

Association Between Socio-Economic Status, Aerated Drinking Pattern and Gastric Alterations in Pediatric Dental Patients with Erosive Tooth Wear - Cross Sectional Study

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ABSTRACT

AIM: To assess socioeconomic factors, aerated drinking habits, and gastric changes affect erosive tooth wear in pediatric dental patients in the south Indian population.

METHODS: Cross-Sectional study was done in pediatric dental patients who visited saveetha dental college for general dental check up. Parents/caregivers completed a questionnaire that included independent variables such as frequency of sports drink consumption, acid/soda consumption, chewing gum usage, recurrent vomiting, gastrointestinal disorders, vomiting after eating, and socioeconomic status.

RESULTS: Erosive tooth wear was found in those who drank a lot of aerated drinks, chewed gums a lot, had a low socio-economic position, and the majority of carers had studied for at least 12 years. High intake of Aerated drinks was linked to tooth erosion (OR 3.42; 95 percent CI: 1.18–9.23). Erosive tooth wear was less common in children whose caregivers had completed four years of schooling or less (OR 0.39; 95 percent CI: 0.17–0.88).

CONCLUSION: Increased levels of Aerated drink intake are presented with erosive tooth wear. Erosive tooth wear is less likely in children whose caregivers have a lower educational level.

Key words: Socio economic status, Aerated drinks, Dental erosion and Pediatric children

INTRODUCTION

Erosive tooth wear, also known as dental erosion, is an irreversible disorder in which the dental structure is damaged without the presence of microorganisms. It's also only described as a surface issue, unlike caries, which has been proven to have harmful effects on both the surface and subsurface (1). In addition to the loss and softening of the surface, erosion

can disclose mineral disintegration beneath the surface. Erosion of the teeth is a chemical and mechanical process that can affect both primary and permanent teeth. In the presence of acidity, the dental tissues weaken, resulting in morphological alterations such as shallow enamel concavities, which can advance to the dentine if the acid contact is prolonged. Previous studies have been done on dental erosion using O'Sullivan index (2) (3) shows prevalence of dental erosion wear was ranging from 25.10% for 8 to 12 year children to 57.30% for 10 to 15 year children. A recent comprehensive review was published with the purpose of assessing the causes of erosive tooth wear in the hard tissue of the permanent dentition of Children and teenagers (4). Based on nine different tooth wear indicators, another study found that the incidence of dental erosion affecting the dentine in children ranged from zero to 82.0 percent in the primary dentition and zero to 54.0 percent in the permanent dentition (5). According to longitudinal studies, tooth loss in the primary dentition can result in the erosion of the hard tissue in the succedaneous dentition.

Dentine abrasive wear lesions have been linked to abrasive wear lesions in the first permanent molars and erosive tooth wear in the primary dentition, making them more likely to develop erosive lesions in the permanent teeth (6). Extrinsic acids are acids that come from a person's food that have been linked to erosive tooth wear. In vitro and cross sectional studies have connected tooth erosion to soda, sports drinks, chewing gum, holding beverages in the mouth for a long period, and consuming acidic drinks before bedtime. Intrinsic acids, such as self-induced vomiting, appeared to be linked to tooth erosion, but no link between gastrointestinal disease and tooth erosion was discovered. There is evidence that acidic foods and beverages contribute to erosion growth. The pH of a dietary material, on the other hand, is not a reliable measure of its ability to cause erosion since other factors influence the erosive mechanism (7,8). These factors may be chemicals like calcium, phosphate, fluoride content, adhesion, chelating properties and pKa values, behavioral factors like lifestyle, use of aerated drinks, eating and drinking habits(9). Due to inherent characteristics, gastric acid accessing the oral cavity and teeth as a result of vomiting or gastroesophageal reflux causes tooth erosion. Teeth erosion induced by intrinsic causes has only been noticed in those conditions because it does not manifest clinically until stomach acid has worked on the dental hard tissues on a regular basis for several years.

