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## Knowledge, Attitude and Practices Regarding Consumption of Carbonated Beverages among School Children Residing in New Delhi and Ghaziabad

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**Material and Method:** 350 students in the age group (8-17 yrs.) were included in the study, divided into two groups based upon their socio-economic status. Self-structured objective type questionnaire containing 11 questions, were prepared and distributed.

**Statistical Analysis Used:** The data was analysed statistically using Pearson Chi-Squares test.

**Results:** Children of upper income group had more knowledge regarding ill effects of beverages as compared to lower income group ( $p < 0.05$ ). Beverages were more popular among upper income whereas milk was favorite among lower income group ( $p < 0.001$ ). In upper income group taste was the most influencing factor for the choice of the drink whereas in lower income friends and family were ( $p < 0.001$ ).

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**GJMR-J Classification:** NLMC Code: WU 300



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**Conclusion:** The frequency of consumption is alarming and the target group is still unaware of the fatal health effects of these drinks, suggesting the need of immediate attention by health and concerned government authorities worldwide

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## I. INTRODUCTION

In today's world, consuming sparkling beverages has become a trend. As an undesirable increase in the ease of availability of these soft drinks its consumption has drastically taken a leap over the past few years. Fluid consumption patterns of children are now more diverse compared to the past years, as carbonated soft drinks and fruit juices have replaced the consumption of water and milk.

These carbonated drinks consist of water, carbon dioxide, color, additives and preservatives. In a tropical country like India, which has torrid summers, there is substantial market for aerated soft drinks. The per capita consumption of carbonated drinks in India is about <sup>4</sup> bottles per year, which is less compared to the

other developing countries such as Pakistan, Bangladesh, Egypt, and extremely less compared to USA where it is 350 bottles <sup>1</sup>. Indian market consists of cola products and non-cola products of which the cola segment constitutes 62%, non-cola segment is bagged with 30% and energy drinks segment is 8%. Furthermore, the urban areas report a dramatically high consumption of aerated drinks as compared to rural areas, where Delhi is on the top of the list for Carbonated Soft Drink consumption<sup>2</sup>.

The excess consumption of these carbonated beverages is creating havoc in teenage population as it contains no essential nutrients and harms their general as well as oral health. Consumption of carbonated soft drinks may be a key contributor to the epidemic of obesity, as consuming more energy than the body requirement leads to weight gain due to the body storing excess energy as fat. Intake of these drinks may also lead to tooth decay<sup>3</sup> and dental erosion<sup>4</sup>. High consumption of carbonated soft drinks during adolescence may reduce bone mineral accrual and increases fracture risk<sup>5</sup>. Another observed repercussion of consumption of these empty calories is hyperacidity, leading to erosion of stomach lining, characterized by stomach ache. These symptoms are caused by caffeine and acids found in these "sweet demons" such as acetic, fumaric, gluconic and phosphoric acid<sup>6</sup>.

It is an area of growing concern, as consumption of these drinks has markedly increased and they are capable of producing a large number of ill effects on oral and general health of the younger population. Hence, the present study was undertaken to assess the knowledge, attitude and practices (KAP) of school students toward carbonated drinks consumption.

## II. MATERIAL AND METHODS

A Self-Structured objective type questionnaire was prepared for collection of data. Approval was taken from Ethical committee of the institution.

This study was conducted among school going children aged between 8 and 17 years. The total number of students included were 350 (200: males and 150: females), which were divided into two groups based upon

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there socio-economic status using kuppuswamy's socio-economic status scale<sup>7</sup>.

Group I- 175 children from upper socio economic group.

Group II- 175 children from lower socio economic group.

Sample size was calculated using Random (non-cluster) sampling.

$$n = Z^2 P (1-P)/d^2$$

$$Z = 95\%, P = 0.65 \text{ and } d = 0.05$$

A signed consent was taken from the parents of the students who were included in the study. A questionnaire containing 11 questions was prepared for data collection. 350 questionnaires were distributed to the school students. The respondents were then asked to tick the most appropriate correct answer from the given list of answers according to them, in order to

assess their knowledge, attitude and practice regarding the consumption of carbonated beverage. Questionnaire was prepared to assess whether they knew, that these carbonated beverages have ill effects on oral and general health. Did they enjoy drinking carbonated beverages and what would they choose if given choice among cold drink, fruit juice, milk and maza /slice. Factors which influenced the choice of drink such television, easy availability in the market, color and taste of the drink, or family and friends was also assessed. How much of the amount, frequency of consumption, where did they preferred to consume, and which was there favorite among those available in the market was questioned. The obtained results were subjected to statistical analysis using Pearson Chi-Square test SPSS version 16.

