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Risk Factors of Dental Anxiety and Exploration of Interventions

by

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Abstract:

Within this literature review, the root causes of dental anxiety, current intervention methods, and possible preventative interventions are discussed. Dental anxiety affects millions of individuals across diverse backgrounds and can be detrimental to oral health. This issue can arise from various sources, however, different socioeconomic and sociodemographic factors can contribute to an individual's risk of developing dental anxiety. Understanding what predisposes certain populations to become more likely to develop dental anxiety is imperative to holistically address the concern. Investigating the relationship between lack of access, oral health, and anxiety levels allows for an understanding of the root causes of anxiety. With these in mind, examining current interventions for dental anxiety and their real-life implications sheds light to where they excel and where they fall short. Current interventions largely focus on in-chair management which allows procedures to be accomplished efficiently but does little to address the causes of anxiety. Examining possible interventions outside of the dental office in a preventative fashion could remove dental anxiety from being a barrier to better oral health for many populations. Exploring interventions that expand access to dental care and improve oral health are imperative to decreasing the prevalence of dental anxiety.

Introduction:

Dental anxiety is one of the most common forms of anxiety experienced in the United States yet little discussion surrounds the topic (Appukuttan, 2016). Dental anxiety can be defined as the fear of visiting the dentist, or having a dental procedure done. This fear can be portrayed as a physical or physiological reaction to a possible danger perceived from going to the dentist (Fletcher, 2022). While the prevalence of Americans that experience any degree of dental anxiety, ranging from mild to severe, is not universally agreed on, an accepted range of the affected population is 50% to 80% (White et al., 2017). Common symptoms of this anxiety include sweating, nausea, shortness of breath, dizziness, chills, and intense emotional responses (*Dentophobia*, n.d.). A key indicator that the symptoms are related to dental anxiety and not another form of anxiety is these symptoms go away once the dental issue is resolved and it does not affect one's day to day life (Fletcher, 2022). Common causes of dental anxiety can be traumatic past experiences, fear of pain, fear of needles, the sound of the drill, cost of treatment, distrust in a dentist, or the invasive nature of the procedures (Huff, 2023). While these are all factors that can differ based on an individual's experience, sociodemographic and socioeconomic factors can influence the risk of developing dental anxiety. Income, gender, education, occupation, and environmental factors play a role in how a person perceives the dentist. This leaves certain populations more vulnerable to developing dental anxiety. It is imperative to understand what risk factors exist in order to holistically address the issue. Management in the chair is possible with the use of pharmaceuticals and a well-trained dentist but the problem arises when either the patient's anxiety is so intense that they avoid the dental chair, or they do not have proper access to dental care. The main question then, is how can dental anxiety be managed

outside of the chair and how can we find a solution for dental anxiety that is more proactive instead of reactive? Within this paper the exploration of preventative measures and interventions will be addressed along with why dental anxiety can arise, who is at higher risk of developing it, and how the current interventions work.

Methods:

The research dives into the relationship between dental anxiety, its causes, and how interventions need to be preventive in order to adequately address root causes. The research was focused on addressing the question: What are the root causes of dental anxiety and what possible preventative measures can be implicated to ensure dental anxiety does not negatively affect our oral health? To answer this question a thorough literature review was conducted that includes many different sources found utilizing academic databases. The sources were critically analyzed and checked for relevance, credibility, and recency. Following the research question, this thesis explores the relationship between lack of access to dental care, poor oral health, and dental anxiety. Many sources alluded to the relationship of these factors being interrelated with poor outcomes inequitably dispersed to certain populations. With this understanding, evaluating current interventions shines a light on the disparities that exist and work to give a better understanding of what needs to be addressed. The purpose of this research is to discuss possible solutions by highlighting why they are needed.

Background:

As in other fields within medicine, there are sociodemographic and socioeconomic barriers that affect one's access to care. These barriers exist within the dental field and influence populations' risk of developing dental anxiety. Low income populations, minorities and those

living in rural places tend to have a difficult time accessing dental care (Freeman, 1999). Lack of access to dental care is strongly associated with poor oral health (Fletcher, 2022). Oral health is inversely related to dental anxiety in which poor oral health increases the likelihood of experiencing dental anxiety (Appukuttan, 2016). Establishing the link between lack of access to oral health, and then oral health to dental anxiety can show how access indirectly influences dental anxiety. This indirect connection is examined through the various sociodemographic and socioeconomic factors shedding light on why dental anxiety is so prevalent and difficult to treat.