Given the significance of the topic, The fact that erosional dental wear in childhood may foretell the condition of the permanent teeth, as well as the fact that the topic is still up for debate. It was assumed that socioeconomic factors, aerated drinking habits, and stomach alterations induced erosive tooth wear, and that These elements could have an impact on a child's erosive experience. As a result, the goal of this study was to find out what socioeconomic and behavioral factors influence dental erosion in youngsters to particularly respond to the questions: "What are the socioeconomic consequences?". Patterns of aerated drinking, the economic characteristics, and the gastric changes brought on by erosive tooth wear in Children aged 8 – 12years old ? What's more, how common is it? at this age group of erosive tooth wear?"

MATERIALS AND METHODS

Study setting

This study includes the pediatric dental patients who visited Saveetha Dental college, Chennai. Caregivers were asked to fill the questionnaire Including consumption of acid/soda, chewing gum, vomiting after eating frequency and their socio-economic status. The patients and their caregivers participated in the study of their own free will after the study purpose was clearly explained. Selection bias was avoided as all the children with the dental erosion between age groups of 8 to 12 years were equally participated in this study. The method of sampling used for this cross sectional study was simple random sampling. To minimize sampling bias large samples were selected with different profiles. The study was approved by the Review Board of Saveetha Institute of Medical and Technical Sciences.

Study design

This was a cross-sectional study aimed at pediatric dental patients in the age category of 8 to 12 years in the south Indian population. 100 children with dental erosion who visited saveetha dental college for dental treatment were included in the study. The children along with their caregivers participated in the study. The children were to be 8–12 years old and

from the south Indian population, with at least one erupted permanent teeth. The study excluded children who were uneducated, had systemic disorders, or were undergoing orthodontic treatment. Standardized clinical examinations were performed in a sitting position in a comfortable environment using sterilized Under artificial light, use clinical mirrors, ballpoint probes, and gauze pads. Personal protective equipment was worn by the dental surgeons.

The dependent variable was erosive dental wear as determined by the O'Sullivan index. Glossy appearances, excavation with shallow protuberances, and enamel degradation with dentine exposures were examined on the occlusal surfaces of permanent incisors, as well as the buccal/labial, lingual/palatal, and incisal surfaces of primary dentition. The presence of erosive toxin was studied using this category variable. Age, gender, aerated and acid drinking practices, head of household education, and information on stomach alterations were all categorical independent variables. The head of the household's schooling was assigned a socioeconomic status. Frequency of aerated/soda consumption, frequency of chewing gum use, frequency of sports drinks consumption, frequency of gastrointestinal disorders, vomiting, and subsequent vomiting after overeating were all assessed based on information provided by the caregiver. The Dental Aesthetic Index—DAI was used to calculate dental caries (DMFT) and dental crowding.

Data Collection

The independent variables were gathered as follows: caregivers completed a questionnaire that included questions about the children's traits, socioeconomic status, and acid reflux.

Patterns of drinking and changes in the stomach. The education of the household head was divided into four categories: 12, 9–11, 5–8, and 4 years of study. Acid juice/soda and low-consumption sports drinks were designated as such. Low frequency (rarely/never) and high frequency (recurrent vomiting and stomach diseases) are the two categories of recurrent vomiting and stomach disorders (a few times a week or more), Low frequency (rarely/never) and high frequency (regularly/constantly) (constantly) There were two groups of people that chewed gum (a few times a week or more) The frequency of vomiting was divided into two categories after overeating: low frequency (rarely/never) and high frequency (frequently) (a few times a week or more). Clinical exams were used to assess dental caries (DMFT) and dental crowding (Dental Aesthetic Index - DAI). If a child had one decayed tooth, they were categorized as having caries, and if they had none, they were classified as not having caries. There was evidence of dental crowding. If the DAI score was 25, it was considered absent, and if the DAI score was 25, it was considered absent.

STATISTICAL ANALYSIS

For statistical analysis, Windows 10's SPSS software version 19 was employed. We used descriptive and unadjusted statistics. Adjusted logistic regressions modeling with the determination of odds ratios (OR), 95 percent confidence intervals (CI), and a significance level of 5% were used to examine the link between the independent factors and the prediction of the dependent measure.

