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Chapter 3

Dental Anxiety and Its Consequences to Oral Health Care Attendance and Delivery

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Additional information is available at the end of the chapter

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Abstract

Dental anxiety has been reported to be a common problem affecting widespread societies, hence a global public health concern. This chapter provides an updated information to dental practitioners, about dental anxiety and its implication to oral health-care attendance and service delivery. It is introduced by defining dental anxiety, providing a summary of prevalence of the problem among children and adults; and its relationship with sociodemography, oral health status, and cultural issues. Causes of dental anxiety and simple ways to diagnose it and management options of dental anxiety for different age groups of populations are summarized to assist dental practitioners during patient management. How dental anxiety influences dental attendance and ultimately impact oral health status of populations; and its relationship with oral health-care delivery are also discussed. Finally, preventive measures both in community and clinical settings are provided and recommendation for dental professionals and other stake holders is outlined.

Keywords: dental anxiety, oral health-care delivery, oral health-care attendance

1. Introduction

1.1. Definition

The terms dental anxiety, fear, and phobia, though often used mutually, differ depending on the situation within which they occur. Nevertheless, a distinction has been made between these terminologies. *Dental fear* is a reaction to a known danger, which involves a "fight-or-flight" response when confronted with a threatening stimulus. On the other hand, *dental anxiety* is a

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reaction to an unknown danger, and *dental phobia* is basically the same as fear, only much stronger, whereby the "fight-or-flight" response occurs when just thinking about or being reminded of the threatening situation [1].

Dental anxiety is extremely common, and most people experience some degree of the anxiety especially if they are about to have a certain dental procedure done which they have never experienced before. Moreover, someone with a dental phobia will avoid dental care at all costs until either a physical problem or the psychological burden of the phobia becomes overwhelming. In this chapter, the term dental anxiety is employed.

1.2. Prevalence of dental anxiety

Dental anxiety is reported to be a global public health concern due to its effects on individual's oral health and quality of life. The prevalence of the condition in children ranges from 5 to 61% [2, 3] and in adults from 1 to 52% [4–12], inclusive of participants with both moderate and high dental anxiety.

1.3. Factors associated with dental anxiety

1.3.1. Sociodemographics

A majority of studies done reveal that females of all age groups, younger age and people who are classified to have low level of education are at more risk of having dental anxiety [2, 11]. The main reasons cited for the observed differences are more linked to environmental factors rather than biological makeup among children. However, Folayan and coworkers [13] revealed no differences in the prevalence of dental anxiety with sociodemography in children, while Minja et al. [11] showed no sex difference in their study among adults.

1.3.2. Oral health status

Individuals with poor oral health status are reported to perceive dental anxiety than their counter parts with good oral health status. Clinically, these patients are observed to have high number of decayed and missing teeth and less restored teeth [14–16]. DeDonno [17] revealed an association between participants' dental anxiety and oral hygiene, whereby individuals with dental anxiety were seen to have poor oral hygiene. Furthermore, patients who are dentally anxious are usually least satisfied with the appearance of their teeth [18].

1.3.3. Oral health-related behaviors

Population studies show that individuals with dental anxiety have difficulties to attend to a dentist [19]. Dental anxiety has also been reported to impact on individuals' daily living including modification of eating habits, such as avoidance of hard to chew and foods that cause sensitivity. Further to this, individuals with dental anxiety are reported to have a high tendency to self-medication so as to avoid visiting a dentist [20].

1.3.4. Cultural issues

The role of culture and norms in modifying individual's perception of dental fear and anxiety is also of prime importance when explaining these phenomena. Culture has been reported to have influence on perceiving dental anxiety [21]. Studies have shown that dental anxiety expression significantly varied according to ethnicity as well as religion due to the engraved dental anxiety coping mechanisms and expression among different cultures [22]. Generally, it has been reported that societies with cultures that emphasize on greater self-control, emotional restraint, and compliance to social rule (such as some Asian and African countries) were more likely to score higher in their fears/anxiety [23].

2. What is dental anxiety

In order to understand the dental anxiety well, it is important to explain its pathway, causes, diagnosis, and management.

