Prevalence of Self-Reported Hypersensitive teeth among a group of Nigerian Undergraduate Students

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Summary

Aims and objectives: *To determine the prevalence of self reported hypersensitive teeth and relate this to the frequency and quantity of consumed carbonated drinks among a group of Nigerian dental and medical undergraduate students and the management of the condition by the students.*

Materials and methods: *Self administered questionnaire was used to collect information on demography, consumption of carbonated drinks, hypersensitivity of teeth and its management from students. Students were chosen using stratified sampling method. Each level of study was taken as a stratum and students were then chosen from each stratum by systematic sampling.*

Results: *A total of 387 questionnaires were returned. Hypersensitivity of teeth was reported by 33.8% while 52.7% of them were bothered about the condition, half (50.0%) of those bothered by the condition had done nothing about it. About a third (29.7%) of the respondents, (16.3% consumed once daily and 13.4% consumed 2/more times daily) consumed carbonated drink at least once a day. A great majority (77.0%, 17.2%) either consumed 1-2 bottles (35cl/bottle) or 1-2 glasses (30cl/glass) of carbonated drinks per day respectively. Tooth sensitivity occurred more commonly among students who consumed carbonated drinks most frequently (i.e. 2 or more times a day) but there was no significant statistical association between frequency and quantity of carbonated drink consumption and self-reported dentine hypersensitivity. ($p>0.05$).*

Conclusion: *Hypersensitivity of teeth was common among the students studied but request for treatment was poor. There is need for increased public awareness on prevention and management of common dental conditions.*

Key words: hypersensitivity of teeth, carbonated drinks, frequency.

Hypersensitivity of teeth commonly referred to as dentine hypersensitivity (DH) is a clinical condition with a prevalence of about 90% among various population groups[1-6]. Dentine hypersensitivity is a transient pain arising from exposed dentine, typically in response to chemical, thermal, tactile or osmotic stimuli which cannot be explained by any other dental defect or pathology[7]. Two processes must be satisfied for DH to develop: dentine has to become exposed by loss of enamel or periodontal tissues and the dentine tubule system has to be opened and be patent to the pulp[8]. The physical and chemical processes of dental erosion that causes dentine exposure either acting alone or in combination with abrasion and attrition have been implicated in DH.[9,10]

Dental erosion is the loss of dental hard tissues from an intrinsic or extrinsic acidic attack[11-15]. Intrinsic causes include regurgitation of acidic stomach content in reflux disease, gastritis, bulimia and pregnancy. The main extrinsic sources of acid are dietary, industrial aerosols and medications. Diet is the most common extrinsic source of the acidic attack on the tooth[14]. Several studies have reported causal relationship between dietary constituents

and dental erosion[11,16-20]. Lussi *et al*[16] reported that acids from beverages are significantly associated with presence of dental erosion while Jarvinnen *et al*[11] found a high strength of association between soft drink consumption and occurrence of dental erosion in the adult population studied. In a study by Bamise *et al*[20] to determine the prevalence of aetiological and predisposing factors of dentine hypersensitivity, a significant relationship between patients with history of dietary acid ingestion and tooth erosion was reported. They also discovered that patients who consumed orange juice either daily or at least once a week had 29 (90.6%) teeth with erosive lesions, while patients who consumed carbonated cola drinks daily or at least once a week had 16 (50.0%) teeth with erosive lesions. Other studies have presented increasing prevalence of dental erosion. A prevalence of 37% and 41% was reported among adolescents in Scotland and Maryland respectively[21], while it was as high as 66.9% in a group of Sudanese adolescents in North Africa[22].

Dentine hypersensitivity is a condition that may be of only minor inconvenience to some patients and yet be a very disturbing condition that affects the quality of life of others[23]. It is therefore a condition that should be prevented from occurring and managed appropriately if the consequences of irreversible pulpal damage are to be averted. Studies in this environment have reported prevalence of attrition[24,25] and abrasion [26] among population groups while Bamise *et al*[20] in a clinical study, determined the prevalence of the aetiological and predisposing factors of hypersensitivity among patients suffering from DH. There seems to be no study in this environment on prevalence of dentine hypersensitivity.

This study therefore aimed to determine the prevalence of self reported hypersensitive teeth among a group of undergraduate students, the frequency and quantity of consumed carbonated drinks and the management of DH by the students.

