

Frequency of various intensities of dentine hypersensitivity versus good and bad oral hygiene practices within Pakistani population

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Abstract

Background: Dentine sensitivity presents as short, sharp pain due to exposed dentine. To keep ourselves abreast with the challenging situation of increasing prevalence of dentine sensitivity within the country, this research was conducted to devise a better management strategy. The aim of this study was to evaluate the frequency and intensity of dentine sensitivity within patients reporting in Outpatient department (OPD) and to correlate good versus bad practices of dentine sensitivity patients with dentine sensitivity frequency.

Methods: A questionnaire based cross sectional study was carried out in three dental institutes of Lahore, Pakistan over a period of four months. A sample size of 300 individuals was selected by non-probability convenient sampling technique. Information collected included demographic data, participant's oral hygiene practices and intensity of dentine sensitivity in them. A numeric rating scale was used to record the degree of dentine sensitivity and descriptive statistics were presented as frequency and percentage.

Results: 210 out of 300 patients reported dentine sensitivity (70%). Only 1/4th patients were highly qualified. 60% individuals were from low income group. 51% reported intensity as mild, 34% as moderate and 15% as severe sensitivity. Most common triggering factor was cold (36%). Good practices resulted in reduction in sensitivity.

Conclusion: According to results, high frequency of dentine sensitivity is observed. More awareness needs to be created about factors leading to sensitivity focusing more on dietary patterns that cause erosive wear of enamel and reduction in aggressive brushing and parafunctional habits.

Keywords: Dentine sensitivity, Dietary habits, Frequency, Oral hygiene, Tooth erosion

Citation: Shakoor A, Rana SS, Khan AS, Raja HZ, Saleem MN, Munir N. Frequency of various intensities of dentine hypersensitivity versus good and bad oral hygiene practices within Pakistani population. *J Oral Health Oral Epidemiol.* 2022;11(3):164-168. doi:10.34172/johoe.2022.07

Received: May 2, 2021, **Accepted:** February 7, 2022, **ePublished:** October 4, 2022

Introduction

The phenomenon known as dentine hypersensitivity (DH) or dentine sensitivity (DS) is one of the more frequently observed conditions in adults presenting to the dental clinic.^{1,2} The terms dentine hypersensitivity or dentine sensitivity have been used interchangeably to describe the same clinical condition.^{1,3} It presents as

episodes of shooting pain over a brief duration arising due to the exposure of the dentine.^{1,3,4} Dentine can be exposed to internal or external stimuli (thermal, tactile, osmotic, or chemical).^{1,3,5,6} The prevalence of dentine sensitivity has been observed to be higher among people within the age range of 20 to 50,^{5,7-9} with higher prevalence among females.²



Sensitivity can lead to physical and psychological problems.⁵ It is deleterious to general well-being due to the discomfort it causes, and it can result from the individual's dietary choices and poor oral hygiene maintenance.^{10,11} Several etiological causes for dentine sensitivity have been identified.^{1,12} Tubules can be exposed as a result of enamel loss from tooth wear, i.e., attrition, abrasion, erosion, abfraction, and parafunctional habits like bruxism.^{1,2,5,13} Gingival recession and loss of cementum from root surfaces as a result of periodontal treatment (scaling and root planning) and aggressive and incorrect tooth brushing techniques contribute to dentine exposure and, consequently, sensitivity.^{1,3,14,15} Reports have shown that 70% of people suffering from dentine sensitivity brush more than twice daily.¹ An acid-rich diet, hard or gritty food items, occupational exposure to acids,^{1,15,16} and gastroesophageal reflux disease have also been associated with dental erosion and dentine sensitivity.^{1,17}

Dentine sensitivity can be investigated by obtaining information via a questionnaire or clinical examination, observing patient's reaction to a stimulus, or ruling out other dental ailments.¹⁴ The multifactorial etiology interferes with accurate diagnosis and treatment of this condition.^{3,14}

Due to the increased consumption of acidic beverages and increased stress levels in the Pakistani population, it seems necessary to investigate the prevalence of dentine sensitivity in Pakistan. Different localities show variations in frequency and etiology. The prevalence varies over a wide range from 1.3% to 92%.¹ Studies conducted in Pakistan have revealed a 22% prevalence in Lahore and a 36.4% prevalence in Karachi.^{7,8} To address the increasing prevalence of dentine sensitivity in the country, this research was conducted to devise a better management strategy. Therefore, this study aimed to evaluate the prevalence and intensity of dentine sensitivity among patients referring to an outpatient department (OPD) and to correlate good versus bad practices of dentine sensitivity patients with dentine sensitivity frequency.

