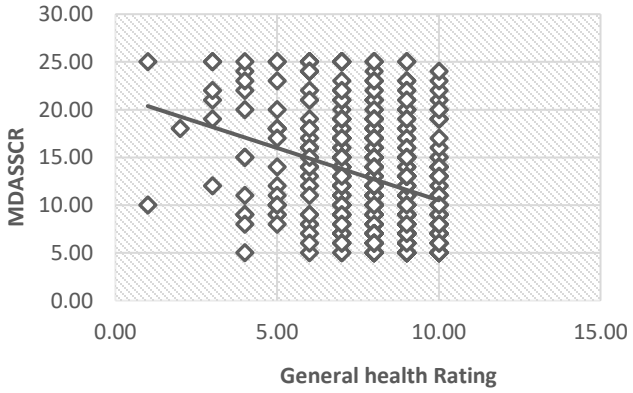

Figure 9 *Scatter Plot of MDAS Score by General health*

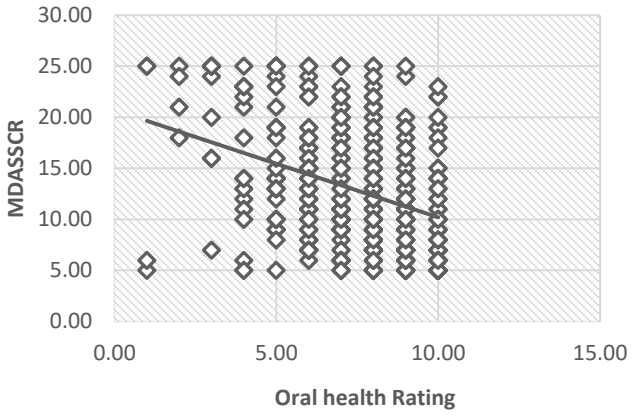

Figure 10 *Scatter Plot of MDAS Score by Oral health*

MDAS score by habits and diet

The students who reported that they were currently smoking were associated with a higher mean dental anxiety score of 15.05, and the P value was 0.001 (see table 3).

Table 3: *MDAS score by habits/diet: UT Tyler N=508*

	Descriptive n (%)	Means (MDAS)[E]	P- Value [D]
Smoking [B]			0.001**
Yes	58 (11.4%)	15.05	
No	450 (88.6%)	12.51	
Alcohol [B]			0.181
Yes	232 (45.7%)	13.17	
No	276 (54.3%)	12.48	
Sweet/ Candy consumption [C]			0.695
Daily/ Every day	183 (36.0%)	13.19	
Some times in week	235 (46.3%)	12.66	
Sometimes in month	85 (16.7%)	12.38	
Never	5 (1.0%)	12.40	
Dairy products consumption [C]			0.141
Daily /every day	257 (50.6%)	12.85	
Sometimes in week	161 (31.7%)	13.30	

Sometimes in Month	77 (15.2%)	11.90	
Never	13 (2.6%)	10.85	
Drinks and juice consumption [C]			0.223
Daily/ Every day	229 (45.1%)	13.17	
Some times in week	114 (22.4%)	13.10	
Sometimes in month	109 (21.5%)	12.09	
Never	56 (11.0%)	12.02	

[**] Statistically significant P<.05
[*] Moderately significant P =.05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

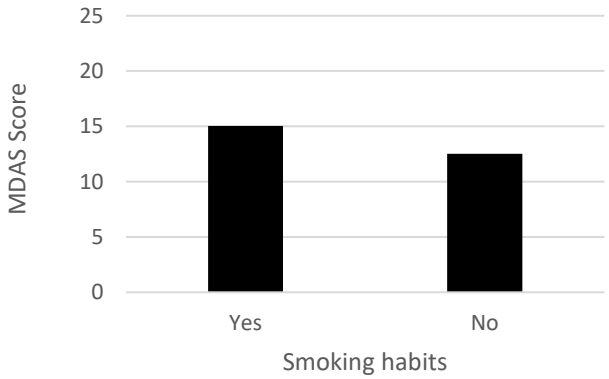

Figure 11 *MDAS Score by smoking habits*

MDAS score by mental health

Students who reported having anxiety were associated with a higher mean dental anxiety score (15.15) than those who did not report anxiety, with a P value of 0.001.

Table 4: *MDAS score by Mental Health: UT Tyler N=508*

	Descriptive n (%)	Means (MDAS)[E]	P- Value [D]
Mental health [C]			0.001[**]
Anxiety	115 (22.6%)	15.15	
Depression/ Phobia	77 (15.2%)	13.49	
No	316 (62.2%)	11.77	

** Statistically significant P<.05
* Moderately significant P = .05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

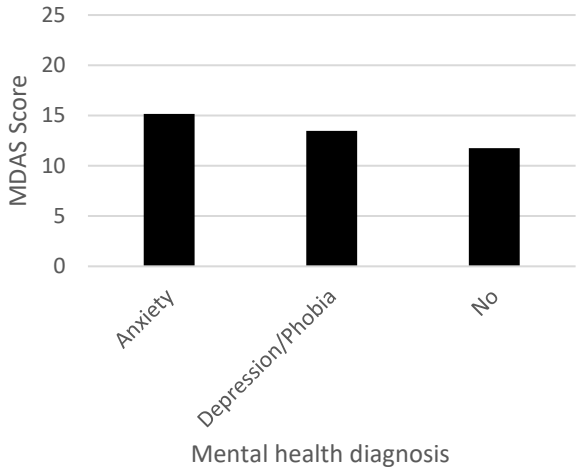

Figure 12 *MDAS Score by mental health diagnosis*

Correlations between age; general health; oral health

Table 5: *MDAS score Correlations: UT Tyler*

		Age	General health	Oral health	MDASSCR
Age		1	.075	.034	-.173**
	Sig. (2-tailed)		.091	.443	<.001
General Health			1	.592**	-.309**
	Sig. (2-tailed)			<.001	<.001
Oral Health				1	-.344**
	Sig. (2-tailed)				<.001
MDASSCR					1
	Sig. (2-tailed)				

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation between age and dental anxiety scores is negative (Pearson correlation -0.173; P value <0.001), so that the older one becomes the less anxiety there is. The correlation between general and oral health ratings is positive (Pearson correlation 0.592; P value 0.001) that is, oral health rating is higher when the general health rating is higher. The correlations between general health and MDAS score (Pearson correlation -0.309; P value <0.001) and oral health rating and MDAS score (Pearson correlation -0.344 ; P value <0.001) are negatively correlated. So that, if general health is reported better, DA decreases and if oral health is reported better, then DA decreases.

