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# Knowledge of dental erosion and frequency of carbonated drink consumption among students of a Nigerian University

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#### Abstract

*Objective*: To assess knowledge about dental erosion and determine frequency of consumption of carbonated drinks among a group of Nigerian medical and dental undergraduate students.

*Methods:* A self administered questionnaire was used to collect information on demography, knowledge about dental erosion, and consumption of carbonated drinks 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. Less than a quarter (22.7%) of the respondents correctly describes what they understood to be dental erosion while 60.5% incorrectly answered that 'sugar is involved in the aetiology of erosion of teeth'. Dental students significantly had better knowledge of acid erosion than the medical students (p < 0.05). Many (42.4%) of the respondents drank carbonated drinks 2-4 times a week and frequency of consumption was not significantly affected by knowledge of dental erosion (p > 0.05).

*Conclusion*: Knowledge of acid erosion was found to be low especially among the medical students indicating a need to include teaching about dental erosion in the general medical school curriculum. Consumption of carbonated drinks was common amongst the surveyed students.

## **Keywords:** Knowledge, Dental erosion, Frequency, Carbonated drinks, Consumption, Students

#### Résumé

Pour évaluer les connaissances par rapport a l'érosion dentaire et déterminer la fréquence de la consommation des boissons gazéifiées parmi les étudiants Nigérians en médecine et soins dentaires. Un questionnaire librement administré, était utilisé pour collecter les données démographiques, connaissance, érosion dentaire, et consommation des boissons gazéifiées parmi les étudiants. Les étudiants étaient choisis par la méthode stratifiée Chaque

Correspondence: Dr. O.H. Oderinu, Department of Restorative Dentistry, College of Medicine, University of Lagos. PM.B. 12003 Nigeria. E-mail: bisioderinu@yahoo.co.uk niveau d'étude était prise comme un strata et les étudiants étaient ainsi choisit de chaque strata de facon systématique. Au total 387 questionnaires étaient retournés. Moins du quart (22.7%) des participants décrivaient correctement ce qu'ils comprennent par érosion dentaire alors que 60.5% répondaient fausses que le sucre est impliqué dans l'étiologie de l'érosion des dents'. Les étudiants dentistes avaient significativement une meilleure connaissance de l'érosion par l'acide que les étudiants en médecine (p <0.05). Plusieurs (42.4%) des participants buvaient les boissons gazéifiées 2-4 fois par semaine et and la fréquence de consommation n'affectait pas significativement par la connaissance de l'érosion dentaire (p > 0.05). En conclusion, la connaissance de l'érosion par l'acide était faible spécialement parmi les étudiants en médicine indiquant le besoin d'inclure les enseignements sur l'érosion dentaire dans leur curriculum. La consommation des boissons gazéifiées était commune parmi ces étudiants

#### Introduction

Dental erosion is the loss of dental hard tissues from an intrinsic or extrinsic acidic attack, often resulting in exposure of dentinal tubules and hypersensitivity to environmental stimuli [1-5]. Dental erosion has multifactorial aetiology [6,7] and predisposing factors are grouped as chemical, biological and behavioural factors [6]. Other factors such as knowledge, education, socio-economic status, habits and general health also influence the process of erosion development [6]. Chemical factors include the pH, the buffering capacity, type of acid, the calcium, phosphate and fluoride content of drinks and foodstuffs [6,7]. Saliva is an important biological factor that protects the 'ooth by dilution, clearance, neutralisation and buffering of acids [6,8]. The acquired pellicle, tooth structure and tooth position in relation to soft tissue and the tongue are other biological factors [6]. Behavioural factors such as, diet and tooth brushing habit; regurgitation, vomiting, drug use and occupational exposure to acid all play a

