

Prevalence of dentine hypersensitivity among general population

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ABSTRACT

Aim: This study aims to assess the prevalence of dentin hypersensitivity among general population. **Objective:** The objective of the study was to determine the prevalence of dentin hypersensitivity among general population. **Background:** Dentin hypersensitivity is characterized by short, sharp pain which results due to exposed dentin in response to stimuli. It often arises due to cold drinks, toothbrushing and sweet foods. The prevalence of dentin hypersensitivity is uncertain. Appropriate diagnosis and treatment of dentin hypersensitivity require accurate knowledge regarding its prevalence. **Reason:** Most of the patients do not seek any dental treatment for their dentin hypersensitivity as they do not perceive them to be a serious dental problem. The common path for dentin hypersensitivity is the activation of pulpal nerves. In dentistry, the major reasons for emergency dental visits are pain and discomfort. Thus, the aim of this cross-sectional study was to determine the prevalence, common causative factors, aggravating factors of dentin hypersensitivity. **Conclusion:** The study was very successful in assessing the prevalence of dentine hypersensitivity in the chosen demographic area and also clearly discussed the possible etiological factors which shows the prevalence of hypersensitivity in various parts of India.

KEY WORDS: Dentine, General, Hypersensitivity, Population, Prevalence

INTRODUCTION

Dentin hypersensitivity is a sharp pain that arises from the exposed part of dentin in response to various stimuli typically thermal, evaporative, tactile, osmotic, or chemical, and it cannot be ascribed to any other form of dental defect or pathology.^[1]

Dentine hypersensitivity (DH) is one of the most common dental clinical phenomenon among the general public. The DH occurs as a result of dentine exposure to the oral environment due to the loss of overlying cementum or enamel. This DH is experienced as episodic pain which over a period of time becomes dental complaint due to the increase in longevity of the dentition and tooth wear.^[2] Various non-carious lesions such as abrasion, abfraction, attrition, and erosion can result in DH. Intake of acid-containing diet has become more common in recent days which is the main cause of dental erosion and resultant dental hypersensitivity. Various systemic problems such as gastroesophageal

reflux disorder also lead to erosion on the lingual surface of teeth resulting in dentin hypersensitivity due to loss of enamel. Aggressive brushing sometimes may lead to gingival recession and dentin exposure which leads to dentin hypersensitivity.^[3] It is manifested in such a way that it is physically and psychologically uncomfortable for the patient. It is a most common problem pertaining to adults. Gingival recession and periodontal disease are found to be major cause for DH among ageing people accounting for about 60–80%.^[4]

The prevalence of DH has been reported over the years in different ways. Nearly 40 million people suffer from dentine hypersensitivity in the U.S. annually.^[5]

There are different factors present which influences the incidence of DH. People belonging to the age group of 30–40 are more susceptible to DH. Females are more vulnerable to DH than males. DH most commonly affects incisors and premolars followed by molars which are least affected and the buccal aspect of the cervical area is the most affected site.^[6]

Etiopathogenesis of DH

Dentin is capable of responding to physiologic and pathologic stimuli as it is considered as vital tissue. It

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is known that dentin is covered by enamel in the crown surface and by a thin layer of cementum in the root surface of the tooth. Sensitivity of dentine to any stimuli is due to the lesion extension of odontoblastic process and formation of dentin-pulp complex.^[7] Although dentin and pulp are histologically different, they have the same embryonic origin, which is the ectomesenchymal origin. Dentin is comprised a number of minute tubules that are filled with odontoblastic process. These odontoblastic processes are surrounded by dentinal fluid which forms about 22% of the total dentine volume. These fluids originate from the blood vessels of pulp.^[8]

