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Assessment of Iraqi Dental Practitioners' and Undergraduate Students' Knowledge Regarding Dentin Hypersensitivity Management: A Cross-Sectional Study

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Abstract

Objective: The characteristic of dentin hypersensitivity
is brief, intense pain that results from exposed dentin in reaction to a variety of stimuli, including mech anical, thermal, osmotic, or chemical factors. This study aimed to evaluate the level of knowledge among undergraduate students and practicing dentists in Karbala City, Iraq, concerning the mechanisms, etiology, and treatment of dentin hypersensitivity (DH).

Methods: 102 surveys were distributed via Google Forms to general practitioners and fourth- and fifth-year dental students at the Kerbala College of Dentistry in Iraq. The data were inputted into Microsoft Excel and analyzed using SPSS 22.0 for Windows as frequency distribution tables and figures.

Results: Despite the differences in comprehension and expertise between students and dentists, a comparative analysis of their responses to various questions revealed several similarities. According to the survey, 28.8% of students reported that 10% of patients suffered from DH, while 32% of dentists reported the same. Additionally, 72% of dentists and 71.2% of students stated that DH is a severe problem for patients. Both dentists, 30%, and 26.9% of students, indicated that DH lasted for less than 2 weeks. According to dentists and students, females are more affected by DH (74%; n=37) and (71%; n=37), respectively.

Conclusion: Students and dentists showed a similar level of knowledge on DH.

Keywords: Dentin sensitivity; Students; Diagnosis, Surveys and Questionnaires.

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Introduction

Dentin hypersensitivity (DH) is a distinct dental condition characterized by pain induction in response to non-painful stimuli focused on the exposed dentin. In healthy teeth, pain is not a typical consequence of this condition. This disorder, which cannot be linked to any other dental defect or illness, is marked by brief, acute pain that arises when exposed dentin reacts to tactile, thermal, osmotic, evaporative, or chemical stimuli. Dentin exposure can occur due to chemical erosion, mechanical abrasion, or loss of cementum due to gingival recession [1-3].

DH is a prevalent condition among patients seeking treatment at dental clinics. It is often confused with other clinical conditions, such as dental caries, microleakage, cracked teeth, or fractured restorations. It is essential to differentiate DH disease from the conditions mentioned above, as they may exhibit similar symptoms at different stages of progression [4,5].

Modern lifestyles often involve consuming acidic foods and drinks. This can lead to tooth wear and exposure to dentin, a problem known as DH. DH can significantly affect the quality of life of adults, causing them to avoid certain activities and foods and skip brushing areas that cause pain. Even routine dental treatments like scaling and polishing can trigger DH

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and make regular dental visits unpleasant and distressing for patients. A hydrodynamic theory can explain DH, suggesting that fluid flow within dentin tubules triggers baroreceptor activation. This activation causes a discharge of neural signals that cause the sensation of pain [6, 7]. Females have a slightly higher incidence of the condition than males, with individuals between 20 and 50 years being the most vulnerable [8, 9].

The management of DH involves taking a detailed clinical and dietary history. DH should be distinguished from other dental pain conditions, and its underlying causes should be addressed. Before starting treatment for DH, clinicians must exclude several different disorders that may be causing similar symptoms. Dental lasers, in-office procedures, gratuitously desensitizing toothpaste and mouthwashes, and home remedies are among the treatment options [5].

Before selecting a treatment for DH, the clinician must consider an exclusive differential diagnosis [10]. DH can be caused by various conditions that are different from those that cause other dental issues. Chipped enamel, broken restorations, dental cavities, marginal restoration leaks, cracked tooth cusps, and evaporative stimuli are a few of these issues. When a liquid moves over a sensitive area, it can generate mechanical receptors related to sensitivity to fluid pressure. As a result, signals get transmitted into the pulpal nerves, developing a pain reaction [11, 12].

This study aimed to evaluate the level of knowledge among undergraduate students and practicing dentists in Karbala City, Iraq, concerning the mechanisms, etiology, and treatment of dentin hypersensitivity (DH).

Methods

From November 2022 to February 2023, 102 questionnaires were distributed to 4th- and 5th-year dental students and general dentists at Karbala College of Dentistry in Iraq. The questionnaire consisted of 24 predetermined questions and was administered via Google Forms. Microsoft Excel was used to gather and arrange the responses, while SPSS 22.0 for Windows was used for analysis. Figures and frequency distribution tables were used to present the findings.

