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Review Article

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The Use and Misuse of Benzodiazepines for the Management of Dental Anxiety- Iraqi Study

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ABSTRACT

Background: Dental anxiety is a prevalent problem among patients. It leads to preventing people from receiving critical dental care. Since benzodiazepines have well-established anxiolytic effects, they are used by dentists as a premedication to provide relief of anxiety, anterograde amnesia, and light sedation. Therefore, benzodiazepines could be a practical and efficient option for dentists to ensure patient comfort and facilitate treatment, especially for invasive or complicated procedures.

Aims of the study: This study assesses the awareness of Iraqi dentists regarding benzodiazepine use in dentistry. It explores the frequency of use, associated complications, and adherence to clinical guidelines. Additionally, it examines the role of benzodiazepines in managing dental anxiety in dental procedures.

Subjects and Methods: A cross-sectional study was conducted on 100 dentists in Iraq. A
Questionnaire was designed for dentists in Iraq about the use of benzodiazepines in dentistry and oral surgery for patients with dental anxiety.

Results: The result shows that majority of dentists don't prescribe benzodiazepines and prefer alternative methods for dental anxiety management. Among minority of dentists who prescribe benzodiazepines, diazepam was the most utilized medication. Oral route, 1-2 hour before procedure was the most preferred choice about benzodiazepine usage. Dentists were mostly use benzodiazepines for high patient anxiety and muscle relaxation during surgery.

Conclusions: Iraqi dentists show a lack of awareness in benzodiazepines prescription with many preferring alternative anxiety management techniques. A significant proportion of dentists who don't prescribe benzodiazepines currently wouldn't consider using them in the future.

Review of Literature

Anxiety in Dental Office

Dental anxiety is a debilitating mental condition that can prevent people from receiving critical dental care. This lack of dental care can lead to several types of health conditions other than those that affect just the mouth. It is important to overcome dental anxiety in order to receive crucial attention from a dentist. If fear begins and persists, however, people should seek help for this specific type of anxiety, just as they would with any other type of mental condition [1]. In its severe form, anxiety may have an impact on the dentist-patient relationship and contribute to misdiagnosis. Anxiety concerning dental treatment can be exacerbated by sounds, smells, sights, situations, prior experiences, friends, and so forth (Ay et al, 2002). The autonomic nervous system's activity varies because of dental anxiety. For example, alterations in the autonomic nervous system's function during dental procedures can lead to medical emergencies such as elevated blood pressure and vasovagal responses. For the safe execution of dental treatments, dentists must comprehend the degree of a patient's preoperative anxiety and the activity level of their autonomic nervous system [2].

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Anxiety in Minor Oral Surgery

Surgical procedures can lead to a high level of anxiety, which may cause significant medical, psychological and social consequences [3]. Surgical intervention frequently leads to anxiety manifestations with different clinical implications. Generalized anxiety disorder may lead to muscle pain, fatigues, headaches, nausea, breathlessness, and insomnia. Fear and anxiety are the two inevitable components of oral surgical procedure. The majority of people admit that they are fearful to go for dental treatment [4].In situations involving minor oral surgery such as, surgical extraction, impactions, biopsies, curettage, peri apical surgeries, there is significant increase in anxiety in patient can be found immediately before these procedures (Lone et al, 2015).Tooth extraction, as an invasive procedure in dental practice, is known to be among the top five most frightening dental procedures. Patients are more worried and anxious about tooth removal than they are about pain or helplessness. Losing a tooth is also a notable stimulus that provokes anxiety, and dental anxiety is usually higher among patients having tooth extractions [5]. One of the most common oral surgical procedures is the extraction of the third molar, which often goes along with significant pain, stress, and anxiety, as well as the use of invasive tools and local anesthesia. It has been determined that preoperative anxiety is linked to greater postoperative pain and longer surgical treatment [2].Anxiety can lead to uncooperative patients during implant surgery, which will extend the duration of surgery, reduce the effectiveness of local anesthesia, and ultimately patient dissatisfaction , increased postoperative pain, delayed wound healing, decreased immune system response, high risk of infection, an increased dose of anesthesia and analgesic. Hence, antianxiety medication can be given as premedication even in some dental procedures as it helps in the reduction of postoperative pain sensation and patient satisfaction [6]. Preoperative medication or premedication is the administration of medications before surgery, to reduce anxiety, which is common in these patients, and as prophylaxis of side effects of anesthesia like heart rhythm disorders, blood pressure variations, hyper salivation, etc. Benzodiazepines are the usual agents used in premedication to provide relief of anxiety, anterograde amnesia, and light sedation [7].

Conscious Sedation

In dentistry, the concept of conscious sedation is defined as a minimum level of depression of consciousness, preserving the patient's ability to maintain their own respiration continuously and to respond to the dental surgeon's verbal commands and physical stimuli during dental procedures. BZDs are the medications most used for this technique [8]. "Conscious" sedation is classified as a moderate sedation/analgesia by the American Society of Anesthesiologists (ASA) which provides sedation and anxiolysis. It is preferred over local anesthetic alone by some patients undergoing oral surgery who are highly fearful and desire attenuated awareness and memory of a procedure (Wilson et al, 2014).

Definition of BZDs

BZDs are a group of pharmacological agents frequently used for dental sedation in routine dentistry in private clinical settings [9]. They Discovered in the mid-1950s, BZDs were designed as pharmacotherapies for anxiety, panic attacks, sleep disorders and epilepsy, and they have been used as myorelaxants during surgical and orthopedic procedures [10]. Being safer than their forerunners, they quickly became drugs of choice and for several decades have been among the most commonly prescribed psychopharmacological agent [11]. The principal BZDs used in dentistry are diazepam, midazolam, lorazepam, alprazolam, and triazolam [8].

