MOHAMMED BIN RASHID UNIVERSITY
OF MEDICINE AND HEALTH SCIENCES

ASSESSMENT OF ANXIETY LEVELS AMONG PATIENTS ATTENDING ORAL SURGERY DEPARTMENT AT HAMDAN BIN MOHAMMED COLLEGE OF DENTAL MEDICINE IN UNITED ARAB EMIRATES

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Abstract

Assessment Of Anxiety Levels Among Patients Attending Oral Surgery Department At Hamdan Bin Mohammed College Of Dental Medicine In United Arab Emirates

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Objectives: To assess the dental anxiety levels among patients attending Oral Surgery department at Hamdan Bin Mohammed Dental Clinics (HBMCDM) and to identify factors influencing dental anxiety level among the patients attending Oral Surgery department.

Methods: A cross-sectional study using a Likert-scale questionnaire was conducted to collect quantitative data from 206 patients at the Oral Surgery Clinics at (HBMCDM). Dubai, U.A.E. Descriptive analysis as well as independent-t test and Chi-Square Test to compare and determine the associations of the dental anxiety scores between groups was carried out using IBM-SPSS for windows version 24.0 (SPSS Inc., Chicago, IL).

Results: The prevalence of dental anxiety (MDAS score of 13 or more) of the 206 patients was 72.33% with overall severity represented by a mean score of 15.50 (SD ± 5.4). The maximum anxiety scores were reported for: planning to going to the dentist for treatment, sitting in the dentist's waiting room, having a tooth drilled, having teeth scaled and polished, having a local anesthetic injection, and having an extraction/surgical procedure with the following anxiety scores respectively 2.12, 2.21, 2.70, 1.92, 3.05 and 3.50. There was a significant high dental anxiety average score among females 16.42 (SD ± 5.54) compared with that among males 14.65 (SD ± 5.16), p-value was 0.02. The average dental anxiety score increases significantly by education level (p-value 0.02). There is statistically significant difference between average dental anxiety scores among student 17.44 (SD ± 6.09) compared with the employee 14.92 (SD ± 5.34) and the unemployed 17.24 (SD ± 4.78) (p-value 0.03). However, there were no relation between dental anxiety scores and age of the patient, marital status, dental history and history of bad dental experience. The best-recorded technique to reduce patients' dental anxiety was communication strategies (51% of the respondents) and followed by Tell-Show-Do techniques (33.0%).

Conclusion:

From the study, it can be concluded that dental anxiety levels among patients in United Arab Emirates was significantly high especially in relation to teeth extraction and dental surgical procedures and the least anxiety scores were reported for scaling and polishing.

KEYWORDS: Dental anxiety, dental fear, modified dental anxiety scale, MDAS

Dedication

I would like to dedicate this thesis to my family and friends. Their boundless love, support and guidance have encouraged me to accomplish all my professional and personal goals.

Declaration

I declare that all the content of the thesis is my own work. There is no conflict of interest with

any other entity or organization.

Name: Albatool Omar

Signature:

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Abbreviations

MBRU – Mohammed Bin Rashid University of Medicine and Health Sciences

HBMCDM – Hamdan Bin Mohammed College of Dental Medicine

UAE – United Arab Emirates

DA – Dental Anxiety

DAS – Dental Anxiety Scale

CDAS – Corah Dental Anxiety Scale

MDAS – Modified Dental Anxiety Scale

VAS – Visual Analog Scale

VAS-A - Visual Analog Scale for Anxiety

STAI – State Trait Anxiety Inventory

PSTSD – Post-traumatic Stress Disorder

MBU – Mind-Body Unit

1. Introduction

Anxiety is a negative and unpleasant emotional state of an inner disorder and an expectation of future danger, usually comes with a nervous behavior like biting nails or clenching and grinding teeth. Among various kinds of fear, phobia and anxiety, dental anxiety is one of the most common amongst patients. It is more specific than general anxiety. It has been widely studied all over the world. The etiology of dental anxiety is not fully clear but it is a multidimensional phenomenon. Anxious patients require more time, are more challenging to manage, and present with behavioral problems that can cause unpleasant and stressful experiences for both the patient and dentist. Research shows that many dentists are also stressed when trying to manage dental fearful patients. Possible factors related to dental anxiety that have been studied include gender, age, education level, objects and situations etc. It is important to assess patient's dental anxiety for better patient management and a proper treatment plan. Many instruments have been developed to measure and evaluate dental anxiety, The most commonly used instrument according to the literatures is the Dental Anxiety Scale (DAS), which is a Likert-scale questionnaire about different dental situations, scored from 1 to 5 (1= not anxious to 5= extremely anxious). The DAS has been modified to become Modified Dental Anxiety Scale (MDAS), which includes a question on local anesthesia.

To reduce patient's dental anxiety, many treatment modalities have been suggested, like behavior modification including cognitive behavioral therapy, Tell-Show-Do technique, communication strategies, seeing a psychotherapist, distraction techniques like music or movies, relaxation strategies, and use of various relevant pharmaceutical agents such as intravenous sedation and inhalation sedation nitrous oxide, conscious sedation, general anesthesia.

2. Literature review

2.1 Definition of anxiety

The Merriam-Webster dictionary defines anxiety as an "*Apprehensive uneasiness or nervousness usually over an impending or anticipated ill*," a concept far from fitting the problem of anxiety in dentistry. A better definition is available in Oxford Medicine Online: "*Anxiety refers to multiple mental and physiological phenomena, including a person's conscious state of worry over a future unwanted event, or fear of an actual situation. Anxiety and fear are closely related. Some scholars view anxiety as a uniquely human emotion and fear as common to non-human species. Another distinction often made between fear and anxiety is that fear is an adaptive response to realistic threat, whereas anxiety is a diffuse emotion, sometimes an unreasonable or excessive reaction to current or future perceived threat.*"

The concept of anxiety has several possible meanings, and may thus give rise to some uncertainty and ambiguity (Facco et al., 2017). The generally available dictionary definitions of dental anxiety (DA) are largely unsatisfactory.

All anxiety disorders share elements of fear and anxiety, where the former is an emotional response to a real or perceived threat, while the latter concerns expectations of a future threat. Anxiety is a very common disorder with a lifetime prevalence of ~30% (Kessler et al., 2005). About one in two individuals diagnosed with an anxiety disorder also meet the criteria for a depressive disorder (Batelaan et al., 2012). As a result, anxiety in dentistry has two implications in routine clinical practice: (a) the high prevalence of anxiety disorders and depression in the general population, which may make patients anxious during dental care as a result of trait anxiety; (b) a high prevalence of specific dental anxiety (DA) and phobia (i.e., raising up only in the context of dental care), which has been estimated to affect from 10 to 30% of the population, depending on sample selection (i.e., general population or patients scheduled for intervention), ethnic and sociocultural variables (Facco et al., 2015b). Given

the high prevalence of anxiety as a whole, dentists must deal with the phenomenon and its adverse effects in their everyday clinical practice.

2.2 Pathophysiology and assessment of dental anxiety (DA)

Given its high prevalence worldwide, dental fear can be considered a universal phenomenon with different cultural features (Berggren et al., 2000). The first reports on the pathophysiology of DA date back to mid-twentieth century with the seminal papers by Coriat (1946) and Shoben and Borland (1954), followed by Forgione and Clark (1974) and Freeman (1985); in the same years, the DA Scale, Corah Dental Anxiety Scale (CDAS) has been developed by Corah (Corah, 1969; Corah et al., 1978) as well as the Visual Analog Scale (VAS), introduced by Aitken to assess emotions and feelings (Aitken, 1969). The interest in pathophysiology and assessment of DA has been paralleled by the first attempts to manage it with both pharmacological approaches (i.e., sedation and general anesthesia) (Goulding et al., 1957; Springer, 1962; Chambiras, 1969; Newman et al., 1970; Machen et al., 1977), and behavioral techniques (Friedman, 1983; Gatchel, 1980), including hypnosis (Marcuse, 1947; Eycleshimer, 1949; Moss, 1951; Kline, 1957; Bertolini, 1970). Since then, an ever-increasing number of studies on DA has been published: 878 papers including the words *dental anxiety* or *fear* in the title and 1558 including the same words in the abstract are now available in, being evidence of the relevance and complexity of the topic.