2.1. Dental anxiety pathway

Five theories are thought to better explain the pathways of dental anxiety: *Pavlovian cognitive conditioning, informative pathway, vicarious conditioning, verbal transmission/threat, and parental pathway* [24].

Pavlovian cognitive conditioning is the most commonly utilized pathway of dental fear and anxiety used by the patients, whereby past painful dental experience may negatively impact an individuals' future dental attendance.

Informative pathway is an indirect pathway to phobia that involves learning about fearful dental events as told by other individuals.

Vicarious conditioning is another indirect pathway, whereby individuals may acquire dental phobia by learning indirectly through observing the responses of others attending a dentist.

In *Verbal transmission/threat*, there is no direct observation of traumatic/fearful event, but through hearing or reading about dangerous or threatening information about a stimulus irrespective of an actual presence of the threating stimulus. In this pathway, dental visit is used as a disciplinary measure for misbehaving.

Parental pathway refers to a situation where a fearful behavior displayed by a parent becomes a pathway of acquiring dental anxiety by a child. A stronger relationship is observed when it is the mother who expresses intensified fearful behavior.

2.2. Causes of dental anxiety

Dental anxiety has a wide range of causes and hence it is considered complex and multifactorial [25]. The causes may be patient, provider, or environment related. The patient-related

causes include past dental experience, pain, influence of family, or peer experience and personality, whereas provider-related causes include communication techniques and provider's bad behavior. Environmental-related causes include sounds of drills or other apprehensive patients, unpleasant smell/clinic area, and sight of blood or local anesthetic injections [26].

2.3. Diagnosis of dental anxiety

The importance of proper diagnosis of dental anxiety cannot be underrated. Identifying anxious patients helps a dental care provider to plan for appropriate ways and procedures for managing the patient. Several means have been developed to identify patients who have dental anxiety before treatment is initiated, so as to assist a dentist to provide appropriate treatment with no negative consequences to both the patient and provider. The measures are grouped into two: *use of questionnaires* and *objective measures* of dental anxiety.

2.3.1. Use of questionnaire

Using reliable and easy-to-administer tools for assessment of dental anxiety at the dental setting is beneficial for the dental team [27]. Despite the presence of a number of pretreatment questionnaires for patient administration, very few dental health-care providers utilize them [28]. Using self-reported questionnaire has been reported to be useful to assist in disclosing as well as reducing dental anxiety, as it might be a way for the dental team to gently build rapport with a patient [29]. A number of self-rated tools are available and no single instrument can be regarded as a gold standard set of questions. Mentioned here are the most commonly used and have shown acceptable psychometric properties for use in different languages worldwide. These measures are simple, easy to use, and acceptable to both patients and dental team [30–32]. They include a four-item Corah's dental anxiety scale (CDAS) and a five-item modified dental anxiety scale (MDAS) which proved to be suitable for use among adults. The results can be utilized in grouping patients according to the level of dental anxiety that is *low*, *moderate*, and *high*. Other measures suitable for use among children are the modified child dental anxiety scale (MCDAS) containing eight questions; and a faces version of the modified child dental anxiety scale (MCDASf) that incorporates facial images on the response format, and this can be used by children as young as 3 years old [27, 29]. Use of questionnaires assists in identifying patients with dental anxiety thus allows planning for possible approaches that can be utilized for management of patients, as suggested by Newton and coworkers [33].

2.3.2. Objective measures

Measuring patients' vital signs can add into the identification of patients with dental anxiety at the dental clinic setting. These measures are assessment of blood pressure, pulse rate, pulse oximetry to assess blood oxygen levels which is affected by stress and anxiety, finger temperature, and galvanic skin response that measures skin conductance of weak electric current [29, 34].

2.4. Management of dental anxiety

When managing a patient with dental anxiety, utilization of different measures to counter anxiety will depend on the patient's history, age, and cooperation. In all instances, a dental care

provider needs to portray behavior that will contribute to reducing anxiety to the patient. These include, but not limited to, being composed and relaxed, friendly to the patient, avoiding being judgmental or instilling pain, being supportive and encouraging to the patient, and working efficiently [26, 29]. Different measures are employed in managing patients with dental anxiety as explained below according to the age group of the patient.