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role in modifying the extent of the tooth wear [1,6,9]. The source of acid that act on the tooth surface is either intrinsic or extrinsic [7]. Intrinsic source of acid includes regurgitation of acidic stomach content in reflux disease, gastritis, bulimia and pregnancy. Dietary factors are the most common extrinsic source of acid. These include acids in fruits, fruit juices, wines, alcohol, candies and carbonated beverages containing citric and phosphoric acids [10-13]. Other extrinsic acid source are occupational exposures to sulphuric acid and hydrochloric acid in battery manufacturing factories, and factories where galvanizing is performed respectively [14-17]. Erosive effects of oral medications such as hydrochloric acid tablets, acetylsalicylic acid and ascorbic acid have also been reported [13,15,18,19]. Clinical problems associated with dental erosion include aesthetic problems, dentine sensitivity, pulpitis and inter-occlusal space loss. Aesthetical problems arise from loss of enamel of the anterior teeth causing tooth translucency, fractures and shortening of the teeth [7]. Dentine sensitivity is often as a result of exposed dentinal tubules that are patent to the pulp [20]. In extreme cases of dental erosion, pulpal exposure may cause widespread inflammation and pain. There could be resultant reduction in the occlusal vertical dimension (OVD) if the rate of loss of the occlusal surfaces of posterior teeth is greater than the alveolar growth compensatory mechanism.

Management of dental erosion at the individual level ranges from simple dietary counselling to expensive and time-consuming restorative treatment [7]. However, due to evidences [21-26] of increasing presence of dental erosion in population groups, particularly the younger generation, prevention of occurrence of this condition will be the most effective control. In the 1993 United Kingdom National Survey of Child Dental Health, over half of the 5 and 6 yearolds had dental erosion [21]. Lussi et al [22] surveyed persons from two age groups of 26-30 and 46-50 year olds and reported that 7.7% of the younger age group and 13.2% of the older age group showed at least one tooth affected with erosion. Dental erosion prevalence of 37% and 41% was reported among adolescents in Scotland and Maryland respectively [24] while it is as high as 66.9% among a group of Sudanese adolescents in North Africa [25]. In a Nigerian study, prevalence of erosion of the teeth was found to be 16% among patients diagnosed with gastro-oesophageal reflux disease [26].

In Nigeria, carbonated drink market has increased significantly over the past years and is still escalating. Consumption of carbonated drinks is gaining popularity among students in Nigerian elementary and secondary schools and also tertiary institutions while water appears to have been substituted with carbonated drinks in some Nigerian homes. Prevalence of dental erosion will continue to rise due to lack of public knowledge about acid erosion, its causes and associated oral health problems. Before any intervention programme could be successful at the community level, it is imperative to assess knowledge about this condition and this will inform what methods will be effective in the preventive programmes.

There seem to be a dearth of studies in the literature to assess public knowledge about acid erosion of teeth. Milosevic *et al* [27] reported that over half of the 14 year olds in their study had heard about dental erosion while only 39% answered correctly that acid was involved in the aetiology of dental erosion.

This study therefore is aimed at assessing knowledge about acid erosion of teeth and to determine the frequency of consumption of carbonated drinks among dental and medical students of College of Medicine, University of Lagos, Nigeria.

#### Materials and methods

A structured self administered questionnaire was used to collect information from the dental and medical undergraduate students of the College of Medicine, University of Lagos, Nigeria. The questionnaire contained questions on respondent's demography, knowledge about dental erosion and frequency of consumption of carbonated drinks. The calculated sample size was 365 but a total of 420 questionnaires were distributed. A total of 387 questionnaires were returned but not all tick boxes were completed.

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/group and each group was accessed in the classrooms. The purpose of the study was explained to the students and informed consent was obtained before distribution of the questionnaires. Participation was voluntary. Using a calculated sampling fraction (sample size/study population size) of 1 in 3, self administered questionnaire was given to every 3<sup>rd</sup> students sitting in a row until a predetermined number of questionnaires were distributed.

Data were analysed with Epi info 6 software [28]. Chi-square test of association was applied where appropriate and level of statistical significance was inferred at p<0.05.

#### Results

A total of 387 questionnaires were returned. The ages of the respondent ranged from 17-37 years with mean age of 23.10  $\pm$  3.0 years. Female respondents (51.4%; n= 199) were slightly more than male (48.6%; n=188) respondents. Most of the respondents (62%) were 20-24 year-old (Table 1).