Coriat emphasized the concept of fear as a form of anticipatory anxiety, not necessarily depending on expected pain (Coriat, 1946); he also defined the fear of a danger which is unknown as a *neurotic anxiety*, related to a feeling of helplessness in an anticipated traumatic situation. Shoben and Borland (1954) investigated the etiology of DA in two groups of 15 patients (anxious vs. non-anxious) checking 11 possible factors, including previous dental or medical bad experiences, previous facial injuries, negative family dental experience or attitude toward dentistry, high anxiety level, dependency, emphasis on appearance (according

to psychoanalysis); the only two factors significantly related to dental fear were the family related ones, leading the authors to conclude that they were the most important factors in determining DA and avoidance behavior. However, these results, though correct, underestimated the role of other factors, such as previous bad experiences, due to the small sample size.

The wealth of data now available makes it definitively clear that the origin of DA is multidimensional and includes both endogenous and exogenous causes (Liddell and Locker, 2000). Several psychological disorders (such as low self-esteem, general fearfulness, conduct disorder, agoraphobia, simple phobia, alcohol dependence) are more frequent in patients with high DA, as defined by CDAS (Locker et al., 2001; Kvale et al., 2002; Locker, 2003). The exogenous factors include conditioned fear (yielded by previous bad experiences or information), fear of somatic intraoperative reactions and distrust of dental professionals; the latter, in turn, is usually caused by dentists' and/or physicians' inappropriate behavior and traumatic dental treatments, leading to patient's helplessness, threat for autonomy loss and violation (Abrahamsson et al., 2002). Finally, patients with severe systemic diseases may have a higher level of dental anxiety, related to previous experience with their diseases and interventions (Facco et al., 2008, 2015b).

In short, DA is far from being a simple monomorphic clinical entity, where people with no dental fear may have had negative dental experiences, and, vice versa, some people with DA or phobia may fail to recall any traumatic incidents; this calls for a proper understanding of each individual subject, in order to assess the factors involved in his/her DA, be they endogenous and/or exogenous, directly learned from previous bad experiences and/or through communication with others.

The assessment of the intensity of DA is an essential aspect of the patient's evaluation. The estimation of the prevalence of DA may also be affected by the used test to check it; in fact, different anxiety tests may provide different results according to their structure and aims [see Newton (Newton and Buck, 2000) as a review of all main DA tests]. For example, the Humphris' Modified Dental Anxiety Scale (MDAS) may improve evaluation of DA when compared to the CDAS, by adding a specific question on dental anesthesia, which is a relevant source for anxiety (Humphris et al., 1995, 2000).

The VAS for anxiety (VAS-A) has proved to be very effective and closely correlated to CDAS, MDAS and Spielberger's State Trait Anxiety Inventory (STAI), but a discordance rate of 25–30% has been detected, suggesting a higher sensitivity of VAS-A (Facco et al., 2013b). This discordance probably depends on the different aims of these tests, providing different information: (a) CDAS and MDAS detect DA components related to the dental setting; (b) the STAI- form Y1 detects *state* anxiety (i.e., the anxiety the subject feels when filling in the form), while the STAI-Y2 detects the *trait* anxiety, (i.e., the anxiety perceived in everyday life); (c) the VAS-A, being a non-verbal test, provides an overall estimation of patient's anxiety (not limited by scenarios), and, when administered during the preoperative visit, provides information on patient's DA when reckoning with undergoing surgery (Facco et al., 2013b).

The above mentioned features may explain discordant cases, such as patients with low CDAS and STAI and high VAS-A, who are neither anxious nor fearful of the dentist, but are facing the operation with a strong fear of its possible consequences (e.g., the informed risk of possible inferior alveolar nerve lesions during wisdom teeth removal). Therefore, in our department we decided to routinely use both VAS-A and MDAS and considered as anxious all patients with a high score of at least one test.

Another major source of variability of DA estimation depends on the grading of test scores. In the literature, CDAS, MDAS, and VAS-A have been graded into the following three levels: (1) Not anxious (CDAS<12, MDAS<14, VAS-A<51 mm); (2) anxious (CDAS = 12–15, MDAS = 14–18, VAS-A = 51–75 mm); and phobic (CDAS>15, MDAS>18, VAS-A>75 mm). In all these tests the threshold for DA has been set at the mid value of each scale, to be regarded as the threshold for clinically relevant anxiety. Generally speaking, any limit, despite reliably identified, is somehow arbitrary: in the case of DA tests, it does not mean that patients slightly below the established threshold are not anxious. Therefore, the reported prevalence of anxiety in population, despite remaining a valid estimation, is partly conventional and one should be aware that several patients with a score below the mentioned limits may be anxious enough as to deserve its management.

Given the wide range of causes, DA should be regarded as part of the anxiety disorders included in the Diagnosis and Statistical manual 5 (DSM 5), rather than as separate entities confined to the dental setting (Berggren et al., 2000; Facco et al., 2015b). Among them, previous distressing experiences remain a major cause of anxiety and phobia and share several features with panic attacks and post-traumatic stress disorder (PTSD) (de Jongh et al., 2006). In a series of 230 patients (Facco et al., 2015b), 106 (46%) reported previous bad experiences in dental and/or medical settings and those with bad experiences in both had significantly higher MDAS score than people without bad experiences (17.4 ± 5.2 vs. 11.3 ± 4.5); among 83 (36.1%) attending dental visits only when painful or in trouble, 51 (61.4%) reported such bad experiences. This suggests that the avoidance behavior is related to previous traumatic experience in the majority of cases, while the remaining ones depended on other factors, like DA due to other causes, cultural factors or the barrier yielded by costs (Armfield and Ketting, 2015).

The above data show the crucial role played by health professionals in the pathophysiology of DA, by leading to patients feeling unbearably helpless, being threatened with the loss of their autonomy, and violated, yielding avoidable suffering, pain, and opening the doors to medical emergencies. Thus, dentists and physicians look like the two-faced Janus, the Ancient Roman God of time in the past and future, in war and peace (the month of January is named after him): they may be gentle and protective experts providing safe and painless care, or turn into torturers capable of causing great suffering. Their inappropriate behavior can exacerbate existing anxiety disorders or trigger a new form of anguish (anxiety, phobia, and PTSD) that may persist for life if not properly managed.

In short, DA can be seen as a complex response of the modern human's mind-body unit (MBU) to a wide range of factors (Bracken, 2002); anxiety and pain during dental treatment may also trigger physical changes, which belong to the so-called *fight-or-flight* reaction and may give raise to emergencies. The incidence of medical emergencies in the dental setting is not rare and ranges between 0.7 and 10 cases/dentist/year; most of them are not disease-related, with vasodepressor syncope being the most frequent one, followed by orthostatic hypotension, hypertension and hyperventilation (Matsuura, 1989; Niwa et al., 1996; Arsati et al., 2010).

It is worth recalling that anxiety and depression had been recognized as inseparable psychosomatic phenomena already in antiquity: in the second century, Galen of Pergamon named them *Melancholia hypochondriaca* (from the Greek μέλας *mélas, black*, and χολή, *cholé, bile*) to underscore their physical origin or manifestation (e.g., neurovegetative changes) at visceral level (in the liver, according to Galen).

The complex interplay of the multiple aspects of anxiety can be usefully discussed in terms of "*set and setting*" (Leary et al., 1969; Zinberg, 1986; Hartogsohn, 2013), where set indicates

the particular *mindset* of the subject (i.e., mental state, thoughts, expectations, intentions, preparedness for particular experiences, personality structure, mood at the time, etc.), and setting denotes the physical environment (weather, light or dark, indoor or outdoor, etc.) and sociocultural features (values, social structure, and culture). Set and setting are clearly shaped by the particular sociocultural paradigm in which a given experience takes place (Kuhn, 1970), so we can differentiate between two levels of set and setting, one individual and the other collective, that are intimately connected and influence one another. Set and setting seem to reflect a uniquely human experience strongly embedded in, and entangled with human consciousness and social life. In the present context, set and setting are represented by the patients/MBUs sitting in the dental chair (and their parents in the case of children), and the key issue concerns how the professionals taking care of them can best manage their problems.

2.3 The birth of anxiety and dentistry

The long journey in the evolution of consciousness began millions of years ago, in human consciousness, emotions and anxieties, probably started some 100,000 years ago, with an event that some archeologists have named the Sapient Paradox (Mellars, 1991; Gabora, 2007; Renfrew, 2008; Richerson et al., 2010; Sterelny, 2011; Abramiuk, 2012; Garofoli and Noel Haidle, 2014).

