A Knowledge, Attitude and Practices of Soft Drinks among Adolescent Students and their Dental Health: A Questionnaire Study

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INTRODUCTION

Nowadays, the consumption of soft drink is much favored by every generation. No sector is left affected by its influence. People are consuming soft drinks almost every day without even knowing the ill-effects and the harm of soft drinks on their dental and general health.¹ A recent study in USA indicates a definitive relationship between cumulative caries scores and frequency of mealtime and between-meal with carbonated beverages intake.² Wear of enamel and dentine can occur through attrition, abrasion and erosion the theoretical process of abfraction may add a fourth predisposing factor to wear. Enamel and dentine appear particularly susceptible to erosion, and this chemical wear process may act in synergy with physical wear processes, particularly abrasion. The importance of erosion to tooth wear has been recognized for many decades with intrinsic and extrinsic acids identified as etiological agents. More recently, much attention has been directed towards soft drinks and epidemiological, laboratory and clinical research have demonstrated detrimental effects on enamel and dentine. Studies in situ do however, suggest that there is a considerable range of individual susceptibility to erosion.³ Immature enamel is porous and more easily dissolved by acids until the final intraoral maturation of the surface enamel has occurred. Normally as the immature enamel is bathed by salivary ions, it becomes progressively harder, less penetrable and fairly resistant to acid attack. However, enamel maturation takes time and therefore young children are at greater risk of dental caries if the acidogenic challenge is excessive. Erosion occurs due to the dissolution of the enamel, and the pH falls below 5.5 (critical pH).²

Dental erosion can be induced as a result of many acidic drinks such as fruit juices, carbonated soft drinks. Many epidemiological studies have cleared confirmed relation between acidic drink intake and erosion. The patients drinking more carbonated drinks, drinking from a can more frequently have more chances of dental erosion then the control subjects. The authors concluded that in the erosion patients, oral pH became lower for more time and drinking habits may play a great impact on dental erosion.⁴
Aim and Objectives

- To evaluate knowledge, attitude and practices of soft drink consumption and their dental health between age group 18-25 years students.
- Amount and frequency as factors influencing the changes on dental health.

MATERIALS AND METHODS

A cross-sectional study was carried out among MBA students of private college of management, Uttar Pradesh, India. The target population for this study was 100 students with no gastric disorders. In this study, a questionnaire was prepared, which consists 4 questions related to knowledge, 5 questions related to practice and 3 questions related to attitude of soft drink consumption among MBA students. The questionnaire contains 6 close-ended questions and 6 open-ended question. The questionnaire was checked for validity. The oral checkup of the students was performed by single examiner. The aims and objectives were explained to all the students before starting the study, and a written informed consent was obtained from all the students prior to the beginning of the study. The study was approved by the Ethical Clearance Committee of the institution.

RESULTS

By this study, we came to know that approximately 73% of students preferred carbonated drinks over fruit juices and other beverages. About 50% of students preferred to drink cola 2 drink, 23% students preferred cola 1 drink while remaining students preferred fruit juices and other beverages [Graph 1]. Approximately, 58% of students consumed beverages twice/day, while 45% consumed 2 bottles/day and 18% consumed 3 bottles/day. 13% of students consumed beverages once per day, 17% consumed thrice/day, 12% consumed more than three times/day and more than 3 bottles/day [Graph 2]. Approximately, 60% of students believed that there is an increase in consumption of carbonated beverages over time while 40%students believed that consumption of these drinks decreased with time [Graph 3]. Approximately, 54% of the students were aware of the ill-effects of consuming carbonated beverages, but approximately 39% of students are not aware of the calories intake by consumption of a glass of coke and sugar free carbonated beverages. About 82% of the students thought that lemon 1 acts as a relieving agent in stomach problems [Graph 4]. About 61% students did not experience ill effects of consuming carbonated drinks while 39% experienced ill-effects of consuming carbonated beverages [Graph 5]. 55% of students did not feel any change in their oral environment after soft drink consumption but many of them, approximately 48% felt discomfort after few minutes of soft drink consumption [Graph 6]. 58% of students consumed soft drinks by bottle, 28% by using glass and 14% by using straw [Graph 7].

DISCUSSION

There is the ideal environment for development of dental caries by interaction between highly acidic pH of soda and sugar in soda pop. Since there is no sugar in diet soda hence, it cannot produce acid from this beverage alone, but when consumed with high sugar beverages, it can produce acid that cause erosion.[5] Soft drinks and commercial fruit juices are known to be acidic and are also known to be involved in the development of erosive lesions in dental enamel. All the beverages caused a fall in salivary pH but to differing degrees. This variation in effect could be attributed to the different composition of the beverages studied the different intrinsic pH values and the different buffering capacities, as previously proposed. The erosive effect of a soft drink depends not only on its intrinsic pH value but also on its buffering effect.[6]

