KAP STUDY

DENTAL SENSITIVITY ASSOCIATED WITH CONSUMPTION OF FIZZY DRINKS: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Sugary carbonated drinks might be the risk factor in patients with complaint of sensitivity. Therefore, the aim of the study was to evaluate consumption of fizzy drinks with sensitivity as consumption of fizzy drinks is being considered as a must societal habit.

Methods: A cross-sectional study was carried out at private tertiary medical university among n=149 study subjects between nineteen to twenty-five years of age. A self-designed close ended structured questionnaire was used to assessed sample's intake and effects of fizzy drinks on oral cavity. Percentages and frequencies were recorded for qualitative variables. However, means and standard deviation were recorded for quantitative variables. Furthermore, spearman rank correlation test was used to find out the association among intake of fizzy drinks with dental caries and sensitivity. Level of significance was considered as $p<0.05$.

Results: Among n=149 study participants, 91.9% (n=137) were consuming fizzy drinks. Tooth ache and sensitivity (of mild degree) was reported in 73.7% of the students. Among those who were consuming fizzy drinks (n=137), 65.7% did not have a history of dental caries in recent past. However, 73.7% (n=101) were experiencing mild degree of sensitivity since the intake of soft drinks. Also, tooth ache was reported in 49.6% of those who were drinking carbonated (fizzy) drinks. A significant correlation was observed between the sensitivity and the duration of intake with a strong positive association r=.830 and a p value of 0.045.

Conclusion: The dentine hypersensitivity is strongly associated with consumption and time to exposure of carbonated drinks.

KEYWORDS: Dental Sensitivity, Carbonated Drinks, Oral Health.

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INTRODUCTION

Oral health conditions have significant physical, social and psychological health implications: associated with quality of life of an individual[1]. Nearly half of the total world's population is still living in dilemmas of untreated oral diseases though the health care expenditures are continuously rising in current times[2]. Soft drinks contain abundant sugar, which may be responsible for carious activity in oral cavity [3].

Dental caries is started by break down of the external tooth surface because of acids delivered by microorganisms in dental plaque[4]. Likewise, in dental plaque, the pH drops from 7 to 5.5 (or lower) for a time of 20 minutes after a 2 minutes wash with glucose while the pH in the plaque rises gradually to normal levels in the next 40 minutes[5].

From the year 2011 to 2015 the growth rate of carbonated drinks industry was about 6% globally which is predicted to rise further by 2020[6]. The World

Health Organization's Global Epidemiology bank uncovered a positive association between per capita accessibility of sugar and dental caries in kids from ages 6-12 in fifty countries. The vast majority of this sugar was devoured by means of fizzy beverages[3]. Studies uncover that sugar sweetened drinks particularly soda beverages were the main reason behind increased rate of admission to doctor's facility for dental care, similarly in 1990-2009 dental treatment has increased by twice in New Zealand[7-11].

To deal with examination stress and anxiety undergraduate students of Public Sector University in Pakistan around 39% were indulged in the habit of caffeine and expanded utilization of instant energy drinks[12]. Association between soda beverages and dental erosion could be more pronounced in a lower income group of Indian population[7]. Dental caries has been accounted for to be the most predominant illness in children of Pakistan, 5 times more pervasive than Asthma and 7 times more typical than hay fever[13]. In Karachi prevalence of caries in children around 6-14 years was found to be 71% according to a study[14]. A study in Iran showed relationship between consumption of fizzy drinks and erosion of teeth, showing annual consumption of 48 litres per person which is considerably an elevated level[15].

Hence, healthy oral cavity is an important constituent; the human body is affected by regular usage of acidic beverages. It is critical to comprehend and feature the risks of fizzy beverages which are expended on a gigantic scale in the global and national market. Therefore, consumption of carbonated beverages and its association with dental sensitivity was the basic aim of the study.

METHODS

A cross-sectional study was carried out at private tertiary medical university from December 2016 - August 2017. Data was collected from 149 students, irrespective of gender and between nineteen to twenty-five years of age. A self-designed close ended structured questionnaire was used to gather information over study variables which were pretested first. The questionnaire was based on 11 questions which were regarding individual's intake and effects of fizzy drinks on oral cavity.

Written consent was taken from all study subjects before they were asked to fill the questionnaire. Also consent was taken from all department heads in their respective institutes. All the data was congregated in university hours mainly during dental OPD timings. Students with complains of acid reflux, citrus candy consumption and recent history of dental scaling were excluded from the study. Data was analysed through SPSS software version 20. Percentages and frequencies were recorded for qualitative variables. However, means and standard deviation were recorded for quantitative variables. Furthermore, spearman rank correlation test was used to find out the association among intake of fizzy drinks with dental caries and sensitivity. Level of significance was $p<0.05$.

RESULTS

Current study was consisted of n=53 males and n=96 females with a mean age of 20.91±2.49 years. Among the total 149 study subjects ninety-two per cent (n=137) reported that they consumed fizzy drinks. On asking about frequency of consuming fizzy drinks majority of the sample i.e. 58% (n=87) stated that they consumed occasionally, 39% (n=58) reported once daily and only 3% (n=4) of the subjects never consumed drinks. When we asked about the history of consumption, majority of the sample 80.5% (n=120) reported that they were consuming fizzy drinks for more than four years, about 14% (n=21) stated that they were in habit of drinking fizzy drinks less than four years and only 5% (n=8) subjects gave the history of consumption for less than one year. Sixty per cent (n=90) of the subjects stated that they consumed fizzy drinks with their meals and about 39% (n=59) reported that they have their meals without fizzy drinks. (Table 1)
Among the total (n=137) subjects who were consuming fizzy drinks when we asked about the problem of dental sensitivity majority of the subjects 74% (n=101) stated of mild sensitivity while 22 % (n=30) and 4 %(n=6) reported moderate and severe sensitivity respectively. On asking about previous history of dental caries majority 66% (n=90) responded that they don't have dental caries however 34% (n=47) of the subjects responded affirmatively. (Table 2)

