Original Article

Carbonated Drink Consumption And BMI In Pakistani Adolescents

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Objective: To evaluate the relationship between intake of carbonated drinks and weight gain among adolescent Pakistanis.

Material & Methods: This comparative study was carried out in urban district of Lahore and total of 270 adolescents 13-15 years of age were studied. Weight and height was measured with Height and Weight Measuring Scale (SMIC). Obesity was assessed by BMI (wt (kg)/Ht (m^2). Carbonated drinks consumed per week were measured using a self administered Food Frequency Questionnaire (FFQ).

Results: There was no significant difference between the intake of carbonated drinks in normal, overweight and obese adolescents.

Conclusions: Carbonated drink consumption cannot be held responsible for increase in BMI unless combined with other factors.

Keywords: Carbonated drinks (CD), Food Frequency Questionnaire (FFQ), Body Mass Index (BMI)

Introduction

Obesity has recently emerged as a global health issue among the young population. Studies have shown that the problem is worsening rapidly. Scientists have reported the prevalence of rising obesity both in developed and under developed countries.[1] Adults who were obese as children are more liable to suffer from ill health.[2] Obesity has been shown to be associated with many chronic diseases leading to compromise on health. Many environmental factors have been suggested as the precipitating factors for the obesity epidemic.[3] One such factor may be increased consumption of carbonated drinks. Several researches regarding childhood and adolescent obesity have been carried out in the western countries.[4] US studies have revealed there has been a three times increase in the intake of soft drinks in the last few decades.[5] There is a huge disparity regarding the consumption of carbonated drinks and obesity incidence in the western population. However its importance has been less documented in developing countries including Pakistan. There is a dire need to study a relationship, if any between consumption of carbonated drinks and its effect on BMI.

Objective

To find out association between intake of carbonated drinks and weight gain in adolescents 13 to 15 years old.

Material & Methods

This cross sectional comparative study was carried out on a total of 270 adolescents, 13-15 years of age in the urban district of Lahore. 135 were males and 135 were females. Each of these were further grouped into normal, overweight and obese according to the international cut off points of BMI.

After taking consent from each subject on a performa, following measurements were taken.

1. Weight was measured to the nearest 0.1 kilogram with height and weight measuring scale (SMIC) in kilograms.
2. Height was measured to nearest 0.1 cm with the same machine. These measurements were used to compute BMI = weight/ height^2 (kg/m^2)
3. Carbonated drinks consumed per week were measured using a self administered food frequency questionnaire (FFQ). Beverage categories included were Pepsi cola, Coca cola, Seven up, Fanta, Mountain Dew and Sprite.

One way ANOVA was used to determine the significance of the difference in consumption of carbonated drinks in normal, overweight and obese.

Results

The mean number of carbonated drinks consumed was 3.2 in normal, 3.88 in obese and 4.45 in overweight. Normal weight subjects consumed 0 to 21 drinks while obese consumed 0 to 21 and the over weight consumed 0 to 28 drinks per week **(Table 1).** There was a no significant difference in the number of carbonated drinks consumed in normal, over weight and obese per week ($F=1.994$, $df = 2$, $p >$

Table-1: Carbonated drink consumption per week in normal, obese and overweight.

	N	Mean CD	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Min	Max
Normal	90	3.2000	3.81364	.40199	2.4012	3.9988	.00	21.00
Obese	90	3.8889	4.19053	.44172	3.0112	4.7666	.00	21.00
Overweight	90	4.44556	4.63053	.48810	3.4857	5.4254	.00	28.00
Total	270	3.8481	4.24035	.25806	3.3401	4.3562	.00	28.00

Table-2: Comparison between carbonated drink consumption in normal, overweight and obese.

	Sum of Squares	df	Mean Square	F	p-value
Between Groups	71.163	2	35.581	1.994	.138
Within Groups	4765.611	267	17.849		
Total	4836.774	269			

Discussion

The results of the present study showed that the consumption of carbonated drinks was not associated with BMI both in female and male adolescents. The results of the current study coincide with other studies. For example Forshee et al found no statistically significant association between carbonated drink consumption and BMI in adolescent males and females using data from Third National Health and Nutrition Survey. There was no significant difference in body mass index between drinkers and non drinkers (p=.05) in adolescent girls of United Arab Emirates reported by Mahmood et al. Another study found no significant association between consumption of carbonated drinks and BMI in adolescents. There was no difference in percentage of energy from soda between obese (6 ± 4.9%) and non obese (5.9 ± 4.96). Studies by Bandini et al and Mahmood et al are similar to the present study being cross sectional and are performed on adolescents. On the other hand although NHANES was a longitudinal study on adolescents, it is in line with the present study. So although all these investigations were conducted in different geographical and cultural backgrounds on different races with different eating habits, they are in line with the present study showing the universality of results. Conversely Kate et al found a positive association between BMI and sugar sweetened carbonated drinks in males (p<0.0001) But association was not statistically significant in girls. This was a cross sectional study performed on a large number of subjects. Another cluster randomized controlled trial in Southwest England showed that reduction of carbonated drink consumption was associated with reduction in number of overweight and obese children. Limitation of this study was that the validity of self collected dietary data can be questioned owing to tendency for under reporting of energy intake, particularly by those who are overweight and obese.

Conclusion

This study elucidates that carbonated drink consumption alone cannot be held responsible for the obesity epidemic. Although carbonated drink consumption may contribute to the total energy intake of adolescents but other lifestyle behaviors like eating high calorie food and decreased physical activity also affect BMI. Consequently it is difficult to ascertain whether the weight gain results from consumption of calories from carbonated drinks, food or from variation of physical activity.

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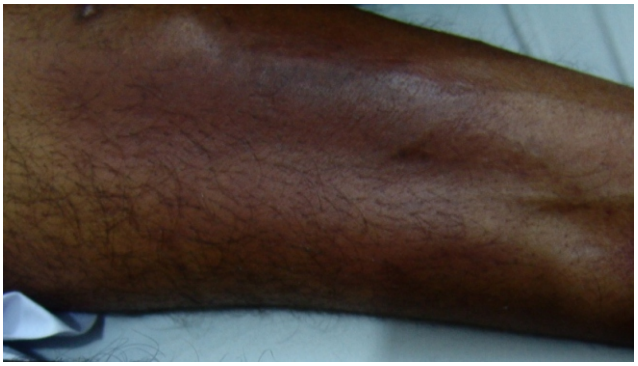
PICTURE QUIZ

This 52 years old man is a known case of coronary artery disease and had undergone CABG 2 years ago. He was taking his medication regularly and was symptom free. Lately he noticed that his skin colour changed but completely ignored it. He then developed bleeding from gums and nose for which he consulted his GP. Next day he presented to the hospital with massive upper GI bleeding. Examination revealed pigmentation as shown in the picture. Blood test showed HB 11.2 G/dl; TLC 1,900; and platelet count 12,000 only. Gastroscopy was performed that showed a picture of erosive gastritis. Dengue serology was negative. Bone marrow aspiration was done which showed marked hypoplasia but no infiltration by other cells.

Question: What is the diagnosis? How do you explain the blood picture? How will you treat him?



See answer on page no. 23