Materials and methods

This study forms part of a survey of dental and medical undergraduate students of College of Medicine, University of Lagos, Nigeria seeking information related to knowledge about dental erosion, consumption of carbonated drinks and self reported dentine hypersensitivity. The calculated sample size of 365 was computed based on the prevalence report on knowledge about dental erosion and consumption of carbonated drinks among teenagers[18]. Total of 420 questionnaires were distributed. A total of 387 questionnaires were returned but not all the questions were completed by every respondent.

Structured self administered questionnaire was used to collect information from the students. The questionnaire contained questions on respondent's demography, frequency and quantity of consumption of carbonated drinks, perception of dentine hypersensitivity and management of DH by the students. The students that participated in the study were chosen using stratified sampling method. Each level of study was taken as a stratum and students were then chosen from each stratum by systematic sampling. The students were identified to be in 8 strata/groups according to how they receive lectures; comprising 2 strata in preclinical and six strata in the clinical levels.

Each group was accessed just before their first lecture of the day which usually starts by 8am. The purpose of the study was explained to the students and verbal informed consent was obtained before the distribution of the questionnaires. Participation was voluntary and no names were required on the questionnaires for confidentiality. All the students in each of the groups gave consent to participate. Using a calculated sampling fraction (sample size/study population size) of 1 in 3, self administered questionnaire was given to every 3rd student sitting in a row until a predetermined number of questionnaires have been distributed.

Data were analysed with Epi info 6 software[27]. Chi-square test of association was applied where appropriate and $p<0.05$ was regarded as significant.

Results

A total of 420 questionnaires were distributed for this study and 387 were returned. The ages of the respondent ranged from 17-37years with a mean age of 23.10 ± 3.0 years. There were 51.4% (n= 199) females and 48.6% (n=188) males in the study. Table i shows the frequency of consumption of carbonated drinks among the students that responded to the question (n=384). The highest frequency of consumption in this study was 2 or more times daily and only about 13.4% of the respondents had this frequency while the lowest frequency of consumption was once a week and 26.2% of the respondents consumed at this frequency. About a third (29.7%) of the respondents, (16.3% consumed once daily and 13.4% consumed 2/more times daily) consumed carbonated drink at least once a day.

Among those (n=343) that responded to the question on quantity of carbonated drinks consumed per day, a great majority (n=264, 77.0%) of them drank 1-2 bottles (35cl/bottle) per day while some others (n=66) who quantified their consumption by glasses also had more students (n=59, 17.2%) who drank 1-2 glasses (30cl/glass) per day. (Table ii)

Only 33.8% of the respondents to the question on perceived tooth sensitivity reported to have had the condition. DH prevalence was highest in the 3rd decade as shown in Table iii. Prevalence of DH was almost similar among male and female respondents, being 34.0% and 33.5% respectively. The difference was not statistically significant ($X^2=0.01$, $p=0.912$) as shown in Table iv.

Tooth sensitivity occurred more commonly among group of students who consumed carbonated drinks most frequently (i.e. 2 or more times a day) but there was no statistically significant association between frequency of

carbonated drinks consumption and self reported dentine hypersensitivity (X^2= 1.77, p = 0.778) as shown in Table v. Quantity of carbonated drinks consumed was not significantly associated with experience of dentin hypersensitivity among the respondents (X^2 = 0.49, p = 0.369). (Table vi).

Among those with sensitive teeth (n=129, 33.8%), a little over half (52.7% n=68) were bothered about it while 47.3% (n=61) were not. In response to the question 'what have you done about your sensitive teeth', half (50.0%) of those who were bothered about their sensitive teeth had done nothing about it while 19.1% hope to see a dentist. Other responses are shown in Table vii.

Table i: Frequency of carbonated drinks consumption

Carbonated Drinks?	Freq	%
Never	4	1.0
Once a week	104	26.9
2–4 times per week	167	42.4
Once a day	63	16.3
2 or more times a day	52	13.4
Total	384	100.0

*Total less than 387 because only 384 responded to the question

Table ii: Quantity of carbonated drink consumption

Quantity of carbonated drinks Number of 35cl bottle consumed per day	Frequency	%
1- 2	264	95.3
3 – 5	13	4.7
TOTAL	**277**	**100.0**
(Number of 30cl glass consumed per day)		
1- 2	59	89.4
3 – 5	7	10.6
TOTAL	**66**	**100.0**

