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Knowledge and awareness of dentin hypersensitivity and different treatment modalities

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ABSTRACT

Background: Hypersensitivity of the dentin is a prevalent condition in dental clinic. There are numerous pre-disposing factors to this issue, for example it could be due to physical or chemical trauma, gingival recession, and periodontal diseases and many other causes. This condition has a considerable consequence on one's quality of life. *Aim:* To evaluate Saudi dentists' knowledge of dentin hypersensitivity (DH) and their diagnostic and treatment strategies. *Methods:* A digital survey, to assess the Saudi dentist knowledge and management in regards to dentin hypersensitivity issue in dental clinical practice. The questionnaire formulated based on; the demographic data and assessing the dentist knowledge about DH and the management used to treat it. The results were analysed using (SPSS) program. *Results:* The study consisted of 718 participants who completed the questionnaire. 52.6% of study candidates were general practitioners, 31.8% were residents, 12.8% were specialists, and only 2.8% were consultants. Only 37.3% of candidates described DH correctly. 40.4% of candidates agreed that DH considered a major issue affecting the standard life of the patient. *Conclusion:* Accurate dentin hyper sensitivity description was shown to be linked to employment location, younger age, male gender, years of experience, and qualifications. Dental practitioner in Saudi Arabia needs to learn more about dentin hyper sensitivity. Controversial education about DH and their management, on the other hand, can improve the quality of care provided to our patients.

Keywords: Dentin Hypersensitivity, Diagnosis, Different Treatment Modalities, Saudi Dentist.

1. INTRODUCTION

Dentin hypersensitivity (DH) is distinguished by a brief, high-pitched pain caused by unprotected dentin in reaction to incitements that are generally thermal, evaporative, tactile, osmotic, or chemically, and that cannot be attributed to any other dental deficiency or disease. This condition reported in teeth with exposed dentin, due to physical or chemical trauma without any other pathological factors (Izhar et al., 2019). The pain associated with hyper sensitivity of dentin can be elucidated by hydro-dynamic theory. The theory proposed that fluid movement within dentinal tubules will activate

baroreceptors which will in turn cause neural discharge and painful sensation were felt as a result (Zeola et al., 2019).

Hypersensitivity of the dentin is a frequently occurring problem in dental practices, with a highly variant prevalence ranging from 2-98%. In self-reported questionnaires there is a tendency of over reporting due to patients deficiency of information's about the type of pain they are experiencing while otherwise, clinical examination reported lower prevalence (Pereira et al., 2018). In a study, by Gibson et al., (2010) reported that; "twenty eight percent of participants suffering of annoyed feeling due to cold drink while twenty six percent of participants unable to have any frozen dessert smoothly and almost nine percent of participants also reported difficulty in cleaning their teeth without feeling discomfort. Which indicates the importance of treating the issue of hypersensitivity since it has a direct effect on maintaining oral hygiene and therefore oral health (David G. Gillam, 2017). Recently there is a lot of available treatment options such as high focused beam, fluoride gel, resin sealer, and periodontal surgical graft procedures but over the years there was no agreement on the gold standard treatment for dentinal hypersensitivity (Pradeep & Sharma, 2010).

In 2019, research has been conducted on perception of dentin hypersensitivity management and the result has shown. The majority of candidates were women; who had employed in a dental office for < 5 years and had finished their speciality degree. Seventy percent of these dentists considered as independent contractors, the diagnostic tools used to identify dentine hypersensitivity was air spray or scraping with a probe or both ways; Utmost frequent DH predisposing factors, according to respondents was Occlusal prematurity (Zeola et al., 2019). A study was carried out in 2018, among dentists who working in Mumbai about aware of dentine hypersensitivity, and the result has shown the bulk of those who participated, DH was usually found during normal clinical examinations, according to 163 (79.1%).