### III. RESULTS

**Table 1 :** Knowledge of students regarding consumption of carbonated beverages

Questions	Responses	Group I N (%)	Group II N (%)	p-value
Have you heard about cold-drinks	Yes	175(100%)	170(97.7%)	0.061
	No	0(0%)	4(2.3%)	
Do you have any idea if it has Bad Effects On Teeth	Yes	145(82.9%)	124(71.7%)	0.015
	No	30(17.1%)	49(28.3%)	
Do you think having these cold-drinks is	Good for health	8(4.6%)	37(21.9%)	< .001
	Bad for health	167(95.4%)	132(78.1%)	

Table 1: 100% from Group I and 97.7% from Group II had heard about carbonated beverages, but still 2.3% in Group II were still unaware about carbonated beverages (p=0.061). 82.9% from Group I and 71.7% from Group II knew that consumption of these beverages is harmful for teeth and still 17.1% from Group I and 28.3% from Group II thought that they don't

cause any harm to oral health and difference was highly significant (p=0.015). 95.4% from Group I and 78.1% from Group II knew that consuming these beverages is bad for general health though 4.6% from Group I and 21.9% from Group II considered it to be good for health(p<0.001).

**Table 2 :** Attitude of students regarding consumption of carbonated beverages

Questions	Responses	Group I	Group II	P-value
Do you enjoy having Cold-drinks	Yes	158(90.8%)	140(81.4%)	0.013
	No	16(9.2%)	32(18.6%)	
If Asked To, Would You Stop Drinking Cold-drinks	Yes	41(23.4%)	65(38.9%)	< .001
	No	53(30.3%)	66(39.5%)	
	May-be	81(46.3%)	36(21.6%)	
What Would you choose out of these drinks	Fruit Juice	63(36%)	61(34.9%)	< .001
	Carbonated Drink	60(34.3%)	6(3.4%)	
	Maza/Slice	41(23.4%)	41(23.4%)	
	Milk	11(6.3%)	67(38.3%)	

Table 2: 90.8% from Group I and 81.4% from Group II enjoyed drinking cold drink. Still 9.2% from Group I and 18.6% from Group II didn't enjoy drinking carbonated beverages (p=0.013). 23.4% from Group I said that they will quit drinking, 30.3% said they won't, and 46.3% said that they might when asked to. And on other hand in Group II 38.9% said that they will quit drinking, 39.5% said they won't, and 21.6% said that

they might when asked to (p<0.001). 36% preferred fruit juice and 34.3% carbonated beverages in group I while those in group II preferred 38.3% milk over 34.9% carbonated beverages(p<0.001)

**Table 3 :** Practices of students regarding consumption of carbonated beverages

Questions	Responses	Group I	Group II	P-value
How Do You make the choice of Your cold-drink	T.V	13(7.5%)	25(14.4%)	< .001
	Easy availability in market	14(8.0%)	32(18.4%)	
	Colour	31(17.8%)	5(2.9%)	
	Family & friends	18(10.3%)	70(40.2%)	
	Taste	91(52.3%)	37(21.3%)	
	Other	7(4.0%)	5(2.9%)	
At a time how much of these drinks do you prefer having	A Glass (100ml)	89(50.9%)	133(76.0%)	< .001
	A Glass Bottle(200ml)	36(20.6%)	33(18.9%)	
	Pet Bottle (500ml)	32(18.3%)	5(2.9%)	
	>500ml	18(10.3%)	4(2.3%)	
How often Do You Consume Cold-drinks	Daily	20(11.4%)	36(21.1%)	>0.05
	Every alternate days	18(10.3%)	17(9.9%)	
	Weekly	77(44.0%)	66(38.6%)	
	Monthly	60(34.3%)	52(30.4%)	
Which is Your Favourite Drink	Pepsi	38(21.8%)	33(19.3%)	=0.001
	Coke	51(29.3%)	21(12.3%)	
	Sprite	26(14.9%)	31(18.1%)	
	Mirinda	21(12.1%)	22(12.9%)	
	Mountain Dew	18(10.3%)	22(12.9%)	
	Thumps Up	20(11.5%)	42(24.6%)	
When do you like having these drinks	When at home with friends & family	53(30.3%)	84(48.6%)	< .001
	When out with family & friends	103(58.9%)	53(30.6%)	
	When I Feel Thirsty	19(10.9%)	36(20.8%)	

Table 3: Those belonging to Group I were more influenced by taste 52.3% compared to other factors i.e color 17.8%, market 8%,T.V 7.5%, whereas in Group II family 40.2% and taste 21.3% influenced choice of drink more in comparison to market 18.4%,T.V 14.4% ( $p<0.001$ ). Children in both the Groups preferred to drink a glass 50.9% in Group I and 76% in group II ( $p=0.113$ ). Group I students preferred to drink on a weekly basis 44%,whereas in Group II weekly consumption was 38.6%, and daily was 21.1% which was high compared to Group 1 being 11.4% ( $p<0.001$ ). Coke29.3%was the most favorite among Group 1 and thumbs-up 24.6% among group II ( $p<0.001$ ). Those in Group I preferred to drink when they were out 58.9% as compared in Group II as they preferred to drink when at home 48.6% ( $p<0.001$ ).