Logistic regression

Table 6: Bilinear logistic regression: UT Tyler

	Unchanged β^E	Unadjusted P	OR CI (95%)	Adjusted β^E	Adjusted P	OR CI (95%)
Model 1						
Age	-0.036	<0.001	0.965 (0.946-0.984)	-0.029	<0.001**	0.971 (0.955-0.988)
Gender	0.391	0.064	1.478 (0.977-2.236)	0.391	0.064*	0.479 (0.978-2.236)
Grade level	0.294	0.201	1.341 (0.856-2.103)	N/A	N/A	N/A
Model 2						
Age	-0.036	0.001	0.964 (0.964-0.986)	-0.037	<0.001**	0.964 (0.943-0.985)
Gender	0.686	0.003	1.985 (1.266-3.113)	0.687	0.003**	1.987 (1.268-3.114)
Grade level	0.439	0.072	1.550 (0.962-2.500)	0.433	0.073*	1.542 (0.960-2.478)
Brushing Frequency	0.722	<0.001	2.058 (1.364-3.106)	0.725	<0.001**	2.065 (1.378-3.093)
Flossing Frequency	0.064	0.779	1.066 (0.682-1.665)	N/A	N/A	N/A
Dental Problem	-0.690	0.003	0.501 (0.316-0.796)	-0.684	0.004**	0.505 (0.318-0.800)
Dental efficiency	-0.616	0.014	0.540 (0.331-0.882)	-0.611	0.015**	0.543 (0.333-0.886)
Dental exam	0.528	0.221	1.695 (0.728-3.946)	0.401	0.072*	1.493 (0.965-2.309)
Dental scaling	-0.157	0.714	0.855 (0.370-1.977)	N/A	N/A	N/A
Model 3						
Age	-0.036	0.001	0.963 (0.942-0.985)	-0.037	<0.001	0.964 (0.943-0.985)
Gender	0.730	0.002	2.074 (1.316-3.271)	0.687	0.003	1.987 (1.258-3.114)
Grade level	0.430	0.083	1.537 (0.946-3.498)	0.433	0.073	1.542 (0.960-2.478)
Brushing Frequency	0.727	<0.001	2.068 (1.367-3.130)	0.725	<0.001	2.065 (1.378-3.093)
Flossing Frequency	0.032	0.889	1.032 (0.659-1.618)	N/A		
Dental Problem	-0.661	0.005	0.516 (0.324-0.822)	-0.684	0.004	0.505 (0.318-0.800)
Dental efficiency	-0.590	0.019	0.554 (0.339-0.907)	-0.611	0.015	0.543 (0.333-0.886)
Dental exam	0.512	0.238	1.668 (0.713-3.904)	N/A	N/A	N/A
Dental scaling	0.152	0.724	0.854 (0.393-1.452)	N/A	N/A	N/A
Smoking	-0.281	0.400	0.755 (0.393-1.452)	N/A	N/A	N/A

Alcohol	-0.233	0.244	0.788 (0.528-1.176)	N/A	N/A	N/A
Model 4						
Age	-0.037	0.001	0.964 (0.943-0.986)	-0.027	0.003	0.973 (0.956-0.991)
Gender	0.650	0.006	1.916 (1.205-3.049)	0.594	0.011	1.812 (1.149-2.856)
Grade level	0.393	0.115	1.481 (0.909-2.413)	N/A	N/A	N/A
Brushing Frequency	0.700	<0.001	2.015 (1.328-3.057)	0.672	0.001	1.957 (1.305-2.934)
Flossing Frequency	0.008	0.974	1.008 (0.642-1.582)	N/A	N/A	N/A
Dental Problem	-0.616	0.010	0.540 (0.338-0.864)	-0.608	0.010	0.545 (0.343-0.865)
Dental efficiency	-0.558	0.027	0.572 (0.349-0.939)	-0.560	0.026	0.571 (0.349-0.934)
Dental exam	0.518	0.228	1.678 (0.723-3.898)	0.428	0.054	1.534 (0.992-2.372)
Dental scaling	-0.146	0.732	0.864 (0.374-1.995)	N/A	N/A	N/A
Smoking	-0.245	0.465	0.783 (0.406-1.510)	N/A	N/A	N/A
Alcohol	-0.236	0.243	0.787 (0.527-1.177)	N/A	N/A	N/A
General anxiety/ Depression	-0.393	0.063	0.675 (0.447-1.021)	-0.404	0.037**	0.648 (0.430-0.975)

** Statistically significant P<.05
* Moderately significant P = .05 -.10
E Non-modified Data

In Model 1, we looked at the relationship between dental anxiety and demographics, using the MDAS score level as a measure of dental anxiety. As age increases, dental anxiety decreases (β= -0.029; P < 0.001; OR = 0.971[0.955 – 0.988]). Also, the female gender is moderately associated with dental anxiety (β=0.391; P=0.064; OR=0.479 [0.978-2.236]).

Model 2 added the oral health behavior to demographics and compared it with the MDAS level. I found that brushing teeth twice a day is associated with an MDAS score in the moderate to severe range (β= 0.725; P < 0.001; OR = 2.065 [1.378-3.093]). Having dental problems (β= -0.684; P = 0.004; OR = 0.505 [0.318 – 0.800]) and decreased efficiency in dental structure (β= -0.611; P = 0.015; OR = 0.543 [0.333 – 0.886]) are also associated with moderate to severe levels of anxiety, as well as having dental examination within a year (β= -0.528; P = 0.072; OR = 1.493 [0.965 – 2.309]).

In Model 3, in addition to demographics, oral health behaviors were adjusted with smoking habits and alcohol consumption. It shows that smoking and alcohol consumption are not related with DA, controlling for other demographics or oral health behaviors.

Model 4, other models are adjusted with a mental diagnosis. A mental disease diagnosis is associated with moderate to severe DA compared to those without such diagnoses (β= -0.404; P < 0.037; OR = 0.648 [0.430 – 0.975]), controlling for all other significant factors.
Table 6 shows that the factors of age, gender, brushing frequency, dental problems and efficiency, dental exams more than a year ago, mental diagnosis and dental anxiety are related to each other.

MDAS Score by data in TJC Clients

Education level was also a significant demographic variable with the TJC sample. The mean anxiety score for graduate education level was 20.33 (P value 0.04) , next is high school diploma holders (See figure 13). Also, clients who have a college plan as their insurance have a high level of DA score (mean 24.00; P value = 0.005) (see figure 14). And clients who are not brushing twice per day have higher dental anxiety scores (mean 12.45; P value 0.002). Other demographics and oral health behaviors information found in Tables 5 and 6.