Table iii: Hypersensitivity of teeth among age groups

	Hypersensitivity of teeth		
	Yes (%)	No (%)	Total (%)
Age range (YR)			
< 20	18(40.9)	26(59.1)	44(11.5)
20 – 24	86(36.1)	152(63.9)	238(62.3)
25 – 29	20(23.0)	67(77.0)	87(22.8)
30+	5(38.5)	8(61.5)	13(3.4)
Total	**129(33.8)**	**253(66.2)**	**382(100.0)**

*Total less than 387 because only 382 responded to the question X^2 = 6.25, p = 0.100

Table iv: Hypersensitivity of teeth among males and females

	Hypersensitivity of teeth		
	Yes (%)	No (%)	Total (%)
Gender			
Male	64(34.0)	124(66.0)	188(49.2)
Female	65(33.5)	129(66.5)	194(52.8)
Total	**129(33.8)**	**253(66.2)**	**382(100.0)**

*Total less than 387 because only 382 responded to the question X^2 = 0.01, p = 0.912.

Table v: Relationship between frequency of soft beverage consumption and tooth sensitivity.

Frequency of consumption of soft beverages	Tooth sensitivity		
	Present	Absent	Total
	Frequency (%)		
Never	1(25.0)	3(75.0)	4(100.0)
Once a week	29(29.0)	71(71.0)	100(100.0)
2-4 times a week	59(36.2)	104(63.8)	163(100.0)
Once a day	21(33.3)	42(66.7)	63(100.0)
2 or more times a day	19(36.5)	33(63.5)	52(100.0)
Total	**129(33.8)**	**253(66.2)**	**382(100.0)**

* Total less than 387 because only 382 responded to the question X^2= 1.77, p = 0.778.

Table vi: Relationship between quantity of soft beverage consumption and tooth sensitivity.

Quantity of consumption of soft beverages (35cl bottle per day)	Tooth sensitivity		
	Present	Absent	Total
	Frequency (%)		
1–2	86(32.7)	177(67.3)	263(100.0)
3–5	6(46.2)	7(53.8)	13(100.0)
TOTAL	**92(33.3)**	**184(66.7)**	**276(100.0)**

X^2= 0.49, p = 0.369

Table vii: Management of tooth sensitivity by respondents

Action taken by respondent to solve problem of tooth sensitivity	Frequency (%)
Nothing	34 (50.0)
I use sensodyne toothpaste	4 (5.9)
Hoping to see a dentist	13 (19.1)
Avoid taking very hot things	7 (10.3)
Fluoride therapy done	2(2.9)
Composite filling done	5 (7.4)
Abandoned treatment because of hectic clinic routine	2 (2.9)
I wash mouth after meals and avoid sugary foods	1(1.5)
Total	**68 (100.0)**

Discussions

Prevalence of self reported DH has been reported to range between 8-86% among various population groups[1-6]. While most of the studies[2-6] reported prevalence among general and specialist dental population, this study investigated a group not recruited from dental clinic attending patients. The prevalence of self reported DH among the undergraduate students in this study was 33.8%. This prevalence is higher than a prevalence of 9-15% from the international survey of adults in the United States[1] but is lower than 45.2 - 86% reported among various dental patients[2-6]. The prevalence recorded in the present study tend to support the observation that higher prevalence is found among patients attending dental practices than it is found among the general population.

However, a more objective prevalence of DH among population groups can be recorded from studies involving both clinical examination and questionnaire based studies that monitor dietary habits and lifestyles of individuals. The prevalence of 33.8% of DH recorded in this study though not as high as those recorded in other studies[2-6], may be attributed to the following. A moderately high frequency of consumption of carbonated drinks among the respondents was recorded. Also contributory may be interpretation of other forms of dental pain such as untreated dental caries as dentine hypersensitivity by the respondents. The frequency of consumption among the respondents that consumed carbonated drinks as frequent as once daily (16.3%) and 2/more times (13.4%) recorded in this study is lower than those reported by Milosevic *et al*[18]. Their findings indicated that, 26% of teenagers in the cases group surveyed consumed fizzy drinks 2/more times daily while a similar percentage (25%) in the control group consumed at 2/more times daily.

Several studies have reported causal relationship between dietary constituents and dental erosion[11,16-19]while others[21,22,28] have presented increasing prevalence of dental erosion among various populations especially the young generation. In this study, though the prevalence of DH among the students increases with the frequency of intake of carbonated drinks, the association was not statistically significant.