Methods

This questionnaire-based cross-sectional study was conducted in three dental institutes/colleges in Lahore, Pakistan, over four months. The study protocol was approved by the Ethics Review Board of the Institute of Dentistry, CMH Lahore Medical College (reference number 526/ERC/CMH LMC, dated 11th December 2020). Informed consent was acquired from all the study participants at the beginning of the questionnaire. A sample size of 300 individuals aged 18 years and above was selected from December 2020 to March 2021 through non-probability convenient sampling. The study conformed with STROBE guidelines for cross-sectional studies.¹⁸

Healthy adult patients with at least 20 teeth in the oral

cavity were included. Any patient who was mentally compromised or had received tooth whitening, bleaching, or orthodontic treatment or trauma during the previous six months was excluded from the study. Data were mostly collected using a pre-existing questionnaire,^{2,8,11} but its content and construct validity were verified by five senior faculty members of various institutions, to confirm the validity of the A pilot survey was conducted among 20 patients, and with a kappa of 0.83, the inter-examiner agreement was excellent. The sample size was calculated using OpenEpiTM 2.11 with 95% confidence and a 5% of margin of error.^{2,11}

The purpose of the study was explained, and informed consent was acquired at the beginning of the questionnaire. The questionnaire was in English and Urdu. For illiterate patients, the questions were orally asked and the answers were entered into the questionnaire. The first component (Section I) collected demographic information, the second section (Section II) included questions about participant's oral hygiene practices, i.e., frequency of tooth brushing and parafunctional habits, the frequency of triggering by stimuli, and the intensity of dentine sensitivity in.^{2,8,11} The questionnaire was revalidated by five senior faculty members of different dental colleges, consisting of professors and associate professors. The experts were requested to assess all items of the questionnaire considering relevance, content, language, and cultural acceptance for Pakistani dentists. The forms from all faculty members were collected, and their responses were analyzed. Cronbach's alpha value was found to be 0.865, which showed the internal reliability of the questionnaire. Some minor corrections were suggested in the language of a few items in order to use the locally popular words.¹¹

A numeric rating scale was used to record the degree of dentine sensitivity,¹⁹ and the degree of dentine hypersensitivity was recorded manually by the interviewer in the attached data collection form. The remedies utilized for dentine hypersensitivity by the patients were also added to the data collection form. The scale consists of 11 numbered items that are arranged in ascending order from 0 to 10, where 0 means no pain and ten, the most severe pain. The participant marked the number that represented their self-assessed dentine sensitivity pain.¹⁹ The scoring of practice ranged from 0-3, with 0 showing no items of good practice and 3 meaning that the patient had all the three good practices, i.e., brushing twice daily, non-aggressive brushing, and opting for management strategies.¹⁹

Good and bad practices were assessed according to Q1, 2, 5, and 8, described in Table 1. Each aspect of good practice was marked as 1, and those of bad practices were marked as 0.^{2,11}

All collected data were entered and analyzed using the Statistical Package for the Social Sciences, version 23.0

Table 1. Description of the questionnaire for good and bad practices related to dentine sensitivity

Good practices	
Q1: How often do you brush your teeth every day?	<ul style="list-style-type: none"> Twice Three times
Q2: Is your brushing technique aggressive?	<ul style="list-style-type: none"> NO
Q8: What do you prefer to do when it occurs?	<ul style="list-style-type: none"> Visit a dentist Use a desensitizing tooth paste Avoid eating food that causes it
Bad practices	
Q1: How often do you brush your teeth every day?	<ul style="list-style-type: none"> Not at all Once More than three times
Q2: Is your brushing technique aggressive?	<ul style="list-style-type: none"> Yes
Q5: What, in your opinion, might be the cause?	<ul style="list-style-type: none"> Unknown to you Accidental chipping / fracture of tooth Bruxism (grinding of teeth) Nail biting Gum recession Recent dental procedure
Q8: What do you prefer to do when it occurs?	<ul style="list-style-type: none"> Using Manjan Using Maswak Nothing

(IBM Corporation, Chicago, Illinois, USA). Descriptive statistics were used to summarize the responses to the questionnaire, with the results presented as frequencies and percentages. At least 95% level of significance ($P \leq 0.05$) was considered statistically significant using a chi-square test to examine the associated factors.