The majority of clinicians questioned said that DH was regarded a significant condition in roughly 5-10% of Pt, and 48 (23.3%) said that the Pt' suffering generally persisted for almost two weeks, the pathogenesis of DH was mostly referred to Tooth Carious lesions (158 [76.7 percent]), dental brush behaviour's [83 (18 percent)], and acidity erosion (54 percent) by the participants. Often these respondents would seem to make the choice discovery of hypersensitivity diagnostics using evaporation [77 (37.4%)] as important role in the diagnosis aids for DH, often these survey candidates [70 (34%)] decided to choose for 'Hydro-dynamic theory,' most candidates [131 (63.6%)] assumed to be 'Convinced' in diagnostic DH, often these candidates [131 (63.6%)] claimed to be 'Confident' in diagnosing DH, most candidates [131 (63.6%)] alleged to be 'When it came to treatment alternatives, the majority of dentists chose At-home desensitizing tooth pastes (185 (89.8%), followed by 'Patient education about DH' (176 (85.4%) (Pereira et al., 2018).

However, till nowadays there isn't significant number of studies about this topic was conducted in Saudi Arabia. Also, there is no agreement on a gold standard treatment for dentinal hypersensitivity. The purpose of this article is to estimate the awareness and understanding of Saudi- based dentist in management DH and their different ways of diagnosis.

2. METHODOLOGY

A cross-sectional based on an organized survey that was developed by the authors from May 2021- January 2022. It will include a message explain the aim of the article and the instructions on filling the survey. The first section of the questionnaire includes dentist's information's for example years of practice, education level and type of facility (private or governmental). While the second section includes assessment of dentists' knowledge about the dentinal hypersensitivity which includes frequency, predisposing factors, diagnosis, and methods of management of the dentinal hypersensitivity.

Inclusion criteria: all dental professionals practicing in Saudi Arabia in both the governmental and private sectors, with different education levels.

Exclusion conditions: practitioners who rejected to take part in the study.

Finally, on the PC, all information was collected by using "Excel Spreadsheet" (2016) software for Windows. The input was then exported to the SPSS Software (SPSS) for statistical analysis.

3. RESULTS

As illustrated in table (1), the study consisted of 718 participants who completed the questionnaire. 40.7% work in MOH hospitals, 31.2% work in university hospitals, and 21.2% work in private clinic. 83.6% of candidates were males and 16.4% females. 51% aged between 36- 45 years old while 49% aged between 24- 35 years old. As for experience, 42.9% had 7- 9 years of experience, 41.5% had 4- 6 years and 15 had 1- 3 years of experience. Regarding qualifications, 52.6% of study candidates were general practitioners, 31.8% were residents, 12.8% were specialists, and only 2.8% were consultants.

Table 1 Individualities of candidates (n=718)

Constraint		No.	%
Working place	Military Hospitals	42	5.8
	MOH Hospitals	292	40.7
	Private Clinic	152	21.2
	University Hospitals	232	32.3
Gender	Male	600	83.6
	Female	118	16.4
Geographic place	Central area	318	44.3
	East area	36	5.0
	North area	206	28.7
	South area	62	8.6
	West area	96	13.4
Age	24-35	352	49.0
	36-45	366	51.0
Years of Experience	1-3	108	15.0
	4-6	298	41.5
	7-9	308	42.9
	>9	4	.6
Dentist Qualification (Rank)	Consultant	20	2.8
	General Practitioner	378	52.6
	Resident	228	31.8
	Specialist	92	12.8

