

# FREQUENCY OF DENTINE HYPERSENSITIVITY: A CROSS-SECTIONAL STUDY

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## ABSTRACT

*The aim of the present study was to find out the frequency and related factors of dentine hypersensitivity among patients seen at Ishrat-ul-Ebad Institute of Health Sciences, Karachi. The present cross sectional study was conducted from 15th February to 15th April 2016 at Periodontology Department. Three hundred-sixty patients were examined after taking written consent. Interview based questionnaire was used to investigate and diagnosis of dental hypersensitivity was made using air blast from triple syringe. SPSS version 16.0 (SPSS Inc Chicago, IL, USA) was used to analyze the data. Variable differences were analyzed using Chi- squared tests.  $P < 0.05$  was considered significant. One hundred thirty-one patients were found to have Dentine Hypersensitivity. It was more common in females with a male to female ratio of 1: 1.7. Age group of 25- 34 years had highest frequency and patients aged 55 years and above had the lowest frequency. Patients educated higher than 12th standard had the highest frequency. Lower incisors were most commonly affected followed by upper incisors and predominantly affected site was buccal surface. Cold was the most common stimulus. Patients who did not have any habit of smoking and betel nut chewers were more affected than smokers.*

**Key Words:** Dentine Hypersensitivity, Hospital Patients, Epidemiology, Frequency.

## INTRODUCTION

Dentine hypersensitivity is a very typical and common clinical presentation which can cause considerable discomfort to an individual.<sup>1,2</sup> Patients with periodontal disease usually encounter this painful condition due to exposure of root surface.<sup>3</sup> Dentine hypersensitivity may be defined as pain arising from exposed dentine typically in response to chemical, osmotic or thermal stimuli that cannot be explained from any other forms of dental pathologies.<sup>2</sup> Several mechanisms have been proposed as to the causes of DH but currently the most

widely accepted theory is Hydrodynamic theory (mechanism of displacement of dentinal fluid).<sup>4</sup> It has been reported that etiology of DH is multifactorial.<sup>3</sup> Gingival recession, pocket formation, abrasion, erosion, attrition, abfraction, overzealous tooth brushing and periodontal procedures are common possible causative factors which often result in the exposure of dentinal tubules and ultimately lead to DH.<sup>1</sup> There is no significant difference between subjective response to tactile stimulus by application of probe and evaporative stimulus in the detection of DH.<sup>5</sup>

Canadian Advisory Board stated that DH is a disease of exclusion.<sup>2</sup> The prevalence of DH varies worldwide, ranging from 1.37% to 98%.<sup>5-15</sup> Variations exist because of a number of reasons, including different study designs, the variation in consumption of the erosive drinks and foods, oral hygiene, brushing habits, diagnostic approaches and the type of setting where the study was performed.<sup>10</sup> Also the different types of stimuli to provoke DH and the sample size of the study affects the prevalence.<sup>16</sup> This variation may also be attributed to the difference in rural and urban population.<sup>9</sup> Also information about the availability of Asian sample is limited. Most researches show that DH is either misdiagnosed or under reported.<sup>10</sup>

The objective of the present cross sectional study was to estimate the frequency and associated factors

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of dentine hypersensitivity among patients who visited periodontology department of Dr Ishrat-ul-Ebad Khan Institute of Oral Health and Sciences, DUHS.

## METHODOLOGY

The Cross Sectional study was undertaken at the periodontology department of Dr Ishrat-ul-Ebad Khan Institute of Oral Health and Sciences from 15th February to 15th April 2016. Present study includes the person of age 14 and above. They were divided into five age groups. Patients below the age of 14 years were excluded because they had other reasons of DH. The sample size estimation was carried out using Openepi.com with 95% confidence interval, 5% margin of error and using most common tooth involved which is lower incisor i.e. 19.15% in a study of Rees et al<sup>10</sup>, the sample size calculated was 238 but patients included in the study were 360.

Interview based questionnaire was used to investigate the DH followed by clinical examination. Informed consent was signed by each patient. The questions related to age, education, occupation, smoking and oral hygiene were asked. Stimuli which initiate or provoke DH were also included in the Questionnaire. DH was diagnosed by using cold air blast, which acts as an evaporative stimulus from triple syringe or air water syringe of dental unit for 5 seconds from a distance of 5mm from tooth surface. Any buccal and lingual/palatal gingival recession present on sensitive teeth was also recorded by using 1mm graduated periodontal probe from cemento-enamel junction (CEJ) to free gingival margin.

Inclusion criteria consisted of all vital sound teeth. Exclusion criteria included carious, cracked or restored teeth, abutment teeth used for removable or fixed prosthesis and tooth with any other dental pathology. Patients using analgesics, mood alteration medications, tooth whitening agents in the last six months or undergoing orthodontic therapy were also excluded. SPSS version 16.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Descriptive statistics were obtained and frequency was calculated. Association was observed between DH and different variables by using Chi-square test. At least 95% level of significance ( $P < 0.05$ ) was considered significant.

