The Prevalence of Dentine Hypersensitivity among Adult Patients Attending a Nigerian Teaching Hospital

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Purpose: The purpose of this study was to determine the prevalence of dentine hypersensitivity and to examine some associated factors such as initiating stimuli among adult patients attending the Dental Clinic of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria.

Materials and Methods: All consecutive adult patients that presented at the oral diagnosis unit over a period of 13 months, from March 2003 to March 2004, were included in the study. Relevant history, such as nature of the pain, initiating stimulus, frequency of episode, interference with eating, drinking and toothbrushing were taken. Evidence of tooth surface loss was noted. Dentine hypersensitivity was confirmed clinically by the use of air blast from the air-water jet and scratching suspected surfaces with a dental probe.

Results: Of the 2165 patients examined, 29 were diagnosed as having dentine hypersensitivity, giving a prevalence figure of 1.34%. The commonest teeth affected were the molars and the commonest initiating factor was cold water. Occlusal surfaces were most affected, followed by cervical surfaces. A male predominance was observed.

Conclusion: A lower prevalence figure was found in the present study in comparison to earlier reported studies. The prevalence of dentine hypersensitivity is slightly lower in females, with female to male ratio of 1 to 1.42. Dentine hypersensitivity resulted in more severe disturbance when drinking water than when eating or brushing.

Key words: abrasion, adults, attrition, dentine hypersensitivity, erosion

Oral Health Prev Dent 2007;5: 49-53. *Submitted for publication: 09.01.06; accepted for publication: 15.02.06.*

Dentine hypersensitivity is a common condition that is generally reported by the patient after experiencing a sharp pain caused by one of several different stimuli. There is a wide variation in prevalence values reported for this condition. In the USA, Abel (1958) claimed an incidence of 25.0% while Jensen (1964) reported that 30.0% of 3000 patients experienced pain with cold-water (20°C) mouth rinses. Graf and Galasse (1977) found that 51 out of 351 patients (14.5%) attending a dental practice in Switzerland had teeth that were sensitive to scratching with a dental explorer. In the UK population, Flynn et al (1985) reported the incidence of sensitivity to cold-water mouth rinses to be 18.0%, and 8.7% for sensitivity to probing. Fischer et al (1992), in Brazil, reported a prevalence of 17.0%, and in subjects attending five private dental practices in Ireland, Irwin and McCusker (1997) reported a prevalence of 57.2%. In a population in Taiwan, Liu et al (1998) reported a prevalence of 25.0%.

Dababneh et al (1999), in their review of dentine hypersensitivity, reported prevalence data ranging from 8.0–57.0%. The diversity of prevalence figures of dentine hypersensitivity can be seen in the works of Rees

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Table 1 Distribution of hypersensitive teeth

	Incisors	Canines	Premolars	Molars	Total	χ^2, df, p-value
Number of teeth examined	232	116	226	337	911	
Hypersensitive teeth	14 (6.0%)	6 (5.2%)	28 (12.4%)	83 (24.6%)	131 (14.4%)	37.4, 3, 0.000

(Rees, 2000; Rees and Addy, 2002), where he reported prevalence figures of 3.0% and 4.1% in the UK. With other coworkers, they reported a prevalence of 67.7% in a hospital periodontology clinic in Hong Kong (Rees et al, 2003).

The diversity of reports may be in part caused by the different methods used to diagnose the condition and it is generally considered that surveys which rely on patient questionnaires alone exaggerate the prevalence figures and thereby yield misleading data (Fischer et al, 1992).

Reported studies among periodontal patients suggest figures in the order of 72.0–98.0% (Collaert and Speelman, 1991; Chabanski et al, 1996). In general, a slightly higher incidence of dentine hypersensitivity is reported in females than in males (Orchardson and Collins, 1984; Flynn et al, 1985; Addy et al, 1987b; Oyama and Matsumoto, 1991; Fischer et al, 1992), which may reflect their overall healthcare and better oral hygiene awareness (Addy, 1990). Most sufferers from dentine hypersensitivity range in age from 20 to 40 years, but the peak occurrence is found at the end of the third decade (Graf and Galasse, 1977; Flynn et al, 1985; Irwin and McCusker, 1997). Regarding intraoral distribution, dentine hypersensitivity is most commonly reported from the buccal cervical areas of permanent teeth. Sites of predilection in descending order are canines and first premolars, incisors and second premolars, and molars (Graf and Galasse, 1977; Orchardson and Collins, 1984; Flynn et al, 1985; Addy et al, 1987b; Oyama and Matsumoto, 1991; Fischer et al, 1992).

A review of the literature revealed a dearth of information on dentine hypersensitivity among Africans. It is therefore the purpose of the present cross-sectional study to establish the prevalence of dentine hypersensitivity and to examine some associated factors, such as initiating stimuli, in adult patients attending the Dental Clinic of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria.