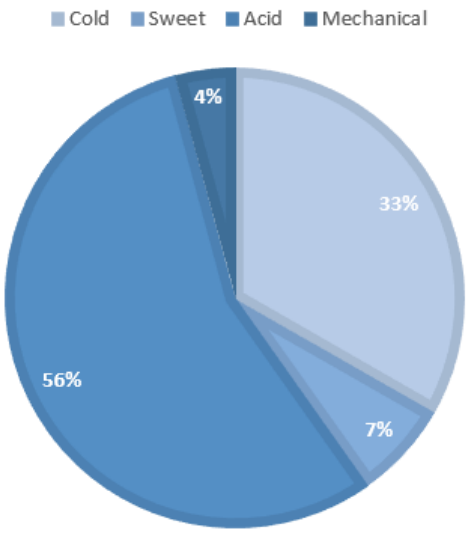

Figure 1 Knowledge assessment about stimulus triggers of dentin hypersensitivity

Table 2 Knowledge of candidates about dentin hypersensitivity

Constraint		No.	%
Read any articles about DH during the past 3 years	Yes	270	37.6
	No	448	62.4
Dentin Hypersensitivity is best described	Intermittent, sharp, stabbing pain that could activated by air or a light touch over the face.	52	7.2
	Drastically radiating pain that last long that could occur spontaneously or following a thermal inducement.	398	55.4
	Acute pain as a result of exposed dentin that affect the fluid in the dentinal tubules not interrelated to any other teeth pathosis.	268	37.3
DH patient should be routinely asked about pain history	Yes	288	40.1
	No	430	59.9
Encounter patients in practice complaining from DH per-week	Less than 5	636	88.6
	5 to 10	82	11.4
DH is considered a major issue affecting patient quality of life	Yes	290	40.4
	No	428	59.6
The following stimulus triggers DH	Cold	346	31.8
	Sweet	72	6.6
	Hot	48	4.4
	Acid	578	53.1
	Mechanical	44	4.0
Technique used to detect and diagnose DH	Air flow	316	35.7
	Hot test	38	4.3
	Questioning	260	29.4
	Probing	142	16.1
	Percussion	128	14.5
Aware of differential DIAG of DH in comparison to other painful condition	Yes	280	39.0
	No	438	61.0
The hydro-dynamic theory is utmost believed theory explaining pain arising from DH	Yes	316	44.0
	No	402	56.0
Preventive measures advise patient to prevent DH	Avoid acidic diet	350	35.0
	Risk factor elimination	288	28.8
	Avoid frequent and or inadequate brushing	20	2.0
	Avoid brushing immediately after eating	16	1.6
	No preventive measure	326	32.6
Methods used to manage DH	Periodontal surgery	8	0.5
	Adhesives	654	43.0
	Varnish	294	19.3
	Topical application of fluoride	260	17.1
	Desensitizing Toothpaste	306	20.1
	Root canal	80	0.5
Patients respond to follow up visits after treatment	Yes	304	42.3
	No	414	57.7

Table 2 illustrate candidates' knowledge of DH. Only 37.6% of candidates read articles about DH during the past 3 years. Only 37.3% of candidates described DH correctly. 40.1% agreed that DH patient should be routinely asked about pain history. 88.6% of candidates encounter patients in practice complaining from DH less than 5 times per-week and 11.4% reported 5- 10 times per-week. 40.4% of candidates agreed that DH is considered a major issue affecting patient quality of life. Regarding stimulus triggers DH, 31.8%, 4.4% and 4.4% responded with cold, sweet and hot respectively (Figure 1). Technique used to detect and diagnose DH was reported correctly by 35.7% airflow and 16.1% probing. A 39% of candidates were able to differentiate the dentin hypersensitivity in comparison to other painful condition. A 44% knew that hydro-dynamic theory is the most believed theory clarifying the discomfort caused by DH. Only 28.8% of candidates reported risk of elimination as a preventive measure to advice patients to prevent DH. 17.1%, 20.1% and 19.3% responded correctly for management of DH by fluoride (topical application), desensitizing toothpaste, and varnish respectively (Figure 2).