Lack of consistent access to dental care can lead to poor oral health outcomes. Without adequate access, preventative services are utilized less. Hygiene appointments are important in prevention of issues and maintaining good oral health ("The Role of Dental Hygienists in Providing Access to Oral Health Care," 2014). However, many Americans do not have this luxury, some may only go to the dentist when in pain or when a glaring dental issue arises. (Davenport et al., 2003). Typically, when a patient waits to come into a dental office until they are in pain, the diagnosis is grimmer. With consistent visits, issues are identified sooner and have less time to become extensive (Duane, 2021). The more invasive the treatment, the more time and resources a dentist needs to use, the more anxiety a person is likely to experience (Appukuttan, 2016). This starts a vicious cycle that can lead to someone intentionally avoiding dental care. This pattern is so common it has a name and is called the vicious cycle model of dental fear maintenance (Armfield, 2013). This model describes the downward spiral of the relationship between avoidance, poor oral health, and extensive treatment. These three factors are interrelated, and each one can cause another. While looking into sociodemographic and socioeconomic factors, it's important to keep in mind that poor oral health and/or avoidance, whether due to lack of

access or by choice, can all be factors that lead to dental anxiety and leave populations at higher risk.

Root Causes of Dental Anxiety:

An individual or family's annual income has been statistically shown to be the most significant determinant of one's ability to access care (Freeman, 1999). Low income populations are most likely to lack access to oral health care services and in turn are more likely to develop dental anxiety. In America the cost of dental care and dental insurance is high. As of 2023, 68 million Americans did not have dental insurance (*Uninsured and in Need*, 2023). Government funded insurance plans can help bridge this gap; however, they still miss vulnerable populations. Medicare does not cover dental, and medicaid mainly assists children up to the age of 21 with the exclusion of some states (Bersell, 2017). While insurance coverage differs state to state, overall, there are few comprehensive plans that exist. Although the abundance of public insurance plans for low income individuals has increased since 2000, they are still limited (Fellows et al., 2022). Without government support people will have to look into private insurances. These plans are often costly and leave many people paying for care out of pocket. This high cost acts as a barrier to limit dental care to those who may need it the most. Preventative treatments are often less utilized by low income populations, leading to some only coming in for a glaring issue. This can lead to more invasive treatment that can be even more expensive causing further stress over finances. For many of these reasons, lower income individuals are at higher risk of developing dental anxiety which has been backed by multiple studies (Muneer et al., 2022). Due to how interrelated access to care and dental anxiety is, until access improves for people with less disposable income, dental anxiety will likely still preside.

Another factor that can influence one's risk of experiencing dental anxiety is the environment in which they reside. Four in ten rural Americans have not accessed dental care within the past year (*New Report*, 2024). This is due to the lack of provider shortages, lack of insurance coverage, and lack of adequate transportation. While most of the nation is experiencing shortages in dental providers, rural communities experience this the worst with 67% of these communities included in a dental health professional shortages area (*New Report*, 2024). Insurance coverage is also lower; about a third of rural residents are uninsured. This could be partially attributed to rural employers being less likely to provide dental insurance benefits (*New Report*, 2024). Access to adequate transportation is also a barrier to care. For many living in rural areas in order to see a dentist they would have to travel much further due to the shortage of dentists as well as the way in which their communities are typically spread out. Public transportation is sparse in rural areas therefore private transportation is the most reliable mode. All these factors contribute to the disparity in access that rural communities experience and can lead to poor oral care. Respectively, 27% of urban residents and 24% of suburban residents rate their oral health as poor; whereas, 34% of rural residents rate their oral health as poor (*Still Searching*, 2023). With more people being affected by poor oral health, lack of access, and lack of coverage, dental anxiety is likely experienced more commonly in these communities.

Race and ethnic background are additional factors that influence a population's risk of experiencing dental anxiety. Minorities in America are more likely to have untreated oral diseases than their white counterparts. Forty two percent of African Americans and 36% of Hispanic adults have untreated issues compared to the 22%of Caucasians that do (Feinberg, 2015). Native Americans have an even harder time accessing care; however, data is difficult to obtain due to

recording issues (Feinberg, 2015). When issues are left untreated over longer periods of time, they tend to get worse. More invasive procedures are needed for larger issues which can increase the likelihood of someone experiencing anxiety. With less access and more issues this leaves minorities more susceptible to dental anxiety than their white counterparts. While part of this disparity can be linked to socioeconomic status, a holistic view acknowledges how other variables such as racism have an effect as well. A study conducted with African American women in the Appalachian area found that racism experienced in the oral health setting was a predictor of dental anxiety and how often dental care was utilized (Sokoto et al., 2022). Over one third of participants in the study reported experiencing racism while receiving oral care. A quarter of these instances were reported as not being listened to (Sokoto et al., 2022).

