

# Observations on dentine hypersensitivity in general dental practices in the United Arab Emirates

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## ABSTRACT

Dentine hypersensitivity is a common clinical finding with a wide variation in prevalence values and etiological factors. The objective of this cross-sectional study was to investigate the prevalence and some etiological factors of dentine hypersensitivity of Emirati patients visiting general dental clinics in the United Arab Emirates (UAE) over a period of three calendar months. **Materials and Methods:** Six general dental practitioners examined 204 Emirati patients over a period of three calendar months and patients who had dentine hypersensitivity diagnosed were questioned further about their smoking habits and the frequency, severity, and duration of their pain. Furthermore, cervical tooth surface loss was noted. **Results:** A total of 55 patients were diagnosed as having dentine hypersensitivity, giving a prevalence figure of 27%. The most common teeth affected were the lower anterior teeth. **Conclusions:** The prevalence of dentine hypersensitivity in Emirati patients visiting a general dental clinic in the UAE was 27%. The most common etiology appeared to be the loss of cervical tooth surface structure.

**Key words:** Dental pain, dentine hypersensitivity, etiology of dentine hypersensitivity, smoking habits

## INTRODUCTION

Dentine hypersensitivity also known as root sensitivity has been defined as “a short, sharp pain arising from exposed dentine, in response to stimuli, typically thermal, evaporative, tactile, osmotic or chemical, and which cannot be ascribed to any other form of dental defect or pathology.”<sup>[1,2]</sup> Other terms that have been used to describe this condition include dentine sensitivity, root sensitivity, cervical sensitivity, and hypersensitivity. All of these terms have one thing in common; however, they are all interpreted as pain.

Dentine hypersensitivity is a common problem found in many adult populations with prevalence figures reported to range between 4% and 67.7%.<sup>[2]</sup>

This wide variation in prevalence may be due to a number of factors, including the population studied,

and/or the methodology used (e.g., questionnaire vs. clinical examination). Patient questionnaire based surveys are thought to overstate true prevalence.<sup>[3]</sup> The majority of the previous investigations of dentine hypersensitivity [Table 1] have included subspecialty referral populations and have been carried out mostly on non-Arab populations.<sup>[3-16]</sup>

The objective of this cross-sectional study was to investigate the prevalence and explore factors that may pre-dispose Emirati patients visiting general dental clinics in the United Arab Emirates (UAE) to dentine hypersensitivity.

## MATERIALS AND METHODS

Six general dental practitioners with at least 6 years of practical experience were recruited to participate in this study randomly and all of the participants

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**Table 1: Dentinal hypersensitivity epidemiological studies**

Authors	Country	Setting	Study type	n	Prevalence (%)
Jensen (1964) <sup>[4]</sup>	USA	University	Clinical	3000	30
Flynn <i>et al.</i> (1985) <sup>[6]</sup>	Switzerland	Practice	Clinical	351	15
Orchardson and Collins (1987) <sup>[7]</sup>	UK	University	Clinical	369	18
Fischer <i>et al.</i> (1992) <sup>[8]</sup>	UK	University	Clinical	109	74
Murray and Roberts (1994) <sup>[9]</sup>	Brazil	University	Clinical	635	17
Murray and Roberts (1994) <sup>[9]</sup>	Indonesia	Not stated	Questionnaire	1000	27
Murray and Roberts (1994) <sup>[9]</sup>	USA	Not stated	Questionnaire	1000	18
Murray and Roberts (1994) <sup>[9]</sup>	Japan	Not stated	Questionnaire	1000	16
Murray and Roberts (1994) <sup>[9]</sup>	France	Not stated	Questionnaire	1000	14
Murray and Roberts (1994) <sup>[9]</sup>	Germany	Not stated	Questionnaire	1000	13
Chen <i>et al.</i> (1994)*	Australia	Not stated	Questionnaire	1000	13
Chabanski <i>et al.</i> (1997) <sup>[11]</sup>	USA	University	Clinical	184	50
Irwin and McCusker (1997) <sup>[12]</sup>	UK	University	Clinical	51	73
Liu, Lan and Hsieh (1998) <sup>[13]</sup>	UK	Practice	Questionnaire	250	57
Ress (2000) <sup>[3]</sup>	Taiwan	University	Clinical	780	32
Tanni and Twartani (2002) <sup>[14]</sup>	UK	Practice	Clinical	3593	4
Clayton <i>et al.</i> (2002) <sup>[15]</sup>	Saudi Arabia	University	Clinical	295	42-60
Ress and Addy (2002) <sup>[16]</sup>	UK	Air force	Questionnaire	228	50
Ress <i>et al.</i> (2003) <sup>[17]</sup>	UK	Practice	Clinical	4841	4,1