Pharmacology

BZDs core chemical structure is formed by the fusion of a benzene ring and a diazepine ring (Figure 1). Different compounds have different side groups attached to this central structure in position 1, 2, 5 or 7. The different side groups affect the binding of the molecule to the GABA, receptor and so can modulate the pharmacological properties, the potency of the effect and the pharmacokinetic conditions (duration of the effect, distribution, etc.) [12].

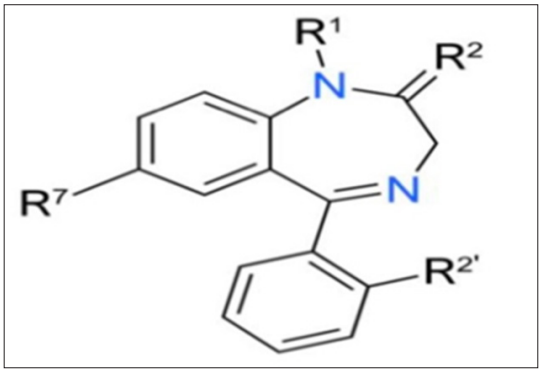


Figure 1: BZD Structure

Mechanism of Action

BZDs has an inhibitory effect and reduces the excitability of the neurons, resulting in a calming effect on the brain. Three types of Gamma-aminobutyric acid (GABA) receptors (A, B, and C) exist, but the BZDs interact with the GABA-A receptor. This receptor consists of 5 glycoprotein subunits, two α-, two β-, and 1 γ-subunit. The BZDs-binding site is located in a specific pocket at the intersection of the α- and the γ- subunit. The binding of BZDs induces a conformational change of the GABA-A receptor, inducing conformational change of the receptor's chloride channel that hyperpolarizes the cell and account for the GABA inhibitory effect throughout the central nervous system [13].

Family of BZDs

Diazepam (Valium)

Diazepam has been found to be a reliable agent for the treatment of emotional stress and anxiety. Is very popular sedating agents due to its wide margin of safety and it has wide therapeutic index (Alrawi et al, 2012). Diazepam most frequently used in dentistry because it is the safest member of this class of drugs [8]. It is also used as an anticonvulsant, sedation, and myorelaxation. It is available in intramuscular, intravenous, oral, and rectal gel forms [14]. Additionally, Diazepam can be used as a support for the treatment of post-operative trismus and temporomandibular disorder [15].

Diazepam, when used for anxiety, can be given as 2-10 mg orally, 2-4 times per day depending on symptom severity and the patient's age. Both intramuscular and intravenous forms are

also available for anxiolysis and should be given in doses of 2-10 mg every 3-4 hours, depending on symptom severity and age considerations [14]. Diazepam being extremely lipophilic, it penetrates quickly into the CNS, but can rapidly redistribute into body fat and muscle. This results in a faster decline in CNS levels and early recurrence of seizures [16]. More recently diazepam has been employed by the intravenous route to produce sedation in dental practice (Anaethis, 1973). Although diazepam is an easy to use, safe and effective intravenous sedative, it has two important disadvantages. First, Valium preparations for intravenous injection contain propylene glycol as a vehicle. This proved to be an irritant to tissues and caused some degree of discomfort during injection in 75% of cases Thrombophlebitis was also a problem. Second, it has a long half-life and an active metabolite which means that recovery may not be complete for up to 72 hours [17].

Midazolam (Versed)

Is the drug of choice when prolonged administration of a BDZ is necessary [18]. It was first synthesized in 1975 [19]. It has proved to be very successful in reducing anxiety and stress pre, peri, and postoperatively with no significant effect on the vital signs of a healthy patient [20]. It has been well established as a suitable sedative for use in patients undergoing dental surgery. When severe pain is expected, midazolam sedation could be used as an adjunct to pain control. This could possibly result in reduced pain with better patient acceptance of treatment. In addition, less analgesic consumption may reduce the overall adverse effects of the analgesics [21]. It comes in both IV and oral routes and is the choice oral sedative in moderate sedation. Adverse effects include hypoventilation, apnea, Vertigo and dizziness [22].

Lorazepam (Ativan)

Is another effective antianxiety and hypnotic medication [23]. Generally used as a premedication, lorazepam also has a long period of latency, which makes use in the dental office problematic [8]. It has a slower onset of action and needs to be administered about 2 hours before the procedure, which does not make it an ideal agent for office sedation. For procedures longer than 3 hours lorazepam (2 to 3 mg) can be used [24].The recommended dose is 2 to 4 mg and Caution must be applied to not over sedate patients with a depressive disorder or psychosis. Adverse effects include sedation, dizziness, weakness, and ataxia [22].

Triazolam (Halcion)

Is another BZD available in oral and sublingual forms [22]. It is indicated for the treatment of insomnia, and it has an off-label use as a preoperative sedative. Triazolam has a wide margin of safety, a high amnesic effect, and no active metabolites, which make it ideal for oral sedation for the anxious patient. Having a short elimination half-life of 2 to 5 hours allows repeated administration of the drug during the day. Peak onset is 1 hour for oral administration but 30 minutes for sublingual. The sedative effect is gone 4 hours after initial drug administration [24]. It is contraindicated in the pregnant patient with a pregnancy classification of X [22].