The most accepted theory to explain DH is “hydrodynamic theory.” According to this theory, it occurs due to quick shift of fluids within the dentinal tubules after the application of stimulus, leading to the activation of the nerve endings at the end of dentinal tubules or at the pulp dentinal complex, thereby initiating pain. DH can be regarded as a clinical entity, which still has not been clearly understood by dentists in spite of the high prevalence of this condition and extensive availability of non-invasive treatment for its management.^[7]

Pathogenesis of DH

Dentin sensitivity due to any stimuli does not lead to any problem until the dentin is covered with protective tissues such as enamel and cementum. It has been evaluated from the results of scanning electron microscope that there are relatively more number of tubules in sensitive dentin than that present in non-sensitive dentin. There are nearly 8 times more number of dentinal tubules in sensitive dentine.^[9] Tubules are also found to be thicker in sensitive dentine than those in non-sensitive dentin. The rate of dentinal fluid flow depends on the fourth power of tubule’s radius and the difference is an important factor in the establishment of DH in the clinical conditions.

Based on the studies, DH is developed in two phases. They are lesion localization and local initiation. It has also been found that the sensitive dentine has thin calcified smear layer, as compared to non-sensitive dentin which leads to an increase in the fluid movement and consequent pain response. In the second phase, for the exposed dentin to be sensitized, removal of tubular plugs and the smear layer take place followed by consequent exposure of dentinal tubules and pulp to the external environment. Plug and smear layer on the surface of exposed dentine are composed of various derivatives from salivary calcium phosphates such as elements of proteins and sediments which help in sealing the dentinal tubules inconsistently and transiently.^[10]

It has been found from various researches that both mechanical and chemical factors are responsible in

removing the smear layer from the dentinal tubules. The removal of smear layer is accompanied most often with intake of acid foods or drink. Microbial plaque was found to have no connection with triggering the initiation of DH.^[11]

Most of the patients do not seek any dental treatment for their dentin hypersensitivity as they do not perceive them to be a serious dental problem. The common path for dentin hypersensitivity is the activation of pulpal nerves. In dentistry, the major reasons for emergency dental visits are pain and discomfort. Thus, the aim of this cross-sectional study was to determine the prevalence, common causative factors, aggravating factors of dentin hypersensitivity.^[12]

MATERIALS AND METHODS

Study Population

This study was carried out among the general population with DH in Saveetha Dental College, Chennai. The study population comprised 100 subjects with DH. Patients attending the dental centers during the course of the investigation were recruited to this study. The series comprised patients aged 20–65 years.^[13]

Questionnaire

The participants were interviewed for the presence of DH. A questionnaire was designed for data collection purpose. The questionnaire was developed in English as well as in Tamil. It comprised three parts and contained 15 questions. The first part enquired about the demographic information including name, age, and sex.^[14] The second part included questions about participants’ experience on dental sensitivity such as nature of pain during sensitivity, its intensity, and initiating factors. The third part inquired about various management options that were followed by the patients which included home remedies, commercially available products, and conventional treatments done by the dentist and its efficiency in management of dental hypersensitivity.^[15]

RESULTS

According to this study, majority of the people suffering from DH belonged to the age group of 25–50 accounting for about 58%. About 20% and 22% of the people suffering from DH belonged to the age group of <25 years and more than 50 years, respectively [Figure 1]. This study also reveals that 29% of male and 71% of female suffer from DH [Figure 2]. Nearly 30% of the people suffer from dental hypersensitivity during consumption of cold water [Chart 1]. On an average, 37.5% of people have tried home remedies such as salt water gargle and clove oil, out of which 80% of them have experienced improvement in

their symptoms. About 33% of people have tried commercially available products such as Sensodyne toothpaste to of which 66% of them had relief [Figure 3]. About 34% of the people were found to have visited the dentist to find a cure for the dental hypersensitivity and 75% of them were reported to have improvement in their symptoms post-treatment [Figure 4].^[16]