Table 7: *MDAS score by Demographics: TJC dental hygiene clinic*

	Descriptive n (%)	Means (MDAS)[E]	P- Value [D]
Age [A]	b=-0.010	35.59	0.219
Gender [B]			0.297
Female	8 (25.0%)	12.50	
Male	24 (75.0%)	11.13	
Race [B]			0.164
White	22 (68.8%)	12.45	
Non-White	10 (31.3%)	9.30	
Grade levels [C]			0.04**

Less than high school diploma	3 (9.4%)	7.33	
High school diploma	19 (59.4%)	11.74	
Bachelor's level	7 (21.9%)	8.71	
Graduate level	3 (9.4%)	20.33	
Dental insurance status [C]			0.005**
College plan	2 (6.3%)	24.00	
Parent's plan	3 (9.4%)	13.67	
Others	10 (31.3%)	9.90	
No Insurance	17 (53.1%)	10.53	

** Statistically significant P<.05
* Moderately significant P = .05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

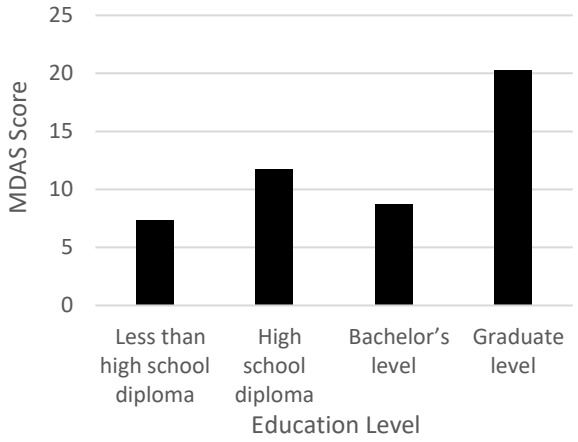

Figure 13 *MDAS Score by Education level*

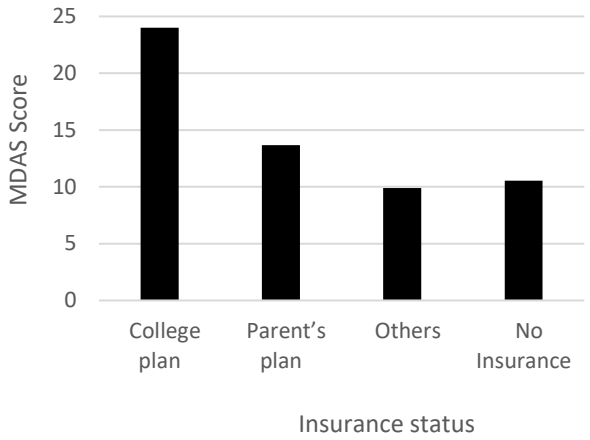

Figure 14 *MDAS Score by insurance Status*

Table 8: *MDAS score by Oral health behavior: TJC N=32*

	Descriptive n(%)	Means (MDAS)[E]	P- Value [D]
Brushing frequency [B]			0.002**
Twice a day	10 (31.3%)	9.30	
Not twice a day	22 (68.8%)	12.45	
Flossing frequency [B]			0.275
At least Once a day	15 (46.9%)	11.07	
Not once a day	17 (53.1%)	11.87	
Mouthwash usage frequency [B]			0.341
At least Once a day	12 (37.5%)	12.17	
Not once a day	20 (62.5%)	11.06	
Any Dental problem [B]			0.430
Yes	8 (25.0%)	11.36	
No	24 (75.0%)	11.50	
Dental problem affected eating/ chewing/ talking ability [B]			0.452
Yes	3 (9.4%)	12.00	
No	29 (90.6%)	11.41	
Rating general health [A]	7.53	b=-0.009	0.927
Rating oral health [A]	7.92	b=-0.029	0.731

** Statistically significant P<.05 [C]ANOVA

[*] Moderately significant P= .05-.10
[A] Linear regression
[B] Independent T-Test
[D] Modified Data
[E] Non-modified Data

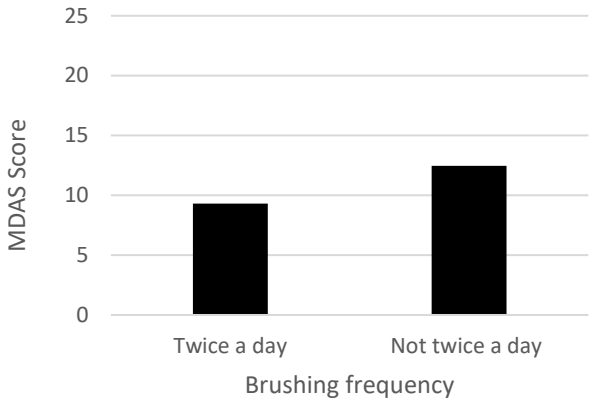

Figure 15 *MDAS Score by brushing frequency*

MDAS score by habits and diet TJC

The data I collected showed that there was no significant difference between the DA of TJC clients who smoke and those who don't, as well as in alcohol consumption. This means that smoking and alcohol habits are not associated with DA. I also found that diet habits are not significantly associated with DA in TJC clients. Furthermore, mental health is not significantly associated with the DA level at TJC.

Table 9: *Baseline MDAS score by Habits and diet: TJC N=32*

	Descriptive n(%)	Means (MDAS)[E]	P- Value [D]
Smoking [B]			0.127
Yes	5 (15.6%)	9.20	
No	27 (84.4%)	11.88	
Do you drink alcohol? [B]			0.428

Yes	20 (62.5%)	11.50	
No	12 (37.5%)	11.42	
Sweet/ Candy consumption [C]			0.409
Daily/ Every day	10 (31.3%)	12.70	
Some times in week	14 (43.8%)	12.41	
Sometimes in month	8 (25.0%)	8.63	
Or Never			
Dairy products consumption [C]			0.240
Daily /every day	12 (37.5%)	11.25	
Sometimes in week	12 (37.5%)	12.83	
Sometimes in Month	8 (25.0%)	9.75	
Or Never			
Drinks and juice consumption [C]			0.424
Daily/ Every day			
Some times in week	12 (37.5%)	12.33	
Sometimes in month	8 (25.0%)	13.12	
Never	12 (37.5%)	9.50	

[**] Statistically significant P<.05
[*] Moderately significant P = .05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

Table 10: *MDAS score by Mental Health diagnosis: TJC N=32*

	Descriptive n(%)	Means (MDAS)[E]	P- Value [D]
Mental health			0.277
Anxiety/Depression/ Phobia	10 (37.5%)	12.50	
No	22 (62.5%)	11.00	

[**] Statistically significant P<.05
[*] Moderately significant P = .05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

Logistic regression

In Model 1, two demographics variables are entered and only one remained which is insurance status but it is not statistically significant. And Model 2, when demographic variables are adjusted with brushing frequency, which is moderately associated with moderate to high level dental anxiety.

Table 11*: Bilinear logistic regression: TJC clients*

	Unchanged β^E	Unadjusted P	OR CI (95%)	Adjusted β^E	Adjusted P	OR CI (95%)
Model 1						
Education level	0.091	0.910	1.095 (0.228-5.266)	N/A	N/A	N/A
Insurance status	-1.752	0.140	0.173 (0.017-1.775)	-1.761	0.137	0.172 (0.017-1.752)
Model 2						
Education level	-0.178	0.838	0.837 (0.153-4.573)	N/A	N/A	N/A
Insurance level	-1.768	0.161	0.171 (0.014-2.024)	N/A	N/A	N/A
Brushing frequency	-1.784	0.063	0.168 (0.026-1.099)	-1.754	0.052 *	0.173 (0.030-1.013)

** Statistically significant P<.05
* Moderately significant P ≤ .05-.10
E Non-modified Data

Comparison UT Tyler and TJC clients' demographics, general health, oral health and MDAS Score

I found that there are significant differences in age average of 35.59 for TJC clients and 27.43 for UT Tyler students. The difference is statistically significant ($P < 0.001$).