In this study, DH prevalence was highest among the 20-24 year olds. Orchardson and Collins[29] observed similar peak prevalence between 20 and 25 year olds. Addy[30] and Graf and Galasse [31] reported a peak at the end of the third decade while Fisher *et al*[32] reported a peak prevalence among 40-49 year olds. Chabanski *et al*[6] had postulated that the prevalence of DH may shift in the future towards a younger age group because of such factors as, an increase in acidic food intake and greater oral care awareness. The result of this study may just be indicative of such a shift. The prevalence of DH in this study was observed to be almost similar among the male (34.0%) and female (33.5%) respondents though the difference was not statistically significant. This is in accordance with the result of other studies[6,31-34] where no significant difference was found between males and female. However, Gillam *et al*[4] observed DH to be significantly higher in females.

In this study, DH was regarded as being bothersome by over half (52.7%) of those that reported sensitivity and over half of these did not seek or receive any treatment because the condition was not perceived as being severe. Similarly, most of the patients with DH in other studies[2,3] did not regard DH as being severe and generally did not seek professional treatment. The potential of the underlying pathology of toothwear either dental erosion, abrasion or attrition, to jeopardize the health of the dental pulp, coupled with the time and cost of treatment should be a cause for prompt management of the condition. Management of DH was found to be poor among the respondents in this study because only a few had done or received a positive line of treatment for DH. Common among the protocol of management of DH includes use of desensitising toothpaste, fluoridation of the teeth and composite restoration of teeth.

Dental conditions in general have been reported in this environment not to be a common reason for hospital attendance except when there is severe dental pain[35]. Most patients present at advanced stage of their dental condition, when management may be radical or more expensive. This poor level of dental attendance cannot be unconnected to economic reasons and lack of public awareness about dental conditions and available treatment. It is therefore important to improve general public awareness about dental conditions and importance of routine dental check-up and early presentation for treatment. A more efficient general and oral health financing system that will replace the current personal health care finance is being advocated.

Conclusion

Consumption of carbonated drinks and hypersensitivity of the teeth was common among the students surveyed but management of the condition was poor. There is need for increased public awareness on prevention and management of common dental conditions.

References

1. Murray L. and Roberts A. J. The prevalence of self-reported hypersensitive teeth. *Arch. Oral Biol.* 1994; **39:** 129S –135S.
2. Gillam D. G., Bulman J. S., Jackson R. J. and Newman H. N. Prevalence of Dentine Hypersensitivity in a general practice population. *J. Dent. Res.* 1996; 75: 321. (abstract no. 2429).
3. Clayton D. R., McCarthy D. and Gillam D. G. A study of the prevalence and distribution of dentine sensitivity in a population of 17-58-year-old serving personnel on RAF base in the Midlands. *J. Oral Rehabil.* 2002; **29:** 14–23.
4. Gillam D. G., Seo H. S., Bulman J. S. and Newman H. N. Perceptions of dentine hypersensitivity in a general practice population. *J. Oral Rehabil.* 1999; **26:** 710–714.
5. Irwin C. R. and McCusker P. Prevalence of dentine hypersensitivity in a general dental population. *J. Irish Dent. Assoc.* 1997; **43:** 7–9.
6. Chebanski M. B., Gillam D. G., Bulman J. S. and Newman H. N. The prevalence, distribution and severity of cervical dentine sensitivity (CDS) in a population referred to a specialist periodontology department. *J. Clin. Periodontol.* 1996; **23:** 989– 992.
7. Dowell P. and Addy M. Dentine hypersensitivity – A review, aetiology, symptoms and theories of pain production. *J. Clin. Periodontol.* 1983; **10:** 341–350.
8. Addy M. Dentin hypersensitivity: new perspective on an old problem. *Int. Dent. J.* 2002; **52:** 367–375.
9. Addy M. Tooth brushing, tooth wear and dentin hypersensitivity–are they associated? *Int. Dent. J.* 2005; **55(4 Suppl 1):** 261–267.
10. Addy M. and Hunter ML. Can tooth brushing damage your health? Effects on oral and dental tissues. *Int. Dent.*