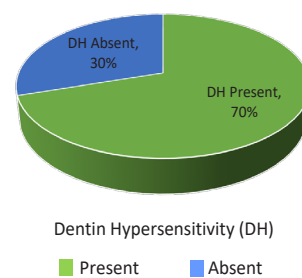
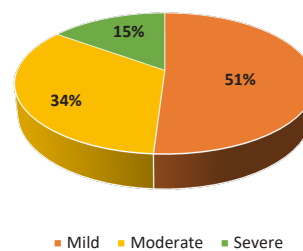
Results

The total number of participants in the study was 300 (150 from private and 150 from public sector/colleges). Two hundred and ten individuals reported hypersensitivity of teeth and the other 90 participants did not complain about any sensitivity; therefore, the frequency of dentine sensitivity was 70%, as shown in [Figure 1](#).

The demographic characteristics of the study showed that out of 210 patients, 90 (43%) were females and 120 (57%) were males, with an average age of 35 ± 11.6 . The prevalence of dentine hypersensitivity in males was significantly higher than in females ($P < 0.001$). A quarter of the patients (26%) were highly qualified, i.e., educated professionals like doctors, dentists, pharmacists, engineers, and teachers. The most prominent income group reporting dentine sensitivity was the low-income group of 125 out of 210 individuals (60%). The intensity of dentine sensitivity was categorized into mild, moderate, and severe. Out of the 210 individuals, 107 (51%) reported mild, 72 (34%) moderate, and 31 (15%) reported severe sensitivity, as shown in [Figure 2](#).

Among the causes of dentine sensitivity, as shown in [Figure 3](#), gum recession was the most common cause of sensitivity.

The most prevailing factor that triggered dentine

**Figure 1.** Frequency of dentine sensitivity in patients reporting in public and Private sectors/hospitals**Figure 2.** Intensity of Sensitivity

sensitivity was cold, reported by 76 participants (36%), followed by heat and cold in 62 (30%) ([Figure 4](#)).

More than half of the patients (56%) brushed their teeth once daily. The data shows that as the practice score increases from 0 to 2, the intensity (frequency) also increases, but as the score rises from 2 to 3, there is a drastic decrease in the intensity, as shown in [Table 2](#). Patients with grade 1, 2, and 3 oral hygiene practice scores presented almost similar dentine sensitivity frequency.

Discussion

This cross-sectional study was conducted in Lahore on 300 individuals, 210 of whom reported dentine sensitivity. Overall, 70% of the patients suffered from dentine sensitivity. This value is closer to the values found in the Western population, with an upper limit approaching 73%.^{1,14,17} Other studies conducted in Lahore and Karachi showed the prevalence of almost 22% and 36%, respectively.^{2,7} This frequency is closer to the lower end of the range observed in multiple studies.^{11,20} The increased frequency found in the present study can be because of the shift of dietary trends towards those of the Western culture with increased intake of sugar, acidic drinks, and foods leading to erosive wear of teeth.^{1,3,4,14} It has been proven that the decrease in pH may lead to initiation and progression of dentine sensitivity.¹³ This can make dentinal tubules patent by dissolving the smear layer.^{3,4,13}

Fewer females report to the dentist due to a lack of awareness among females from low socioeconomic classes with limited access to regular checkups.^{21,22} Other contributing factors may be more vigorous brushing habits among males.²³