Results

Of the total participants, 102 participated in the survey, of which 52 were students (51%) and 50 were dentists (49%). In response to question 2 of whether they had examined patients with DH in the previous (2-4) weeks or months, 52.6% (n = 30) of students and 47.4% (n = 27) of dentists responded affirmatively.

The following information was obtained in response to question 3, which requested an estimate of the percentage of patients receiving care at the dental hospital who suffered from DH: 10% of patients, according to 28.8% (n = 15) of the students, were thought to have DH, while 15% of patients were believed to have it. Furthermore, 10% of patients had DH, as reported by 32% (n = 16) of dentists.

In response to question 4 concerning the initiator of the conversation before the clinical examination and DH diagnosis, 52% (n = 26) of the dentists and 59.6% (n = 31) of the students reported that the clinician initiated the conversation. On the other hand, 48% (n = 24) of dentists and 40.4% (n = 21) of students stated that patients initiated the conversation.

Dentists (82%; n = 41) and students (78.8%; n = 41) reported observing signs of DH in response to question 5. Regarding question 6, 72% (n = 36) of dentists considered DH an urgent clinical condition in their patients, while students (71.2%; n = 37) expressed the same opinion.

Regarding question 7, 30% (n = 15) of dentists and 26.9% (n = 14) of students indicated that the DH lasted for >2 weeks.

Regarding questions 8 and 9 about the effect of DH on the patient's quality of life, both dentists (72%; n = 36) and students (76.9%; n = 40) reported that it had a significant impact. On the other hand, dentists (82%; n = 41) and students (76.9%; n = 40) indicated that it had mild to moderate effects.

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In response to question 10, 68% (n = 34) of dentists and 75% (n = 39) of students indicated that they were asked. Some variations between the dentist and student responses were highlighted in question 11 concerning the etiology of DH. According to dentists and students, the top dental issues were as follows: for dentists, 38% (n = 19) reported exposed dentin, 12% (n = 6) reported gingival recession, 10% (n = 5) reported fluid movement, 8% (n = 4) reported loss of enamel, and 6% (n = 3) reported abrasion. For the students, 26.9% (n = 14) reported exposed dentin, 15.3% (n = 8) reported gingival recession, 15.3% (n = 8) reported a loss of enamel, 13.4% (n = 7) reported needing periodontal treatment, and 7.6% (n = 4) reported having caries, as illustrated in Table 1.
environment, as well as perceived stress and career future (Table 1).
In response to question 12, when asked about the steps followed to clinically diagnose a patient with dentin hypersensitivity (DH), dentists (38%; n = 19) and students (34.6%; n = 18) mentioned clinical sensitivity to cold as the first diagnostic technique, as shown in Table 2.

As for question 14 about other dental causes or conditions that should be taken into consideration regarding the diagnosis of DH, they provided the following primary responses: 1) Cracked syndrome (20%; n = 10) (19.2%; n = 10); and 2) Post-operative sensitivity (18%; n = 9) (19.2%; n = 10).
Responses to question 15 suggested that dentists were more confident than students in correctly identifying DH compared to other painful dental diseases. Out of all the dentists surveyed, 10% (n = 5) were very confident in diagnosing DH, 52% (n = 26) felt confident, and 36% (n = 18) were somewhat confident. On the other hand, only 7% (n = 4) of the students felt very confident in diagnosing DH, whereas 50% (n = 26) were confident, and 25% (n = 13) were somewhat confident. Interestingly, a higher percentage of students (17.3%; n = 9) were not very confident compared to dentists (2%; n = 1), as depicted in Figure 1.
During the survey, dentists and dental students received questions regarding the currently accepted theory of dentinal hypersensitivity. The survey illustrated that 73% (n = 38) of students and 62% (n = 31) of dentists stated they currently subscribed to the hydrodynamic theory. However, some students (26.9%; n = 14) indicated other theories, such as direct innervation theory and odontoblast receptor, compared to dentists who had other answers (38%; n = 19).
Figure 2 displays the results of a survey conducted among dentists and students about their methods for evaluating patients with DH in a clinical setting.
The most used assessment methods, according to the responses of dentists and students, were as follows: 1) a dental exam (54% of dentists and 46% of students) and 2) thermal tests (18% of dentists and 28.8% of students).
In question 18, both dentists and students concurred on the following suggestions for patients with DH: 1) use of home desensitizing toothpaste (34%; n = 17) (95.1%; n = 39); and 2) education on proper tooth brushing techniques (34%; n = 17) (87.8%; n = 36).
In response to question 19 on recommending at-home materials for DH, dentists and students had varying confidence levels: 10% of the dentists were very confident, 56% were confident, 22% were somewhat confident, and 12% were not. On the other hand, 13.4% of the students were very confident, 25% were confident, 50% were somewhat confident, and 11.5% were not very confident.
Regarding the question about further details on any non-dental issues associated with DH, dentists and students reported different responses. For dentists, the three most common responses were psychological stress (30%; n = 15), bruxism (22%; n = 11), and clenching (22%; n = 11). On the other hand, students listed bruxism (23%; n = 12), clenching (23%; n = 12), and psychological stress (19.2%; n = 11) as their top three responses.