## RESULTS

Three hundred sixty patients were examined during the study and 131 (36.4%) were found suffering from dentine hypersensitivity. Details of the results can be seen from Fig 1-4 and Table 1-2.

## DISCUSSION

The present study found the frequency of 36.4% among patients attending the Periodontology Department of Dr Ishrat-ul-Ebad Khan Institute of Oral Health and Sciences (DIEKIOHS) in Dow University of Health and Sciences (DUHS). The results are closer to those found in studies which were conducted in Taiwan<sup>17</sup>

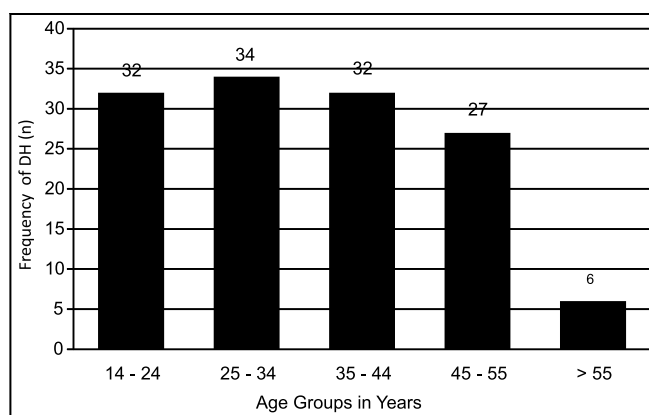


Fig 1: Frequency of dentine hypersensitivity in different age groups

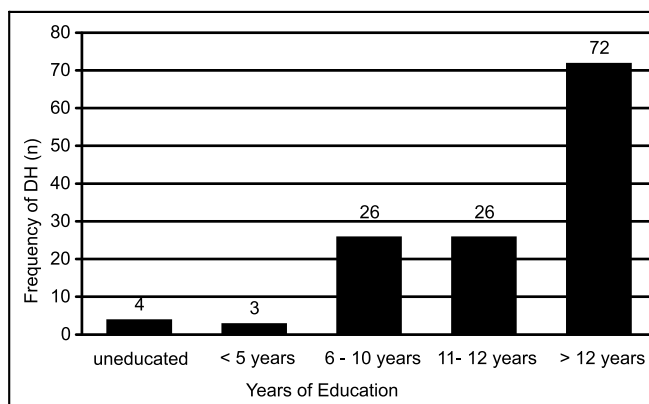


Fig 2: Frequency of DH in different education groups

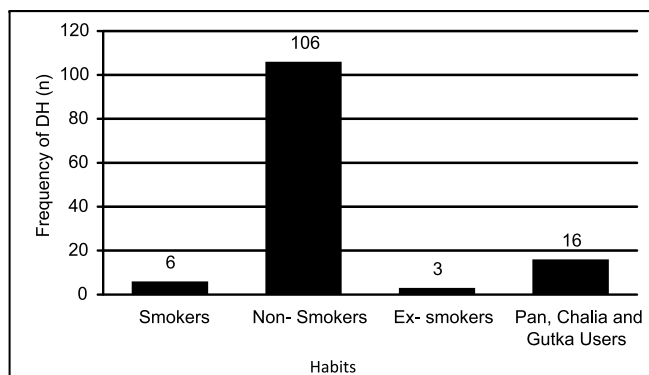


Fig 3: Frequency of DH according to habits

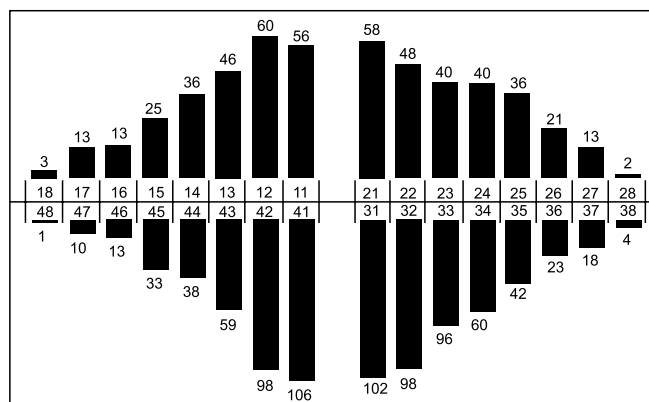


Fig 4: Frequency of DH according to Tooth Type

TABLE 1: FREQUENCY OF DH AMONG MALES AND FEMALES

Demographic		Frequency (N = 131)	Percentage
Gender	Male	48	36.64
	Female	83	63.36

TABLE 2: FREQUENCY OF DH RELATED TO DIFFERENT STIMULI

		Frequency (N = 131)	Percentage
Stimuli	Hot	9	6.87
	Cold	93	70.99
	Sweet	4	3.05
	Cold + Sweet	4	3.05
	Cold + Hot	9	6.87
	Cold + Hot + Sweet	7	5.34
	Cold + Sweet + Sour	2	1.52
	All + Air	3	2.29
	Cold + Sweet + Sour	2	1.52

