

# Prevalence of buccal cervical dentine hypersensitivity and related risk factors - A cross-sectional study

Gaurav Mahajan, Harjit Kaur, Aditi Gautam

Department of Periodontology, Guru Nanak Dev Dental College & Research Institute, Sunam, Punjab, India

## Keywords

Dentine hypersensitivity, gingival recession, prevalence, risk factors, tooth brushing

## Correspondence

Dr. Gaurav Mahajan, Department of Periodontology, Guru Nanak Dev Dental College & Research Institute, Sunam, Punjab, India. Phone: +91-9463647710. Email: gauravmhjn03@gmail.com

Received 04 March 2017;

Accepted 08 April 2017

doi: 10.15713/ins.idmjar.64

## Abstract

**Background:** This study was done to assess dentinal hypersensitivity in a population and related risk factors that enhance its prevalence.

**Aim:** This cross-sectional study aimed to demonstrate the prevalence of buccal cervical dentine hypersensitivity (DH) and related risk factors.

**Materials and Methods:** The total number of 135 subjects, aged 20-65 years was diagnosed with DH included in the study. All the subjects completed a self-administered questionnaire and were further examined using a three-way syringe used to put a rush of cold air which further helps in establishing DH diagnosis. Furthermore, in our study, we used one more criteria of recording buccal gingival recession which was associated with sensitive teeth only, using UNC-15 probe.

**Results:** The prevalence of DH was 64.2%. First premolar was the most commonly affected tooth. The risk factor which exaggerates DH response related to periodontal diseases includes poor oral hygiene and clinical attachment loss (gingival recession). The predominant risk factors appear to be horizontal tooth brushing and acidic beverage intakes such as juices and soft drinks.

**Conclusion:** The study assessed the prevalence of DH and enlightens predominant risk factors which further enhance its occurrence. DH is important to recognize to manage it clinically and to take preventive measures for patient benefits.

**Clinical Significance:** In this study, the prevalence of DH was found to be 64.2%, high compared to many published data, further provides strong-related risk factors that help in the clinical management of dentinal hypersensitivity pain and to take preventive measures that will be beneficial to the patients.

## Introduction

Dentine hypersensitivity (DH) is a type of pain which is sharp and for short duration arising from dentine that got exposed, further respond to stimuli typically tactile, chemical, osmotic, evaporative or thermal and cannot be ascribed to any other type of dental disease or defects.<sup>[1]</sup> Other terms that have been used to describe this condition include dentine sensitivity, root or cervical sensitivity, and hypersensitivity. One thing is common in all of these terms; however, they all interpreted to be as pain.<sup>[2]</sup> To experience pain, dentinal tubules must be in contact with oral fluids from the dental pulp, making a channel for further transmission of pain sensation, this was thought to be result of stimulus produced by dentinal tubule flow of fluids that activates nociceptors present in the pulp and dentinal tubules border area. This type of pain

alters the patient standard of living making it very much difficult as it occurs frequently. Due to DH behavior modifications can be seen in a patient that includes avoiding taking cold food and drinks and starts self-treatment or seek a professional treatment. There are different epidemiological studies on DH prevalence which showed conflicting results ranging from 1.35% to about 98.3%. The factors which are responsible for such figures and data includes type of dental care sample population get from there dentists, location or area where the study was conducted, periodontal disease status, ethnic origin, type of diagnostic tools used to diagnose DH like patient-based questionnaire/clinical evaluation. Another factor which worse the diagnosis of this condition is its frequency or episodic nature as it occurs in on and off manner, sometimes dentinal tubules are closed and sometimes opens.<sup>[3]</sup> The prevalence of DH was found to be more in hospital

and specialty practices due to the risk of root exposure after periodontal disease treatment which leads to gingival recession and clinical attachment loss. Dababneh *et al.* (1997)<sup>[4]</sup> done a study to suggest a link between DH and periodontal diseases and that was bacterial cause which travels from oral cavity fluids to dentinal tubules and enter in odontoblastic processes, as a result produces hypersensitivity sensation.<sup>[5]</sup> As this study aimed to establish the prevalence of DH.