Table 1: Age and sex distribution of participants

Age (Years)	Frequency	Percentage (%)			
< 20	45	11.6			
20-24	240	62.0			
25-29	89	23.0			
30*	13	3.4			
Total	387	100.0			
Sex	Frequency	Percentage (%)			
Male	188	48.6			
Female	199	51.4			
Total	387	100.0			

## Awareness of acid erosion of teeth

Majority (75.7%, n=293) of the respondents were aware of acid erosion of teeth while 24.3% (n=94) had never heard about it. Most of the respondents got their information about acid erosion of teeth from school lecture (n=198, 44.8%). Some had more than a single source of information. Other sources of information are shown in Table 2.

 Table 2: Source of information on acid erosion of teeth

 by the participants

Source of information									
on dental erosion	Frequency	Percentage %							
Lecture	198	44.8							
Friends	58	13.1							
Media	72	16.3							
Dentist	100	22.6							
Others(magazine,	14	3.2							
Total	442	100.0							

\*\* Total greater than number of respondents because some had more than one source of information.

## Knowledge about acid erosion of teeth

Correct definition or description of dental erosion was given by only 22.7% (n=88) of the respondents. Many of the respondents 48.8% (n=189) gave incorrect description while 28.4% (n=110) did not know. However, 71.8% of the respondents (n=278) correctly answered that 'acid is involved in the aetiology of erosion of the teeth' whilst 60.5% (n=234) of the respondent incorrectly answered that 'sugar is involved in the aetiology of erosion of teeth'. Other responses on knowledge about acid erosion of teeth are shown on Table 3. Dental students significantly had better knowledge about acid erosion of teeth than the medical students, ( $X^2 = 38.76$ , p = 0.000). Table 4.

 Table 3: Knowledge of acid erosion of teeth by the participants

Question	Res	Total			
	Yes	No	Don't know		
Is sugar	234	49	104	387	
involved in the etiology of teeth erosion?	(60.5%)	(12.7%)	(26.9%)	(100.0%)	
Is acid involved	278	10	99	387	
in the etiology of teeth erosion?	(71.8%)	(2.6%)	(25.6%)	(100.0%)	

Frequency of consumption of carbonated drinks The highest frequency of consumption by the respondents was 2 or more times daily while the lowest frequency of consumption was once a week. Only 13.6% and 26.2% of the respondents consumed carbonated drinks at these frequencies respectively. The frequency with highest number of respondents (42.4%) who consume carbonated drinks was 2-4 times a week while only four (1.0%) respondents claimed that they do not take carbonated drinks. Table 5.

Frequency of consumption of carbonated drinks was not significantly affected by knowledge about dental erosion ( $X^2$ = 11.10, p = 0.196). Table 6.

Table 4. Pelationshi	in between undergra	aduate course of si	tudy and knowle	dge about acid	erosion of teeth.
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Course of study	Kno	Total						
	Correct		Incorrect		Don't know			
	freq	(%)	freq	(%)	freq	(%)	freq	(%)
Dentistry	57	(40.1)	55	(38.1)	30	(21.1)	142	(100.0)
Medicine	31	(12.7)	132	(54.7))	80	(32.7)	245	(100.0)
Total	88	(22.7)	189	(48.8)	110	(28.4)	387	(100.0)

 $X^2 = 38.76, p = 0.000$ 

 Table 5: Frequency of carbonated drink consumption

 by the participants

How often do you take carbonated Drinks?	Freq	%
Never		
Once a week	4	1.0
2-4 times nor	104	26.9
Once a day	167	42.4
2 or more time	63	16.32
Total	52	13.4
Total	384	100.0

\*\*Total less than 387 because only 384 responded to the question students, they reported that 39% of the respondents answered correctly that acid was involved in the actiology of dental erosion. This difference may be due to the dental and medical background and older age group of the respondents in this study.

Expectedly, the dental students had significantly better knowledge about dental erosion compared to the medical students because they receive lectures on tooth wear lesions including dental erosion, abrasion and attrition.