Additionally, I found that the insurance status between TJC clients and UT Tyler students is significantly different ($P < 0.001$). TJC clients predominantly do not have insurance while in UT Tyler students have their parents' plan predominantly.

Table 12: *Comparison UT Tyler and TJC clients' demographics*

	UT Tyler [D]	TJC Dental clinic [D]	P- Value [D]
Age	27.43	35.59	<0.001**
Gender			0.990
Male	124	8	
Female	374	24	
Race			0.855
White	357	22	
Non-White	151	10	
Insurance			<0.001**
College Plan	12	2	
Parent's Plan	222	3	
Other	165	10	
No Insurance	98	17	
Prefer not to say	11	0	
General Health	7.91	8.19	0.322
Oral Health	7.53	7.63	0.326
MDAS Score	12.80	11.47	0.188

** Statistically significant P<.05
* Moderately significant P =.05-.10
[A] Linear regression
[B] Independent T-Test
[C] ANOVA
[D] Modified Data
[E] Non-modified Data

The next chapter discusses these finding in light of the already published research

Chapter 5

Discussion

DA and dental phobia are common problems that affect many people, which causes them to avoid seeking dental care. Information about its prevalence and causes, as well as its impact on oral health, are crucial for understanding DA and phobia (Beaton et al., 2014). According to Seligman (2017), DA is an understudied problem in youth. The aim of this study was to determine the prevalence of DA among university students and those visiting a dental clinic. This study also aimed to find out what factors contribute to DA among these groups of people.

Prevalence of DA

Dental fear and dental phobia are widespread in adults worldwide with an overall prevalence of 15.3%, high DA reaches a presence of 12.4% and severe DA is 3.3% present (Silveira et al., 2021). I surveyed DA levels of dental hygiene clinic patients in TJC, and in UT Tyler students, and found that both groups have moderate levels of DA. The mean MDAS score for university students is 12.80 out of a possible score of 25, while the mean MDAS score for TJC clinic clients is 11.47 out of a possible score of 25. Both of these averages fall within the range of moderate levels of DA. Surprisingly, 50.3% of UT Tyler students had moderate to high levels of DA, while 44.4% of TJC clinic clients had moderate to high DA. Almost 1 out of 5 (18.2%) of UT Tyler students were extremely dental anxious or phobic, while 12.5% of TJC clinic clients were extremely anxious or phobic about going to the dentist.

DA and demographics

The results of my study show that as age keeps increasing, DA decreases. That is, younger people tend to have more anxiety than older people. My results are consistent with

previous studies that have also found this relationship. According to a study conducted by Murad et al. (2020), DA decreases as age advances. It was found that previous visits to dentists significantly impact anxiety levels by establishing dentist and patient trust, which matures and becomes stronger with age (Murad et al, 2020). Sivaramakrishnan et al. (2022) examined the DA levels of patients before and after treatment and found that previously unpleasant dental experiences, lack of awareness, and being 50 years old or younger were all significant predictors of elevated DA levels. In a similar study by Caltabiano et al. (2018), patients aged less than 30 years had the highest DA scores while those aged over 50 years had the lowest DA. Yildirim (2016) used the Dental Fear Scale (DFS) to investigate DA and found that high levels of dental fear varied from 0% in 50–59-year-olds to 15.3% in 18–29-year-olds. This was a statistically significant difference in the distribution of Dental fear between age groups. Minja et al. (2019) also found similar results and stated that the reason for this difference may be environmental factors. Locker et al. (1999) explored the age of onset for dental fear and found that half of the participants reported onset in childhood, 22% in adolescence, and 27% in adulthood.

In my study, I found that female students reported higher DA than male students. The mean MDAS score for females was 13.25, which was significantly higher than the mean score of 11.23 for males. This finding is confirmed by study done by Tan et al. (2021) and Muhammad et al. (2020) where it was found that female students have higher DA than male students. Murad et al. (2020) found the same results and added that the reason for this could be that girls are generally more anxious than boys. They suggested that these findings can be attributed to certain factors like the cultural settings of the population being assessed, and different scales used. Carter et al. (2014) noted that regardless of age, females experience more DA. Sivaramakrishnan

et al. (2022) found that female participants presented with a higher mean MDAS score in both pre-and post-treatment groups compared to males.

In contrast to the above discussion about women and DA, TJC clients did not show an association of gender with MDAS score, Hawamdeh and Awad (2013) also found that gender and frequency of dental visits were not associated with DA and they found that the feeling of lack of control and pain anticipation were strong predictors of anxiety. Gender differenced at TJC may not have emerged because TJC clients are older, but in advanced modeling age was controlled for.

Sophomores and Juniors have significantly higher DA scores than students in other grade levels. Caltabiano et al. (2018) confirms this finding and found that the level of DA significantly decreases with each successive year of students' study. Yildirim (2016) found that education level and socioeconomic status has a significant effect on dental fear. Yildirim (2017) shows that those with higher education levels have less fear of the dentist than those with lower education levels. In stark contrast to this, TJC clients who completed Graduate level education have the highest DA (mean MDAS score 20.33) compared to their counterparts. However, Tan et al. (2021) found that there were no differences in grade levels when comparing MDAS scores.

At UT Tyler, 19.3% of students do not have any type of dental insurance, and 12.0% are covered by a college plan. At TJC, 53.1% of the respondents have no dental insurance, 31.3% have job-based insurance and 15.7% have other types of plans. In Texas, 18.4% of residents do not have health insurance compared with 8.6% of the rest of the country. Texans make up 9% of the U.S. population and 19% of the country's uninsured population (Dunkelberg, 2023). As of 2020, 28 million people in the United States (8.6%) do not have health insurance (Health Insurance Coverage in the United States: 2020, n.d.). In the United States, 50.2% of adults with

private health insurance also have dental care coverage throughout the past 12 months. This number is 45.9% in the West South-Central region of the U.S., which includes Texas (Products - Data Briefs. (n.d.)). For every adult without medical insurance, there are three adults who don't have dental insurance (Texas DSHS, n.d.).

Students with college-based plans are more likely to have higher scores of DA than those who have other insurance plans. The same is true in TJC clients.

Oral health associated with DA

In a study conducted by Crego et al. (2014), they found that DA is not only a mental health issue, but also a public health concern. They concluded that fear of dental treatment increases the likelihood of experiencing oral health problems as a result of irregular or delayed dental visits, and severe oral symptoms may reinforce dental fear.