Alprazolam (Xanax)

This is another therapeutic option, but it is more commonly administered to patients who have severe cases of generalized anxiety and panic syndrome, and it is not used very much in dental offices because of its long period of latency [8]. When compared to other BZDs, has the highest anxiolytic activity, with an onset of 1.4 hour and an elimination half-life of 10.6 hours. Its main effects are the reduction of anxiety and panic attacks in patients, thus being a possible alternative premedication for surgical patients [3]. The recommended dose for anxiety starts with 0.25-0.5 mg tablets, administered by mouth 3 times per day. The maximum recommended daily dose of alprazolam for anxiolysis should not exceed 4 mg. For panic disorders, the same tablet form and route of administration are recommended at a maximum recommended dose of 6-10 mg/d [14].

Route of Administration

Forms of administration include oral, intravenous, intramuscular, intranasal, sublingual, or rectal, but in dentistry the oral route is most often employed because of the ease of administration and convenience for the patient [14]. So, normally this family of drugs is taken by oral administration due to its good absorption [12].

Intravenous sedation has been a well-established and a suitable method for the relief of anxiety associated with oral surgical procedures. But the use of intravenous drugs has its own array of complications. Patients with a moderate or high anxiety grade may benefit from the use of oral sedation or conscious sedation. Oral sedation has been well documented and is a suitable method for the relief of anxiety associated with minor oral surgical procedures performed under LA [4].

Pharmacokinetics

Absorption and Distribution

From a pharmacological perspective, BZDs are usually well absorbed by the gastrointestinal tract after oral administration. After intravenous administration, BZDs quickly distribute to the brain and CNS. Following intramuscular injection, absorption of diazepam is slow and erratic, whereas absorption of intramuscular administration of lorazepam or midazolam appears to be rapid and complete. Lorazepam is well absorbed after sublingual administration, reaching peak levels in 60 minutes [14].

The BZDs and their active metabolites avidly bind to plasma proteins [25]. BZDs follow a 2-compartment distribution, which involves a rapid central compartment phase followed by a redistribution phase to adipose tissue that ultimately determines duration of action [26].

Metabolism and Elimination

Metabolism takes place in the liver by oxidation or conjugation [18]. The first phase of metabolism involves the formation of N-desalkylated metabolites that are biologically active. Exceptions are triazolam, alprazolam and midazolam. The second phase of metabolism involves hydroxylation and usually yields an active derivative. The third phase of metabolism is the conjugation with glucuronic acid. Most BZDs are metabolized extensively by hepatic CYP3A4 and CYP2C19 [24]. At elimination, the urine excretes them almost entirely [12]. The elimination half-life of BZDs is increased in older patients and patients with renal dysfunction [24].

Classification of BZDs

BZDs are classified in terms of their elimination half-life in short acting, intermediate acting or long acting:

- Short-acting: Elimination half-life <5 h. Ex: Midazolam and mainly used as hypnotic for their quick sleep onset. They have few residual effects and can cause rebound insomnia when disruption, as well as amnesia and dependence problems.
- Intermediate-acting: Elimination half-life 5-24 h. normally they are used for anxiety purposes. Might have next-day residual effects if used as hypnotic. Ex: Alprazolam, lorazepam, lormetazepam.
- Long-acting: Elimination half-life >24 h, arriving to 100 h in diazepam. They present risk of accumulation, especially in the elderly or patients with metabolism disease. Ex: Diazepam, clorazepate [12].

Uses of BZDs

BZDs are indicated for a variety of uses due to sedative, hypnotic, anxiolytic, anticonvulsant, muscle relaxant, and amnesic actions. BZD are indicated for alcohol withdrawal, seizures, anxiety disorders, panic, agitation, and insomnia (Coop et al, 2020).

BZDs are important adjuncts in medical and dental procedures. When administered prior to surgical anesthesia, they reduce anxiety, provide sedation, facilitate anesthetic induction, and produce amnesia for the events surrounding induction; they also often reduce the required doses of anesthetic agents. They provide safe and effective sedation for mechanical ventilation following cardiac surgery [27]. BZDs can be used by general dentists to treat chronic conditions, such as temporomandibular joint dysfunction and burning mouth syndrome. BZDs will likely be used for longer periods for these conditions than premedication for a single dental procedure [28]. BZDs can cause anterograde amnesia. anterograde amnesia is one of the reasons BZDs are often used as premedication drugs before surgery or other medical procedures that may be painful and/or unpleasant [7]. Furthermore, for the dental treatment of medically poor risk patients, particularly those with cardiovascular disease, given either in a fractionated dose or a single dose [29].

Contraindications and clinical precaution of BZDs

Receiving BZDs when contraindications are present is dangerous [30].BZDs are generally contraindicated in patients with: myasthenia gravis, hypersensitivity to BZDs, severe respiratory insufficiency, sleep apnoea syndrome and severe hepatic insufficiency (Crowley, 2002).These drugs can be metabolized in a range of different tissues and organs, but the primary site of metabolism is with reduced excretion and increased plasma concentrations, which makes prolonged use unfeasible in such the kidneys. Patients with renal problems may have an altered profile of clearance of these drugs from the body, with reduced excretion and increased plasma concentrations, which makes prolonged use unfeasible in such patients [8].Respiratory depression is an adverse effect of BZDs and, therefore, caution should be taken if the patient has chronic respiratory failure [3].The geriatric population is especially sensitive to the CNS depressant and memory impairment effects of this class of drugs because of a combination of decreased biotransformation, decreased clearance, and increased receptor sensitivity Reducing typical doses at least in half seems prudent in this population [31]. In patients who drink alcohol, use of BZDs should be analyzed with care. Ethanol has additive effects on BZDs in the CNS and accelerates hepatic metabolism of these drugs. Use of short-acting variants of these drugs may not have the desired effects [8]. In pregnancy, BZDs cross the placenta, and if taken regularly by the mother in late pregnancy, even in therapeutic doses, can cause neonatal complications. The neonate metabolizes BZDs very slowly, and appreciable concentrations may persist in the infant up to two weeks after birth, resulting in the "floppy infant syndrome" lax muscles, over sedation, and failure to suckle. Withdrawal symptoms may develop after about two weeks with hyper excitability, high-pitched crying and feeding difficulties [32]. Care should also be taken to avoid occurrence of drug interactions, since the pharmacological properties of one or both medications could be increased or reduced. For example, use of BZDs in combination with drugs such as cimetidine, erythromycin, disulfiram, oral contraceptives, and certain groups of antifungals, may inhibit biotransformation of the BZD, resulting in higher plasma concentrations and, as a consequence, excessive sedation [8].Therefore, they should be used with caution in patients who are treated with other central nervous system depressants, patient with kidney or liver disease, severe congestive heart failure, in pregnancy and during lactation [3].It is still necessary for the dental surgeon to choose the drug that fits best with the patient's requirements based on age, weight, medical history, and duration of clinical treatment, always assessing each on an individual basis according to their requirements in order to choose the best therapeutic option for each case [8].