Knowledge about toothwear is important because dental erosion is now being viewed as a community based dental problem just as dental caries because of emerging evidence [21-26] of high prevalence among

Relationship between	knowledge of acid	erosion and freq	juency of bevera	ige consumpti	ion
	Relationship between	Relationship between knowledge of acid	Relationship between knowledge of acid erosion and free	Relationship between knowledge of acid erosion and frequency of bevera	Relationship between knowledge of acid erosion and frequency of beverage consumpti

Knowledge about acid erosion (Definition or description of dental erosion)	Fr	Frequency of soft beverages consumption										Total
	N	ever	r Once a week		2-4 times a week		k One	Once a day		2 or more times a day		
	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)	Fre	eq (%)	Fre	eq (%)
Correct	2	(2.3)	26	(29.5)	40	(45.5)	14	(15.9)	6	(6.8)	88	(100.0)
Incorrect	1	(0.5)	51	(27.0)	74	(39.2)	37	(19.6)	26	(13.8)	189	(100.0)
Don't know	1	(0.9)	27	(24.5)	50	(45.5)	12	(10.9)	20	(18.2)	110	(100.0)
Total	4	(1.0)	104	(26.9)	164	42.4	63	(16.3)	53	(13.4)	387	(100.0)

X<sup>2</sup>=11.10, p=0.196.

#### Discussion

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Majority of the respondents (62%) were young adults within the age range 20-24 years. More than three quarter (75.7%) were aware of acid erosion of teeth while less than one quarter (24.3%) had never heard about it. This result is comparable with a reported study in which over half of the 14 year olds had heard about dental erosion [27].

Knowledge about acid erosion of teeth was low among the respondents in this study. This was because less than a third of the respondents (22.7%) could correctly define or describe what they understood to be erosion of the teeth. Although most of the students (71.8%) correctly answered that acid was involved in the actiology of dental erosion, this knowledge was not definite because 60% of them incorrectly answered that sugar is involved in the aetiology of erosion of teeth. This indicates that there is a knowledge gap.

The (71.8%) of respondents in this study that correctly answered that acid is involved in the aetiology of dental erosion is higher than that reported by Milosevic *et al* [27]. In their study of 14-year old population groups. Prevention of this dental condition among population groups will be greatly enhanced if they are knowledgeable about the condition, its causes and associated dental problems. Also, knowledge about dental erosion among medical and dental students is important because they will become health professionals and have the responsibility of impacting information concerning health issues to the general population. It is therefore recommended that the school curriculum should include teaching of toothwear alongside dental caries and periodontal disease to both the medical and dental students.

Frequency of consumption of soft beverages among the respondents in this study was relatively high because over a quarter of them (29.7%) drank carbonated drinks as frequent as once (16.3%) to two or more times daily (13.4%). The frequency of consumption among the respondents in this study can be said to be lower than those obtained in the study by Milosevic *et al* [27]. They reported that 25% of cases (adolescents that have dental erosion) and 20% of the controls drank fizzy drinks 2 or more times daily compared with 13.4% recorded in this study while 26% of the cases and 24% of the controls in their study compared to the recorded 16.3% in this present study consumed carbonated drinks once a day. The result of this study supports the observation that there has been an increase in the consumption of carbonated drinks over the last few decades [30]. In our study, a 99% consumption prevalence of carbonated drinks among the respondents was recorded and this consumption prevalence is greater than the 25% consumption prevalence that was reported in a previous Nigerian study [29].

Knowledge about acid erosion of teeth should ideally influence the attitude and behaviour of the individuals to maintain oral health by adopting preventive measures like reducing frequency and quantity of consumption of acidic soft beverages. In this study the effect of knowledge about acid erosion of teeth is not seen because there was no statistical significant difference between knowledge of acid erosion and frequency of consumption of acidic soft beverages among the respondents.

#### Conclusion

The level of knowledge about acid erosion of teeth was found to be low among the respondents. A highly implicated causative factor of dental erosion i.e. consumption of carbonated drinks was common among the students. It is suggested that the undergraduate curriculum for medical and dental students should include the teaching of tooth wears. There is a need for dental health education in the community regarding information on the effects of soft and alcoholic beverage consumption on the dentition and prevention methods.

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