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Table 1. Selected responses from question 11 regarding an understanding of the etiology of DH.

The etiology of DH (selected variables)	Staff (n)	Students (n)
Exposed dentin	19	14
Gingival recession	6	8
Wrong (incorrect) brushing	3	0
Fluid movement	5	3
Attrition	0	2
Abrasion	3	0
Enamel fracture	1	0
Bleaching techniques	1	2
Periodontal disease	2	0
Loss of enamel	4	8
Caries	2	4
Leaking restoration	1	3
Erosion	1	1
Periodontal treatment	2	7

Table 2. Selected responses to question 12 concerning the steps taken to diagnose a patient with DH.

What steps would you take to clinically diagnose a patient with DH (selected variables)?	Staff (n)	Students (n)
Clinical sensitivity to cold	19	18
Clinical examination	12	5
DH history	11	13
Vitality test	4	3
Aggravating factor	0	1
Eliminate the cause of DH	0	4
Assess recession	0	1
Take a radiograph	0	2
Apply a bonding agent	1	2
Provision of a desensitizing toothpaste	1	0
Diet history	1	2
Medical history	1	1

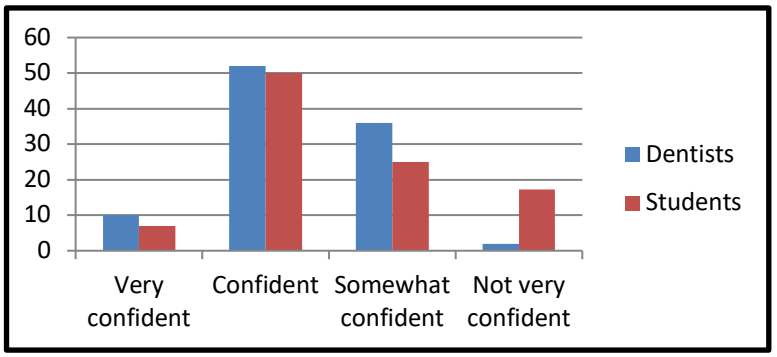

Figure 1. Comparison of confidence levels of dentists and students in diagnosing DH.

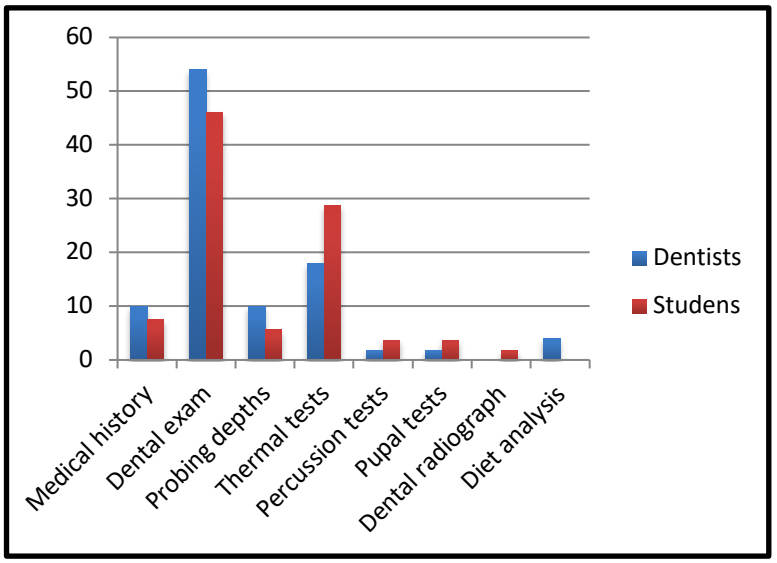

Figure 2. The responses of dentists and students to question 17 regarding the assessment and evaluation of DH in the surgical environment.