Erosion can be caused by soft drinks which are carbonated, have a low pH, with sugar and a variety of other additives.[7-9] Soft drinks intake at meal times are less harmful than those consumed alone, and continuous sipping is more harmful to teeth than taking a drink at once.[10] Some of the soft drinks especially cola beverages have property to be retained on the tooth surface, which is hard to remove by saliva and hence increase the cariogenicity.[11] The acidity of drinks is considered as main reason in the development of dental erosion; this total acid level (known as titratable acid), rather than the pH, is believed to be an vital factor in dental erosion due to its hydrogen ion availability for interaction with enamel.[12,13]

Dental erosion has been defined as the dissolution of dental hard tissue without involvement of bacteria. It is well-known that acid containing food and beverages may lead to erosive damage of dental enamel. The acids in soft drinks are the major etiological factor of dental erosion. Moreover, a wide range of extrinsic and intrinsic factors are involved in the process of dental erosion. The combination of these factors, e.g. high soft drink consumption, or eating disorders with acid regurgitation, leads to greatly enhanced tooth mineral loss.

The early stages of enamel erosion were characterized by demineralization of the enamel surface leading to softening and nano-structural changes. The subsequent stages of enamel...
erosion were characterized by material loss and the structural collapse of dental enamel. Some beverage modifying agents, such as citrate and fluoride, have been successfully added to acidic solutions to reduce the dissolution of human enamel. The effect of proteins in the saliva that bind to the enamel surface has been investigated with respect to the reduction of erosive effects. Moreover, the interaction of milk-proteins with human enamel has been tested. In both cases, a reduced erosive enamel damage has been demonstrated.\cite{14}

Graph 2: The frequency of consumption of soft drinks per day

Graph 3: The amount of consumption of soft drinks over a period of time

Graph 4: The ill effects of drinking carbonated beverages, calorie intake by soft drink consumption, knowledge about lemon 1 as a relieving agent and knowledge about sugar free carbonated beverages

Graph 5: The ill effects of consuming carbonated beverages

Graph 6: Any change in oral environment and any feeling of discomfort after soft drink consumption

and sport drinks, are almost exclusively acidic (pH < 4.0) in nature in order to maintain a fresh and fizzy mouth feel (carbonated beverages) and to prevent rapid growth of bacteria.

Reduce the frequency of dietary intake of acidic beverages and foods: Frequency and duration of direct contact between teeth and acids are important factors for the development of erosive lesions. Prolonged sipping of acidic drinks will increase the risk of erosion while gulping will minimize the risk. Adopt drinks habits that limit contact time with teeth: Using a straw will reduce contact time between teeth and acidic drinks. Rinsing with water or drinking milk immediately following the drinking of acidic beverages will accelerate the clearance of acids and help return the oral pH to neutral. Avoid the misuse of acidic medications, including vitamin C: Chewing this type of medication or using
such pills as lozenges increases risk for dental erosion. Acidic medications should be swallowed, if possible.

Most soft drinks contain phosphoric and citric acids, but malic, tartaric, and other organic acids may also be present. The presence of these polybasic acids in beverages is important because of their ability to chelate calcium even at higher pH. The prevalence of dental erosion in this study was high, and the frequency of consumption of potentially erosive soft drinks with low pH values was the only plausible risk factor identified for the development of dental erosion.

CONCLUSION

From the conducted survey and above the discussion, we came to the conclusion that most of the students preferred to drink carbonated drinks (Cola 2 mostly) over fruit juices. It was surprising to note that they were aware of the ill-effects of carbonated beverages, still their consumption of soft drinks was increasing day by day, but they have not experienced any ill-effects of consuming carbonated beverages. Most of the students were not aware of sugar-free carbonated beverages and calories intake by consuming one glass of carbonated beverage. Many of the students showed early signs of erosion and dental caries also. They felt discomfort for few minutes after the consumption of soft drinks. Many of them believed that Lemon 1 acts as a relieving agent and most of the students believed that the consumption of soft drink is increasing day by day.

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REFERENCES


**QUESTIONNAIRE**

Q1. Most preferred soft drinks?
   A. cola 1
   B. cola 2
   C. fruit juice
   D. other

Q2. How many times you consume soft drinks?
   A. once a day
   B. twice a day
   C. thrice a day
   D. more than thrice a day

Q3. Amount of carbonated beverages consume?
   A. 1 bottle/day
   B. 2 bottles/day
   C. 3 bottles/day
   D. more than 3 bottles/day

Q4. Consumption of carbonated beverage is increased or decreased?
   A. increased
   B. decreased

Q5. Are you aware of ill effects of drinking carbonated beverages?
   A. yes
   B. no

Q6. Are you aware of calorie intake?
   A. yes
   B. no

Q7. Do you think Lemon 1 acts as a relieving agent?
   A. yes
   B. no

Q8. Are you aware of sugar free carbonated beverages?
   A. yes
   B. no

Q9. Did you experienced any ill effects of consuming carbonated beverages?
   A. yes
   B. no

Q10. Did you feel any change in your oral environment after soft drink consumption?
   A. yes
   B. no

Q11. Did you feel any discomfort after soft drink consumption?
   A. yes
   B. no

Q12. How do you take soft drinks?
   A. bottle
   B. glass
   C. straw