\*As cited in Ress<sup>[3]</sup>

completed the study. The study ran from November 1/2008 to January 31/2009. Prior to the start of the study, the practitioners met with the author to finalize details of the study protocol. The study protocol emphasized that in order to make the diagnosis of dentine hypersensitivity, other pathologies, such as caries, enamel cracks, and restored teeth must be ruled out. To be considered for the study, the patients had to be Emirati be new patients to the practice or pre-existing patients presenting with a new complaint. The patients were given information about dentine hypersensitivity and all of the patients seen by each dentist during the trial period were screened for sensitive teeth prior to completion of the questionnaire related to dentine hypersensitivity. If the patient then recorded a positive response on the questionnaire, the diagnosis of dentine hypersensitivity was confirmed using a blast of air from a triple syringe. Tactile sensitivity using a probe applied to the cervical region was not assessed as it has been reported that there is no difference in the subjective response to tactile and evaporative stimuli in the detection of dentine hypersensitivity.<sup>[10]</sup> Where a diagnosis of dentine hypersensitivity was made, a study form was completed. This form included details of the patient's age, gender, occupation, and smoking habits. Furthermore, included was the history of dentine hypersensitivity, such as the teeth affected and the frequency, severity, and the duration of the complaint. Details regarding any previous treatment and any factors thought to have initiated the sensitivity were sought. In addition to this, the clinicians were

asked to measure any buccal gingival recession associated with these sensitive teeth. Measurements were made using a 1 mm graduated periodontal probe from the amelocemental junction to the free gingival margin. The participating dentists were also asked to record the total number of patients seen during the trial period and the methods that the dentists employed to manage the sensitivity.

The relationship between dentine hypersensitivity and social class was examined using the Registrar General's Classification of Occupations as used by Bradnock *et al.* in the UK Adult Dental Health Survey.<sup>[17]</sup> This divides occupations into a series of six groups using the following classifications:

- I: Professional (e.g., doctor, dentist, lawyer)
- II: Managerial and lower professional (e.g., manager, nurse, school teacher)
- IIIN: Skilled, non-manual (e.g., clerk, cashier)
- IIIM: Skilled, manual (e.g., carpenter, bricklayer, coal face worker)
- IV: Semi-skilled, manual (e.g., postman, agricultural worker)
- V: Unskilled, manual (e.g., porter, ticket collector, general laborer).<sup>[17]</sup>

## RESULTS

Two hundred and four Emirati patients were seen by the six general dental practitioners who were involved in the study (128 male patients and 76 female

patients). A total of 55 patients were diagnosed as having dentine hypersensitivity, giving an overall prevalence figure for dentine hypersensitivity of 27%. Nearly, 29% of the male patients in this study were found to have hypersensitivity, versus 22% of the female patients examined [Table 2].

A histogram showing the age distribution of the patients with hypersensitive dentine is given in Figure 1. This figure makes it clear that the highest numbers of patients with dentine hypersensitivity were in the age range of 20-29 years.

The distribution by tooth type is given in Figure 2 and shows that the lower anterior teeth were most commonly affected by dentine hypersensitivity.

The mean number of sensitive teeth per patient by age group is given in Figure 3. This demonstrates that the number of sensitive teeth in this sample peaked at 8.2 in the 50-59 year age group.