#### IV. DISCUSSION

A questionnaire study was undertaken, as it allows to collect a lot of information and data from a large number of respondents in a short span of time. Aerated beverages are an important sector in the country because it not only contributes to export earnings of the country, but also acts as a revenue driver for other industries such as glass, refrigeration, transport, paper and sugar. This segment is universal in its demand, catering to all income groups and age-brackets<sup>8</sup>. Consumption of these carbonated beverages is becoming a major factor for health issues faced by the future generation.

In the study it was found that majority of the school children in both the groups had heard about cold drinks. But regarding knowledge of its ill effect on teeth, the upper socio-economic group had (82.9%) more knowledge, as compared to lower socio-economic group (71.1%) (Table 1). The area of concern is that their deleterious association with human teeth induces demineralization causing erosion of enamel due to their high acidic pH which ranges between 2.5-3.4. During demineralization, calcium and phosphorus are removed from the enamel which eventually leads to loss of outermost layers of the enamel causing sensitivity, other is tooth decay caused by sugar content as high as 10 tea spoons of sugar in every 250ml of this toxic elixir in the younger age group.

The finding of the study depicts that, carbonated drinks (34.3%) and fruit juices (36.0%) were more popular in the upper income group, and milk (38.3%) and fruit juice (34.9%) in the lower income group (Table 2). Popularity of these "sparkling beverages" is still more in upper socio-economic group, as children belonging to lower income group preferred milk and fruit juice more over the carbonated beverages.

Weekly consumption was common in both the group's i.e. upper socio economic group (44.0%), and lower socio economic group (38.6%)(Table 3). Not only the frequency, but the method of drinking also plays an important role, as holding the drink in the mouth before swallowing leads to the most pronounced pH drop followed by the long-sipping method<sup>9</sup>. Most of the



children in the upper income group were influenced by taste (52.3%) and color (17.8%) of the drink, while those belonging to the lower income group were more influenced by parents (40.2%) at young age which is in agreement with the findings of Grimm et al. (2004)<sup>10</sup>. Soft drink companies use a wide variety of marketing techniques to increase their sales. These techniques include easy accessibility in a wide variety of venues including schools, heavy media advertising as pre-teens and young adults are more vulnerable to get influenced by such factors. People who consume sugary drinks regularly i.e one to two cans a day or more have a 26% greater risk of developing type 2 diabetes than people who rarely have such drinks<sup>11</sup>. According to a study, people who increased their sugary drink consumption by one 12-ounce serving per day gained more weight over time approximately an extra pound every four years than people who did not change their intake<sup>12</sup>. Surprisingly in the study it was seen that influence of parental soft drink intake is more than peer influence, which directly reflects the responsibility of the parents. Parents should be aware that their behavior regarding the consumption of beverages has a great impact on their children's intake habits as well. So, health promotion strategies should be implemented, involving both parents and children. The parents can be helpful in exposing children to healthier drinks available in the market. Studies have shown that the frequent consumption of soft drinks can lead to change in body mass index (Ludwig et al. 2001<sup>13</sup>, Striegel Moore et al. 2004<sup>14</sup>, and increase the frequency of obesity in children (Welsh et al. 2005<sup>15</sup>), which is becoming a common health issue in children nowadays. This concern is growing by each passing day, as the population of upper income group is adapting to a western lifestyle thereby more affected by adverse health conditions as a consequence. In contrast, the low income group is still fascinated by the traditional Indian diet which is rich in nutrients and has less harmful contents.

In the present study, not every student was aware about the hazardous effects of carbonated beverages on general and oral health. Government strategies should be implemented in promoting healthier drinks at a low cost in the market, reducing production of soda drinks and encouraging the future of our nation to adapt to a healthier living as a well-known proverb is "An ounce of prevention is worth a pound of cure"

## V. CONCLUSION

82.9% in upper socio economic and 71.7% in lower socio economic group had knowledge of ill effects of carbonated drinks on oral health. 46.3% in upper socio economic groups said they may discontinue consuming these popping beverages and 38.95% in lower socio economic group were ready to quit consuming carbonated beverages when they came to

know about the hazardous effect of fizzy drinks. Most influencing factors for the choice of their drink were taste (52.3%) in upper socio economic group and (40.2%) family in lower socio economic group. So there is a need to, spread awareness among children at a younger age and their parents about the adverse effects of soft drinks, so as to inculcate good oral practices. As the concern is growing, thus it is necessary to provide data to the concerned planning authority, so as they can implement an integrated approach to overcome the plight associated with consumption of carbonated beverages.

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