J. 2003; **53(supplement 3):** 177–186.
11. Jarvinen V. K., Rytomaa II. and Heinonen OP. Risk factors in dental erosion. *J. Dent. Res.* 1991; **70:** 942–947.
12. Ten Cate J. M. and Imfeld T. Dental erosion, summary. *Eur. J. Oral Sci.* 1996; **104:** 241–244.
13. Pindborg J. J. Pathology of the dental hard tissues. 2nd ed., Copenhagen: Munksgaard, 1970; 294–325.
14. Imfeld T. Dental erosion: definition, classification and links. *Eur. J. Oral Sci.* 1996; **104:**151–155.
15. Patel A. D. Treatment of pathological toothwear with cast lingual gold veneers. *Saudi Dental J.* 1999; **11/2:** 70–73.
16. Lussi A., Schaffner M., Hotz P. and Suter P. Dental erosion in a population of Swiss adults. *Comm. Dent. Oral Epidemiol.* 1991; **19:** 286–290.
17. Milosevic A., Lennon M. A. and Fear S. C. Risk factors associated with tooth wear in teenagers: a case control study. *Comm. Dent. Hlth.* 1997; **14:** 143–147.
18. Milosevic A., Bardsley PF. and Taylor S. Epidemiological studies of tooth wear and dental erosion in 14-year old children in North West England. Part 2: The association of diet and habits. *Br. Dent. J.* 2004; 197: 479-483.
19. Al-Dlaigan Y. H., Shaw L. and Smith A. Dental erosion in a group of British 14-year-old school children Part II: Influence of dietary intake. *Br. Dent. J.* 2001; **190:** 258–261.
20. Bamise C. T., Olusile A. O. and Oginni A.O. An Analysis of the Etiological and Predisposing Factors Related to Dentin Hypersensitivity. *J. Contemp. Dent. Pract.* 2008; **5(9):** 052–059.
21. Deery C., Wagner M. L., Longbottom C. and Nugent Z. J. The prevalence of dental erosion in a United States and a United Kingdom sample of adolescents. *Padiatr. Dent.* 2000; **22:** 501-510.
22. El Karim I. A., Sanhouri N. M., Hashim N. T. and Ziada HM. Dental erosion among 12-14 year old school children in Khartoum: a pilot study. *Comm. Dent. Hlth.* 2007; **24(3):**176-180.
23. West N. X. The dentine hypersensitivity patient - a total management package. *Int. Dent. J.* 2007; **57:** 411-419.
24. Kumar V. and Ana JR. Prevalence and severity of tooth attrition in Nigerian rural areas. *Niger Med. J.* 1978; **8:** 557–562
25. Odusanya S. A. and Abayomi I. O. Tooth attrition among rural Nigerians. *Afr. Dent. J.* 1987; **1:** 73–78.
26. Oginni AO., Olusile AO. and Udoye CI. Non-carious cervical lesion in a Nigerian population: Abrasion or Abfraction. *Int. Dent. J.* 2003; 53:275-279.
27. Dean A. G., Dean J. A., Coulombier D., Brendel K. A. and Smith DC. *et al.* Epi info version 6: a word processing database and statistical program for public health on IBM compatible microcomputers. Centers for Disease Control and prevention. Atlanta Georgia, USA. 1995.
28. O'Brien M. Children's dental health in the United Kingdom 1993. London: Office of Population Censuses and Surveys 1994. Her Majesty's Stationary Office; 1994.
29. Orchardson R. and Collins WJN. Clinical features of 'hypersensitive' (HS) dentine. *J. Dent.* 1987; **15:** 242–248.
30. Addy M. Clinical aspects of dentine hypersensitivity. *Proceedings of Finnish dent. Soc.* 1992; **88 (Suppl. 1)**: 23–30.
31. Graf H. and Galasse R. Morbidity, prevalence and intraoral distribution of hypersensitive teeth. *J. Dent. Res.* 1977; 56: 162 (Abstract no. 479).
32. Fischer C., Fischer RG. and Wennberg A. Prevalence and distribution of cervical dentine hypersensitivity in a population in Rio de Janeiro, Brazil. *J. Dent.* 1992; **20:** 272–276.
33. Flynn J., Galloway R. and Orchardson R. The incidence of 'hypersensitive teeth' in west of Scotland. *J. Dent.* 1985; **13:** 230–236.
34. Addy M., Mostafa P. and Newcome R. G. Dentine hypersensitivity: the distribution of recession, sensitivity and plaque. *J. Dent.* 1987; **15:** 242–248.
35. Ukeje C. N., Agbelusi G. A. and Jeboda S. O. Presenting complaints of patients at the oral diagnosis clinic of Lagos University Teaching Hospital (LUTH). *Nig. Quart. J. of Hosp. Med.* 2000; **10(2):** 121–125.