Adverse Effects and Misuse

Toxicity in Overdose

The acute toxicity of BZDs is extremely low; even large overdoses taken alone rarely cause death, although risks are increased in the presence of obstructive pulmonary disease. However, BZDs usually in combination with other drugs are involved in 30% to 40% of self-poisoning incidents [33].

Memory impairment

BZDs have long been known to cause amnesia, an effect which is utilized when the drugs are used as premedication before major surgery or for minor surgical procedures. Loss of memory for unpleasant events is a welcome effect in these circumstances [32].

Over sedation

Is a dose-related extension of the sedative/hypnotic effects of BZDs. Symptoms include drowsiness, poor concentration and vigilance, ataxia, dysarthria, motor incoordination, diplopia, muscle weakness, vertigo, and mental confusion, persists longer and is more marked in the elderly, partly due to decreased rates of metabolism and partly due to greater susceptibility to CNS depression confusion [33].

Paradoxical stimulant effects

Characterized by increased talkativeness, emotional release, excitement, and excessive movement, are relatively uncommon and occur in less than 1% of patients. The exact mechanism of paradoxical reactions remains unclear. Most cases are

idiosyncratic; however, some evidence suggests that these reactions may occur secondary to a genetic link, history of alcohol abuse, or psychological disturbances (Mncuso et al, 2012).

Depression, emotional blunting

Long-term BZD users, like alcoholics and barbiturate-dependent patients, are often depressed, and the depression may first appear during prolonged BZD use. in the UK recommended that "BZDs should not be used alone to treat depression or anxiety associated with depression "Emotional anesthesia", the inability to feel pleasure or pain, is a common complaint of long-term BZD users. Such emotional blunting is probably related to the inhibitory effect of BZDs on activity in emotional centers in the brain [32].

Withdrawal

The long-term use of BZDs is highly prevalent in developed societies and is not devoid of risks. Withdrawing patients from these drugs is often difficult. Tapering off BZDs has been shown to be a good strategy for discontinuing their long-term use [34]. Generally, the higher the dose and the longer the BZD is taken, the greater the risk of developing withdrawal symptoms [35]. Management of BZD withdrawal includes measures to prevent the development of dependence, careful attention to underlying medical conditions, medication consolidation and gradual dosage reduction, accompanying psychological interventions, occasional prescription of concomitant medication, and relapse prevention with on-going support to address psychosocial stressors [36].Therefore, like all drugs, they should only be used in patients whose symptoms are suggestive of potential efficacy and should not be prescribed in large amounts that would permit dose escalation without professional supervision or the development of dependence with long-term therapy [37].

There are various studies across different countries have discussed how dentists use benzodiazepines and the rationale behind their prescription.Significant variation in benzodiazepine prescribing rates and types were seen among the countries [28]. In UK, There is lack of confidence in prescribing OBZs for anxiolysis exists among UK dentists [38].Lebanese dentists reported some lack of knowledge and confidence in prescribing, particularly to specific populations [39].

In Australia, A small but significant percentage of dentists indicated they would prescribe benzodiazepines for several doses, with some up to three days prior to the procedure and some prescribing increased dose quantities. A discussion paper from the Dental Board of Australia states that "minimal sedation (anxiolysis) is the use of a single low dose oral sedative drug," as advised by the International Federation of Dental Anesthesiology [40]. Benzodiazepines and their derivatives were the most frequent subgroup of anxiolytics, sedatives, and hypnotics prescribed by dentists in Brazil. There was a low rate of dental prescriptions of these drugs, although excessive doses were concentrated in the same prescription [41].

The Aims of the Study

1. To evaluate the awareness, knowledge, and practices of Iraqi dentists regarding the use of benzodiazepines in dentistry.
2. To explore the frequency of benzodiazepine usage, associated complications, and adherence to guidelines in clinical practice.
3. To analyze the role of benzodiazepines in managing dental anxiety and sedation during dental procedures.

Materials and Methods

Subjects: A cross-sectional study was conducted on 100 dentists in Iraq according to their qualifications (resident, General practitioner and Specialist dentist). The participants were from both genders (females and males). Age of the dentists was ranging from <30 to ≥50 years and Years of practice ranging from 1 to >30 years.

Methods: The sample was selected by using systematic random sampling. A questionnaire was designed for the dentists in Iraq about the use of benzodiazepines in dentistry and oral surgery (Appendix 1). The main data source for the current study made up of an online survey questionnaire, participants were recruited through Facebook and other social networks and some samples were collected by printed questionnaires and distributed to dentists randomly. The recruitment message explained that the study aimed to explore drug prescribing for patients with dental anxiety. The protocol designed for this study was approved by the College of Dentistry/Ibn Sina University of Medical and Pharmaceutical Sciences, the data was collected within a period extended from (1/11/2024) to (13/1/2025) and presented in the tables.