## Materials and Methods

The study comprised 135 subjects with DH including males 72 (53.3%) and females 63 (46.6%) between the age range of 20 and 60 years. The subjects were informed about the examination and a self-administered questionnaire [Table 1] regarding DH was asked from the patients. The tool used for diagnosis purpose was rush of cold air from a three-way syringe for 5-7 s, and buccal gingival recession of affected teeth was measured with UNC-15 probe.

### Inclusion criteria

- Subjects who comply with full study procedure and understand its restrictions also were recruited
- Subjects with good health, without any systemic diseases
- Those subjects who showed symptoms of DH in questionnaire were further examined.

### Exclusion criteria

- Subjects on any type of nonsteroidal anti-inflammatory drugs or painkiller drugs
- Pregnant women's
- Subjects with gastroesophageal reflux disorder
- Subjects undergoing for periodontal or orthodontic treatment
- Restored tooth
- Teeth used for fixed partial denture or removable partial denture prosthesis.

### Statistical analysis

Statistical analysis in this study was conducted using Statistical Package for the Social Sciences statistics with version 20.0. The Chi-squared test was performed at significance level of  $\alpha = 0.05$  to find the prevalence of dentinal hypersensitivity between both sexes.

## Results

### Results from questionnaire

There was total number of 135 subjects who showed DH symptoms evaluated from the questionnaire and shown prevalence of about 64.2% [Table 1]. From 135 subjects, 63 females presented with DH and 72 males were affected, although the number of females was less than males, the number of affected teeth were more in females so the prevalence of DH was also higher in females. By far the age group which showed the highest percentage of DH was between

**Table 1: Questionnaire**

Dentin hypersensitivity questions	N (%)
Gender	
Female subjects reporting DH	63 (46.6)
Male subjects reporting DH	72 (53.3)
Occupation	
Professional	17 (12.5)
Management and lower professional	13 (9.6)
Skilled, non-manual	18 (13.3)
Skilled, manual	19 (14.1)
Semi-skilled, manual	28 (20.7)
Unskilled, manual	40 (29.6)
Duration of DH	
<6 months	21 (15.5)
>6-<12 months	47 (34.8)
>1-<5 years	38 (28.1)
>5-<20 years	19 (14.1)
>20 years	10 (7.4)
Professional treatment for DH	
Yes	22 (16.2)
No (never planning to seek treatment)	49 (36.2)
No (time or economic factors)	25 (18.5)
No (other factors)	39 (28.8)
Use of desensitizing toothpaste	
Yes (reporting a relief)	36 (26.6)
Yes (reporting elimination)	13 (9.6)
Yes (reporting complete inefficacy)	21 (15.5)
No	65 (48.1)
Brushing movements	
Circular	35 (25.9)
Horizontal	46 (34.1)
Vertical	24 (17.7)
Variable	43 (31.8)
Soft drinks	
Often	73 (54.1)
Sometimes	17 (12.5)
Rarely	32 (23.7)
Never	13 (9.6)
Fruit/veg juice	
Often	59 (43.7)
Sometimes	30 (22.2)
Rarely	31 (22.9)
Never	15 (11.1)

(Contd...)

**Table 1: (Continued)**

Dentine hypersensitivity questions	N (%)
Type of stimulus	
Cold	124 (35.2)
Sour	60 (17.1)
Sweet	47 (13.35)
Hot	60 (17.1)
Tooth brushing	52 (14.7)
Others	9 (2.5)