MATERIALS AND METHODS

All consecutive adult patients that presented at the oral diagnosis unit of the Dental Hospital, Obafemi Awolowo University Teaching Hospitals Complex, over a period of 13 months, from March 2003 to March 2004, were recruited to participate in the study after informed consent had been obtained.

For all of the patients, an interview including detailed relevant history, patient's name, age, sex, address, occupation and the presenting complaint, was taken by one examiner (CTB). The past dental history included previous dental treatments, such as extractions, conservative treatment, endodontic treatments, periodontal treatment and previous professional treatment for dentine hypersensitivity. Other relevant history, such as nature of the pain, initiating stimulus, frequency of the episode, interference with eating, drinking and brushing, were also taken by the same examiner.

All standing teeth were examined for tooth surface loss such as attrition, abrasion, erosion (the degree of tooth surface loss was not measured), and any evidence of dentine hypersensitivity was confirmed by the use of air blast from the air-water jet of the dental chair and scratching suspected surfaces with a dental probe. At the first visit, a data sheet was completed for each patient that gave positive response to intraoral testing of dentine hypersensitivity.

Data collected were entered into a computer and analysed using SPSS for windows statistical software package version 11.0; p value < 0.05 was defined as statistically significant.

RESULTS

A total of 2165 adult patients (male, 1179; female, 986) were examined in the 13-month study period, from which 29 patients gave positive responses to

Table 2 Quadrant distribution of all the teeth examined and hypersensitive teeth diagnosed

	Upper right quadrant n (%)	Upper left quadrant n (%)	Lower right quadrant n (%)	Lower left quadrant n (%)	Total n (%)	χ^2, df, p-value
Total number of teeth examined	230 (25.2)	227 (24.9)	230 (25.2)	224 (24.6)	911	
Number of sensitive teeth	35 (15.2)	35 (15.4)	34 (14.8)	27 (12.1)	131 (14.4)	1.02, 3, 0.796
Number not sensitive	195 (84.8)	192 (84.6)	196 (85.2)	197 (87.9)	780 (85.6)	0.10, 3, 0.991

intraoral testing for dentine hypersensitivity. All the 29 patients were right handed; none of them had medical conditions associated with intrinsic acid or occupational exposure to acid. Of the 29 patients that had dentine hypersensitivity, 17 (58.6%) were males and 12 (41.4%) were females ($\chi^2 = 0.21$, $p = 0.65$). The age of the patients ranged from 17 to 65 years with a mean age ± standard deviation (SD) of 42.17 ± 14.0 years. The majority fell within the 31–40 (27.6%) year's age group, followed by the age group 41–50 years.

Twenty-five (86.2%) patients described the pain of dentine hypersensitivity as sharp whereas four (13.8%) patients claimed dull pain. The pain episodes were described as often by 14 (48.3%) patients and occasional by 15 (51.7%) patients. The duration of sensitivity was less than or equal to 26 weeks in 16 (55.2%) patients and between 27 and 52 weeks in seven (24.1%) patients. Three (10.3%) patients reported pain that lasted more than or equal to 105 weeks (2 years).

Of the 29 patients with dentine hypersensitivity, 13 (45%) of them had their sensitivity initiated by cold/heat stimulus, 10 (35%) patients by cold/heat/air stimulus and one (3%) patient claimed initiation of sensitivity by sour/sweet stimulus.

Dentine hypersensitivity interfered with eating in nine (31%) patients, brushing in 12 (41.4%) patients, and 21 (72.4%) patients had pain when drinking water. Only one (3.4%) patient had sought professional treatment to relieve the discomfort of dentine hypersensitivity previously.

Nine hundred and eleven teeth were examined in the course of the study, from 29 patients. Of these, 117 (12.8%) had gingival recession (62 teeth in the upper arch and 55 teeth in the lower arch); 99 (10.9%) teeth had attrition; 67 (7.4%) had abrasion; 25 (2.7%) had abfraction-like lesions (wedge shaped cervical lesion in association with occlusal wear facet); and 32 (3.5%) had erosion. One hundred and thirty-one (14.4%) teeth actually gave a positive response to intraoral testing. Dentine hypersensitivity was seen more in the posterior teeth and on the right side, as shown in Table 2.

It was observed that the upper arch had 70 sensitive teeth while the lower arch had 61 sensitive teeth. There was no statistically significant difference in sensitivity between upper and lower arches ($\chi^2 = 0.490$, $df = 1$, $p = 0.484$).

Dentine hypersensitivity was more frequently elicited on the occlusal surface in 56.0% of cases, followed by the cervical surface in 28.0% of cases.