StatisticsThe data was collected through an online questionnaire created using Google Forms. After data collection, Google Forms provided automatic analysis, including frequencies (the number of dentists selecting each response) and percentages (the proportion of responses for each option relative to the total participants) for each response. These data were extracted and visually represented using Microsoft Excel, where charts were created to illustrate the statistical findings. All calculations and graphical representations were based on the data provided by Google Forms which Built-in statistical summaries, eliminating the need for additional statistical software.

Results

A total of 100 dentists participated in our study, with 59 (59%) are females and 41 (41%) are males (Figure 2). Participants categorize into different age groups the majority 49 (49%) are under 30 years old, followed by 36 (36%) in the 30-39 age range, while 11 (11%) are in the 40-49 age range and only 4 (4%) are 50 years or older (Figure 3).Regarding to the years of practice, the majority of respondents have between 1-10 years of experience with 70 (70%), followed by 19 (19%) have between 11-20 years of practice, 8 (8%) have between 21-30 years of practice and 3 (3%) have more than 30 years of practice (Figure 4).

Participants were classified based on their professional qualifications into 40 (40%) are general practitioner dentists, 18 (18%) are resident dentists and 42 (42%) are specialists (Figure 5).When asked about prescribing BZDs for patients, 42 (42%) of participants reported using them, while 58 (58%) did not (Figure 6). We found that the drug of choice among those who prescribed BZDs was diazepam, which was used by 80 (80%) of our

participants followed by lorazepam used by 3 (3%), temazepam used by 1 (1%) of our participants and 16 (16%) chose to use Other BZDs (Figure 7). We noticed that the dose commonly used by our participants was 5 mg by 37 (37%), followed by 2 mg by 21 (21%), 10 mg by 7 (7%), other doses by 1 (1%) while 34 (34%) did not prescribe BZDs (Figure 8).We found from our results that the main route of administration is the oral tablet used by 62 (62%) of our participant dentists, followed by 3 (3%) use Intravenous injection, 1 (1%) use other administration methods while 34% (n=34) did not prescribe BZDs (Figure 9).According to the future use of BZDs, among those who did not prescribe BZDs currently, we found that 27 (27%) would consider using them in the future, followed by 31 (31%) would not use them while 42 (42%) did not respond (Figure 10).When we asked about the situations in which dentists use BZDs, they were prescribed for high patient anxiety by 32 (32%), for muscle relaxation during surgery by 13 (13%), for complex surgical procedures by 8 (8%) and for patients with a strong gag reflex 5 (5%), while 42 (42%) reported not prescribing them (Figure 11). Among those who did not prescribe BZDs, the main reasons are preference for alternative anxiety management techniques responded by 20 (20%), concerns about addiction by 14 (14%), concerns about side effects by 14 (14%), concerns about drug administration methods by 7 (7%) and concerns about drug effectiveness by 3% (3%) (Figure 12). We found that the main factors influencing our participant decisions to prescribe BZDs included the severity of the patient's anxiety chosen by 37 (37%), patient's medical history and health condition by 29 (n=29%), availability of alternative methods by 26 (26%), patient's age by 6 (6%) and procedure duration by 2 (2%) (Figure 13). When prescribing benzodiazepines, we found that 55 (55%) of dentists preferred administering them 1-2 hours before the procedure, followed by 8 (8%) the night before the procedure, 3 (3%) during the procedure, 1 (1%) preferred administering them after the procedure while 33 (33%) did not prescribe BZDs (Figure 14). We found when we asked about the protocol of follow-up that 30 (30%) of our participant dentists have no formal follow-up among the dentists who prescribed BZDs, 16 (16%) of dentists have follow-up after each appointment, 1 (1%) have follow-up the day after appointment and 11 (11%) chose occasionally, depending on the patient while 42 (42%) did not prescribe BZDs (Figure 15).

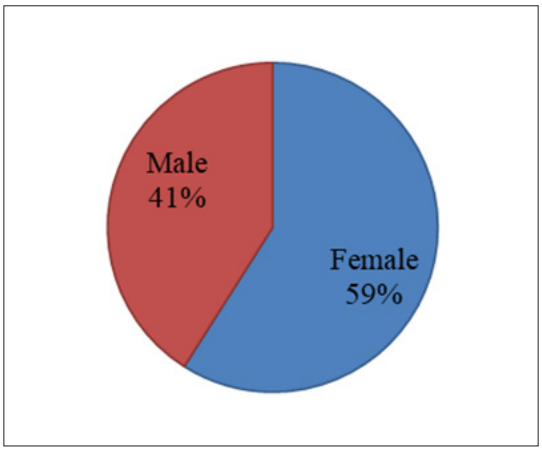


Figure 2: Gender of Participants

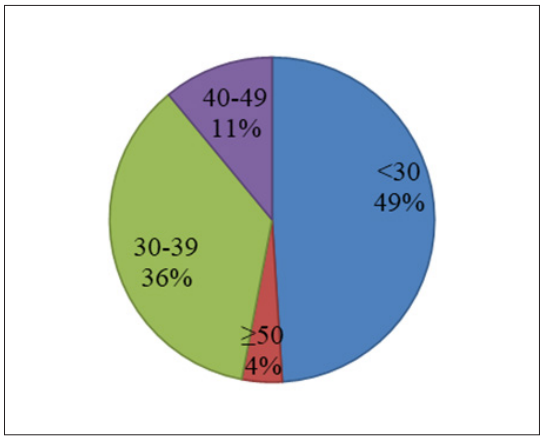


Figure 3: Participant's Ages.