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In response to inquiries regarding the adherence of their patients to the professional recommendations for the treatment and control of DH, a significant proportion of dentists and dental students, constituting 64% (n = 32) and 63.4% (n = 33), respectively, indicated that their patients adhered to the advice dispensed. Conversely, 36% (n = 18) of dentists and 36.5% (n = 19) of students reported instances where their patients did not adhere to the provided guidance.

In response to question 22 regarding the necessity of additional information in the form of a leaflet to prevent further occurrences of DH, 86% of dentists (n = 43) and 86.5% of students (n = 45) responded affirmatively. On the other hand, 14% of dentists (n = 7) and 13.5% of students (n = 7) stated that further information about the prevention of DH was unnecessary. Both dentists and students noted that females were more affected by DH (74%; n = 37) and (71%; n = 37), respectively, compared to males (26%; n = 13) and (29%; n = 15), respectively. The teeth that were most affected by DH, according to both dentists and students, were incisors (46%; n = 23) (42%; n = 21), while the least affected were canines (4%; n = 2), (3.8%; n = 2).

In response to the last question regarding the potential impact of oral hygiene on DH, 82% of dentists (n = 41) and 80.7% of students (n = 42) agreed that it might have an effect.

Discussion

This study's questionnaire was constructed based on a previous survey conducted in the United Kingdom. The initial questionnaire was modified from a survey used in a study by Schuurs et al.[13], and this adaptation was confirmed in a study by Hatton et al. [14]

Numerous prior studies and reviews have indicated that dentists may exhibit uncertainty regarding the etiology, diagnosis, and optimal treatment of DH [14-17]. Insufficient knowledge or understanding of DH often leads to the failure of dentists to screen for DH routinely. Consequently, this may affect the dentist's confidence in managing the condition and impact the successful treatment of DH to the patient's satisfaction. Moreover, there is an inability to perform a differential diagnosis to discard other clinical conditions with characteristics similar to DH [14].

Despite differences in understanding and knowledge, both groups exhibited similar responses. For instance, 10% of patients experienced DH, according to 32% of dentists and 28.8% of students. Additionally, both dentists (72%) and students (71.2%) acknowledged the severity of DH for patients. Moreover, DH persisted for more than two weeks for 30% of dentists and 26.9% of students. Most of both dentists (72%) and students (76.9%) concurred that DH negatively affects people's quality of life (QOL). They described it as mild to moderate (82% of dentists and 76.9% of students).

The responses regarding DH's causes, diagnosis, and treatment were in line with other published studies [14, 15].

A previous study identified a problem of insufficient understanding of the primary mechanism of DH. The current survey discovered that 73% of students and 62% of dentists identified the hydrodynamic theory as DH's prevailing mechanism of action [16]. Recent research has validated that clinicians better understand the mechanisms that trigger DH [15, 17].

The study revealed that dentists had greater confidence in managing DH than students. This suggests dentists are more proficient in dealing with DH-related issues than students. Regarding recommendations for DH and at-home desensitizing products, it was discovered that both dentists and students had the same degree of confidence. However, when asked about the non-dental factors that may impact DH, such as stress, the responses generally agreed. Still, specific factors were limited to anxiety, bruxism, and clenching. Furthermore, the participants agreed that there was a lack of knowledge about DH and its treatment options, stressing the need for additional information in a leaflet [14].

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According to several studies, DH incidence is significantly higher in females than males. This may be attributed to women's nutritional habits, which render them more vulnerable to tooth sensitivity. In addition, more women tend to seek tooth whitening treatments, which can further aggravate the issue, leading to even more significant tooth sensitivity [2, 18].

It is essential to note that these findings are significant, as they may have implications for dental professionals who treat patients with DH. Given the higher incidence of DH in female patients, dental professionals should consider this factor when developing treatment plans and providing recommendations. Furthermore, additional research may be necessary to elucidate the underlying factors and develop more effective treatment strategies for patients who experience DH [19].

According to dental professionals and students, the teeth most commonly affected by DH are the incisors and premolars [2, 20], with 46% of dentists and 42% of students reporting this trend. Poor oral hygiene is the primary cause of DH, as reported by 82% of dentists and 80.7% of students. This condition can result from incorrect brushing techniques or other detrimental oral hygiene habits, which contribute to gingival recession and the subsequent exposure of teeth to hypersensitivity [21]. Understanding the etiology of DH is critical to its effective management and treatment [22].

Conclusion

Students and dentists showed a similar level of knowledge on DH.

Conflicts of interest

The authors declare no competing interests.

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