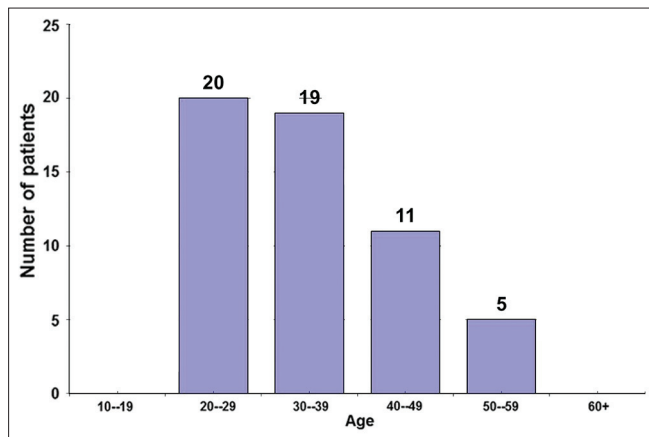


Figure 1: The age distribution of patients with hypersensitive teeth

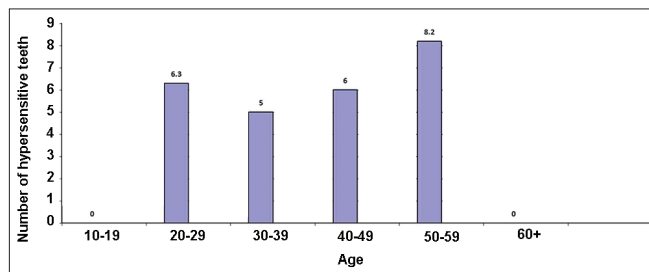


Figure 3: The mean number of hypersensitive teeth per patient

Figure 4 shows the relationship between dentine hypersensitivity and smoking, and the distribution of dentine hypersensitivity between male and female smokers and non-smokers. The difference between the smokers and non-smokers was 5%.

This study found that in 68% of cases, the etiology of dentine hypersensitivity was due to the loss of cervical tooth surface structure (abrasion, attrition, erosion, and abfraction). The study also found that 15% of patients with sensitive teeth suffer from gingival recession.

Sixty four percent of the patients with hypersensitive teeth reported experiencing pain “occasionally” in response to stimuli such as cold or hot drinks. Only 2% reported having pain “all the time,” while 34% encountered pain “most of the time”. When

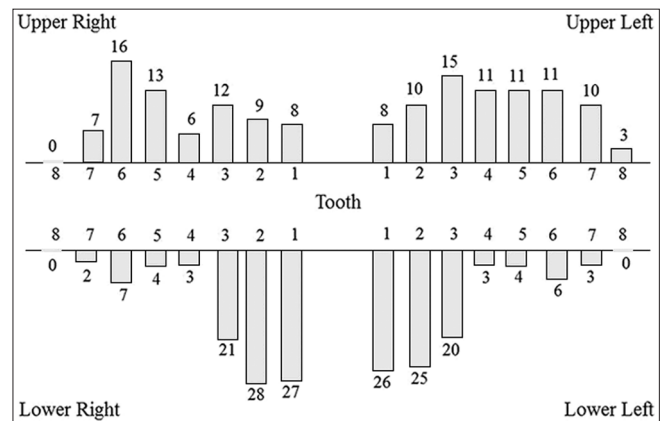


Figure 2: Frequency of dentine hypersensitivity by tooth type and quadrant

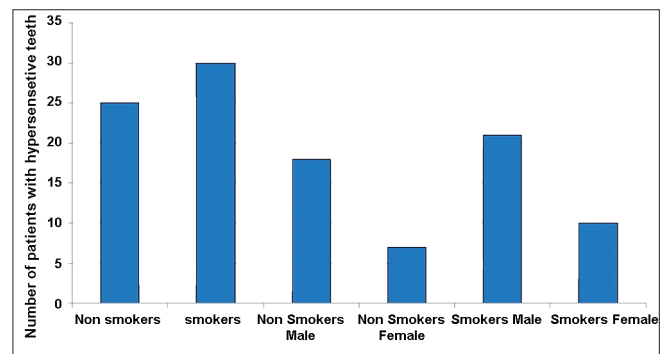


Figure 4: The frequency of hypersensitivity for male and females according to smoking habit

Sex	N	Hypersensitivity absent	Hypersensitivity present	Nonsmoker patients with hypersensitivity N	Smoker patients with hypersensitivity N	Hypersensitivity (%)
Male	128	90	38	18	21	69
Female	76	59	17	7	10	31
Total	204	149	55	25	30	27

those patients were asked about the severity of hypersensitivity, 59% had a “slight to moderate concern” while only 11% had a “severe concern”. Approximately, 36% of the patients reported that they “never” avoided the sensitive area while 57% claimed that they avoided it “sometimes”.

Approximately, 14% of the patients claimed that dentine hypersensitivity was present for “1-6 days,” while 34% reported duration of “1-4 weeks.” Approximately, 41% stated that their discomfort lasted for “1-12 months,” while 11% claimed that it had lasted more than “1 year” [Table 3].

About 34% of the patients had received professional treatment for their hypersensitive teeth, and 55% reported using desensitizing dentifrice.

Figure 5 shows the relationship between dentine hypersensitivity and social class. It was found that of the patients with sensitivity, 71% could be classified into the first three groups I, II and IIIN.