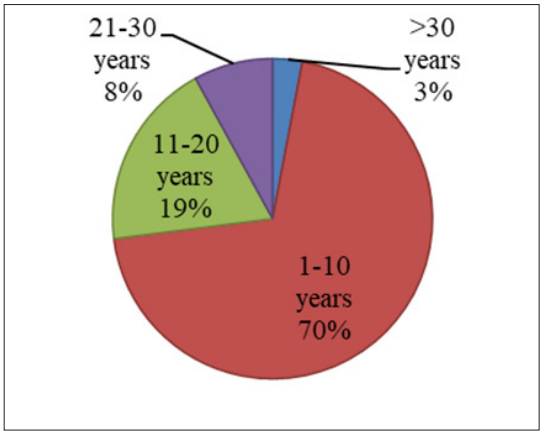


Figure 4: Years of Professional Practice.

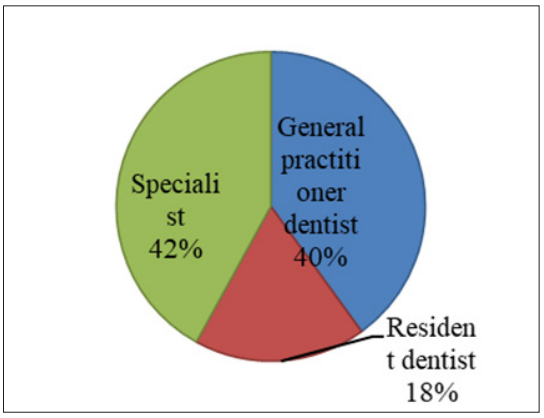


Figure 5: Professional Qualifications.

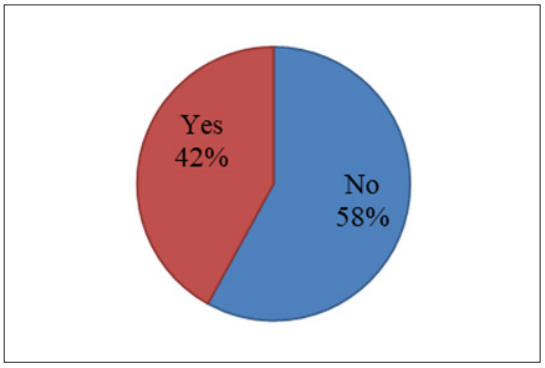


Figure 6: Prescription of BZDs.

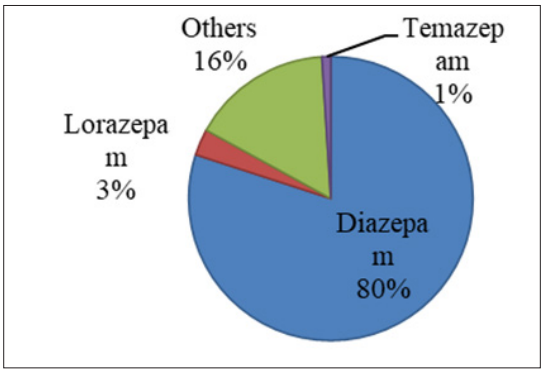


Figure 7: Commonly Prescribed BZDs.

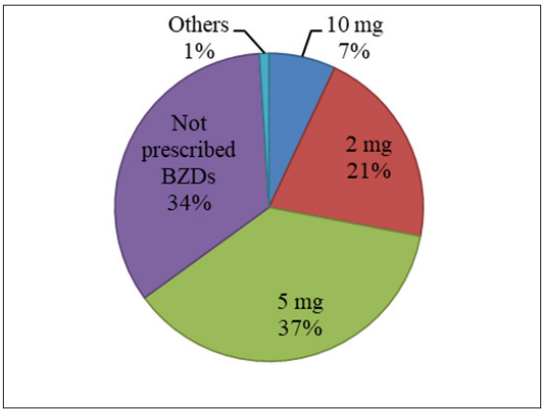


Figure 8: Dosage Preferences.

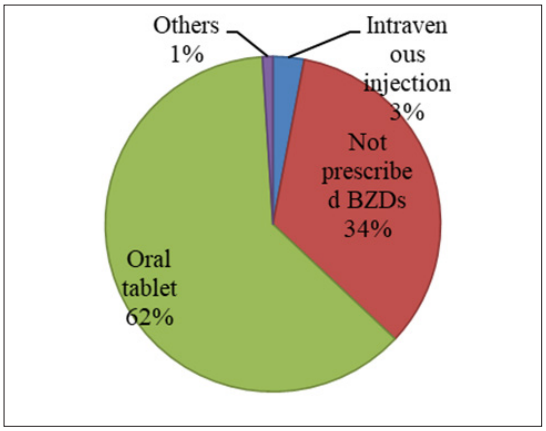


Figure 9: Administration Routes

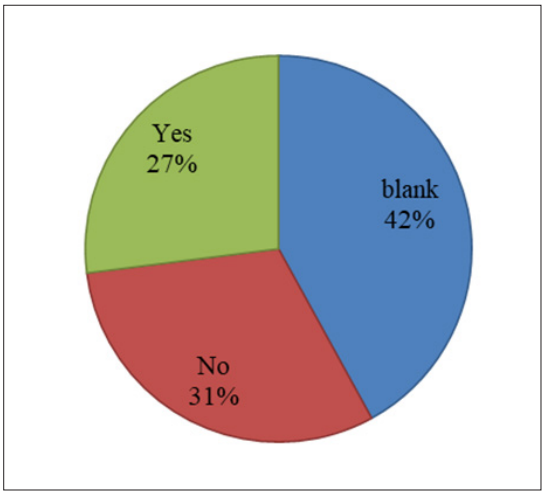


Figure 10: Future use of BZDs for participants that don't use it.