The paradox stems from the observation that our DNA was much the same across the ages since 100,000 years ago, while the explosion of human culture only dates from about 20,000 years ago, anticipated by cave paintings in France and Spain (dating back to about 30,000 years ago). It is hard to explain this time lag on genetic grounds only (Richerson et al., 2010). The sapient paradox has its critics (Gabora, 2007; Abramiuk, 2012; Garofoli and Noel Haidle, 2014), however, since it relies on an over-simple relationship between genome, mind and culture. The topic has been investigated by cognitive archeologists too, who combine

archeology and the neurosciences to study the evolution of consciousness in the genus Homo, and particularly in Homo sapiens. Their aim is to glean information on how ancient people were thinking and feeling when they built and used the objects that have been found, and to shed light on their very human features, such as perceptions, emotions, attribution of symbolic meanings, mental processes of comprehension, planning, decision-making, communication, and education.

Archeological records also provide some evidence of very human behavior in the management of diseases and injuries (e.g., amputations, repair of severe long bone, and skull fractures), congenital skeleton deformities (e.g., dwarfism), hydrocephaly, etc. (Trinkaus and Zimmerman, 1982; Lordkipanidze et al., 2005; Buquet-Marcon et al., 2007; Oxenham et al., 2009). The severely disabled received long-term care in Neolithic times, as in the reported case of a patient with Klippel-Feil Syndrome (a congenital fusion of the spine) who survived for more than 10 years, despite depending on others for his survival (Oxenham et al., 2009). A case of an early *Homo* (dating back to 1.77 million years ago) who had lost all but one tooth several years before his death also makes us wonder about his alternative subsistence strategies, which may have included receiving help from other individuals (Lordkipanidze et al., 2005). On the whole, there is a growing body of evidence that these ancient humans experienced some degree of consciousness as well as emotions, exploring their surrounding natural environment and seeking help and solutions to their daily problems (Dettwyler, 1991; Cross, 1999; Tarlow, 2000; Spikins et al., 2010; Apicella et al., 2012; Hardy et al., 2012, 2013; Tilley, 2015).

From the above-mentioned data, it seems reasonable to conclude that forms of human anxiety—including DA, can be seen as a sort of odyssey begun in prehistory, when our ancestors were faced many times a day with danger, pain, stress, and the related *fight-or-flight* responses, as well as with diseases, toothache and some sort of dental treatments.

Animals clearly know fear too, but human beings are often reluctant to admit that they belong to the animal kingdom (Panksepp et al., 2012). On the other hand, human anxiety also entails much greater use of memory and imagination with respect to animals, enabling one to move backwards and forwards in time, a mind faculty related to the human's well-developed default mode network (Buckner et al., 2008; Andrews-Hanna et al., 2010).

2.4 Anxiety and pain

According to the *fight-or-flight* theory, our first reaction to danger involves a sympathetic activation that can be regarded as the early stage of a general adaptation syndrome adopted by many animals, including *H. sapiens*. This acute stress response—described many years ago by Bernard (1973) and Cannon (1929)—involves several organs and systems (including the central and peripheral nervous system, the cardiovascular apparatus, the endocrine and immune systems, and the skeletal muscle), and yields specific physiological and psychosomatic changes through the release of several chemical mediators and neurotransmitters (e.g., epinephrine and norepinephrine). The resulting neuro-immune-endocrine storm triggers the well-known *centralization* of the circulation (vasoconstriction, and an increase in blood pressure, heart rate and respiratory rate) in order to assure a sufficient blood supply to the heart, brain, lungs, and skeletal muscles, and thus facilitate actions needed in fighting or fleeing. This reflects the situation experienced by patients in the dental chair when they feel threatened by the dentist, making the latter resemble the enemy and predator, or even the proto-dentist of ancient times.

The concept of *fight-or-flight* has evolved into a more structured theory, better fitting the complexity of stress reactions, called the *Polyvagal Theory*, which was introduced by Porges at the end of the last century and subsequently expanded by other authors (Porges, 1995, 2004; Quintana et al., 2012). According to the polyvagal theory, social and defensive behaviors in mammals, and primates especially, are controlled by particular brain structures

and circuits that have evolved over a very long time into three different stages: *immobilization, mobilization*, and *social engagement*. With evolution, the stress response has developed into a broader range of behaviors: fighting may now be in the form of expressing anger and quarreling, while flight may take the shape of a vasodepressor syncope, the most common medical emergency in the dental office (Malamed, 1997). The latter has become more common today because stress responses are usually prompted in settings (such as the dental office) where fighting is considered inappropriate for well-educated adults. It is worth noting that children are less likely to experience any vasodepressor syncope because they are more likely to fight against the dentist if necessary, thus closing the physiological loop of their reaction.

The polyvagal theory has brought with it the novel idea of *neuroception* (Porges, 2004), which describes how human beings can distinguish between safe and dangerous or life-threatening situations. This ability of our consciousness still triggers certain neurobiologically-determined prosocial or defensive responses depending on the perceived context and explains why we may react differently in similar settings (an infant may coo at a caregiver, but cry at a stranger, for instance). Some patients may experience DA or phobia as a result of several causes, such as earlier unpleasant experiences in medical/dental settings, or relationships with a dentist (Facco et al., 2008, 2015a).

Pain is the other essential factor related to anxiety and emergencies in the dental office and, as easily understandable, the most feared intervention are root canal and restorative treatments without local anesthesia, as well as oral surgery (Collado et al., 2008).

Pain is a universal phenomenon, the symptom *par excellence*, and a major health problem the world over, severely affecting people's overall quality of life. The International Association for the Study of Pain (IASP) has defined pain as "*An unpleasant sensory and emotional*

experience associated with actual or potential tissue damage, or described in terms of such damage." (Merskey, 2008). Although pain is subjective, a matter of experience and emotion, most of the research and clinical practice have only focused mechanistically on analgesic and anesthetic drugs, understating its nature and forgetting the patient's role in its management (Aydede, 2009; O'Sullivan and Schroer, 2012). In short, pain is a matter of experience, a subjective psychological state that does not necessarily have a detectable organic cause. It is a complex functional phenomenon that depends on a wealth of factors and can be classified in various ways, as acute, chronic, incident, procedural, etc. The procedural pain perceived by patients undergoing medical/dental procedures is an important and common cause of anxiety, stress, *fight-or-flight* reactions, and vasodepressor syncope. Anxiety and pain are thus two partners that have always existed in real-life, as well as in dental and medical care, and that has always had the potential for turning into a vicious circle.

2.5 History and the role of pharmacological techniques

The first documented evidence of human beings using medicinal herbs dates back to *Homo Neanderthalensis* (around 60,000 years ago), when small groups of hunter-gatherers were wandering all over the planet, encountering very different territories and landscapes, and carving out ecological niches for their self-preservation (Hardy et al., 2013). Hardy and Buckley examined the chemicals embedded in the calcified plaque on the teeth of five *H. Neanderthalensis*, from the El Sidrón Cave in Spain (Hardy et al., 2012, 2013). They found that *H. neanderthalensis* cooked and ate plants, including bitter-tasting medicinal ones like *Matricaria chamomilla* and *Achillea millefolium*.

It is well-recognized that the perception of a bitter taste is useful for survival because it can regulate the intake of foods containing toxic substances, and prevent poisoning, making it easier to adapt especially in wild environments. Bitter taste perception is mediated by G-protein-coupled receptors, expressed in taste cells on the surface of the tongue and encoded

by the TAS2R gene family, which was also present in *H. neanderthalensis* (Lalueza-Fox et al., 2009). Interestingly, both the above-mentioned plants have little nutritional value, but are well-known for their medicinal qualities and still used today for their anti-inflammatory and sedative properties, in teething toddlers, for instance, and in insomnia and anxiety disorders.

Among hundreds of natural products used by humans, the most powerful were the psychotropic plants, which were capable of taking humans to realms of ethereal wonder. These plants, called *plants of power, plants of knowledge*, or *plants of the gods*, were used to manage people's problems, help them adapt to stress and adversity, and promote resilience (El-Seedi et al., 2005; Ratsch, 2005; Balick et al., 2007; Russo et al., 2008; Akers et al., 2011; Gosso and Webster, 2013; Guerra-Doce, 2015).