DH: Dentine hypersensitivity

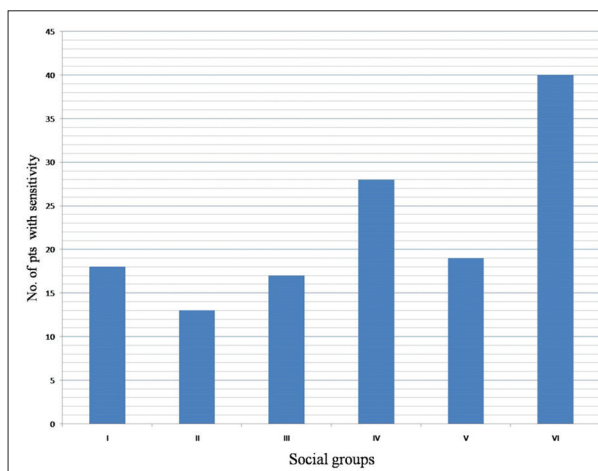
the age group of 20 and 40 years that is 64.4%. A series of six groups were used which divided social class into six different occupational categories including professional, skilled, management and lower professionals, and unskilled, to find relation between DH and social classes. Graph 1 shows DH affected teeth more in VI and V (29.6% and 20.7%) as compared with Group I and II (12.5% and 9.6%). The majority of subjects experienced hypersensitivity symptoms for 6-12 months (34.8%) duration. A total of 16.2% DH cases received some type of professional treatment from a dentist such as scaling and root planning, anti-sensitivity toothpastes or restoration. Subjects who were not willing or did not plan for any type of professional treatment for their DH problem were about 36.2%. There were about 51.8% subjects who used some type of antisensitivity toothpaste to relief sensitivity but only 9.6% subjects got relief from its use and 26.6% got some sort of relief, but 15.5% reported no effect. The brushing movements were variable in patients (31.8%) but horizontal brushing technique found to be most commonly used (34.1%) [Graph 2]. Often consumption of fruit juices (43.7%) and soft drinks (54.1%) was also observed in some subjects.

**Clinical test results**

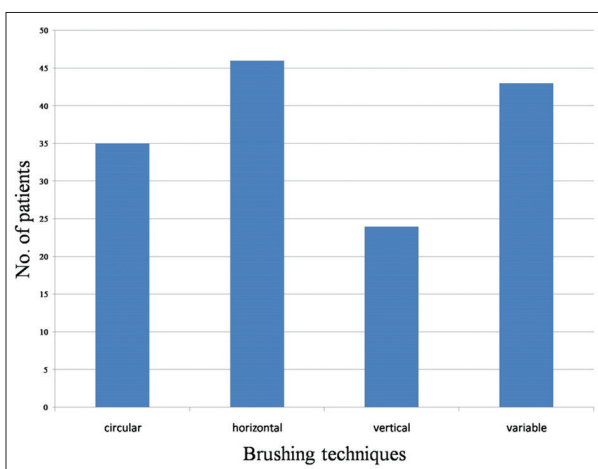
A total of 135 subjects were diagnosed with DH when clinically examined, and 1757 total teeth were checked for DH using rush of cold air from three-way syringe on buccal cervical areas only. From the tooth type point of view, premolars were more affected, than first molars, least affected were second molars [Graph 3]. To check gingival recession in affected teeth only UNC-15 probe was used to take reading from buccal side only. As shown in the Graph 4, more gingival recession was in between 1 and 3 mm very less subjects having recession above 4 mm. These data also showed that even <2 mm of recession can also produce DH symptoms. Statistical analysis report showed that females with the presence of gingival recession ( $P < 0.05$ ), less education qualification ( $P < 0.05$ ), were more affected with DH.