With a dental office already prone to cause anxiety, adding discrimination and poor treatment to the mix causes more reason to skip appointments and avoid the dentist altogether. Poor oral health increases the likelihood of developing dental anxiety which leaves minorities increasingly vulnerable to developing it.

While income, environment, and race/ethnicity are not the only risk factors that indicate one's likelihood of developing dental anxiety, they are able to bring to light the structural inequalities that exist within the oral health field. Disparities in access and populations' oral health contribute extensively to dental anxiety and affect some populations more than others. With this knowledge, an examination of how to proactively manage dental anxiety can holistically be put together. Looking at current interventions for dental anxiety and where they fall short and what populations they leave behind will contribute to decreasing the prevalence of dental anxiety in vulnerable populations.

Current Interventions:

Current methods of intervention are largely focused on in-chair management. Common ways of managing anxieties are mainly grouped into two categories: Pharmaceutical and psychotherapeutic. Pharmaceuticals involve drugs that are able to alter one's consciousness and state of mind. Depending on how severe the anxiety, or invasive a procedure, different levels of sedation can be achieved ranging from mild conscious sedation to general anesthesia which is total loss of consciousness. The most common type of sedation dental staff use is conscious sedatives. These include nitrous oxide, oral sedatives, and intravenous sedatives (Appukuttan, 2016). Pharmaceuticals are a great intervention to use when a patient is anxious in the chair and a procedure needs to be done that does not cause excessive stress on a patient. However, they can be a band-aid fix. They are not addressing the main causes of the anxiety; they just cover up the symptoms and allow work to be completed that day. This management strategy typically doesn't help a patient figure out how to cope with their anxiety (Huff, 2023). Learning valuable skills to manage anxiety in and out of the chair could help lead to less anxiety and less avoidance of care.

Psychotherapeutic interventions have the ability to do just that. This type of management strategy is versatile, and some techniques can be conducted both in and out of the dental office. These strategies can give patients the ability to cope on their own. These types of interventions include, but are not limited to, behavioral management techniques, relaxation techniques, guided imagery, hypnotherapy, acupuncture, distraction, enhanced control, exposure therapy, cognitive therapy, and positive reinforcement learning (Appukuttan, 2016). The downside to most of these management strategies is the lack of implementation. Techniques such as hypnotherapy, acupuncture, and cognitive therapy must be conducted by a qualified professional that is not part

of most dental teams which makes it difficult to access (Appukuttan, 2016). Strategies that can be implemented by dentists like relaxation techniques and positive reinforcement are not taught in most dental schools and are therefore rarely implemented (Huff, 2023).

Enhanced control is a common method used. Loss of control can be a trigger for dental anxiety given the vulnerable situation a patient is in while being laid back in the dental chair (*Dentophobia (Fear of Dentists)*, n.d.). Dentists can combat this by giving a patient more information. Most dental schools teach the "tell-show-do method." This method helps dentists communicate what a procedure entails, and how they will do it in order to inform the patient and reduce their uncertainty. With increased predictability the patient feels more control (Appukuttan, 2016). This method helps ease one's anxiety while in the chair but does not do much to settle nerves before appointments and could still allow for avoidance of appointments so further interventions are required.

Lots of recent studies have looked into the effects of cognitive behavioral therapy which encompasses a combination of psychotherapeutic management strategies. (Wide Boman et al., 2013). Cognitive behavioral therapy (CBT) is an evidence-based treatment method for anxieties and phobias. It works by addressing negative connotations and reshaping them in such a way that gives the patient skills to manage the anxiety or phobia. This type of therapy is conducted with a therapist (Appukuttan, 2016). In a meta-analysis including 38 studies of CBT it was shown that this mode of treatment was efficient in reducing dental anxiety and avoidance of future appointments (Gordon et al., 2013). While proven effective, the access to this treatment is very limited. Due to lack of psychologists in dental clinics, cost of treatment, and lack of time and availability, this method of treatment is inaccessible to many. (Shahnavaz et al., 2018). A method

of treatment that works but allows little access is not a solution to address an anxiety that affects such a high percent of the population.