With time, medicine underwent a huge evolution, first in ancient Egypt and then in Greece. The Edwin Smith Surgical Papyrus (dating back to 2,500–3,000 years BC) describes 48 clinical cases of neurological injuries and related brain lesions (e.g., aphasia and hemiplegia), giving detailed accounts of the brain's anatomical features, including the cranial sutures, meninx, and cerebrospinal fluid (Cunha, 1949; Helgason, 1987; Minagar et al., 2003). As for pharmacological anesthesia, the so-called *Aleppo sponge* (steeped with a mixture of opium, cannabis, hyoscyamus, mandragora, black nightshade, and other plants containing tropane alkaloids) was used by ancient Arabian physicians and other populations to induce sedation and a sort of general inhalational anesthesia (the sponge was placed over the patient's nose/mouth; Ajram, 1993; Hehmeyer and Khan, 2007). In South America, the Maya, and Inca also used plants with tropane alkaloids to induce sedation, as well as *Erythroxylum coca* leaf extract as a kind of local anesthetic (Fairley, 2007; Stolberg, 2011; Biondich and Joslin, 2016).

The stressful scenario of dentistry demands an appropriate management of anxiety, pain and the related physical reactions in order to improve the overall safety of dental care, and make the patient's centered approach the ethical gold standard in modern dentistry. Pharmacological anxiolysis is a keystone of this fundamental goal. To be effective, anxiolysis must be integrated with an effective local anesthesia, able to prevent pain during dental procedures.

The European perspective considers the intravenous or inhalational administration of a single sedative drug (benzodiazepine and nitrous oxide are the preferred ones, respectively) and the endpoint is reached by titration (i.e., the administration of incremental doses) until a full anxiolysis is reached with preserved consciousness; physical restraint is not allowed in Europe and may elicit legal claims (Zanette et al., 2007). The rationale for the European recommendations is that the target is the withdrawal of anxiety and pain: that's all, and can be fully achieved with conscious sedation and local anesthesia. Avoiding the use of hypnotic drugs, opioids, and general anesthetics, allows for several relevant advantages: (a) patient's full tranquility and collaboration are assured, easing the dentist job; (b) there is neither risk of inhalation of saliva, blood and debris, nor need of tracheal intubation to control the airway; (c) high simplicity and safety, which make conscious sedation a technique easily managed by the dentist; (d) no risk of major anesthesia related complications.

2.6 Prevention of anxiety, pain and emergencies in dentistry: behavioral techniques

In ancient Egyptian and in Greek medicine, along with the knowledge of medicinal plants and development of surgical procedures came the use of incubation, a healing technique that can be regarded as the ancestor of modern hypnosis.

The relevance of psychology and behavioral sciences in dental education and clinical practice has progressively increased in the past two decades. Oral surgery is a stressful condition,

causing a relevant increase of anxiety, expected suffering and pain perception immediately before the operation (Eli et al., 2000; 2003), while intraoperative anxiety and pain are the main cause for emergency in dentistry and bad oral health, the latter due to delaying or avoiding treatments (Berggren and Linde, 1984; Berggren et al., 2000; Haugejorden and Klock, 2000). Therefore, their assessment and prevention is an essential part of safety and overall quality of care. Anxiety and phobia in turn make the dentist's job hard and stressful (Moore and Brodsgaard, 2001; Hill et al., 2008), a fact leading to the idea, perhaps a myth, of a high suicide rate among professionals in the past years (Stein, 2004; Jones et al., 2016).

Several behavioral techniques allow for a proper patient's management, including the use of psychological tests for the assessment of DA (Facco et al., 2008, 2015b), iatrosedation (Friedman, 1983, Friedman and Wood, 1998; Taneja, 2015), empathic communication (Wiltshire et al., 2002; Parkin et al., 2014), and hypnosis (Facco et al., 2013a, 2014; Facco and Gonella, 2015), but they are still underused, looking traditionally incompatible with the ruling reductionist approach.

Hypnosis has been proven to yield specific changes in several brain areas and circuits, according to the aims of delivered suggestions, such as changes of activation and connectivity of pain neuromatrix, default mode network and extrinsic system (Faymonville et al., 2003; Rainville and Price, 2003; Derbyshire et al., 2004; Roder et al., 2007; Demertzi et al., 2011; Deeley et al., 2012; Vanhaudenhuyse et al., 2014; Facco, 2016). It has proved to be a valuable technique in perioperative care, able to improve recovery after surgery. For the sake of coherence with the very definition of pain, its management should take into account a double path, including both drugs and behavioral techniques able to alter its experience. Analgesic drugs are effective in modulating the activity of pain pathways in the peripheral and central nervous system at different levels with different mechanisms, thus affecting pain perception up to the level of surgical analgesia. Hypnosis may reach the same target by

directly modulating pain perception through an introspective mental activity able to change the connectivity of the pain neuromatrix in the brain. Pain neuromatrix, through the anterior cingulate cortex and the connections of the limbic system with the structures responsible for the fight or flight reaction may in turn open the doors to the anxiety and pain-related emergencies in the dental setting. Therefore, pharmacological interventions may be regarded as bottom-up procedures, affecting anxiety and pain from pain pathways and limbic system to consciousness, while hypnosis may be regarded as a top-down intervention able to affect anxiety and pain through mental activity on the neuromatrix and limbic system. Therefore, it looks reasonable to speculate that drugs and behavioral techniques might be gathered in a whole, exploiting their different mechanisms in a synergistic way.

The mentioned behavioral techniques should not be considered as separate, independent tools; rather, they are to be regarded as a continuum in the communication skill of the dentist, since their common relevant tract is the empathic relationship and the capacity of taking care of the patient, instead of teeth only. Pharmacological sedation may be added when behavioral techniques are not enough and remains the essential, valuable technique in non-hypnotizable patients and those with special needs.

2.7 The prevalence of clinical significance of dental anxiety

Anxiety can be on a range from mild to severe and can be generalized anxiety, where the central theme is an excessive worry, or specified, like a fear of a needle phobia (American Psychiatric Association, 2000).

The prevalence of clinical significance of dental anxiety can be varied based on the population studied and the criteria used to measure the dental anxiety. Generally, worldwide evaluations range from about 4% to over 20% (Moore et al., 1993).

Adult Dental Health Survey 2009 in UK for 11,380 adults was conducted using the Modified Dental Anxiety Scale (MDAS) to measure dental anxiety of the population in UK. The result of the survey reported that 48% has been estimated with a dental anxiety. The extreme dental anxiety was experienced by 30% of adults undergoing a tooth cavity preparation; 28% receiving a local anesthetic injection; 15% while seated in the waiting room; 13% undergoing dental appointment next day and 8% receiving a regular scale and polish (Steele et al, 2012).

Another survey conducted in Canada showed that 9.8% of the respondents were "somewhat afraid" of dental visits and 5.5% of the respondents were "very afraid or terrified". Higher number of patients reported a feeling anxious when visiting the dentist. 36% of Canadians reported that were at least little afraid of dental care (Chanpong et al., 2005).

Moreover, a study in the Saudi Arabia to evaluate dental anxiety score among Saudi adults showed that 48.3% of the population had dental anxiety (Aadil et al., 2014). However, there were limited studies had been performed at the UAE in order to assess the anxiety level among people in the United Arab Emirates. A study done by (Hawamdeh S and Awad M., 2013) among university students in UAE showed that Prevalence of dental anxiety (MDAS score of 13 or more) was 36%.

3. Aims and Objectives of the study:

1. To assess the dental anxiety levels among patients attending Oral Surgery Department at Hamdan Bin Mohammed Dental Clinics.

2. To identify factors influencing the dental anxiety levels among the patients attending Oral Surgery Department at Hamdan Bin Mohammed Dental College of Dental Medicine.

4. Material and Methods

A cross-sectional survey was used to assess the dental anxiety levels of patients in UAE. More specifically, the Study was conducted at the Oral Surgery Clinic of Hamdan Bin Mohammed College of Dental Medicine (HBMCDM), Dubai, United Arab Emirates. The questionnaire was designed in Arabic and English languages to improve validity and consisted of three parts (Appendix 1). The first part of the questionnaire was used to obtain information on socio-demographic details of the participants.

The second part was a modified dental anxiety scale (MDAS) which is a self-reported measure of the Likert-scale with values between 1-5 (1 = anxious - 5 = extremely anxious) was used to assess the levels of dental anxiety in relation to an upcoming dental visit, the dentist's waiting room, having tooth drilled, scaled and polished, local anesthetic injection and oral surgery procedure. The total score of MDAS ranged from 6 to 30. The score 6-12 indicates low dental anxiety. Whereas, a score 13-18 is indicates moderate levels of dental anxiety and a score ≥ 19 is indicates high dental anxiety and dental phobic.