My data shows that 5.1% of UT Tyler students are brushing less Frequently or Never brushing. People who report brushing less frequently had higher levels of DA (mean score of 18.62); those who reported no flossing had even higher anxiety levels (mean score of 14.66). At TJC the participants who are not brushing twice a day are associated with a moderate level DA (mean score 12.45). Similarly, in a study by Pohjola et al. (2016), the association between oral health habits and DA was analyzed. Their results found that adults who brushed their teeth less than twice a day were more likely to have high dental fear than those who brushed at least twice a day. Likewise, oral hygiene is negatively associated with DA, according to a study by Yildirim (2016). Their study found that patients with DA still have significantly worse oral hygiene than patients without DA. They also found that the frequency of brushing teeth, the frequency of changing a toothbrush, the importance of toothbrush selection, and the importance of brushing

time were negatively associated with DA. The same results were found in a study conducted by Minja and Hahabuka (2019). In addition, it has been found that knowledge and oral health literacy also play an important role in DA. For example, Shin et al. (2014) reported that DA and oral health literacy are negatively related.

Students who reported that their last dental examination was more than a year ago had greater DA scores (mean score 14.01) than did those who reported less than a year (mean score 12.30). Sivaramakrishnan et al. (2022) found that extremely anxious patients are often unable to cope with urgent symptomatic or routine dental interventions and they are likely to postpone dental visits. Furthermore, Murad et al. (2020) shows that previous visits to the dentist significantly improve anxiety levels by establishing a trust between patient and dentist that matures and gets stronger with age. Pohjola et al. (2016) discovered that the prevalence of high dental fear was higher among students who had last visited a dentist 5 or more years ago than among those who had been to a dental check-up within the previous 5 years. They also found that a high level of dental fear was more common among students who frequently needed treatment at dental check-ups than among those students who never or rarely needed treatment. Tellez et al. (2015) found that more emergency patients than regular patients met the diagnostic criteria for dental phobia and reported more pain at their last dental visit. Moreover, White et al. (2017) found that participants responded to missing a dental appointment due to DA. Tan et al. (2021) found that participants who had last visited the dentist less than 12 months before their study had a lower mean MDAS score.

The relationship between dental fear and dental visit behavior was negatively associated. According to Crego et al. (2014), fear of dental treatment increases the likelihood of experiencing oral health problems as a result of irregular or delayed dental visiting. They also

found that severe oral symptoms may reinforce dental fear, as perceived disgusting or threatening interventions are anticipated. The Cognitive Vulnerability Model (CVM) has identified a cognitive schema that comprises four interrelated assessments associated with dental fear: dangerousness, uncontrollability, unpredictability, and disgustability (Crego et al., 2014). According to this framework, dentally fearful people assess dental events as potentially dangerous, uncontrollable, unpredictable and disgusting. Overall research conducted using this model has supported the idea of a cognitive vulnerability schema operating in dental fear in both adults and children (Crego et al., 2014).

I found that 30.1% of respondents have a current dental problem, and 24.4% report that their dental problem has affected their ability to eat, chew or talk. The mean MDAS score was 14.80 and 15.23, respectively, with both scores being associated with DA. In the study by Beudette et al. (2017), these authors conclude that oral health status affects food and nutrient intake. It can influence the perceived ease with which individuals eat different foods. There is some evidence that individuals with fewer teeth avoid foods that can be considered difficult to chew. However, it should be noted that the TJC clients do not have any association with current dental problems and efficiency to MDAS score. Since they are a clinic population, I believe they do not have any current issue with their dental structures.

Among other things, I found that oral health rating is correlated to DA (MDAS Score); when it decreases the MDAS score also goes down and vice versa in the UT Tyler population. Also, I found that there is a correlation between oral health and general health. In other words, if the general health rating decreases, the oral health rating also decreases.

Sabbah et al.(2019) suggested a causal relationship between oral health and general health has not yet been confirmed, but evidence shows that there is a strong correlation between

the two. This correlation appears to be due to common risk factors. The impact of oral diseases on chronic systemic conditions has been identified in previous studies. Later research examined the potential impact of oral diseases on cardiovascular diseases, high blood pressure, stroke, diabetes, dementia, respiratory diseases, and mortality (Sabbah et al., 2019). A nutritional pathway has also been suggested in relation to periodontal disease and severe dental caries among older adults and children (Sabbah et al., 2019). But my data shows there is no correlation between oral health rating and general health rating to DA in TJC clients.

DA is a problem that affects both patients and dentists. It causes people to avoid the dentist, which results in untreated dental problems. National oral health surveillance reports shows that untreated dental caries prevalence in adults is about 26%, and in younger adults it's 29%. The Texas Department of State Health Services (DSHS) reports that adult Texans aged 19 years or older are not receiving enough dental care (Texas DSHS, n.d.).

Habits

Data from 2019 reveal that nearly 14 of 100 U.S. adults, aged 18 years or older, currently smoke cigarettes (34.1 million). More than 16 million Americans live with a smoking-related disease. Currently, smoking behavior is greatest among 25-44 years (Centers for Disease Control and Prevention. (2021)). In a study conducted by Johnson et al. in 2000, it was suggested that cigarette smoking may increase the risk of certain anxiety disorders during late adolescence and early adulthood. UT Tyler Students who reported that they were smoking had a higher mean DA score of 15.05, and the P value was 0.001. The study by Pohjola et al., (2016) found that dental fear was associated with tobacco use and alcohol use among Finnish university students. Furthermore, Pohjola et al. (2014) found that people who use tobacco regularly or have problems related to alcohol use were more likely to have high dental fear than those who use tobacco

occasionally, do not use it at all, or have low-risk levels of alcohol use problems. While TJC clients tobacco use is not significantly associated with MDAS scores, the small population size may have limited the ability to detect this association.

Diet profile

According to a report on the burden of oral disease in Texas, in 2018, factors contributing oral disease burden in Texas are sugary beverage consumption, tobacco and alcohol consumption, absence of fluoridation, and food insecurity. Drinks like soda, sports drinks, energy drinks, and 100% fruit juices are main sources of additional sugar in the American diet (Texas DSHS, n.d.). There was no association between a person's diet profile and DA in both the UT Tyler students and TJC clinic participants. Similarly, the study by Pohjola et al. (2016) found that students who reported eating or drinking more than ten times per day had similar dental fear levels as those who reported eating or drinking ten times a day or less, but this finding does not connect frequency of consumption with amount of sugar consumed. Dental fear is a common reason for patients to avoid dental treatment. Patients with fewer teeth have been found to have a lower food intake or lack of some nutrients, such as vitamin C, compared to individuals with more teeth. It can be concluded that fear is a reason patients avoid dental treatment, poor oral health status or diminished nutrient profile (Beaudette et al., 2017).

Mental Health

According to Pedrelli (2015), the most prevalent psychiatric problems among college students are anxiety disorders. Approximately 11.9 % of college students suffer from an anxiety disorder. Another common mental health problem among college students is depression, with prevalence rates in college students of 7 to 9 %. The next prevalent is eating disorders. In addition, in a study conducted by Pohjolo et al. (2014), the researchers found that general mood

was associated with dental fear; those who reported negative mood were more likely to have high dental fear than those who reported positive mood.