DISCUSSION

The prevalence of dentine hypersensitivity in the present study (1.34%) is closer to the 3.0% reported by Rees (2000) in the UK. It is, however, relatively much lower than the figures reported in other population groups (Abel, 1958; Graf and Galasse, 1977; Fischer et al, 1992; Irwin and McCusker, 1997; Liu et al, 1998). The low prevalence of dentine hypersensitivity observed in this study may be due to low prevalence of the aetiological and predisposing factors such as gingival recession and dental erosion. The presence of calculus covering exposed root surfaces may lead to a lower prevalence of hypersensitivity; however, the study population had fair oral hygiene with little calculus deposit. Other factors that might have contributed were procedural differences in diagnosing dentine hypersensitivity such as the use of questionnaires, mouth rinsing with cold water and intraoral testing with

probe or air-blast. It has been reported that the prevalence of dentine hypersensitivity largely depends on the stimulus used (Burke et al, 2000).

The prevalence of dentine hypersensitivity is slightly lower in females, with female to male ratio of 1 to 1.42. Al-sabbagh et al (2004), in their review of aetiology and prevalence of dentine hypersensitivity, reported no gender difference. Although the difference in the present study is not statistically significant, the finding is inconsistent with the results of some other workers, where the female to male ratio was 1.59 to 1 (Orchardson and Collins, 1984), and between 1.34 and 1.67 to 1 (Flynn et al, 1985). A higher incidence of dentine hypersensitivity seen generally in females by these workers has been adduced to their overall healthcare and better oral hygiene awareness. The slightly higher prevalence in males seen in this study may be a reflection of higher number of adult male patients that presented in the hospital during the study period.

The nature of the pain described by most of the patients (86.2%) was similar to the general definition/description of dentine hypersensitivity as occurring with a sharp pain of short duration (Ochardson and Collins, 1984; Andrej, 2002), and also as in the consensus-based recommendations for the diagnosis and management of dentine hypersensitivity by the Canadian Advisory Board on Dentine Hypersensitivity (2003). The frequency of each episode was either often or occasional in all the patients. This explains the occurrence of dentine hypersensitivity following application of the initiating stimulus, which can be cold, touch, evaporation, osmosis or chemical stimuli, and the response varies in different patients. The majority of the patients described cold/heat stimulus as the most potent, which is consistent with the recommendations on the diagnosis of dentine hypersensitivity by the Canadian Advisory Board on Dentine Hypersensitivity (2003) and that of previous studies, such as Ochardson and Collins (1984), Irwin and McCusker (1997) and Rees (2000).

The duration of the pain of dentine hypersensitivity in these subjects were found to range from 2 weeks to about 20 years, which is consistent with the findings of Schuurs et al (1995), who reported that pain due to dentine hypersensitivity may last from months to years. Also, Taani and Awartani (2002), in a similar hospital-based study population of 302 subjects, reported that 14% to 23% claimed their sensitivity had lasted from 1 to 5 years. In the present study, it was found that drinking water represented one function that was severely interfered with, as described by the patients (72.4%). Lower percentages were seen with brushing (41.4%) and eating (31.0%). These results are similar to the findings of Taani and Awartani (2002), who reported that 64.0% of the dentine hypersensitivity in their patients did not interfere with normal functions of eating and brushing. The severe disturbance seen with drinking water may be explained by the fact that the drinking water gains access to relatively more sites in the mouth.

The most vulnerable surface of the tooth involved with sensitivity seen in the present study appears to be the occlusal surface (56.0%), followed by the cervical areas (28.0%). A tooth predilection order of molars and premolars followed by the incisors and canines was found. This result is consistent with the study of Liu et al (1998) in a Taiwanese population, and Irwin and McCusker (1997) in Ireland, where premolars and molars were the most sensitive and incisors the least. However, these results differ from some studies, where canines and premolars are more frequently involved, followed by the incisors and molars (Addy et al, 1987a; Addy and Urquhart, 1992). The findings of the present study may be explained by the fact that attrition affecting the occlusal surfaces of molars, and abrasion affecting the cervical areas of teeth, have been reported to be the two most important forms of tooth wear leading to dentine exposures among Nigerians (Oginni and Olusile, 2002). Attrition occurs during mastication, resulting from interaction between the coarse, abrasive and fibrous Nigerian diet and their robust occlusal movements. The rate of tooth attrition is strongly determined by the nature of diet. The more fibrous a diet, the higher the rate of tooth attrition (Hooton, 1940). It has also been reported that increased bite force correlates significantly with increased occlusal wear (Johansson et al, 1993).

Although some patients who develop dentine hypersensitivity may improve with time, a reasonable percentage may never achieve spontaneous remission. Therefore in the future, with teeth being retained longer, there will be an increased demand on the clinician to manage the sensitivity of exposed dentine.

CONCLUSIONS

A lower prevalence figure was found in the present study in comparison with earlier reported studies. Although the prevalence of dentine hypersensitivity is slightly lower in females, with female to male ratio of 1 to 1.42, the difference is not statistically significant. Dentine hypersensitivity resulted in more severe disturbance when drinking water than when eating or brushing.

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