2.4.1. Management in children

In managing children with dental anxiety, the following is suggested:

- Allocate enough time for appointment.
- Communicate effectively.
- Utilize the four "s" principle by reducing triggers of stress. These are *sight* of injections, handpieces, and blood; *smell* of materials such as eugenol; *sound* of drilling or other patients crying; and *sensation* of vibrating instruments.
- Distract the patient using music, video.
- Give a sense of control over the procedure by involving the patient during treatment, like to raise hand when feeling pain or uncomfortable.
- Reduce pain by giving enough anesthesia.
- Provision of cognitive behavioral therapy (CBT).
- Provision of relaxation therapy for older children that will assist patients to gain control over their psychological state. The techniques can be given before and even during the procedure. These may include *Jacobsen's progressive muscular relaxation*, *paced breathing techniques*.

In highly anxious patients who could not do any of the psychotherapeutics, pharmacotherapy may be indicated such as:

- Conscious sedation technique, whereby drugs are provided to render an anxious patient to a depressive state. The routes of application can be oral, sublingual, intramuscular, rectal, and in dental setting with enough resources, intravenous administration, or inhalation using nitrous oxide (N_2O) gas.
- When the above techniques do not help, the practitioner can refer the patient to a specialist psychologist for further management or can resort to general anesthesia if equipment and trained personnel are available.

2.4.2. Management in adults and older adults

All the techniques used in children can be utilized when managing adults with dental anxiety. In addition, the following techniques can be employed:

- Utilization of computer-assisted relaxation learning (CARL), which is a self-paced treatment by patients to cope with dental anxiety (needle specific) without the presence of a therapist.

- Individual systematic desensitization, whereby patients are gradually introduced to a fearful stimulus and learn to cope with anxiety by utilizing another method such as CARL or relaxation therapy methods.
- For patients whose anxiety is induced by a needle, computer-controlled local anesthesia can be used; or electronic dental anesthesia, wherein anesthesia is achieved based on "gate-control theory of pain," with no use of a needle. This method, though, is expensive and requires special training.
- Adults could also be referred for group therapy with specialist psychologist and behavioral therapist.

2.4.3. Benefits to patients

A patient will calm down, hence be receptive of oral health information provided for his/her own benefit. Furthermore, the patient will allow receiving the required treatment. Ultimately, the patient will be positively motivated, on a long-term basis and thus acquire positive attitudes toward dentistry.

2.4.4. Benefits to practitioner

This will assist service provider to be at peace, hence facilitate accurate provision of the required treatment. The whole scenario will, eventually, minimize occupational stress.

3. Dental anxiety and its consequences to oral health-care attendance and delivery

Generally, dental procedures take a couple of minutes to accomplish, and therefore require a patient to be calm and cooperative in the dental chair. Unfortunately, this is not always the case, since some patients are apprehensive probably because most procedures are either believed or are actually associated with some degree of pain to the patient. Furthermore, dental patients are usually "alert" or "not ill," thus in full perception of all that is happening. This situation contributes to acquisition of dental anxiety.

3.1. Influence of dental anxiety on dental attendance and oral health status

It has been observed that individuals with dental anxiety tend to fail to keep appointments, avoid attending to a dentist for dental care or complying with prescribed treatment [35]. This tendency cuts across all individuals regardless of their socioeconomic status or geographical location. Dental anxiety is also associated with poor dental health conditions [36]. Research shows that anxious patients possess poor oral health when compared to nonanxious counterparts in terms of decayed, missing, and filled teeth [37]. Moreover, poor oral health conditions negatively impact individuals' quality of life [38, 39]. Generally, dental anxious patients have been viewed as unreliable and of poor economic risk [26].

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The cycle of dental anxiety (**Figure 1**) explains the interrelationship of the above. Whereby, an individual with dental anxiety is usually worried and anticipates that something bad is going to happen if she/he visits a dentist; thenceforth, tends to delay or avoid dental attendance. This action deprives the individual from receiving dental preventive care and treatment and thus leads to deterioration of oral health, poor oral health status, and poor dental-related quality of life. Poor oral health, coupled with feeling of guilt, shame, inferiority, and worry of being reprimanded by a dentist for oral neglect, further increases dental anxiety and the cycle continues [40, 41]. Failure to provide the required treatment to counter dental anxiety, the vicious cycle will continue. It has been suggested that effective treatment of dental anxiety will improve dental attendance and ultimately the oral health of individuals [42].