The results of this study indicate that students who reported being generally anxious were associated with a higher mean DA score (15.15) than those who did not report anxiety. Similarly, Halonen (2018) found that the most common co-morbidity associated with dental fear was anxiety-related disorders. Halonen found that a high level of DA (dental fear) has a strong positive correlation with a high level of other comorbid phobias, depression, mood disorders and other psychiatric disorders. Moreover, in a study published in 2017, Yildirim found that individuals have high levels of DA and dental fear, and there is an association between psychological disorders, DA and dental fear, over time.

According to Chapman and Kirby-Turner (2018), psychological intrusion plays an important role in the etiology of some children's dental fear. The authors suggest that belittlement and shaming experiences may be particularly salient, but they also acknowledge that the relationships between child DA, child temperament (behavioral inhibition), parental anxiety (particularly maternal DA), general anxiety, parenting style, and intrusive parenting are complex. Lastly, De Jongh et al. (2003) found that nearly half of the anxious patients they studied reported symptoms that are typically reported by patients with post-traumatic stress disorder (PTSD). Their results suggest that, in anticipation of treatment, dentally anxious individuals suffer from a high level of intrusive recollections of earlier dental experiences.

Bigger questions

“These are some issues that emerged from the two final models:

- Why are there so many university data associated with DA, but few with a client population? I mentioned before that small sample size could explain it, but also many studies are already done with university students, perhaps pushing dental researchers expectations a certain way. More studies with non-university students need to take place.
- Why did dental exam trend so much toward more importance in university students (model 2-4), even though it moved to the marginally significant spot?
- Why did education switch directions on DA between UT Tyler and TJC, even though it is still insignificant?
- What does it tell us in general if behaviors drop out of the models, on their effects on DA?
- General anxiety is real, and people’s perception of it seems valid and not imaginary.”

Limitations

- UT Tyler is only one public university from South-Central United States, therefore generalizing these results is doubtful.
- The TJC dental hygiene clinic sample size is very small and lacks power to draw confident conclusions.
- The sampling procedure for this study was convenience, which means that we selected participants based on whether they were available at the time of the study. This is not a random sampling method, therefore there is bias in the study. Selection and recall bias are two types of bias that may have influenced my results. A convenience sampling method

enhances selection bias as people who were more motivated or interested in dental issues may have volunteered for the study. Recall bias refers to participants' ability (or inability) to accurately recall their experiences. Lastly, there may be an unknown bias due to surveying on an online platform.

Strengths

- Sufficient sample size for UT Tyler participants.
- The analysis process controlled for confounders.
- I used two different sites with completely different demographics.
- I transformed skewed distribution.
- I used the MDAS scale which has been shown valid and reliable from others studies, and allowed me to conduct many comparisons.
- I enhanced my questionnaire by adding diet, behavior, oral behavior, mental health, general health sections to thoroughly check for confounders.
- Our sampling procedure was double-blinded: neither the author nor the participants knew each other in order to prevent any bias from occurring.
- My oral health behavior section confirmed the validity of MDAS because there were many significant associations confirmed by the literature.

Conclusion

In conclusion, DA is a critical issue in our society. It affects all individuals regardless of their socioeconomic status or geographical location. Individuals with DA tend to not keep appointments, avoid visiting the dentist for dental care or comply with prescribed treatment. DA is also associated with poor dental health conditions. Other research shows that anxious patients

possess poor oral health when compared to no anxious counterparts in terms of decayed, missing, and filled teeth. Moreover, poor oral health conditions negatively impact individuals' quality of life. This study emphasizes that age is important in university students but education level is important in public service clients. Furthermore, oral cleanliness habits are important for both groups as well as general cognitions in students.

Recommendations

A community level intervention that addresses DA in students and clients is necessary because it can greatly improve the quality of life for people who are prone to this issue. The intervention should include a combination of awareness campaigns and education, as well as an effort to improve the relationship between dentists and patients.

Awareness campaigns should be targeted toward both children and women adults, as DA is something that affects people of all ages but especially younger adults. Awareness campaigns could focus on educating the public about the prevalence of DA, how it affects people's lives, and how it can be treated. The campaigns would also need to educate the public about being understanding and supportive when they encounter someone who is struggling with this issue.

The second component of this intervention involves education for dentists and their staff members so that they are better equipped to help patients who are experiencing DA issues. Training should focus on how to interact with patients who have these fears, what causes them, what treatment options exist for them (such as sedation dentistry), and how best to communicate with them throughout their appointments so that they feel comfortable enough to work through whatever issues they may be having at any given time.

My Reflections

The experience of thesis writing taught me to learn and think critically about my research topic and its connections with other academic works. It also showed me how to work on my own time management skills and how to plan for data collection. Most importantly, it helped me develop the ability to find solutions for problems when things did not go as planned.

At the beginning of my graduate school career, I was inspired by the stories of thesis writing from senior students and professors. These stories were interesting, inspirational, and a bit frightening too.

I couldn't have written this thesis without the help of my advisors and my teachers, who provided me with valuable advice on how to make my proposal stand out from the crowd. They helped me understand what kind of information would make it professional, reliable, and marketable. I also consulted some senior students who had completed their own research proposals before me. They shared their experiences with me and gave me some tips on how to approach the work in a way that would be clear for my readers.

As I began to collect data for my thesis, I found myself in a challenging situation. I was struggling to get the required data for my project. There were many things that were going on in my life and it was difficult for me to finish all the work on time. At this point in time, I started talking to myself and had long conversations all by myself. My first day of the data collection journey was very memorable because it was the day when I got 250 responses within a day. This made me check if it really happened or not!

After all my hard work, I was so excited to finally start analyzing and interpreting my data. But I soon found myself struggling. I didn't know where to begin or what to look for. It felt

like a lot of work with no end in sight. The information I had collected was overwhelming, and I wasn't sure how to make sense of it. I met with my advisor, and he helped me put things in perspective.

The journey of writing a master's thesis as a beginner in research becomes a very inspirational story for me to explore further. I have come across many challenges, which made me learn and grow at the same time. In the end, I am truly indebted to the pious souls whose contribution made my journey of writing a thesis the most enjoyable and encouraging. Most importantly, I extend my sincere gratitude to my respected gurus, the advisor, and my committee members for their incredible guidance, suggestions, and love throughout the writing process. My journey of writing a master's thesis has taught me many things: how to face failure with grace; how to accept criticism; how to be independent; how to work hard; how to enjoy the work; how to be motivated by others' successes; and most importantly, what it means to be a part of society.

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Appendix A

Consent

Study title: Assessment of dental anxiety/phobia in university students in East Texas

Principal Investigator: Gangavaigai Guruparankumar

Faculty Advisor: Dr. William Sorensen PhD

You are invited to take part in a research study. This page contains information that will help you decide whether to join the study.