Upon observing the outcome variables i.e. dental sensitivity and its association with duration, consumption of carbonated drinks and preferred intake volume. Statistically significant correlation was found with duration of intake of carbonated drinks with dental sensitivity with a strong positive association $r=0.830$ and $p<0.045$. Furthermore, a weak positive correlation was found between intake of fizzy drinks and sensitivity among subjects $r=0.115$ and $p<0.002$. (Table 3)

DISCUSSION

Current study reported higher prevalence of mild levels of dental sensitivity problems among consumers of carbonated drink. This association was strong between extended history of consumption and occurrence of dentine hypersensitivity as the acidic pH of carbonated drinks dissolves the outer mineral layer of the enamel thereby exposing the dentinal

tubules. The effect like such is aggravated when mechanical tooth wear occurs simultaneously when the brushing techniques are inadequate. In this regard, a frequent sip of water is beneficial for neutralizing the pH of oral cavity thereby preventing the teeth from the acid associated tooth surface loss.

Nowadays the consumption of sweetened beverages is becoming common in low and middle income countries[16]. Although such drinks attract people from all age groups however adolescent and young adults are highly vulnerable for their increased tendency towards socialization, exam stress and instant energy boost, etc. Likewise, the intake of energy drinks was observed in 91.9% of undergraduate students with daily consumption at about 38.9% of the students being slightly lower than studies on from other regions since they were health conscious medical students who were using it during times of stress only[16-19].

A longitudinal study over Swedish adolescent observed higher risk of developing dental erosion in between meal soft drink users[20]. We found more than half of the students drinking it between meals with greater than three fourth consuming it since last four years. Considering the medical profile of the study participants, the oral hygiene habits were observed to be adequate in majority of the students and perhaps can be a potential reason for reduced dental pain. Although brushing frequency and usage of fluoridated tooth paste was assessed in our study. But our data was lacking information over other tooth mineralization factors such as calcium rich beverages which makes teeth resistant to erosive wear and this might have distorted our findings to an extent[21].

There were some major limitations and associated biases. Since it was a questionnaire based cross sectional study defined for medical students only, the oral hygiene and food habits recorded would be quite different than other segment of population. Also we did not inquire about using up of steroid inhalers in the case of participants with known history of asthma as its relation with dental erosion is still a debate. In addition to this we could not infer the occurrence of dental sensitivity with reference to a particular gender as the proportions were not balanced in our case.

This research study relied on self-reported measure for assessing dental sensitivity. The results of this study would have been more accurate if the outcome measure was further validated by clinical parameters. A Cross sectional study over Nigerian under graduate students following the similar parameters as used in this research could not establish an association between dental sensitivity and carbonated drink usage[22]. We instead observed a weak positive correlation between dental sensitivity and carbonated drinks which was consistent with other researches[23-25]. However, cross sectional nature of this study cannot determine temporal nature of this relation and more evidence is needed in this regard.

CONCLUSION

The current study has reported mild levels of dentinal hypersensitivity among consumers of acidic beverages. However further research is required to establish the causative association of these drinks through analytical studies.

TABLE 1: PATTERN OF CARBONATED DRINKS CONSUMPTION AMONG STUDY SUBJECTS

YES	137	91.9
NO	12	9.1
FREQUENCY OF CONSUMPTION		
ONCE DAILY	58	38.9
RARELY	87	58.3
NEVER	4	02.6
HISTORY OF CONSUMPTION		
LESS THAN A YEAR	8	5.36
1-4 YEARS	21	14.0
MORE THAN 4 YEARS	120	80.5
INTAKE WITH MEALS		
YES	90	60.4
NO	59	39.4
PREFERRED VOLUME		
350 ML	98	65.7
500ML	31	20.8
1 LITRE	12	08.0
1.5 LITRE	8	05.0

TABLE: 2 DESCRIPTIVE ANALYSES OF ORAL HEALTH PROBLEMS AMONG THE STUDY SUBJECTS

VARIABLES	FREQUENCY (N)	PERCENTAGE%
INTAKE OF FIZZY DRINK		
YES	137	91.9
NO	12	9.1
FREQUENCY OF CONSUMPTION		
ONCE DAILY	58	38.9
RARELY	87	58.3
NEVER	4	02.6
HISTORY OF CONSUMPTION		
LESS THAN A YEAR	8	5.36
1-4 YEARS	21	14.0
MORE THAN 4 YEARS	120	80.5
INTAKE WITH MEALS		
YES	90	60.4
NO	59	39.4
PREFERRED VOLUME		
350 ML	98	65.7
500ML	31	20.8
1 LITRE	12	08.0
1.5 LITRE	8	05.0

TABLE 3: ASSOCIATION BETWEEN SENSITIVITY AND CONSUMPTION PATTERNS OF CARBONATED DRINKS

VARIABLES	DENTAL SENSITIVITY	
CONSUMPTION PARAMETERS CORRELATION WITH CARBONATED DRINKS	**P-VALUE***	**R****
INTAKE OF CARBONATED DRINKS	0.002*	.115
DURATION OF INTAKE	0.045*	.830
PREFERRED VOLUME	0.060	.154

*Spearman ranked correlation, level of significance <0.05
** Spearman rho

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