The last part of the questionnaire was asking the participants' for their opinion about the most useful techniques to reduce their dental anxiety by choosing from nine different coping techniques (seeing a psychotherapist, communication strategies, distraction techniques like music or movies, Tell-Show-Do technique, relaxation strategies, cognitive behavioral

therapy, nitrous oxide, conscious sedation, general anesthesia).

A convenience sample size was used. The quantitative approach was beneficial in measuring the anxiety level and to see it through the eyes of the patients in the objective manner, depending on their answers and descriptions in the survey, and then generalizing the results from a larger sample population. The measurable data was used to formulate the facts of the dental anxiety level among patients in UAE.

The reliability and validity of the questionnaire were tested by Cronbach's alpha (0.88) in SPSS (Statistical Package for Social Sciences) for Windows version 24, to ensure the suitability of the test, quality and usefulness of the study. Also, Test-retest reliability was done to make sure that the data is repeatable and consistent. The patients were asked the same questions in the questionnaire in a different period of time, like when the patient arrived in the clinic and sitting in the waiting room, then patient was asked again the same questions when he/she sitting on the dental chair, to ensure the stability of the data. Because the patient's answers and their level of anxiety can be influenced by their psychological and physical state at different time.

In term of internal consistency reliability, a simple and not very long questionnaire was used to make sure that the patients could understand the questions clearly and answer them thoroughly without getting bored or exhausted with the length of the survey, as the length of a survey can influence the internal consistency reliability. In term of Inter-rater reliability, only one researcher was enrolment for collecting the data to prevent any variations in the test scores, and the involvement was controlled to prevent any bias. In term of validity, predictive validity was conducted in this study by demonstrating the correlation, and the criterion was used at the same time the test is given like in concurrent validity.

4.1 Data Collection

Self-Administered questionnaire in English and Arabic languages was distributed to 206 patients who visited Oral Surgery Clinic at Hamdan Bin Mohammed College of Dental Medicine, Dubai, during a period of one year (July 2016- July 2017), to collect the quantitative data.

The collected data were analyzed by using IBM-SPSS for windows version 24.0. The descriptive statistics which include means, mode, median, standard deviations, and interquartile range were done for all the demographic variables for the study sample and for all dental anxiety scale questions.

For comparison the means of dental anxiety scores and gender, independent t-test was used. Chi-square test was done to determine the association between dental anxiety and bad dental experience history. The associations and differences between the variables were considered statistically significant if the associated p-value is equal to or less than 0.05 (p ≤ 0.05).

4.2 Exclusion Criteria

- All patients that did not speak English or Arabic or those attended without an interpreter.
- Children below the age of 16 years old.
- Patients with remarkable psychological disorders.

4.3 Ethical approval

This study was conducted in the full conformance with a principle of the Helsinki Declaration, Good Clinical Practice (GCP), and within the laws and regulations of the UAE/DHCC. The ethical approval was obtained by the Research Ethics Review Committee in Hamdan Bin Mohammed College of Dental Medicine, Mohammed Bin Rashid University. All participants have been consented verbally and in writing

5. Results

5.1 Part A: Socio-Demographical Data

The participants' demographical data distribution of the study is shown in table1 below. For each question response, internal consistency coefficient (Cronbach's alpha) was calculated with 95% confidence intervals (Appendix 2).

Out of the 300 questionnaires distributed for Oral surgery patients during the 2016-2017 academic year, only 206 patients responded and completed the questionnaire (response rate= 68.7%), possible reasons for this may be because some patients don't speak English or Arabic, or refusal by some to participate in the study or because of lake of time. Among the 206 respondents, 110 were males and 96 were females (53% and 47%, respectively). The majority of the sample (44%) was aged between 31 to 40 years followed by 41-50 years age group (19%), while the age groups of 21 to 30 years comprise (18%) and for the 51 years and above represent (13%) of the sample. Only 5% of the respondents were aged 20 years and younger. For the nationality of the respondents, the majority of the sample was non-UAE nationals (84%), whereas 16% were UAE nationals. 74% of the patients were married and 26% of them were single. Most of the patients were employed (77%), whereas only 14% were unemployed and 9% were students. The educational level of the respondents was 38% had a bachelor degree, 28% with a diploma, 21% with a school degree and 12% had a master degree. More than half of the patients in the sample were irregular visitor to the dentist (56%), while, 35% of the patients were regular visitor to the dentist and only 9% didn't visit the dentist at all. In the sample, the number of patients with good or moderate oral hygiene were very high 91% (43% good oral hygiene, 48% with moderate oral hygiene), whereas only 9% of the patients with bad oral hygiene. Regarding patients' bad dental experience history, most of the patient (79%) didn't have any bad dental experience history and only (21%) of the patient had bad dental experience (Table 1).

Table 1 : Demographical data statistical distribution.

Variables	n	(%)
Gender		
Male	110	53.4
Female	96	46.6
Age		
<20	10	4.9
21-30	38	18.4
31-40	91	44.2
41-50	40	19.4
>51	27	13.1
Nationality		
Local	33	16
Expatriate	173	84
Marital Status		
Single	54	26.2
Officially married	152	73.8
Occupation		
Unemployed	29	14.1
Student	18	8.7
Employee	159	77.2
Education		
School	44	21.4
Diploma	58	28.2
Bachelor	79	38.3
Master	25	12.1
Dental History		
No history of dental visit	19	9.2
Irregular dental checkup	116	56.3
Regular dental checkup	71	34.5
Oral hygiene		
Good	89	43.2
Moderate	99	48.1
Poor	18	8.7
Bad dental experience		
Yes	43	20.9
No	163	79.1

5.2 Part B: Modified Dental Anxiety Scale (MDAS) data:

Table 2: Modified Dental Anxiety Scale (MDAS) data

MDAS Items	Mean ± sd	Classification
Going to the dentist for treatment tomorrow	2.12 ± 1.04	Slightly Anxious
Sitting in the dentist waiting area	2.21 ± 1.03	Slightly Anxious
Having a tooth drilled	2.70 ± 1.19	Fairly Anxious
Having teeth scale and polish	1.92 ± 1.04	Slightly Anxious
Having local anesthetic injection	3.05 ± 1.25	Fairly Anxious
Having extraction or surgical procedure	3.50 ± 1.25	Fairly Anxious to very anxious
Total score	15.50 ± 5.4	Moderate Anxious

Overall responses to the anxiety scale questionnaire varied with different parameters (Table 2). In the first question in Modified Dental Anxiety Scale (MDAS), asking the patient about his/her anxiety level when anticipating a treatment for the next day, the average of the patients was slightly anxious with the mean 2.12 (SD ±1.04). Regarding the anxiety level, while sitting in the dentist's waiting room, the average was slightly anxious as well with the mean score of 2.21 (SD ± 1.03). Anxiety level was increased to fairy anxious; when the patients were asked about getting their tooth drilled, the mean score was 2.70 (SD ± 1.19). However, the mean score of dental anxiety level drop to slightly anxious 1.92 (SD ± 1.04) for the question about scaling and polishing patients' teeth, which were the least anxiety levels in the respondents compared to the other parameter of dental situations and procedures. The anxiety level was increased dramatically in the parameter of a local anesthetic injection in the gum with the mean of the patient were fairly anxious 3.05 (SD ± 1.25). The anxiety level was increased furthermore with the tooth extraction and dental surgical procedure. Results showed that the average of the patients in the sample 3.50 (SD ± 1.25) were fairly to very anxious about having their tooth extracted or having dental surgical treatment. The maximum numbers of extremely anxious responses were found in this parameter (chart 1).

In general, the average of the dental anxiety level of the patient who attended the oral surgery department of Dubai Dental Clinic at Hamdan Bin Mohammed College of Dental Medicine was moderate anxious (15.50 ± 5.4). The prevalence of dental anxiety (MDAS score of 13 or more) in the sample was 72.33% (48.06% moderate dental anxiety and 24.27% high dental anxiety). And only 27.67 of the respondents were low dental anxiety (MDAS score from 6 to 12). (chart 2).