Things you should know:

- The purpose of the study is to assess Dental anxiety among students and clinic population.
- This survey is anonymous.
- If you choose to participate, you will be asked about dental anxiety and oral health. This will take about 15 minutes
- By participating this study there will be no risk or physical discomfort but it may provoke particular upsetting memories which may upset you.
- Taking part in this research project is voluntary. You can stop at any time.
- If you have any concerns, please contact Ganga:gguruparankumar@patriots.uttyler.edu ; # 9032038236 and Dr.Sorensen: bsorensen@uttyler.edu ; #9035667032

Thank you for participation!!

Questionnaire for survey

Age ____

Gender Male /Female /Another identity

Race White /Black/Hispanic/Asian /Others

For university students:

Grade Level ☐ Freshman

☐ Sophomore

For clinic population:

What is the highest level of education you have completed?

☐ Less than High school diploma
☐ High school diploma
☐ Bachelor's degree
☐ Graduate degree

- ☐ Junior
- ☐ Senior
- ☐ Master
- ☐ Doctorate

For university students:

International student Yes/ No

Dental insurance College plan/Parent's plan /employment plan/No Insurance/prefer not to say/ Other _____

On a scale of 1-10 (1=Terrible 10= Excellent)

How would you rate your health generally? _____

How would you rate your oral health? _____

Do you currently have a dental problem? Yes/No

Has a dental/teeth/oral problem affected your eating/chewing/talking ability? Yes/ No

Each week: √ the following

	Twice a day	Once a day	Every other day	Once a week	Never
Brushing frequency					
Flossing frequency					
Mouthwash frequency					

Last dental examination 1-3 months/ 4-6 months/7-12 months/ more than year/ never

Last dental cleaning 1-3 months/ 4-6 months/7-12 months/ more than year/ never

Do you currently smoke? Yes/ No

If yes what type? Cigarette/E-Cigarette/ Marijuana

Do you currently drink alcohol? Yes/ No

Food habits:

How often do you eat sweet snacks/candy? Several times per day/Once a day / 3-5 times per week / 2 times per week/ 1 time per week/ sometimes in month/ never

How often do you consume dairy products(yogurt/milk)? Several times per day/Once a day / 3-5 times per week / 2 times per week/ 1 time per week/ sometimes in month/ never

How often do you drink soft drinks/energy drink/fruit juice? Several times per day/Once a day / 3-5 times per week / 2 times per week/ 1 time per week/ sometimes in month/ never

Mental health questions

Have you ever diagnosed with following conditions?

Anxiety

Depression

Any phobia

If so, please specify name of the condition_____

Year you got diagnosed with_____

PLEASE INDICATE BY INSERTING 'X' IN THE APPROPRIATE BOX

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 (cleaned and scrapped), 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 (needle) in your gum, above an upper back tooth, how would you feel?

Not Anxious ☐	*Slightly Anxious* ☐	*Fairly Anxious* ☐	*Very Anxious* ☐	*Extremely Anxious* ☐

Appendix B

Consentimiento

Título del estudio: Evaluación de la ansiedad y fobia dental en estudiantes universitarios del Este de Texas

Investigador principal: Gangavaigai Guruparankumar

Asesor del profesorado: Dr. William Sorensen PhD

Se le invita a participar en un estudio de investigación. Esta página contiene información que le ayudará a decidir si quiere participar en el estudio.

Lo que debe saber:

- El propósito del estudio es evaluar la ansiedad dental entre los estudiantes.
- Esta encuesta es anónima.
- Si decide participar, se le preguntará sobre la ansiedad dental y la salud bucodental. La encuesta durará unos 15 minutos.

• Al participar en este estudio no habrá riesgo ni molestias físicas, pero puede que le provoque recuerdos especialmente perturbadores que le puedan perturbar a usted.

- La participación en este proyecto de investigación es voluntaria. Puede dejar de hacerlo en cualquier momento.
- Si tiene alguna duda, póngase en contacto con Ganga:gguruparankumar@patriots.uttyler.edu # 9032038236 and Dr.Sorensen bsorensen@uttyler.edu # 9035667032

¡Gracias por participar!

Cuestionario para la encuesta

Edad ____

Sexo Masculino /Femenino /Otra identidad

Raza Blanco /Negro/Hispano/asiático /Otros

¿Cuál es el nivel más alto de educación que ha completado?

☐ **Menos de un diploma de escuela secundaria**

☐ **Diploma de escuela secundaria**

☐ **Licenciatura**

☐ **Diploma de graduación**

☐ **Doctorado**

Estudiante internacional Sí/ No

Seguro dental

Plan de la universidad/plan de los padres/seguro de empleo/No hay seguro/prefiero no decirlo / Otro _____

En una escala del 1 al 10 (0=Terrible 10= Excelente)

¿Cómo calificaría su salud bucodental?

¿Cómo calificaría su estado de salud general?

¿Tiene actualmente algún problema dental? Sí/No

¿Un problema dental ha afectado a su alimentación? Sí/No

Cada semana:

Frecuencia de cepillado Dos veces al día / una vez al día/ cada dos días/ una vez a la semana/ nunca

Frecuencia de uso del hilo dental Dos veces al día/ una vez al día/ cada dos días/ una vez a la semana/ nunca

Frecuencia de lavado bucal Dos veces al día/ una vez al día/ cada dos días/ una vez a la semana/ nunca

¿Fuma? Sí/ No

En caso afirmativo, ¿qué tipo de tabaco?

Cigarrillo

Cigarrillo

Marihuana

¿Consume alcohol? Sí/ No

¿Con qué frecuencia usted bebe?

diario

1- **4 veces a la Semana**

   Mensualmente

   de vez en cuando

Hábitos alimenticios:

¿Con qué frecuencia comes dulces/caramelos? Varias veces al día/Cada día/ 3-5 veces a la semana/ 2 veces a la semana/ 1 vez a la semana/ De vez en cuando/ nunca

¿Con qué frecuencia comes productos lácteos (yogur/leche)? Varias veces al día/Cada día/ 3-5 veces a la semana/ 2 veces a la semana/ 1 vez a la semana/ De vez en cuando/ nunca

¿Con qué frecuencia bebe refrescos/bebida energética/jugo de frutas? Varias veces al día/Cada día/ 3-5 veces a la semana/ 2 veces a la semana/ 1 vez a la semana/ De vez en cuando/ nunca

Preguntas sobre salud mental

¿Le han diagnosticado alguna vez las siguientes condiciones?

Ansiedad

Depresión

Alguna fobia

No

En caso afirmativo, especifique _____

Año en que te diagnosticaron_____

POR FAVOR, INDÍQUELO MARCANDO UNA "X" EN LA CASILLA CORRESPONDIENTE

6. ¿Si fuera a su dentista para recibir TRATAMIENTO MAÑANA, cómo se sentiría?

No	*Ligeramente*	*Bastante*	*Muy*	*Extremadamente*
Ansioso ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐

7. ¿Si estuviera sentado en la SALA DE ESPERA (esperando el tratamiento), cómo se sentiría?