**Discussion**

Our study was a cross-sectional study conducted over local adult population. In this study, total prevalence of DH was found to

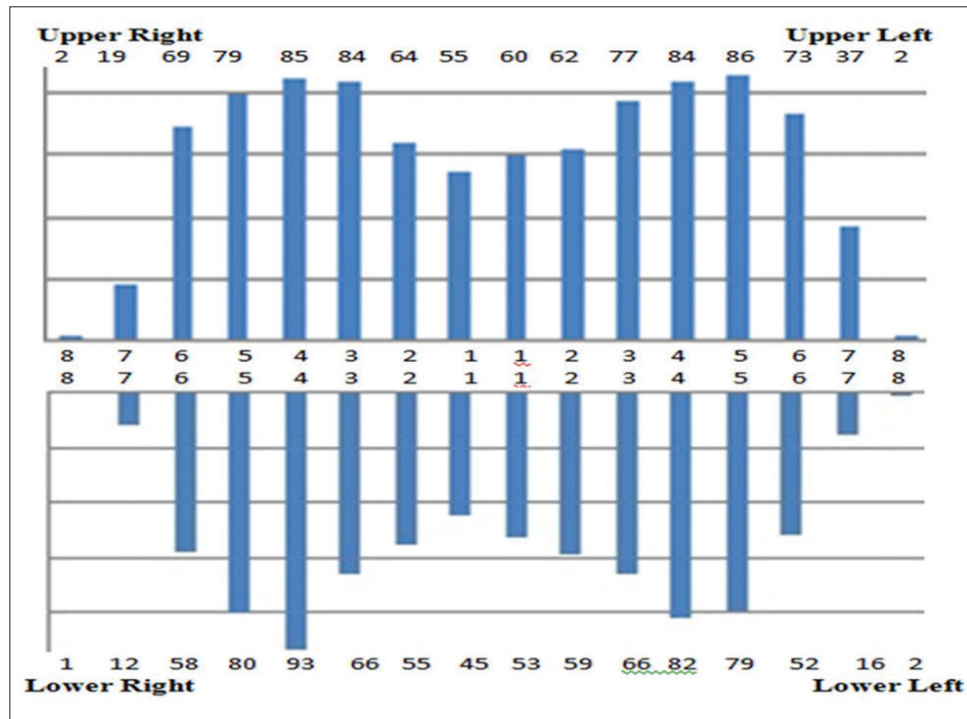


**Graph 1:** The relationship between dentine hypersensitivity and social classes

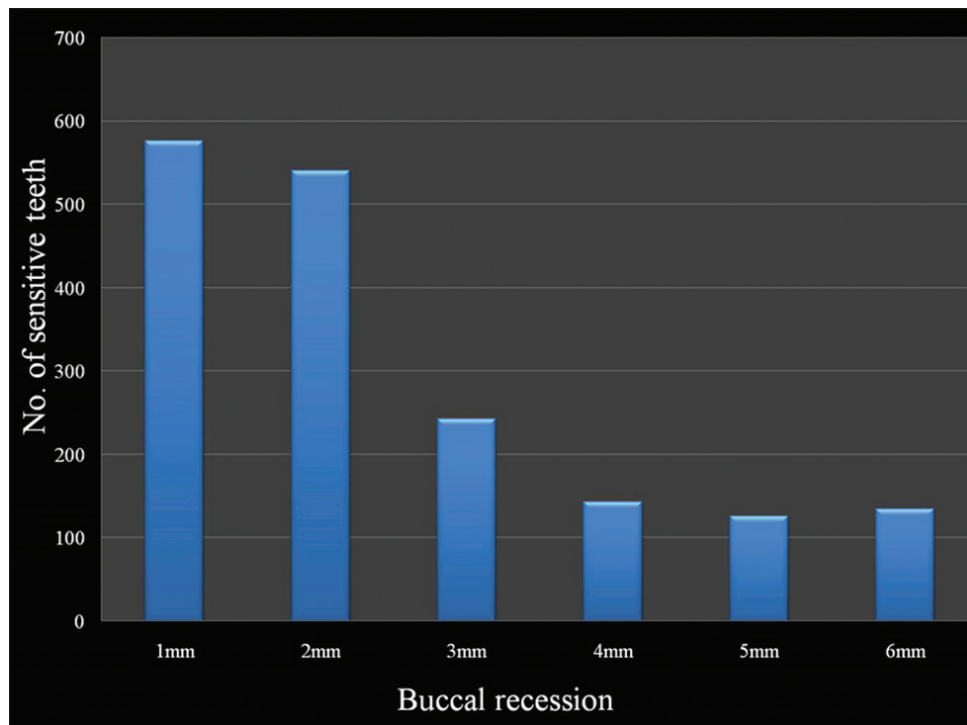


**Graph 2:** Different types of brushing techniques used by patients

be 64.2%. There is presence of different level or percentage of DH found in different studies including higher percent of DH of about 74% in study conducted with questionnaire by He *et al.*<sup>[6]</sup> and less percentage in study conducted by Kamal *et al.*<sup>[7]</sup> There are also some studies which were conducted in institutional set ups that reported about 28% and above DH prevalence.<sup>[8-11]</sup> There are also reports on DH prevalence from private dental practices shows about 3-26% of value.<sup>[12-15]</sup> These reports and studies results are so much different from each other because of their type of questionnaire used, diagnostic tool used, location or region, sampling types, and different types of methods for investigation. In most of the studies, even in our study, it was noted that most of the subjects did not want the treatment to be done by dentists. One of the studies done by Liu *et al.*<sup>[16]</sup> found that DH treatment was too unimportant for them to be done by a clinician. Only 5% subjects took the treatment for DH. Subjects take treatment only when prompted by their dentists. Till date, desensitizing toothpastes are the only prescription given by dentists or used



Graph 3: The presence of dentine hypersensitivity by tooth type



Graph 4: The amount of gingival recession associated with the sensitive teeth

by patients without prescription also for relief of DH pain and in our study, about 11% used these toothpastes also 26.6% got relief from it. Some of the studies showed that there is no effect of these

desensitizing toothpastes on patients. One of the studies done by Canadian Board of Advisory on DH<sup>[17]</sup> reported that these pastes did not show any effect to relieve symptoms of DH even hygienists