3.2. Influences of dental anxiety on oral health-care delivery

Good oral health-care delivery entails harmonious environment contributed to by both providers and patients as well as dental environment. When either party's attributes are not positive toward reaching a harmonious environment, it may interfere with attaining the intended management goals.

3.2.1. Provider perspective

Provider's good communication skills coupled with proper use of behavior management techniques as well as positive behavior toward dental patients play a significant role in creating a harmonious dental treatment environment. The reverse may induce dental anxiety or exacerbate the already anxious situation [43]. Ultimately, treatment may take longer or may have to be rescheduled but may also be compromised. Various consequences of this situation include loosing patients, bad provider reputation, and negative professional image, as well as negative economic implications. Consequences affecting the patient directly include eliciting pain and

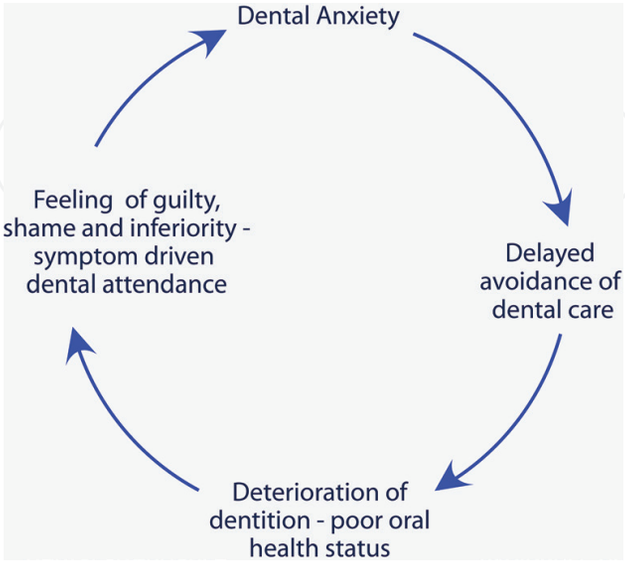


Figure 1. The vicious cycle of dental anxiety [40, 41].

contributing to patients' unpleasant dental experience. Handling an anxious patient when not prepared has been reported to add stress on the dentist and the dental team as a whole [44].

3.2.2. Patient perspective

Delaying, rescheduling, or avoiding dental visit due to dental anxiety leads to seeing a dentist only when it is inevitable, which may end up into a need for complicated treatment [36]. The latter might bring about more anxiety, failure to abide to instructions, or comply to preventive care hence exaggerate oral health problems [43]. Unfortunately, causes of dental anxiety such as personality, past dental experience, or family/peer influence are basically out of patients' control. Therefore, they need to be assisted to overcome the anxiety, which is a sole responsibility of the dental team. The dental team should have a broad approach on patient's needs, not be judgmental while managing the patient, instead do all that is required to allay the patient's anxiety, thus facilitating provision of proper care.

3.2.3. Environmental perspective

Dental environment is generally perceived by patients to be unfriendly, offensive, and anxiety-provoking, especially so by anxious patients. The looks of the dental chair and its accessories may not give an appealing first impression. Smell of the medicaments as well as invasive contact in the mouth, sound of the drill, sight of blood are some of the situations that most patients may have difficulties to tolerate [45]. The dental environment condition, coupled with the nature and duration of dental treatment procedures, may bring about or amplify patient dental anxiety. This situation will interfere with delivery of dental care. It is, therefore, the responsibility of the dental team to make sure that the dental environment is friendly to patients with or without dental anxiety.

3.3. Prevention of dental anxiety

Like in any other disease/condition, prevention before development of dental anxiety is important for effective management of patients. This may entail putting in place modifications to address operators, patients, or dental clinic environment concerns. Further to this, strategies aiming at the community may be critical.