No	*Ligeramente*	*Bastante*	*Muy*	*Extremadamente*
Ansioso ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐

8. ¿Si le fueran a TALADRAR UN DIENTE, cómo se sentiría?

No	*Ligeramente*	*Bastante*	*Muy*	*Extremadamente*
Ansioso ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐

9. ¿Si estuvieras a punto de hacerte un RASPADO Y PULIDO DE DIENTES, cómo te sentirías?

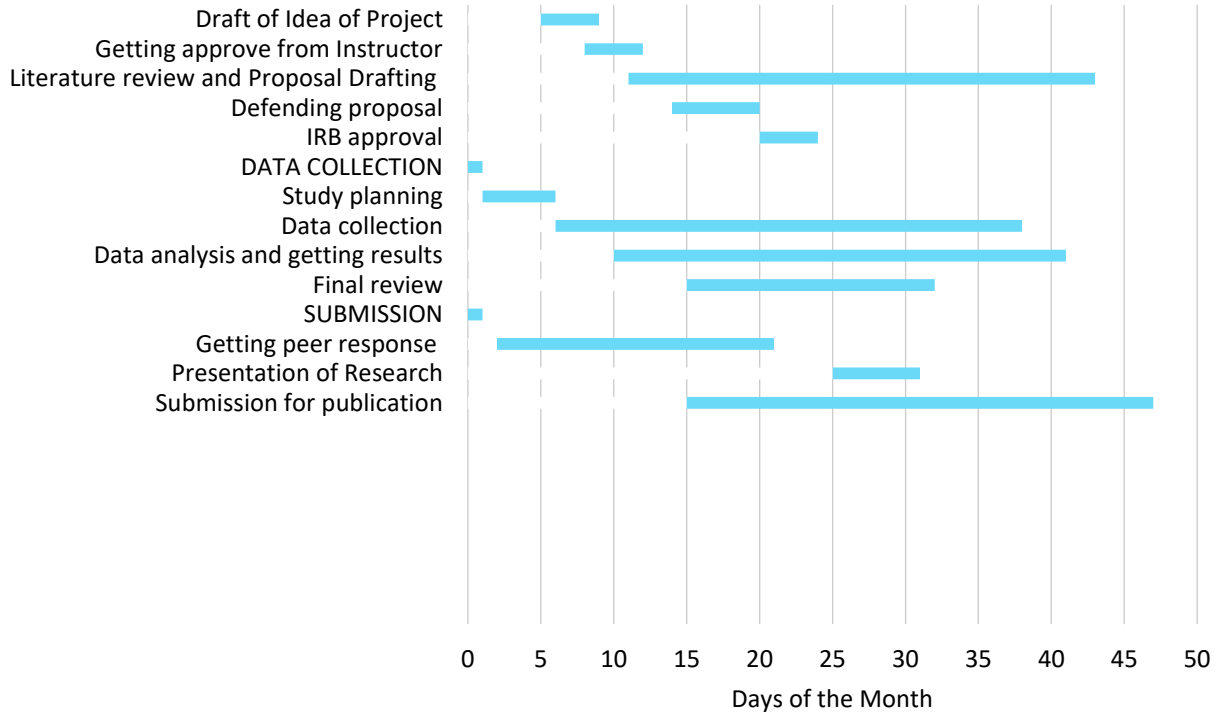
No	*Ligeramente*	*Bastante*	*Muy*	*Extremadamente*
Ansioso ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐

10. ¿Si le fueran a poner una INYECCIÓN ANESTÉTICA LOCAL en la encía, encima de un diente de la parte superior de la espalda, cómo se sentiría?

No	*Ligeramente*	*Bastante*	*Muy*	*Extremadamente*
Ansioso ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐	*Ansioso* ☐

Appendix C

T*otal project hours – 320. Work week: Mon-Fri, 9am-5pm (20 hrs/week for 6 months). I will have weekly meetings with my chair and committee members to track progress, I will also be consulting regularly with senior graduate students for suggestions.*



Appendix D

IRB approval UT Tyler

UTTyler
THE UNIVERSITY OF TEXAS AT TYLER

DATE: 10/24/2022

TO: Gangavaigai Guruparankumar, BDS
3900 University Blvd
Tyler, TX 75799

SUBMISSION TYPE:	**Exemption Submission**
PROTOCOL NUMBER:	2022-135
PROTOCOL TITLE:	Assessment of dental anxiety/phobia in university students and dental clinic population in East Texas
IRB ACTION:	**EXEMPT DETERMINATION**
APPROVAL DATE:	10/24/2022
EXPIRATION DATE:	10/23/2025
REVIEW TYPE:	**Expedited Review**

Thank you for your protocol submission for the above-referenced study. The UT Tyler Institutional Review Board has GRANTED YOUR EXEMPTION REQUEST based on :

Exempt Category (2)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:(i) 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;(ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

*This determination is for a three year period beginning on **10/24/2022** and ending on **10/23/2025**. A progress report will be required prior to this end date if research is still ongoing.*

Items Submitted for Review:

- ***IRB Exemption Request Submission Form***
  - ***Citi certificate (Investigator Training Documentation)***
  - ***English questionnaire (Consent Form)***
  - ***English questionnaire (Consent Form)***
  - ***Form 26 (Assent Form)***
  - ***Qualtrics link (Data Collection Tools)***
  - ***Resume (Investigator/Research Team CV or Resume)***

Institutional Review Board Office
1100 East Lake Street, Suite 330, Box-14
Phone: 903-877-7632
Email: irb@uthct.edu

Appendix E

IRB approval TJC

TJC THE COLLEGE OF EAST TEXAS

November 4, 2022

Gangavaigai Guruparankumar
Department of Public Health
UT Tyler

Study Title: Assessment of dental anxiety and phobia in university students and dental hygiene clinic population in East Texas
Protocol #: 2022.11.04 IRB
Approval Type: Expedited Review
Approval Date: November 4, 2022

Dear Andrea Hathcote and Josue Hernandez,

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board – Human Subjects (IRB-HS) of Tyler Junior College has reviewed your study as requested.

Responsibilities of the Principal Investigators include:

- Inform the IRB-HS in writing immediately of any emergent problems or proposed changes.
- Do not proceed with the research until any problems have been resolved and the IRB-HS have reviewed and approved any changes.
- Report any significant findings that become known in the course of the research that might affect the willingness of the subject to take part.
- Protect the confidentiality of all personally identifiable information collected.
- Submit for review and approval by the IRB-HS all modifications to the protocol or consent form(s) prior to implementation of any change(s).
- Notify the IRB-HS when study has been completed through submission of a *Project Completion Report*, located at https://www.tjc.edu/downloads/file/96/project_completion_report .

Should you have any questions or need any further information concerning this document please feel free to contact me at (903) 510-3318 or via email at belinda.prihoda@tjc.edu.

Sincerely,

Belinda A. Prihoda, EdD
IRB Chair