DISCUSSION

There are various other studies that are conducted throughout the world to study the prevalence of DH among the general public. The findings of various studies are discussed here. According to a study conducted at Mahidol University, Bangkok, the overall prevalence of DH accounts for about 32%.^[17] As per the cross-sectional study conducted in Punjabi Indian village, the total prevalence of DH was about 48.9%. It has also been found from various other studies that nearly 80% of the Indian population are from rural areas which results in lack of education. This factor had led to the usage of various primitive methods of toothbrushing such as neem stick which acts as a strong abrasive causing non-cariou lesions such as abrasion defects which may result in dentine sensitivity in future.^[18]

In the present study, the confirmation of DH was based on questionnaire. Al-Sabbagh *et al.* in their study reported that no gender difference in prevalence of DH which is in contrast with our present study where the gender difference in prevalence of DH was present. As per various studies, it was well understood that the prevalence of DH varies with age, peaking in the 35–60 years of age. The study by Liu *et al.* reported that more number of subjects is from 50 to 59 years of age which is again in contrast with our present study. Almost all of the patients enquired had same nature of sensitivity which was described as sharp pain of short duration (95%), which is similar to the study described by Orchardson and Collins.^[19]

Majority of the subjects enquired described cold and hot food substances as the most potent initiating stimulus of DH. This is in accordance with Orchardson *et al.* In the present study, cold food substances (45%) represented as most common stimulus that was severely involved with DH, followed by hot food substances (25%), citrus fruits (20%), and sweets (10%) which was similar to the findings of Jagjit *et al.* According to various other studies, tooth predilection order was from premolars to molars followed by incisors and canines. However, results are found to differ in studies by Taani *et al.*, where canines are more frequently involved followed by incisors and molars.^[20]

Liu *et al.* in his study have reported that only 5% of the subjects had sought professional help and 11% had tried the desensitizing toothpastes which are in contrast with our study where 34% of the subjects had sought professional help and 33% of the subjects had tried commercially available products such as desensitizing toothpaste. Raghoobar has reported that only 20% of the subjects investigated had received desensitizing treatments. Many subjects think that it is too trivial to refer to the clinicians and the problem of DH is not examined by dentists except when prompted by the patients. The desensitizing toothpastes have been the most common treatment modality encountered by the patients till date. In our study, 66% of subjects reported that they had complete relief after using the toothpastes.^[21]

Some of the studies have reported that DH is more common in patients undergoing periodontal treatment