Possible Preventive Interventions:

Preventative interventions of dental anxiety exist but are limited. The most widely accepted form of prevention is consistent dental care that starts at a young age. “Happy Visits” are dental appointments made for children once they start developing teeth. The purpose of this appointment is to help children build a positive association with the dentist as well as allow parents to ask questions and to learn what good hygiene habits they should help their children build. With positive connections and good hygiene, a child is less likely to develop fear or anxiety towards the dentist as they get older (Vigler, 2018). Even after childhood, visiting the dentist routinely allows greater likelihood of having better oral health (Thomson et al., 2010). With better oral health the likeness of experiencing dental anxiety is also lower which is why routine care is accepted as a prevention intervention. However, with millions of adults and children lacking adequate access to care this prevention strategy leaves out large portions of the population and contributes to oral health disparities. Interventions that increase access to dental care and contribute to the education of both dentists and patients are ones that seem promising. An example of this type of intervention comes in the form of an occupation known as a Dental Therapist. Their main duty is to provide dental care and education to communities and populations that tend to lack access to a traditional dentist. They are found in schools, rural areas, and communities largely living below the poverty line. Dental therapists exist in nearly 50 countries including the U.S., although America is slow to adopt this occupation as only fourteen states authorize their work and only five have practicing dental therapists and education programs

in place (*Nine Questions That Dive Deeper into Dental Therapy*, 2022). New Zealand has had dental therapists, previously called dental nurses, in schools since the 1920's (Mathu-Muju et al., 2013). Dental therapists have had a large impact on the oral health of children leading to significantly less extractions, less caries and a greater access to oral health (Mathu-Muju et al., 2013). While New Zealand seems to have the best research regarding dental therapists, other countries are observing these same trends and reaping the benefits. Children's rate of accessibility of dental services in many of these countries is over ninety percent which is much higher than in the U.S. (Mathu-Muju et al., 2013). Dental therapists are able to significantly expand access to dental care and have a positive impact on oral health, two factors that influence the risk of developing dental anxiety.

With such few states utilizing dental therapists, the U.S. is unable to experience the benefits of having them. Many states have proposed legislation to authorize dental therapists to practice within the state but the majority of them have either fallen inactive or still have not been pushed through (*Authorization Status of Dental Therapists By State*, n.d.). Getting states to authorize dental therapists would be a great first step into utilizing them more and starting to create programs to train people for this role. Implementing dental therapists into schools across the U.S. should be an end goal in order to expand access to dental treatment and enhance dental literacy. The results of this could allow for better overall oral health of the nation's children as well as decreasing the prevalence of people who experience dental anxiety. Since our healthcare system is different from many of the nations that have had success with dental therapists, more research needs to be done in order to test the efficacy they could provide in the U.S. More studies regarding what it would take to keep the cost inexpensive or free to patients in order to allow the

intervention to still be as efficient in expanding access would need to take place. The idea of adding to a workforce in order to expand access is not a new topic. Medical assistants, physician assistants and nurse practitioners have been successfully implemented and proven to increase access and are seemingly similar to dental therapists (Mertz et al., 2021). While this strategy to decrease the prevalence of dental anxiety is slow moving, with more research and proper funding it could be a successful intervention.

Dental anxiety and access to care are intertwined so closely that improving one limits the other in an inversely related way. A way to decrease dental anxiety is to increase access. By improving access to dental insurance, more low income populations would be able to afford dental care. Government programs that serve low income populations have been shown to increase access to dental care such as the Special Supplemental Nutrition Program for Women, Infants, and Children also known as WIC. A study conducted followed children born in North Carolina in the year 1992 and tracked their dental usage. This study compared children within the WIC programs usage with children not in the program. It was found that children involved in WIC were 1.7 times more likely to see a dentist twice a year, and 1.5 times more likely to see a dentist once a year than children outside the program (Lee et al., 2004). It was also found that children within the program were more likely to visit the dentist for preventative or restorative services than emergency dental services than those excluded from the program (Lee et al., 2004). As previously mentioned, consistent dental care starting from a young age not only stands as a predictor of better oral health but also helps to establish positive connections with dentists and lessens the likelihood of developing dental anxiety. Having more programs similar to WIC and an expansion of WIC will increase access to vulnerable populations.