3.3.1. Modification of operator characters

Operators/dental team character plays a big role in determining future behavior of dental patients. Particularly, what the patient experiences at his/her first visit to a dentist is what shapes his/her attitudes with dental care services [46]. Positive behavior of operator and the dental team will automatically influence positive attitudes and minimize chances for dental anxiety. On the contrary, a bad operator/dental team behavior may induce, as well as exaggerate, dental anxiety in patients [43, 47]. To prevent operators/dental team from inducing dental anxiety, starting from the moment the patient enters the dental clinic to exiting, it is advisable for the team to have good communication skills, be sympathetic, have empathy, and be able to control temper. To make this happen, proper training and continuing education on prevention of dental anxiety

are of paramount importance. Therefore, the provider and dental team at large should strive to intentionally acquire these characteristics, which will lead to having positive behavior toward patients, particularly to be understanding to anxious ones.

3.3.2. Modification of patient characters

Every dental patient has his/her own preconceived ideas about dental care. Apparently, each patient might be anxious depending on his/her personality trait, past dental experience, influence from family and peers, etc. Therefore, all patients attending the dental clinic should be calmed down and be made to relax regardless of whether the patient is anxious or not, (**Figure 2a** and **b**). This is a sole responsibility of the dental team [48].

3.3.3. Modification of dental clinic environment

Most patients consider the dental environment to be unfriendly and anxiety provoking. For this reason, various efforts have been made by dental professionals to modify the environment so as to counter that effect (**Figures 3** and **4**). The efforts include avoiding white uniforms by using attractive colorful attire, minimizing bright lights, playing soft/relaxing music, placement of nondental attractions in waiting rooms, making reception and waiting rooms colorful for children, minimizing noise from dental instruments/equipment by sound proofing the operating rooms, and intentionally engaging a receptionist who is charming, positive, and having caring attitudes to patients. Other measures are utilization of aromatherapy and sensory-adapted dental environment (SDE). Aromatherapy in dental settings is done using essential oils, the most common ones being smell of orange and lavender. Lavender smell has been shown to produce positive physiological and pharmacological effects which proved to



Figure 2. (a) A 7-year-old child presenting with dental anxiety trying to stop the doctor from performing oral examination. (b) The same child while a dentist employs behavior management techniques to allay the child's dental anxiety (pictures by courtesy of Dr. Gustav Rwekaza).



Figure 3. A patient-friendly dental clinic reception (picture by Jacob Francis, courtesy of Smiles dental clinic).



Figure 4. A child-friendly dental surgery (picture by Jacob Francis, courtesy of Smiles dental clinic).

be effective in reducing state anxiety [49]. Similarly, SDE, which has been utilized and proved to be effective for management of dental anxiety, is also helpful in reducing the anxiety and relaxing the patient [45].

3.3.4. Community prevention

At community level, prevention of dental anxiety through giving education is a responsibility of the dental team. The education should primarily be directed to children since the onset of dental anxiety often occurs in childhood. This implies that early intervention will help to prevent the problem from extending into adulthood, but adults should also be involved. Among measures of intervention at community level, it is to inform the community on the impact of dental anxiety on individual's oral health status, oral health-care attendance, and service delivery. Another measure is to educate and discourage individuals from sharing their dental fears and/or negative dental experiences in such a way that it may influence others to develop

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dental anxiety or negativity toward dentistry. Furthermore, it is beneficial to empower the community to prevent dental diseases, to encourage them on the importance of regular visit to a dentist for checkup, and to strongly disapprove the use of dental visit/services as punitive measure or to shape behavior [24, 48]. Moreover, population screening for dental anxiety will assist in identifying those who are affected thus earmarking them for preventive intervention.

4. Conclusions

Dental anxiety is a problem affecting populations of all ages, from all geographical locations. It affects individuals' oral health status, interferes with dental attendance and service delivery. Dental professionals, therefore, have a major role to play in the management and prevention of dental anxiety among dental patients and the community at large.

5. Recommendations

We recommend that:

1. Dental professional associations and dental teaching institutions should conduct workshops and continuing education and professional development (CPD) courses for the dental fraternity on management and prevention of dental anxiety.
2. Dental professionals to educate themselves on the different options of management and prevention of dental anxiety.
3. Dental professionals to educate community on dental anxiety.

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Conflict of interest

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