Chart 1: Modified Dental Anxiety Scale (MDAS) data, comparison of each parameter
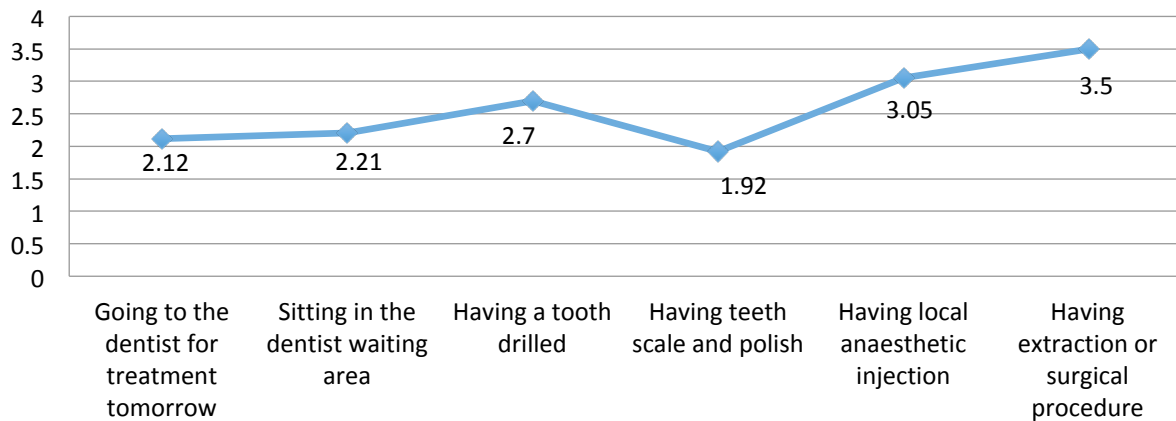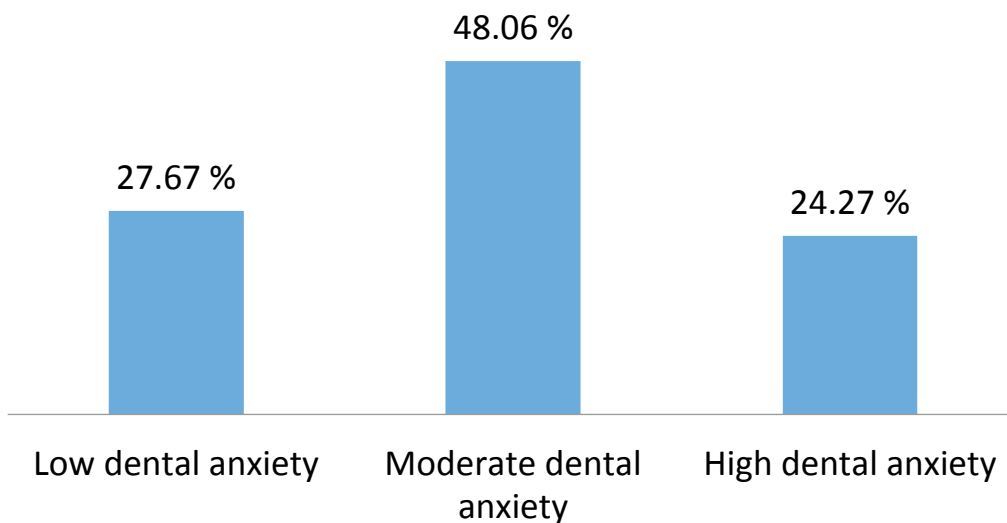
Mean of MDAS

Chart 2: The prevalence of dental anxiety

5.2.1 Group comparison

Table 3. Comparison of Dental Anxiety Score by socio-demographic characteristics.

Characteristics	Levels	Low Dental Anxiety	Moderate Anxiety	High Dental Anxiety	P-value
Gender	Male	37 (33.6%)	51(46.4%)	22(20.0%)	0.084
	Female	20(20.8%)	48(50%)	28(29.2%)	
Age	< 30	13(27.1%)	20(41.7%)	15(31.3%)	0.866
	31-40	24(26.4%)	47(51.6%)	20(22.0%)	
	41-50	12(30.0%)	18(45.0%)	10(25.0%)	
	≥ 51	8(29.6%)	14(51.9%)	5(18.5%)	
Nationality	Local	9(27.3%)	18(54.5%)	6(18.2%)	0.623
	Expatriate	48(27.7%)	81(46.8%)	44(25.4%)	
Marital Status	Single	17(31.5%)	23(42.6%)	14(25.9%)	0.631
	Officially married	40(26.3%)	76(50.0%)	36(23.7%)	
Occupation	Unemployed	4(13.8%)	14(48.3%)	11(37.9%)	0.034*
	Student	4(22.2%)	6(33.3%)	8(44.4%)	
	Employee	49(30.8%)	79(49.7%)	31(19.5%)	
Education	School	19(43.2%)	16(36.4%)	9(20.5%)	0.004*
	Diploma	12(20.7%)	39(67.2%)	7(12.1%)	
	Bachelor	20(25.3%)	35(44.3%)	24(30.4%)	
	Master	6(24.0%)	9(36.0%)	10(40.0%)	

Table 3 showed that there is no relation between dental anxiety level and age, nationality, marital status. However, there is a significant difference in dental anxiety level among occupation status to the patients. The highest dental anxiety level among student (44% of student patients have high dental anxiety), followed by unemployed patients (37% of unemployed patients have high dental anxiety), and the least is the employee (only 19% of the employed patients have high dental anxiety). Moreover, there is a significant difference between dental anxiety level and educational level of the patients. The higher educational level the patient is, the higher dental anxiety level he/she has.

Table 4. Comparison of the mean Dental Anxiety Score by socio-demographic characteristics.

Characteristics	Levels	Mean ± sd	P-value
Gender	Male	14.65 ± 5.16	0.026*
	Female	16.42 ± 5.54	
Age	< 20	20.10 ± 5.82	0.17
	21-30	15.26 ± 5.41	
	31-40	15.49 ± 4.91	
	41-50	15.00 ± 5.67	
	>= 51	14.67 ± 6.02	
Nationality	Local	15.03 ± 4.50	0.64
	Expatriate	15.55 ± 5.57	
Marital Status	Single	15.6 ± 6.03	0.85
	Officially married	15.43 ± 5.19	
Occupation	Unemployed	17.24 ± 4.78	0.03*
	Student	17.44 ± 6.09	
	Employee	14.92 ± 5.34	
Education	School	13.95 ± 6.17	0.02*
	Diploma	14.62 ± 3.71	
	Bachelor	16.61 ± 5.71	
	Master	16.84 ± 5.60	

Table 4, shown that there was a significant high dental anxiety average score among females 16.42 (SD ± 5.54) compared with that among males 14.65 (SD ± 5.16), p-value was 0.02. The study revealed that there were no differences in the averages of dental anxiety score comparable in different classes of age, nationality, and marital status. The average score of dental anxiety was significantly higher among student 17.44 (SD ± 6.09), followed by the unemployed 17.24 (SD ± 4.78) and the lowest was among the employee 14.92 (SD ± 5.34), p-value was 0.03. The average of the dental anxiety score increase significantly by education level, the p-value was 0.02.

Table 5: Comparison of the Anxiety Scores according to dental characteristics

| Variable		Mean ± sd	P-value
Dental history	No history of dental visit	17.05 ± 8.44	0.57
	Irregular dental checkup	15.19 ± 5.39	
	Regular dental checkup	15.49 ± 4.32	
Oral hygiene	Good	15.3 ± 4.65	0.999
	Moderate	15.55 ± 5.73	
	Poor	15.94 ± 7.12	
Bad dental experience	Yes	16.95 ± 6.97	0.11
	No	15.08 ± 4.87	

To examine the possible relationship between dental anxiety and bad dental experience history, a Chi-Square statistical test was conducted. The result showed that there is no significant relationship between dental anxiety and bad dental experience history. As well as, there is no relationship between dental anxiety and oral hygiene of patients and dental history. (Table5).

5.3 Part C: The best techniques that can be used to reduce dental anxiety

There are multiple techniques that can be implemented in the dental clinic to manage and help in reduce patients' dental anxiety such as: seeing a psychologist or psychiatrist before having the dental treatment, communication strategies by the dental clinic staff with the patients, distraction techniques like Quraan, music or movies during the dental treatment, Tell-Show-Do technique, relaxation strategies like boxed breathing and progressive muscles relaxation, cognitive behavioral therapy, Nitrous oxide, conscious sedation by using pharmacological drugs (midazolam) and general anesthesia.