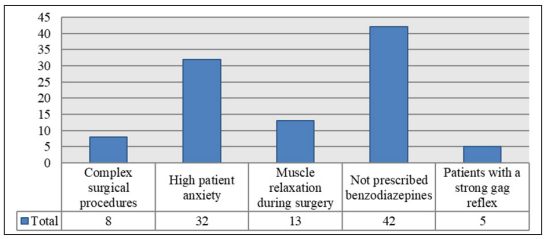


Figure 11: Situations in Which Dentists Use BZDs.

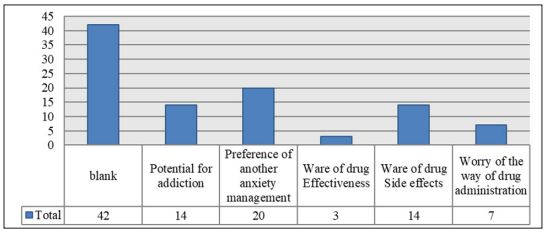


Figure 12: Main Causes for Rejection of Prescribing BZDs by Dentists.

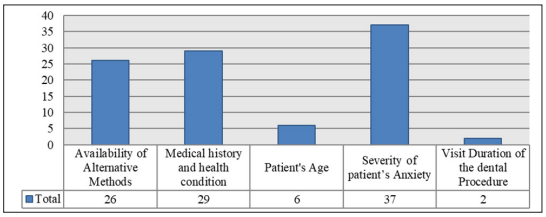


Figure 13: Factors Influence the Dentist's Decision to Prescribe BZDs.

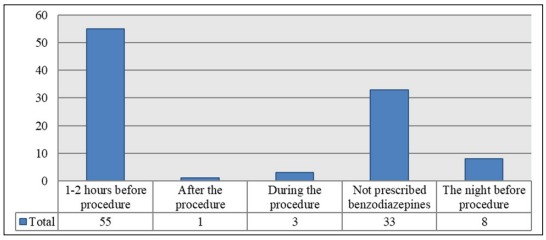


Figure 14: Timing Preferences for BZDs Prescription.

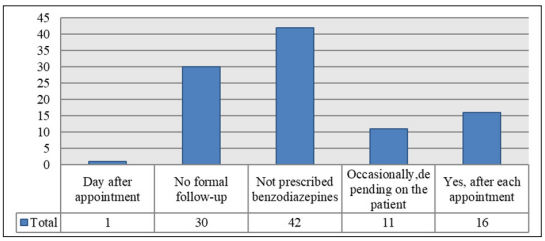


Figure 15: Availability of a follow-up protocol after treatment.

Among dentists using BZDs, we noticed that 37 (37%) found it moderately effective, 13 (13%) found it very effective and 7 (7%) of our participants found it a little effective (Figure 16).

From our results, we found that the most commonly reported side effects were drowsiness by 19 (19%), dizziness by 16 (16%), nausea/vomiting by 11 (11%), other side effects reported by 12 (12%) while 42 (42%) from our participants don't report any side effects (Figure 17). Dentists who did not prescribe benzodiazepines preferred alternative methods for managing dental anxiety such as cognitive-behavioral techniques used by 42 (42%) of our participants followed by nitrous oxide sedation

used by 18 (18%), stress reduction protocols by 16 (16%), sedation dentistry by 8 (8%) while 16 (16%) preferred to use other methods (Figure 18).

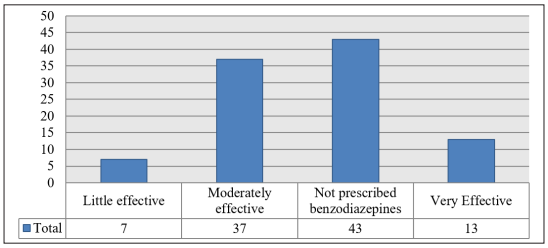


Figure 16: Dentist's opinion about the effectiveness of BZDs in dental Practice.

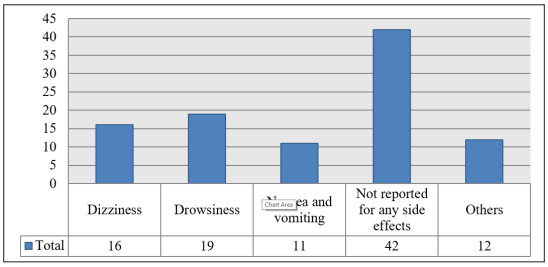
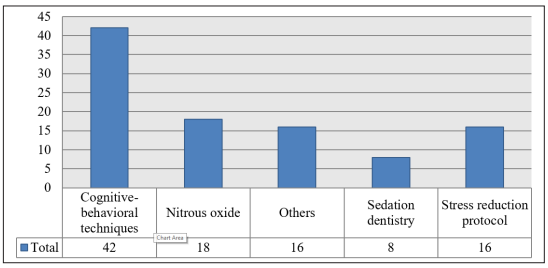


Figure 17: Common side effects have patients reported after BZDs administration.



Figur 18: Alternative methods used by dentists to manage dental anxiety.

Discussion

Our research assessed the patterns of BZDs prescriptions among dental practitioners, accentuating the determinants that influence their decision-making processes, the pharmacological agents they prefer, their administration methods and the concerns affecting their prescribing behaviors.