Increasing reimbursement rates of medicaid is another route to take to increase access to lower income populations. The idea behind this is that higher reimbursement rates will allow more dentists to participate and accept Medicaid patients so the density of accessible Medicaid accepting dentists will increase. To recap, Medicaid is available to low income Americans under the age of 21 and above that age in some states. One study found a correlation between increased Medicaid reimbursement rates and improved accessibility to dental care. This relationship was found to be particularly evident in specific states, contingent upon factors such as dentist density and current reimbursement rates (Chalmers & Compton, 2017). In states with high density of dentists, raising reimbursement rates increased accessibility. In states with low dentist density and low dentist participation in Medicaid, raising reimbursement rates increased access. However, in states with low dentist density and high dentist participation in Medicaid, raising reimbursement rates had no significant impact on accessibility (Chalmers & Compton, 2017). In most cases, increasing Medicaid reimbursement improves access. Similar to WIC, improving access to youth will help affirm positive relationships with the dentist, benefit oral health, and reduce the risk of dental anxiety. Implementation of new programs and expansion of existing ones can help contribute to expanding access. In order to begin implementing this strategy, more studies are needed to determine the most cost-effective method of increasing access.

Dental related professional programs have the ability to change the prevalence of dental anxiety as well. Dentists, dental hygienists and most dental assistants must graduate from a school or program in order to obtain a license or certificate to practice. These programs have a lot of influence over education of dental anxiety and the total number of dentists licensed to practice. Although information about curricula regarding dental anxiety is difficult to find without being

enrolled in a program, one source claims behavioral science education is minimal in most doctorate programs (Huff, 2023). Breathing exercises and relaxation techniques may be the extent of their training (Huff, 2023). Education about these management strategies is important to ensure every clinical dental staff understands the array of options available in order to best help their patients. Understanding psychotherapeutic interventions and their ability to give the patient coping skills with the anxiety could help to minimize band aid fixes like sedation from being overused. This assumes that increased knowledge of psychotherapeutic interventions among dentists would increase the use of these interventions; however further research would need to be done examining the relationship between education in programs and utilization of the techniques in practice.

Another way doctorate schools influence dental anxiety is related to the shortage of licensed dentists. Currently, most dental schools are increasing their incoming class size each year to account for the growing population (Solana, 2023). However, determining appropriate class size of one school can be difficult to calculate due to the various variables that need to be considered when trying to supply the correct number of dentists to the population. With the rise in dental insurance coverage, fluctuating population demographics and improving oral health of the nation, predicting future needs with the current information is unreliable (Rehan, 2020). Although the exact number is difficult to determine, there is no community benefit of achieving the perfect number of dentists over an excess of dentists. From a capitalistic standpoint, a hypothesis could be drawn that having an excess number of dentists in an area would encourage lower costs of dental care and possibly encourage dentists to spread out more. Both lower cost and increase in densities allow for better access to care for populations that tend to lack access. While this theory

follows the trend to how many businesses work in America, studies would need to be conducted to test its legitimacy. In the District of Columbia, the ratio of dentist to population is the highest in the nation (*The Dental Workforce - Key Facts*, 2021). Places like DC where dentist density is high could serve as case studies to compare the cost and surrounding densities across multiple different states to gain insights into the impact of dentist surplus on costs, distribution, and access.

Conclusion:

Dental anxiety, a pervasive concern affecting millions of individuals across diverse backgrounds, is a topic that often goes overlooked. There are so many causes of dental anxiety, whether it be a bad experience or a buildup of anxiety over time because of one's circumstance, and for this reason it is difficult to prevent and treat. Each case is unique and requires its own set of treatment modalities. Current interventions exist to treat symptoms patients experience in the chair so the anxiety can be managed while procedures are taking place. This method of treatment excludes populations that cannot access dental care as well as those who have had unresolved anxieties that keep them from the dental chair. Finding management strategies that are able to fill in the gaps is imperative to ensure better oral health. Reducing dental anxiety is important because it increases receptiveness to treatment and improves health outcomes (Hoffmann et al., 2022). Expansion of insurance coverage, more accessible dental health professionals and further education within dental related programs are all ways in which the prevalence of dental anxiety could decrease, and the overall oral health of the nation could be positively impacted. With so many unknowns pertaining to dental anxiety, more research into the efficacy of these different prevention interventions are needed before implication is possible.

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