Results in chart 3 demonstrated that the majority of the best techniques from the above nine techniques according to patients needs was 104 (51%) of the patients had chosen communication strategies, followed by Tell-Show-Do techniques, 68 (33%), and then in the third rank were relaxation strategies and distraction techniques 62 (30%) and for the conscious sedation 33 (16%). Lastly, the results showed that GA, cognitive behavioral therapy and seeing psychologist were on the bottom of the rank, 15 (7%) and 6 (3%) respectively

Chart 3: Rechniques that can be used to reduce dental anxity
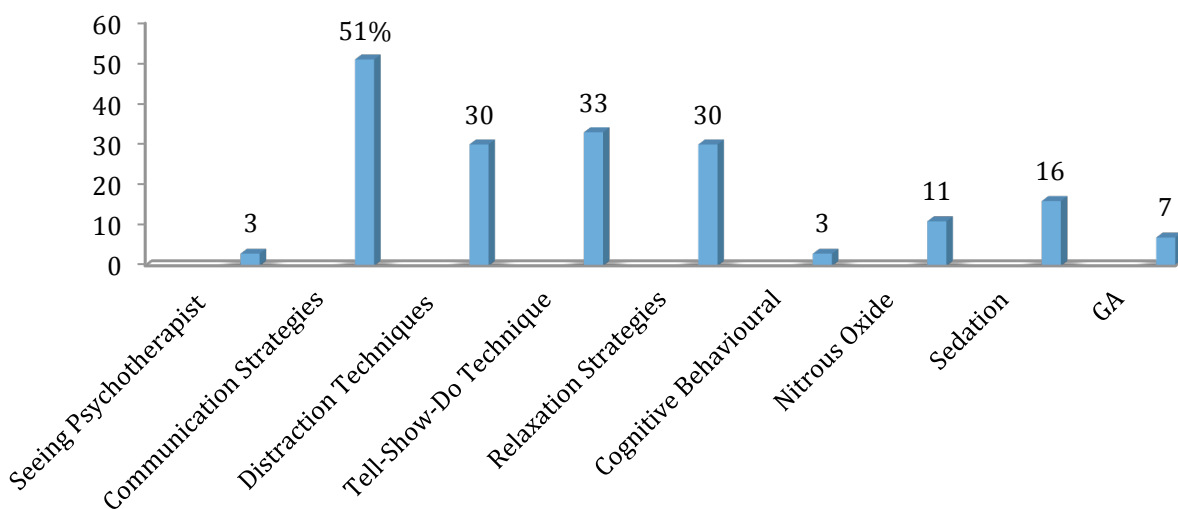
6. Discussion

The present study was carried out to assess the dental anxiety level and the factors affecting dental anxiety among the patients attending the oral surgery clinics of HBMCDM. The mean total dental anxiety score was 15.50 (SD ± 5.4), which is higher than the anxiety levels reported from studies in India, (Acharya, 2008) China, (Yuan et al., 2008), Turkey (Erten et al., 2006) with overall dental anxiety mean score was 8.7 (SD ± 3.8), Greece (Coolidge et al., 2008) with the overall mean score for MDAS was 10.91 (SD ± 4.79), Saudi Arabia (Fayad et al., 2017) with the mean dental anxiety score was 11.39 (SD ± 2.7), Spain (Coolige et al., 2010) with overall dental anxiety mean score was 11.8 (SD ± 5.1), Iran (Saatchi et al., 2015) with the mean score was 12.34 (SD ± 4.74), and UAE college populations (Hawamdeh and Awad, 2013) with the mean score was 11.52 (SD ± 4.88). It is not clear why this study shows a higher mean value compared to previously reported studies. One possible explanation is that all the patients included in this study, attended for varying oral surgery procedures, which are known to be more invasive than conventional dental check-ups or restorative work, and this could be the reason for scoring high DA values. Based on the severity of dental anxiety in each parameter of MDAS, dental surgical procedures and extractions scored the highest mean anxiety score with the mean of 3.50 (SD ± 1.25), which was similar to the findings in Saudi Arabia (Gaffar et al., 2014), (Fayad et al., 2017), Turkey (Erten et al., 2006) and in China (Yuan et al., 2008).

The study showed a significant difference (p=0.026) in dental anxiety level between males (mean total anxiety score 14.65) and females (mean total anxiety score 16.42). This result is in agreement with the studies by Erten et al., (2006), Auerbach and Kendall (1978), Saatchi et al., (2015), Jongh et al., (1991), Nascimento et al., (2011), Tunc et al., (2005), Yuan et al., (2008), Malvania et al., (2011), Coolidge et al., (2008) and Fayad et al., (2017). However, the majority of the studies revealed similar anxiety results between males and females (Corah

1988; Weinstein et al., 1973; Mellor 1992; (Al-Madi & Hoda 2002; Sohn & Ismail 2005). The observed difference between males and females might be due to: real difference in the anxiety levels between genders; a greater readiness among females to acknowledge feelings or anxiety; and both factors acting in combination (Locker et al., 199; Sohn et al., 2005). In this study, one possible explanation is females are known to be more emotional than males.

The results from this study showed that there was no relationship between the age and dental anxiety score. This finding is similar to the findings of Tunc et al., (2005), Erten et al., (2006), Malvania et al., (2011), Saatchi et al., (2015) and Moore et al., (1993) who reported that the dental fear and anxiety were not affected by age. In contrary to the findings of Acharya (2008), Yuan et al., (2008) and Fayad et al., (2017) who reported that an inverse relationship between the age and dental anxiety score.

In the present study, the occupation characteristic showed a statistically significant association with dental anxiety, students and unemployed patients showed higher anxiety scores than employed patients. None of the studies reviewed has analyzed the relationship between employment and dental anxiety. The possible reasons behind such a result might be due to the interaction of various factors like low level of rationalization of the situation, the stressful condition of the subjects, etc. Further reasons which account for the current results need to be explored.

Regarding education, the results of the present study showed that dental anxiety score increase with the educational level. This result is in agreement with the study by Akeel et al (2000) who reported that subjects with a higher level of education were found to be more anxious. However, the result is not in agreement with the studies by Fayad et al., (2017) and Saatchi et al., (2015) which showed that the education level has no effect on dental anxiety. As well as with other studies, which indicated that patients with a primary school education had the highest anxiety scores in comparison to highly educated patients (Moore et al., 1993;

Albert et al., 2006; Erten et al., 2006; Firat et al., 2006). A possible explanation for the observed findings could be as the individual get more education will become more knowledgeable about the dental procedures and the complications that may occur, thus more anxious he/she will become.

Regarding the relationship with oral hygiene, the result from this study showed that there was no relationship between dental anxiety score and oral hygiene of the participants. A possible explanation for the observed findings could be that this measure of oral hygiene was a self-reported measure; some patients with poor oral hygiene can evaluate their oral hygiene as "good oral hygiene".

As well as, the results of the study showed no significant difference in dental anxiety based on past dental visit and bad dental experience. This result is in agreement with the study done by Malvania et al., (2011) who reported that previous dental visit was not significantly associated with dental anxiety. However, it is not in agreement regarding the past bad dental experience result which was found to be significantly different. Moreover with studies done by Acharya (2008) and Saatchi et al., (2015) who reported that patients who had visited a dentist before, showed less anxiety than other patients who had not visited a dentist at any time. Patients who had visited a dentist with an undesirable dental experience showed higher level of anxiety. The main reason of irregular dental visits is not due to dental anxiety, but due to 'Lack of time' and 'no need for treatment Taani (2001).

There are a number of notions as for how dental anxiety may arise. In reality, multiple factors act in combination to initiate and maintain the feelings of anxiety. Some patients are afraid of some of the stimuli involved with dental treatment especially the injections and the oral surgeries which had revealed the highest score in MEDAS parameter in this study and in the study by Gaffar (2014).