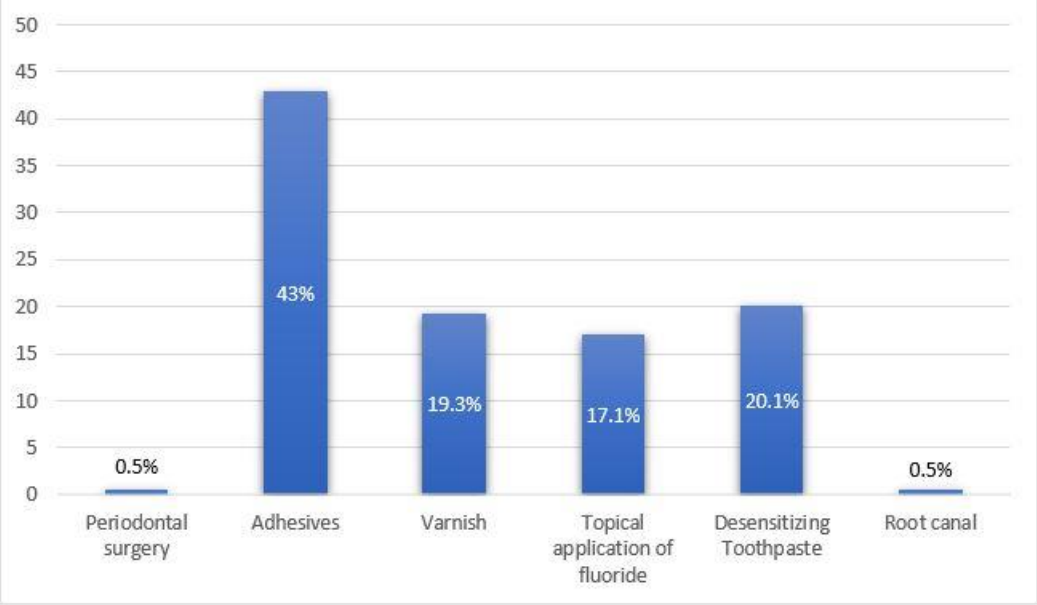

Figure 2 Knowledge of candidates about different treatment modalities of dentin hypersensitivity

There was a significant association between correct description of DH with workplace, younger age, male gender, years of experience, and dentist qualification (P= 0.01) (table 3).

Table 3 Association between correct description of DH with sociodemographic characters and other variables

		Describe DH		Total (N=718)	P value
		Correct answer	wrong answer		
Work place	Military Hospitals	0	42	42	0.001
		0.0%	9.3%	5.8%	
	MOH Hospitals	16	276	292	
		6.0%	61.3%	40.7%	
	Private Clinic	20	132	152	
		7.5%	29.3%	21.2%	
	University Hospitals	232	0	232	
		86.6%	0.0%	32.3%	
Gender	Male	252	348	600	0.001
		94.0%	77.3%	83.6%	
	Female	16	102	118	
		6.0%	22.7%	16.4%	

Location	Central region	236	82	318	0.001
		88.1%	18.2%	44.3%	
	East region	8	28	36	
		3.0%	6.2%	5.0%	
	North region	0	206	206	
		0.0%	45.8%	28.7%	
	South region	4	58	62	
		1.5%	12.9%	8.6%	
	West region	20	76	96	
		7.5%	16.9%	13.4%	
Age	24-35	244	108	352	0.001
		91.0%	24.0%	49.0%	
	36-45	24	342	366	
		9.0%	76.0%	51.0%	
Years of Experience	1-3	16	92	108	0.001
		6.0%	20.4%	15.0%	
	4-6	8	290	298	
		3.0%	64.4%	41.5%	
	7-9	240	68	308	
		89.6%	15.1%	42.9%	
	>9	4	0	4	
		1.5%	0.0%	0.6%	
Dentist Qualification	Consultant	0	20	20	0.001
		0.0%	4.4%	2.8%	
	General Practitioner	16	362	378	
		6.0%	80.4%	52.6%	
	Resident	228	0	228	
		85.1%	0.0%	31.8%	
	Specialist	24	68	92	
		9.0%	15.1%	12.8%	

4. DISCUSSION

Dentin Hypersensitivity affects a large scale of the grownup population. Many articles found a wide range of prevalence for DH (Splieth & Tachou, 2013). DH is thought to affect more than forty percent of the population in the world, with prevalence reaching 90% in some populations. This wide variation in prevalence has been attributed to a variety of factors, including variances in the approaches used to diagnose the condition, in the type of sample population, and differences in the consumption of foods and beverages (Sood et al., 2016). Teeth hypersensitivities can impair the person's quality of life causing difficulties in the usual habits and affect the ability to remove plaque, which jeopardizing the oral hygiene. Dentists must therefore understand DH in order to properly diagnose and treat it (Baniasadi et al., 2021). The objective of this essay is to measure the dental practitioner knowledge of DH, as well as its diagnosis and treatment.