## DISCUSSION

We found that the prevalence of dentine hypersensitivity among a sample of Emirati patients attending six general dental clinics in the UAE was 27%. However, in comparing these results to those of other studies, caution is needed.

Firstly, some of the previous investigations have used patient questionnaires alone to assess prevalence. This methodology is likely to overestimate the prevalence of dentine hypersensitivity as the sensitivity reported might be due to other pathologies such as caries or cracked cusps, which could easily be detected by clinical examination.<sup>[15]</sup> Secondly, the wide range of individual prevalence figures may suggest that any differences were due to factors related to individual examiners rather than their patients.

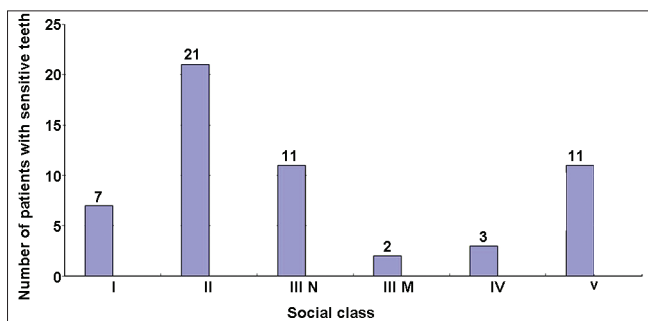


Figure 5: Patients with hypersensitive teeth classified by social class

Finally, variations are likely due to differences in the populations studied.<sup>[18]</sup>

Dentin is naturally sensitive owing to its close structural and functional relationship with the dental pulp.<sup>[19]</sup> This inherent sensitivity usually is not a problem because normally other tissues cover the dentin.

Dentinal pain is thought to be mediated by a hydrodynamic mechanism. According to this hypothesis, a pain-provoking stimulus applied to dentin increases the flow of dentinal tubular fluid. In turn, this mechanically activates the nerves situated at the inner ends of the tubules or in the

**Table 3: Responses to the questionnaire and intraoral examinations in relation to dentine hypersensitivity**

The questionnaire	%
Etiology of DH	
Gingival recession	15
Erosion	16
Abrasion	27
Attrition	20
Abfraction	5
Bleaching	7
Periodontal therapy	5
Aging	2
Medication	0
Other	2
Frequency of DH	
Occasionally	64
Most of the time	34
All of the time	2
Severity of DH	
No concern	30
Slight to moderate concern	59
Severe concern	11
Avoidance of sensitive teeth	
Never	36
Some times	57
Most of the time	7
Duration of DH	
1-3 Day (s)	7
4-6 Days	7
1-4 week (s)	34
1-12 month (s)	41
>1 year	11
Professional treatment of DH	
Yes	44
No	66
Use of desensitizing dentifrice	
Yes	55
No	45

DH: Hypersensitivity

outer layers of the pulp.<sup>[18]</sup> Evidence suggests that patients complain from dentine hypersensitivity when dentine is exposed and the dentinal tubule system is open to the oral cavity. The process needed to localize lesions of dentine hypersensitivity includes loss of enamel and/or gingival recession. This has led some authors to suggest dentine hypersensitivity is a tooth wear phenomenon-while acknowledging that much remains unknown or unproven about the etiology of this condition.<sup>[20]</sup>

However; not all exposed dentin is sensitive. Sensitivity is thought to occur when the smear layer or tubular plugs are removed, opening the outer ends of dentinal tubules.<sup>[18]</sup> Microscopic examination reveals that patent dentinal tubules are more numerous and wider in hypersensitive dentin than in non-sensitive dentin.<sup>[16,21]</sup>

Several investigators have reported the age distribution of dentine hypersensitivity. Orchardson and Collins reported a peak prevalence between 20 years and 25 years;<sup>[7]</sup> Graf and Galasse between 25 years and 29 years;<sup>[5]</sup> Addy observed peak prevalence between 20 years and 40 years;<sup>[22]</sup> and Fischer *et al.* between 40 years and 49 years.<sup>[8]</sup> In our study, dentine hypersensitivity was the greatest in the 20-39 years age group, with a peak prevalence in the 20-29 years age group ( $n = 20$ ) and slightly lower in the 30-39 years age group ( $n = 19$ ).