(32%), Thailand<sup>18</sup> (30.7%), China<sup>6</sup> (34.1%) and Greece<sup>16</sup> (21.3%-38.6%). This similarity to the findings in the present study may be attributed to similar methodology and study designs. In contrast, this value is greater than some studies conducted in Australia<sup>19</sup> (9.1%), Turkey<sup>20</sup> (5.3%), UK general dental practice<sup>21</sup> (2.8%), UAE<sup>12</sup> (27%) and Northwest United States<sup>14</sup> (12.3%). Whereas some studies show higher frequency of DH such as in India<sup>11,22</sup> (55% and 42.5%), Nigeria<sup>15,23</sup> (52.8% and 63.3%). A study conducted in hospital based setup in Hong Kong showed DH frequency as high as 68.4%.<sup>10</sup> These higher values are due to neglected oral health in these countries. This should be kept in mind that patients in developing countries do not have awareness about DH and they usually resort to avoiding the stimulus rather than seeking treatment.<sup>9</sup>

It was previously reported in a study that patients usually apply local remedies for their medical and dental treatment instead of going to professionals for proper treatment.<sup>5</sup> High frequency was reported in studies which were carried out in periodontal specialist clinics because they are more equipped for diagnosing and treating the condition.<sup>5,10</sup> The frequency figure of present study should be further evaluated and further research should be done to find out further factors that contribute to dentine hypersensitivity in Pakistani population.

In present study, frequency was significantly higher in female patients (63.3%) Table 1. This finding is similar to majority of studies carried out in different setups.<sup>6,8-10,13-15,19,20</sup> However in few studies, males had higher frequency of dentine hypersensitivity.<sup>11,12,22</sup> The reason female patients had a higher frequency of DH may have been due to their decision to seek treatment rather than neglecting the condition.<sup>24,25</sup> This gender difference may be attributed to greater level of oral health awareness among female population.

Different previous studies reported peak frequency values of DH at ages 50- 59 years<sup>9</sup>, 40- 50 years<sup>10</sup>, 40- 49 years<sup>20</sup>, 30-49 years<sup>19</sup>, 18- 27 years.<sup>11</sup> In present study, frequency is common in age group of 25-34 years old (26%), followed by 35-44 years (24.4%), and 15-24 years (23.7%). These findings are somewhat similar to the findings to many other studies. This trend in the present study may be due to consumption of erosive carbonated drinks.<sup>12,14,18</sup> As seen in Fig 1, frequency of DH rises up to 25-34 years of age and then gradually declines. This decline with age may be due to formation of secondary and tertiary dentine and presence of restorations, that places older patients in the exclusion criteria.

It has been noted in the present study that patients educated higher than 12th standard had highest frequency of DH, which was 55%. It was followed by patients having 6th to 10th standard (19.8%) and 11th to 12th standard education (19.8%). The least group affected with DH included patients having education up to 5th (2.3%) standard and uneducated (3.1%) (Fig 2). This difference may have been due to less awareness of oral hygiene among the last two groups and more attention to their oral hygiene among educated people.<sup>26</sup>

In present study, non-smokers high frequency of dentine hypersensitivity as compared to smokers and ex-smokers (Fig 3). This finding was similar to the study conducted in Hong Kong.<sup>10,12</sup> Previously it was assumed that dentine hypersensitivity might be more common among smokers based on the reason that smoking exacerbates the effects of periodontal destruction.<sup>11</sup> However, present study does not find any significant correlation of dentine hypersensitivity with smoking. The present study is contrary to the findings of other studies in which DH and gingival recession are more common in Smokers.<sup>27</sup>

Cold stimulus is the most common initiating and aggravating stimulus (71%) for dentine hypersensitivity (Table 2). This finding is in accordance with many other studies.<sup>5,8-11,13</sup>

Based on the clinical examination, lower incisors were the most common teeth with DH (31.88%) followed by upper incisors (17.52%) (Fig 4). This finding in current study is similar to the studies which were conducted in university hospital settings.<sup>9,10,12,15</sup> However, different previous studies found that the most common affected teeth were premolars and molars.<sup>9,11</sup> One study shows that lower incisor being the least sensitive tooth.<sup>21</sup> The higher frequency in incisors is due to the reason

that these teeth show greater gingival recession and longevity in the oral cavity.

## CONCLUSION

In present study frequency of dentine hypersensitivity was 36.4%. It was significantly higher in females and in the age group of 25-34 years. Lower incisors were most commonly affected and cold was the most common stimulus.

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## CONTRIBUTIONS BY AUTHORS

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|--------------------------------|--|
| <b>1 Ather Akber:</b>          | Execution and generation of idea, manuscript drafting, data collection and analysis, Principle Author. |
| <b>2 Nadya Sultan Ali:</b>     | Helped in literature search, Supervised the Research.  |
| <b>3 Sumaiya Shabbir:</b>      | Helped in title selection and literature review.   |
| <b>4 Umair Wahid:</b>          | Helped in discussion and revision.   |
| <b>5 Waqas Ahmed Farooqui:</b> | Helped in statistical work and designing of tables.  |