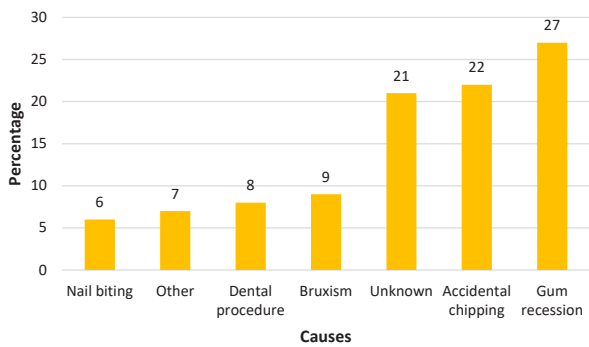


Figure 3. Causes of sensitivity

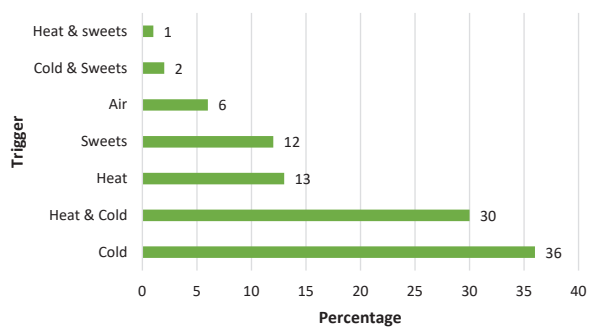


Figure 4. Triggers of sensitivity

Table 2. Cross tabulation of practice score with intensity of dentine sensitivity

Score	Intensity			Total
	1 Mild	2 Moderate	3 Severe	
0	11	20	10	41
1	38	22	9	69
2	50	24	11	85
3	8	6	1	15
Total	107	72	31	210

This study assessed a list of factors potentially contributing to dentine sensitivity. The results showed a significant association between gum recession, and to a lesser degree, other factors such as caries, and dentine sensitivity.^{1,13,14,22,24} This association can be due to aggressive and incorrect brushing habits.^{1,16,20} Incorrect brushing habits might have contributed to an increased percentage of abrasions and recessions leading to dentine sensitivity.^{5,16,25} Other reported risk factors of dentine sensitivity, such as accidental chipping of the tooth, dental procedures, and nail-biting were found to be significantly associated with dentine sensitivity in this study.¹¹

Our study found cold to be the most bothersome trigger factor, which agreed with the results of a Chinese⁹ and a Brazilian study.¹⁷ Our study also recorded thermal stimuli as triggering factors in most participants. No correlation was found from the previous studies, probably due to differences in the location of the target population and

dietary habits.

Evaluation of sensitivity intensity revealed that 51% of the individuals reported mild sensitivity, and only 15% complained of severe sensitivity. This may be because the majority would prefer avoidance of triggering factors and switch to non-aggressive brushing to avoid sensitivity as soon as it is felt, resulting in a lower chance of increase in severity. The severity of sensitivity has not been studied or reported. The reason for this may be the lack of data reliability due to the wide variation in evaluation techniques, causative factors, and subjectivity of responses in different people.

This study revealed that improving brushing habits, like brushing twice daily and using non-aggressive brushing techniques, along with other management strategies, like the use of desensitizing toothpaste or avoidance of food that triggers sensitivity, helped in the reduction of intensity. This finding is consistent with other studies which emphasize a reduction in sensitivity with good practices.²⁶⁻²⁹ Use of desensitizing toothpaste as the first line of treatment, atraumatic brushing technique, and avoidance of etiology lead to a decrease in sensitivity.^{26,29} Desensitizing toothpaste contains potassium salts that act by either blocking dentinal tubules or depolarizing nerve cells, thus reducing sensitivity. These toothpastes also contain sodium fluoride and calcium phosphate, which help re-mineralize the tooth surface.⁵ The combination of tubule occlusion, nerve cell depolarization, tooth surface remineralization, and non-aggressive brushing techniques help reduce dentine sensitivity.⁵

The present study had some limitations; first, a detailed clinical examination of dentine hypersensitivity precludes other probable reasons before making a definitive diagnosis and treatment. Second, knowledge of possible etiology, emphasis on oral hygiene maintenance, prescribed use of over-the-counter products or toothpastes, and timely intervention by a specialist may be needed to manage the problem.

Further studies are needed to determine the etiological and predisposing factors in different areas of Pakistan.

Conclusion

In the current study, the prevalence of dentine sensitivity among the patients was 70%. A higher number of males reported dentine sensitivity as compared to females. Cold food or drink was identified as a common triggering factor for initiating teeth sensitivity. Gingival recession was the most prevalent etiological factor causing dentin sensitivity.

Using desensitizing toothpaste is the most widely used method to relieve pain from dentine sensitivity, followed by avoidance of triggering factors, and these strategies or a combination of good practices helps reduce sensitivity.

Acknowledgments

This study was supported by the Institute of Dentistry, CMH Lahore Medical College, whom we thank sincerely.

Conflict of Interests

The authors have no conflict of interest to declare.

Funding

This research did not receive any specific grant from public, commercial, or not-for-profit funding agencies.

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