This age distribution of dentine hypersensitivity appears to be in closest agreement with the data reported by Orchardson and Collins;<sup>[7]</sup> Graf and Galasse,<sup>[5]</sup> and Addy.<sup>[22]</sup>

The probable reason for the observed reduction in dentine hypersensitivity with increasing age of patients may be due to the laying down of secondary or tertiary dentine.<sup>[23]</sup> However, the high prevalence in younger age group patients may result from their cultural attitudes towards oral health and their home care habits, in addition to the increasing numbers of young patients who get restorative treatments or teeth whitening with vital bleaching techniques in the UAE. This may be similar to the findings reported by Haywood.<sup>[24]</sup> All of the teeth in this study exhibiting dentine hypersensitivity also had some degree of gingival recession. Most teeth had at least 1-3 mm of gingival recession ( $n = 15$ ), which is similar to the average recession of 2.5 mm reported by Addy *et al.* in their sample of sensitive teeth.<sup>[25]</sup>

The teeth most often affected by dentine hypersensitivity were the lower incisors, followed by the premolars, then the canines, and then the upper molars. This distribution is reminiscent of the reports of Rees *et al.*<sup>[16]</sup> Taani and Awartani studies,<sup>[13]</sup> but dissimilar to Rees and Addy,<sup>[15]</sup> and Rees,<sup>[3]</sup> and earlier studies that reported the upper premolars most affected. Since the lower incisors are the teeth most affected by calculus accumulation followed by non-surgical periodontal therapy and because of the esthetic impact of these teeth, the lower incisors are more likely to be retained, even when severely compromised.<sup>[26]</sup>

The mean number of sensitive teeth per patient peaked at about 8 in the 50-59 year group, which is higher than the values reported in several of the studies mentioned above.<sup>[2,27]</sup>

It has been hypothesized that dentine hypersensitivity might be more common among smokers, as they are more prone to gingival recession. However, the data from this study found no association between dentine hypersensitivity and smoking. A recent report by Müller *et al.* suggested that smokers are not at risk for gingival recession,<sup>[26]</sup> but other studies, including those of Al-Wahadni and Linden,<sup>[28]</sup> and Rees and Addy,<sup>[15]</sup> have found more gingival recession and sensitivity among smokers.

The previous studies (Fischer *et al.*<sup>[8]</sup> Orchardson and Collins;<sup>[7]</sup> Addy *et al.*<sup>[25]</sup> Flynn *et al.*<sup>[6]</sup> Cunha *et al.*<sup>[29]</sup> Oyama and Matsumoto;<sup>[30]</sup> Taani and Awartani;<sup>[31]</sup> Rees;<sup>[3]</sup> Rees and Addy,<sup>[15]</sup>) reported a higher incidence of dentine hypersensitivity in females than in males. In this study, the ratio of females to males with hypersensitivity was 1.3:1; this difference is not likely to be statistically significant.

About 11% of patients in the current study reported avoiding hypersensitive teeth most of the time. This figure is similar to that reported by Taani and Awartani.<sup>[31]</sup> Approximately, 34% of patients in this study were treated for dentine hypersensitivity by dentists, and 55% had tried treatment with desensitizing dentifrice. These figures are higher than those reported by Taani and Awartani,<sup>[31]</sup> Liu *et al.*<sup>[12]</sup> and Fischer *et al.*<sup>[8]</sup>

It is the author's clinical impression, supported by some data, (Absi *et al.*),<sup>[32]</sup> that dentine hypersensitivity is more prevalent among patients who have good oral hygiene practices as tends to be the case in higher socioeconomic groups. To investigate this further, the

patients with dentine hypersensitivity were divided into social groups using the Registrar General's Classification of Occupations as used in the recent UK Adult Dental Health Survey.<sup>[33,34]</sup> This demonstrated that dentine hypersensitivity was more prevalent in the higher social groups, with 71% of the sensitive teeth being found in the top three social groups I, II and IIIN. However, this data must also be interpreted with a certain amount of caution as sampling bias due to dental clinic attendance is very likely.

## CONCLUSIONS

The findings of the present study have revealed that the prevalence of dentine hypersensitivity in Emirati patients visiting a general dental clinic in the UAE was 27%. The prevalence of dentine hypersensitivity in this sample was high in the 3<sup>rd</sup> and 4<sup>th</sup> decades of age. On the same time, the prevalence of dentine hypersensitivity was more prevalent in the high social groups. Some differences in our findings when compared to other studies may reflect variations in study methodology as well as national differences in attitudes toward oral health and home care procedures. Improved patient education in dental hygiene and preventive measures might reduce these figures.

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