and dental practitioners do not recommend them. They show that one of the underrated pieces of population of adolescent people who suffer from DH should be considered (which might be the case in the present study as well) and studied to find related risk factors and further epidemiological survey should be performed.

There are so many risk factors and stimulus recorded in the literature, from all one of it is a cold stimulus.<sup>[10,15]</sup> In our study, the most common factor is also cold stimulus (35.2%) and other was both sour and hot (17.1%), in contrary to study by Vijaya *et al.*<sup>[10]</sup> There was the presence of DH during tooth brushing also (14.7%). The intake of soft drinks and fruit juices shown tooth wear potential which further cause DH.<sup>[1,3]</sup> In our study, we tried to find a relation between smoking and DH, but number of subjects were less, so no correlation existed, but in some studies, this relation showed that smoking increased chances of developing severe periodontal problems such as generalized chronic periodontitis, smokers palate. and even gingival recession.<sup>[18]</sup> Rees and Addy<sup>[12]</sup> done a study to show link between socioeconomic status and DH, they found that higher social class subjects prevalence toward DH was more but there result may be biased by the factor that their subjects were from higher class only. This was not the case in our study as most of the subjects were from lower socioeconomic class. Our study showed similar results to study done by Que *et al.*<sup>[1]</sup> One of the studies done by Al-Wahadni and Linden<sup>[11]</sup> showed that DH was more seen in females, same findings as in our study. Teeth having gingival recession or any other type of periodontal disease that leads to loss of gingival or clinical attachment loss will definitely cause opening of dentinal tubules at the junction of cementum and enamel. As the rate of cementum resorption is faster than dentine so this further exposes root surface and increase chances of more opening of dentinal tubules. This whole cycle further results in dentinal hypersensitivity pain. Today's scenario shows that DH treatment modalities are not enough and patient attitude toward its treatment is also not good. Therefore, further studies and awareness to people by giving public dental education plus new treatment modalities will suffice our goal to eradicate DH.