This could affect the dental treatment plan and the patient-dentist relationship; therefore, before dental treatment, patients' anxiety and fear levels should be assessed, an empathic approach to the patient, the right dentist's behavior, the use of sedation and hypnosis are to be regarded as the first step of dental care, which may be implemented, when needed, by a wise use of anxiolytic drugs to get a full conscious sedation, while keeping general anesthesia for selected cases only. This may ensure the best overall quality of care, providing a reasonably pleasant dental care, while preventing complications (Brunton, 2012). The European recommendations regarding conscious sedation, should be regarded as the safest and simplest way of managing the patient, able to improve safety through emergency prevention rather than being a cause of adverse events, while the use of general anesthesia should be indicated in selected, non-collaborating patients only. Moreover, in this study, nearly half of the patients (51%) had chosen communication strategies as the best technique that can be used in the dental clinic to manage and help in reduce their dental anxiety. Followed by tell-show-do technique (33% of patients had chosen tell-show-do). Communication is the key to build the trust between the dentist and the patient, as well as explaining to the patient all the steps will cut the uncertainty and increase predictability in the clinical setting, which therefore will reduce patient's anxiety dramatically.

7. Limitation

Such type of studies inevitably will encounter some limitations and although meticulous care has been taken to exclude the patients with psychological disorders, which may influence the assessment of anxiety, some patients might have been missed out as reliability was based on the response of the patient. Other accepted limitation is the cross-sectional design of the survey that does not provide information on causality. Also a self-administered questionnaire could be biased, as there are chances that patients may over or underestimate their responses.

8. Recommendations

Further evaluation and analysis of anxiety associated with dental treatment may clarify more information for better patient management and a proper treatment plan for patients suffering from dental anxiety. There is a need for an appropriate scale that includes both the patient's evaluation and doctor's observation to accurately analyze dental anxiety.

Dental anxiety is obviously present to some degree in a majority of patients, the following recommendations could be considered to control the levels of dental anxiety and accordingly improve patient dental attitudes and compliance:

- Dental health awareness measures are required for the population in general.

- Assessment the dental anxiety of the patient and manage it by communication strategies, Tell-Show-Do technique before starting any dental treatment.

- Create a relaxing dental clinic environment for the patient by adding calming music, changing the room temperature as the patient's need and/or offering a blanket.

- Implementing conscious sedation in the oral surgery department in Dubai Dental Clinic, Hamdan Bin Mohammed College of Dental Medicine in an attempt to reduce dental anxiety levels of the patients. The effectiveness of the sedation can be evaluated through further longitudinal studies.

9. Conclusion

As there were limited studies to assess anxiety of dental patients has been carried out in UAE, thus this cross-sectional study may provide a glimpse about the factors to be considered for the future studies to check causal relationship. Within the study limitations, it can be concluded that the prevalence of dental anxiety was moderate among the study subjects. Amongst the various socio-demographic factors, gender, educational level and occupational status were significantly associated with dental anxiety. On the other hand, there is no significant difference in dental anxiety level in the base of age, nationality, marital status, past dental history and past undesirable dental experiences.

Further studies are needed to address the dental anxiety levels in different populations, which will help dental care providers to better manage their patients. More information should emerge in this field since specialties in dentistry are becoming more available to the public. The development of dental anxiety could be prevented with pain control, behavior management, and consideration of the patient as a whole. The inclusion of behavioral sciences in dental education and the integration of ethical considerations in the academic dental curriculum could help to improve the situation.

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Dental Anxiety Level Questionnaire
استبيان معدل التوتر والقلق تجاه علاج الأسنان

Part A: القسم الأول

❖ Patient Name (optional) :
اسـم المريض (اختـيـاري) ....

❖ Gender: ☐ Male ☐ Female
الجنـس: ☐ ذكـر ☐ أنـثى

❖ Age: ☐ <20 ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ >51
العمر

❖ Nationality : ☐ Local ☐ Non-local
الجنـسيـة ☐ مواطن ☐ غير مواطن

❖ Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed
الحالة الاجتماعية ☐ أعزب ☐ متـزوج ☐ مطلـق ☐ أرمـل

❖ Occupational Status: ☐ Unemployed ☐ Student ☐ Employment
الحالة الوظيفية ☐ غير موظف ☐ طـالب ☐ مـوظـف

❖ Education: ☐ School ☐ Diploma ☐ Bachelor ☐ Master
التـعـليـم ☐ مدرسة ☐ دبـلـوم ☐ باكالوريوس ☐ ماجستير

❖ Dental History: ☐ Not registered ☐ Irregular Check-ups ☐ Regular Check-ups
زيارة عيادة الأسنان ☐ لا يـوجـد ☐ بشكـل غيـر دوري ☐ بشكـل دوري

❖ Your oral hygiene? ☐ Good ☐ Moderate ☐ Poor
ما هي صحة فمك وأسنانك ☐ جيـدة ☐ متـوسطة ☐ غير جيدة

❖ Do you have any bad dental experience history? ☐ Yes ☐ No
هل لديك أي تجربة سيئة سابقة مع طبيب الأسنان؟ ☐ نعم ☐ لا

44

Part B : Modified Dental Anxiety Scale Questionnaire
القسم الثاني: درجة القلق الذي تشعر به لدى زيارة طبيب الأسنان

How do you feel about below situations كيف سيكون شعورك في الحالات التالية	😄	☺️	🙁	😣	😭
1. Going to the dentist for treatment tomorrow? لو ذهبت لزيارة طبيب الأسنان للعلاج غدا، كيف سيكون شعورك؟	1	2	3	4	5
2. Sitting in the dentist's waiting room? إذا كنت جالسا في غرفة الإنتظار لعلاج أسنانك، كيف سيكون شعورك؟	1	2	3	4	5
3. Having a tooth drilled? إذا كنت على وشك أن تتعرض لعلاج ضرسك بالحفر، ماهو شعورك؟	1	2	3	4	5
4. Having teeth scaled and polished? إذا كنت على وشك أن تتعرض لتلميع الأسنان، كيف سيكون شعورك؟	1	2	3	4	5
5. Having a local anaesthetic injection? إذا كنت على وشك أن تتعرض لحقنة من المخدر الموضعي في اللثة ؟	1	2	3	4	5
6. Having an extraction/surgical procedure? إذا كنت على وشك أن تتعرض لخلع ضرسك أو لخضوع جراحة سنية ؟	1	2	3	4	5

Each of the five answers is scored as follows: دليل الأرقام التي في الجدول موضحة كالآتي

1= Not anxious, 2= Slightly anxious, 3= Fairly anxious, 4= Very anxious, 5= Extremely anxious

1= غير قلق   2= قلق قليلا   3= قلق   4= قلق جدا   5= قلق إلى أبعد الحدود

Part C : القسم الثالث

What are the best techniques can be used in the dental clinic to help in reducing dental anxiety?

اختر الوسائل المناسبة التي يمكن توفيرها في عيادة الأسنان لتساعدك على التقليل من القلق.. (يمكن اختيار أكثر من وسيلة)

☐ Seeing a psychologist or psychiatrist   ☐ رؤية أخصائي علم النفس قبل الدخول لعلاج الأسنان

☐ Communication strategies   ☐ التواصل بين الطبيب والمريض خلال العلاج

☐ Distraction techniques like music or movies   ☐ وسائل الترفيه والإلهاء كالموسيقى الهادئة و أفلام الكرتون

☐ Tell-Show-Do technique   ☐ تقنية الشرح ثم الرؤية فالتطبيق

☐ Relaxation strategies   ☐ طرق استرخاء

☐ Cognitive behavioural therapy   ☐ علاج سلوكي معرفي

☐ Nitrous oxide   ☐ التخدير بواسطة الغاز (الغاز الضاحك)

☐ Sedation   ☐ التخدير الشبه عام

☐ General anesthesia   ☐ التخدير العام

APPENDIX 2: CRONBACH'S ALPHA TEST

Case Processing Summary

		N	%
Cases	Valid	206	100.0
	Excluded[a]	0	.0
	Total	206	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.882	6

a. Listwise deletion based on all variables in the procedure.

APPENDIX 3: ETHICAL APPROVAL LETTER

Date: 30/10/2016

Dear Dr Al Batool Omar Oral Surgery Resident

Re: Your research protocol

Titled: Assessment of anxiety levels……………

Thank you for submitting your research protocol to the Research and Ethics committee of the Hamdan Bin Mohammed College of Dental Medicine, MBRU.

It was considered at the meeting held on: 23/10/2016

The initial protocol lacked information but after Dr Tawfik re-submitted with consent etc, I have taken chairman's action and agreed to approve the protocol. Please make sure you see your research supervisor regularly during the project in order to maintain close collaboration and support. The committee would like to remind you that it is a requirement of the programme that you complete a research dissertation, which comprises 15% of credits within the 3-year MSc programme.

With best wishes

Yours sincerely,

Prof A Milosevic

Chair, Research and Ethics Committee, HBMCDM

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