RESULTS

In this study sample consists of 100 school children with age groups between 8 to 12 years. Sample size was 100. All the children with dental erosion who came for dental treatment were included in the study. (Figure 1) Bar Graph denotes the age wise distribution of the study population. 8 and 10 years have the most with 30 participants each. (Figure 2) Bar graph denotes the relationship between chewing gum consumption and dental erosion. It shows that people who consume a high frequency of chewing gum are prone to dental erosion. Erosive tooth wear was more common in individuals who drank a lot of aerated drinks, chewed gums a lot, had a low socioeconomic standing, and the majority of carers had studied for at least 12 years. Unlike the sports drink consumption trend, acid juice/soda consumption was quite popular. Children who drank sports drinks regularly (2–4 times per week or more) had 3.42 times the chance (95 percent confidence interval 1.21–9.63) of having erosive tooth wear as those who drank them seldom (rarely/never). Erosive tooth wear was 61.0 percent less probable in children with caregivers with equivalent or less than 4 years of study than in children with

caregivers with equal or more than 12 years of study (OR 0.39; 95 percent CI 0.17–0.88). The variables' descriptive statistics are given in (Table:1)

Figure: 1 Bar graph denotes the age wise distribution of study population

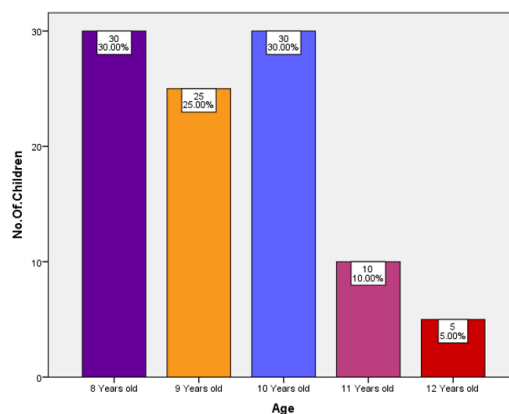


Figure: 2 Bar graph denotes the relationship between chewing gum consumption and dental erosion.

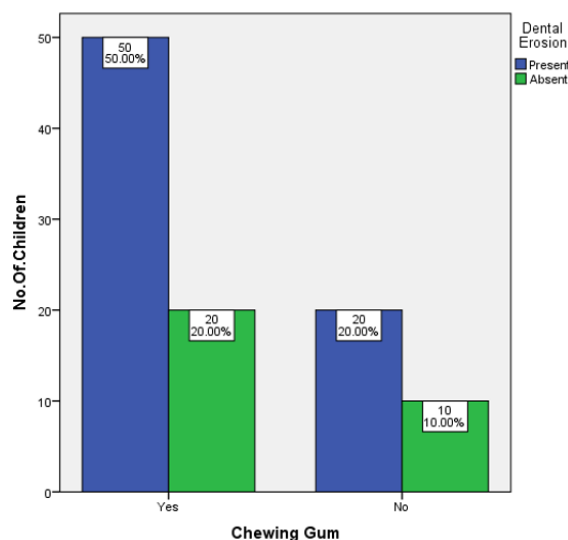


Table: 1 The descriptive statistics of the variables - Mean and standard deviation of each variable

	Dental Erosion	Socioeconomic status	Aerated Drinks	Chewing gum	Gastric disorder	Vomiting	DMFT	Age	Dental Aesthetic index	O'Sullivan index	sex
N Valid	100	100	100	100	100	100	100	100	100	100	100
Missing	0	0	0	0	0	0	0	0	0	0	0
Mean	1.30	2.00	1.50	1.30	1.60	1.60	1.00	9.35	1.20	1.00	1.55
Std. Deviation	.461	.778	.503	.461	.492	.492	.000	1.158	.402	.000	.500