The dentine hyper sensitivity was defined as: An acute pain sharp and short once as a result of exposed dentine affected by thermal, evaporative, tactile, osmotic, or chemical stimulus that not related to any other dental disease (Miglani et al., 2010). In our study, only 37.3 percent of candidates described DH correctly. This was lower than a previous study whish reported that 85.4 percent described it as the most frequent mechanism that triggered acute pain from a tooth (Izhar et al., 2019). Another study aligned with Izhar et al. result's, it was steady with the results of (92.8 percent) in Nigeria (Oderinu et al., 2017) . In addition, (Benoist et al., 2014) found that 83% of dentists responded to a description of DH pain. However, a similar study initiated that,

while the majority of dentists correctly described the condition, more than 1/2 also designated its indicators as pulpal inflammation pain.

According to our findings, 44 percent of those polled were aware that hydro-dynamic theory is of the utmost beliefs for clarifying the pain caused by DH. This was under than reported in a paper, where 66.7 percent of respondents agreed that the most universally acknowledged explanation for DH suffering is the hydro-dynamic theory (Miglani et al., 2010). The Journal of Canadian Dental Association at 2003 stated that; only 17 percent of dentists identified the hydro-dynamic theory as the most believed rout of pain for DH. In disparity to the widely held beliefs by Brännström (Brännström & Åström, 1964). According to the hydro-dynamic theory, dentinal fluid is affected by altered temperatures or other stimulation near the exposed surface of tubules that transmitted to the odontoblasts close the pulp therefore explains the mechanism of pain in dentin hyper sensitivity (Liu et al., 2020; West et al., 2013). The definite diagnosis of dentine hyper sensitivity cannot be made unless all other causes of dental pain should be ruled out. A basic scientific approach for diagnosing DH entails evaluating the whole area of discomfort using a sprinkling of air or the explore of uncovered dentin (Sampat, 2019).

In our study, technique used to detect and diagnose DH was reported correctly by 35.7% airflow and 16.1% probing. 39% of candidates were aware of finding the dentin hyper sensitivity in comparison to other painful condition. Only two dental practitioners used the electric pulp tester in the study (Izhar et al., 2019). Similarly, to study held in USA; dentists accuse the DH by the patient report after their clinical test using air (Costa et al., 2014). An additional experiment conducted in the United States found that the mainstream of practitioners relied on patients' reports to diagnose DH (Cunha-Cruz et al., 2010). Mechanical stimuli were used by 68% of dentists in Senegal to diagnose DH pain (Benoist et al., 2014). According Oderinu et al., (2017); there were a maximum stimulated pain raised from scrabbling the tooth (73.4 percent), administering an air flow (93.3 percent), or applying any liquid onto the affected tooth (73 percent).

The utmost treatment of dentine hyper sensitivity is application of fluoride that constantly used. Diet and toothbrushing observations or advice were frequently regarded as the least successful (Kopycka-Kedzierawski et al., 2017). In this experiment we found that 17.1 percent, 20.1 percent, and 19.3 percent of people correctly responded to DH treatment with topical fluoride, desensitising toothpaste, and varnish, respectively. A previous study reported that; the toothpaste that contain fluoride and potassium nitrate was widely used to treat DH (Izhar et al., 2019). These findings were conveyed in other similar studies (Amarasena et al., 2010; Cunha-Cruz et al., 2010; Gillam et al., 2002).

According to an experiment held in India, most common management to prescribe desensitising agents for home use (Pereira et al., 2018). Recently, As a first line of management for DH, dentists in the UK prescribed sensitivity toothpastes and desensitizers (Clark & Levin, 2018). It was also discovered that using fluoride toothpaste increased patients' satisfaction with their DH treatment (Heft et al., 2018). Furthermore, there were striking similarities among dental practitioners' preferences for DH management (Kopycka-Kedzierawski et al., 2017). As shown in Nigerian research, over 80% of dentists implemented a standard management protocol, which included identifying etiological and predisposing variables. One-third of those polled said they would treat a hypersensitive tooth with a root canal therapy (Oderinu et al., 2017).

5. CONCLUSIONS

Saudi dentists have the need to expand their knowledge about dentin hyper sensitivity. There was a clear correlation among correct description of DH with workplace, younger age, male gender, years of experience, and dentist qualification. However, contentious education about DH and their management can develop the care standard toward our patients.

Ethical approval

The research proposal was approved by the Ethical Committee of Human Research at the School of Dentistry-KAU, in Jeddah, Saudi Arabia with Ethical approval number (019-0122).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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