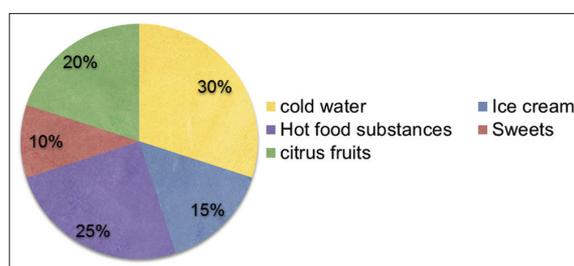


Chart 1: Initiating factors of dentine hypersensitivity

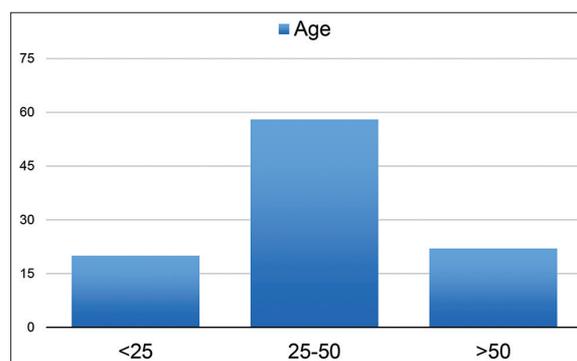


Figure 1: Age

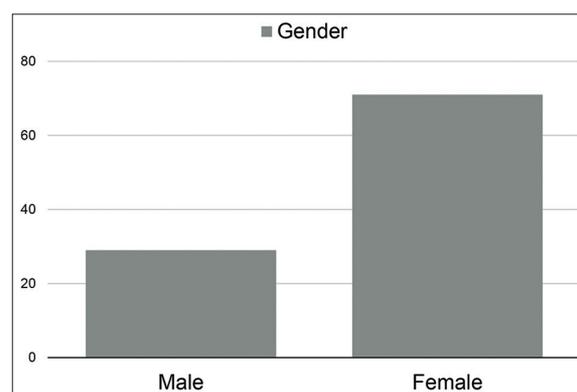


Figure 2: Gender

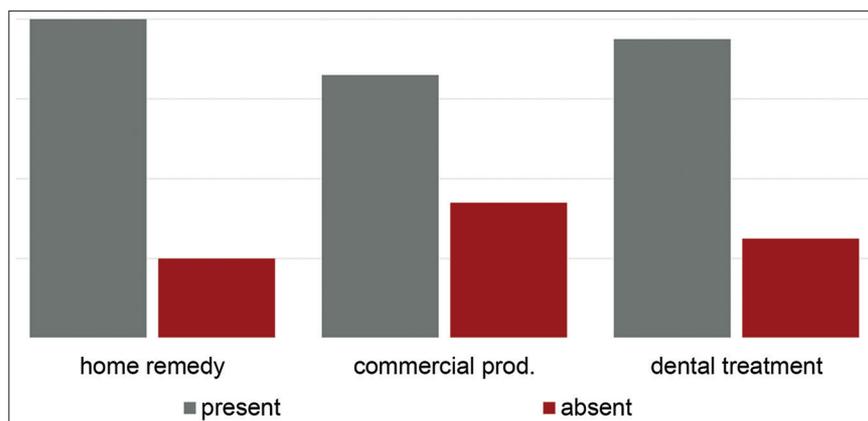


Figure 3: Improvement in symptoms following the use varies treatment modalities

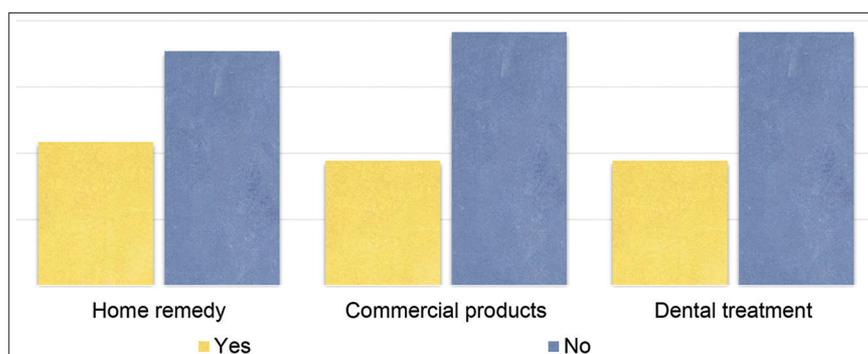


Figure 4: Management options for the treatment of dentine hypersensitivity

due to gingival recession caused by periodontal therapy or due to loss of cementum during periodontal treatments such as root planing in a study conducted among rural Punjabi Indians, it has been found that most subjects reported hypersensitivity symptoms post-scaling and were also reluctant to get periodontal scaling once again.^[22] This situation has revealed the fact that most of the dental therapists do not pay enough attention to possible post-treatment sensitivity. The possibility of post-scaling sensitivity should be explained to the patients before the treatment to reduce anxiety levels. This also helps in gaining more cooperation in carrying out treatment recommendations.^[23]

CONCLUSION

The study was very successful in assessing the prevalence of DH in the chosen demographic area and also clearly discussed the possible etiological factors which shows the prevalence of hypersensitivity in various parts of India.

However, the study was performed in a limited group of population pertaining to a limited age distribution. The main aim of the study is to find the prevalence of DH among general public, thereby encouraging them to gain awareness of DH, its etiological factors, treatment options, etc.^[24]

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