DISCUSSION

This study was done to find out whether socioeconomic characteristics, acid drinking habits, and stomach alterations were linked to erosive tooth wear in youngsters aged 8 to 12. Children with lower educational levels of their carers have less incidence of dental erosion, according to available research (10). When these characteristics are taken into account, excessive drinking of sports drinks and chewing gum are main etiological factors of dental erosion, confirming the study hypothesis that socioeconomic factors and aerated drinking habits influence erosive tooth wear (11). The usage of sports drinks and chewing gum by children and teenagers is a source of worry. Countries were asked to establish legislation limiting the sale of sports drinks to such persons, similar to the legislation prohibiting the sale of tobacco products to protect children's health, based on the "Conventions on the Rights of the Child" and World Health Organization standards. Because of the increased risk of obesity, diabetes, and tooth erosion, the American Academy of Pediatrics issued research in 2011 advising children and adolescents to avoid or limit their consumption of carbohydrate-containing sports drinks. Furthermore, the research emphasizes that the physical activity regimens of children and teenagers do not necessitate this level of energy consumption; rather, sports drinks add extra calories to the diet (12). It's crucial to understand the behavior of youngsters and teenagers who have consumed a lot of sports drinks in the past. As a result, a study was conducted to determine which boys as well as girls use this type of product, as well as the reasons for and situations in which they are used (13). As a result of the good taste offered by the product, 12 to 14 year old children found consuming sports drinks more than two times a week (13). Another noteworthy finding was that when the kids weren't exercising, they drank more sports beverages. The age group, on the other hand, is not the same as in the present study. There is really no variation in sports drink consumption patterns between children aged 9 who exercise and those who do not, proving that sports drink use is not constrained to athletes (14)(15). As a minimum educational requirement of the household's head could be a valid predictor, the socio-economic level was calculated. Erosive tooth wear was less common in children whose caregivers did not have a high school diploma, possibly due to the importance of food consumption (16). Erosive tooth wear was less likely in children whose caretakers had a limited education due to the importance of food consumption. People from lower socioeconomic backgrounds are likely more concerned with feeding their children than with supplying drinks and carbonated beverages, and the cost of these things makes them difficult to obtain. Another study found that children with tooth erosion were more likely to be from low-income homes, highlighting the fact that there is still no consensus on the subject (17). While the study did not look at diet habits, it's worth mentioning that a cohort study found that lower maternal education, lower income, and a high and moderate body mass index (BMI) were all linked to a higher likelihood of eating processed foods (18). Children and teenagers with high parental education levels have a healthy eating habit, according to a recent systematic analysis of rising countries. The authors argue that more research is needed in developed nations such as Brazil to better understand the unfavorable correlations between income and/or education and eating habits (19). The current study found no correlation between gastric changes and erosive tooth wear, despite reports of such links in the literature (20). A new study of 8.6-year-old children who had their teeth checked for gastroesophageal reflux discovered that those who had acid reflux had more decaying teeth than those who did not.

Caregivers were asked to complete out a questionnaire about their children's stomach changes in the current study. One of the explanations for the lack of linkage could be this. According to a new analysis on eating disorders such as bulimia nervosa, the average incidence of eating disorders in the 9–10 year age range is poor (1.4 percent; 95 percent, CI 1.0–1.8 percent) (21). The prevalence of frequent vomiting and vomiting after overeating was higher in the current study, but no link to erosive tooth wear was found. Other randomized trials that used the same index indicated that this cohort had a distinct incidence of erosive tooth wear. Erosive tooth wear was seen in fewer children. Even though the prevalence was lower than in other studies, it should not be overlooked. As a result, health experts should educate both caregivers and children about the risks of taking sports drinks on a regular basis (22). Identifying dental erosion in children and their causes should be acquainted with pediatric dental surgeons in order to prevent the problem from worsening. A proper sample method, examiner preparation, use of a validated screening aid that delivers a trustworthy result, and a pre-tested survey are all included in the study.

Oral health, plaque presence, salivary consistency, acidic food intake, periodicity, and alkaline intake style also weren't considered significant confounders in the study, which only included children aged 8 to 12. As a result, extrapolation of the findings should be approached with caution. In addition, the acidity of carbonated drinks, juices, or soft drinks, as

well as the sugar level of gum chewing, were not determined. To learn more about the evolution of erosive tooth wear, extensive studies are also required.

CONCLUSION

It was revealed that erosive teeth wear is fairly common. Two to four sessions per week or more of a sports drink has been connected to erosive tooth damage. Erosive tooth wear was reduced in youngsters whose caretakers had a lower level of education of less than four years.

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