Our data demonstrated that (42%) of dental professionals incorporate BZDs into their therapeutic practices and (13%) found it very effective (Figure 16), but the vast majority of them (58%) don't prescribe it (Figure 6). the result which is in agreement with other studies. For instance, there was a study that made in UK by [38], 235 dentists participated in this study, only 114 dentists who had prescribed OBZs, 36 % (n=41) had done so most recently in the last year, whilst 25% (n=29) reported that it was over (5) years ago. In other study done by [28], found that U.S. dentists prescribed (23) times more than English dentists and (7) times more than Australian dentists by population. This is may be due to lack of confidence, reluctance, institutional restrictions and preference for alternative sedation techniques.

Our study's findings showed that the most frequent situation in which BZDs are prescribed is excessive patient anxiety by (32%) of our dentists (Figure 11). This may be due to extreme fear or stress associated with dental operations that patients may have and can cause can cause avoidance behavior, heightened pain perception, and difficulties complying during procedures. BZDs are a well-known pharmacological alternative for treating anxious people because of their well-established anxiolytic effects. This is in agreement with a Swedish study done by [42] indicate that (77%) of their responders use BZDs medications for anxiety reduction.

Based on our study, the main factor that influenced the dentist's decision to prescribe BZDs was the severity of patient anxiety (37%) (Figure 13). Dentists prioritize anxiety levels because anxiety has a direct impact on patient compliance, safety, and treatment results. BZDs provide a workable way to deal with severe dental anxiety, making the experience better for the patient and the dentist.

The analysis indicated that diazepam is the most frequently prescribed drug with (80%) prescription rate (Figure 7). It is the preferred choice, likely due to its long half-life and well-established anxiolytic effects. This result is also in agreement with many other researchers such as [38,28]. While in Brazil, the most frequently anxiolytics dispensed was bromazepam (25.30%), whereas diazepam dispensed by (15.06%).

The results revealed that the preferred dose was 5mg which prescribed by (37%) of our dentists that's maybe they consider it as efficient and safe dose (Figure 8).

Our study's findings were consistent with studies done in the UK by and in Australia by that revealed most participants preferred to have their medications prescribed 1-2 hours before the surgery (Figure 14) [38,28]. This observation may be explained by the fact that the drug's optimal absorption and peak effect occur during this time frame, which guarantees sufficient anxiolysis and patient comfort during the surgery.

Among dentists who utilize BZDs, we found that the oral tablet was preferred by most of our participants (62%) (Figure 9). This result is in agreement with a study made in Nigeria by which found that the most preferred route of administration of anxiolytic drugs was oral (57.3%) likely due to ease of administration and patient compliance [43]. Also, the oral route is non-invasive and potentially less associated with the risk of viral and bacterial infection and side effects.

In conducting this study we noticed that most dentists who use BZDs (42%) didn't report any side effects (Figure 17), That's may because the dose used was small and had mild side effects or may come from lack of monitoring after prescribing the drug (that can be confirmed in the term of follow up as we noticed that most of them (30%) do not do follow-up the patients (Figure 15)).

In this research, we found that the most common cause for those who reject the use of BZDs was the preference for alternative methods of treatment (Figure 12). This outcome might emerge

from worries about the possible negative effects, dangers of reliance, and ethical or legal issues surrounding the use of benzodiazepines. Furthermore, since non-pharmacological sedation treatments and behavioral management are seen as safer and more sustainable for long-term patient care, many dentists may favor them.

Among dentists who don't use BZDs currently which constitute a percentage of (58%), we found that the majority of them (31%) won't use them in the future and (27%) would consider using them in the future (Fig 10) this result disagrees with a study done in the UK where Two-thirds of the (161) dentists (n=108) who had never prescribed anxiolytics were interested in doing so in the future.

In this study, we found that most participants who don't use Benzodiazepine preferred to use behavior management techniques (42%) (Figure 18). This result is agreement with a study done in Saudi Arabia by that also prefers use behavior management techniques; this is may be due to safety of this technique that minimizing the risks and side effects associated with pharmacological interventions [44-50].

An extensive review of Iraqi dentists' prescription practices for BZDs to treat dental anxiety is given in this research. According to the findings, a sizable percentage of dentists (58%) do not recommend BZDs because of worries about potential negative effects like fatigue, lightheadedness, and nausea or vomiting, which has caused many to favor other approaches. These results are in line with a global trend that is shifting away from pharmacological sedatives and towards non-pharmacological methods in dentistry practice due to increased awareness of the risks of addiction and side effects. Based on this, the study suggests improving clinical guidelines on when and how to safely and efficiently prescribe BZDs, as well as expanding education and training in anxiety management [51-56].

Conclusions

1. There is lack of confidence and awareness in prescription of BZDs in majority of Iraqi dentists participated in this study.
2. The majority of dentists who don't prescribe BZDs prefer alternative anxiety management techniques.
3. Dentists who prescribe BZDs mostly prefer them for highly anxious patients and the severity of anxiety is an influence factor for prescribing them.
4. Diazepam is most frequently administered orally, according to the minority of dentists who use BZDs.
5. A significant proportion of dentists who don't prescribe BZDs currently wouldn't consider using them in the future.

Recommendations

These suggestions for aspiring researchers to motivate research with similar goals include:

1. To be more accurate, larger sample sizes were required for future researches.
2. Undertake thorough clinical trials to ascertain which BZDs are most effective in treating dental anxiety while minimizing side effects.
3. Participate in interdisciplinary research by working with medical, psychological, and pharmacological experts to develop comprehensive approaches to dental anxiety management.
4. In order to find best practices and standardize dental sedative techniques globally, compare prescribing patterns and sedation practice across various geographical areas.
5. Future studies should concentrate on improving sedation procedures and raising awareness of the best dental anxiety management techniques.

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