## Conclusion

Our study was a cross-sectional study that concluded the prevalence of DH about 64.2% and enlightens and discussed different types of risk factors for DH, which will further improve the diagnosis and treatment modalities toward dentinal hypersensitivity.

## References

1. Que K, Ruan J, Fan X, Liang X, Hu D. A multi-centre and cross-sectional study of dentine hypersensitivity in China. *J Clin Periodontol* 2010;37:631-7.
2. Al-Khafaji H. Observations on dentine hypersensitivity in general dental practices in the United Arab Emirates. *Eur J Dent*

- 2013;7:389-94.
3. West NX, Sanz M, Lussi A, Bartlett D, Bouchard P, Bourgeois D. Prevalence of dentine hypersensitivity and study of associated factors: A European population-based cross-sectional study. *J Dent* 2013;41:841-51.
4. Dababneh RH, Khouri AT, Addy M. Dentine hypersensitivity - An enigma? A review of terminology, mechanisms, aetiology and management. *Br Dent J* 1999;187:606-11.
5. Nield-Gehrig JS, Willmann DE. Foundations of Periodontics for the Dental Hygienist. Philadelphia, PA: Lippincott Williams and Wilkins; 2002. p. 266-7.
6. He SL, Wang JH, Wang MH. Development of the Chinese version of the dentine hypersensitivity experience questionnaire. *Eur J Oral Sci* 2012;120:218-23.
7. Kamal H, Hantash RO, Taani DQ, Hammad MM. The prevalence of dentine hypersensitivity and gingival recession among Jordanian patients at JUST dental teaching center. *Open J Stomatol* 2014;4:497-506.
8. Ye W, Feng XP, Li R. The prevalence of dentine hypersensitivity in Chinese adults. *J Oral Rehabil* 2012;39:182-7.
9. Rees JS, Addy M. A cross-sectional study of buccal cervical sensitivity in UK general dental practice and a summary review of prevalence studies. *Int J Dent Hyg* 2004;2:64-9.
10. Vijaya V, Sanjay V, Varghese RK, Ravuri R, Agarwal A. Association of dentine hypersensitivity with different risk factors - A cross sectional study. *J Int Oral Health* 2013;5:88-92.
11. Al-Wahadni A, Linden GJ. Dentine hypersensitivity in Jordanian dental attenders. A case control study. *J Clin Periodontol* 2002;29:688-93.
12. Rees JS, Addy M. A cross-sectional study of dentine hypersensitivity. *J Clin Periodontol* 2002;29:997-1003.
13. Que K, Guo B, Jia Z, Chen Z, Yang J, Gao P. A cross-sectional study: Non-carious cervical lesions, cervical dentine hypersensitivity and related risk factors. *J Oral Rehabil* 2013;40:24-32.
14. Bahsi E, Dalli M, Uzgur R, Turkal M, Hamidi MM, Colak H. An analysis of the aetiology, prevalence and clinical features of dentine hypersensitivity in a general dental population. *Eur Rev Med Pharmacol Sci* 2012;16:1107-16.
15. Colak H, Aylikci BU, Hamidi MM, Uzgur R. Prevalence of dentine hypersensitivity among university students in Turkey. *Niger J Clin Pract* 2012;15:415-9.
16. Liu HC, Lan WH, Hsieh CC. Prevalence and distribution of cervical dentin hypersensitivity in a population in Taipei, Taiwan. *J Endod* 1998;24:45-7.
17. Canadian Advisory Board on Dentin Hypersensitivity. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. *J Can Dent Assoc* 2003;69:221-6.
18. Salvi GE, Lawrence HP, Offenbacher S, Beck JD. Influence of risk factors on the pathogenesis of periodontitis. *Periodontol* 2000 1997;14:173-201.

**How to cite this article:** Mahajan G, Kaur H, Gautam A. Prevalence of buccal cervical dentine hypersensitivity and related risk factors - A cross-sectional study. *Int Dent Med J Adv Res* 2017;3:1-5.

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Mahajan G, Kaur H, Gautam A. 2017