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Sugar Sweetened Beverage Consumption, TV Viewing Hours, Sociodemographic Profile and Bmi of Adolescent Boys and Girls

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Abstract

Obesity is a condition of abnormal or excessive fat accumulation in adipose tissues. The prevalence of overweight and obesity is increasing worldwide at an alarming rate. Both developed and developing countries are affected.

Over the past few decades, globally percentage of overweight had increased by 3.3%. WHO, Obesity International Task Force (OITF), 2004 reported 155 million youngsters as overweight or obese. The percentage of 1 overweight child was reported highest in Latin America and Caribbean 4.4% followed by Africa 3.9% and Asia 2.9%.

Keywords: Adolescents; Hypertension; Heart disease; Obesity

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Introduction

The problem of industrialized world has now spread to developing countries also. Countries like South Africa had shown 25% of girls from 13-19 years as overweight and obese [1,2]. Overweight and obesity is confined not only to adults but also reported among children and adolescents of developed as well as developing countries. Nationally representative data obtained during National Health Examination Survey (2011-2012) reflected that 16.9% between 2 to 19 years old and 34.9% of adults aged 20 years or older were obese. The number of obese children and adolescents aged 5 to 19 years worldwide has risen tenfold in the past four decades. If current hypertension, diabetes, heart disease and overall increase in morbidity.

Well described data are available in the adult population but data about Sugar Sweetened Beverage (SSB) consumption trend continues more children and adolescents will be obese than moderately or severely underweight by 2022 [3].

The primary cause of global obesity lies in environment and behavioural changes, specially related to eating behaviour. Easy availability of food especially energy dense, high fat food and increased consumption of Sugar Sweetened Beverages (SSB) are major contributing factors to rise in average body weight of population. Our modern eating environment has an effect on the way children eat. The traditional micronutrients rich foods are being replaced by energy dense processed micronutrients poor food like pizza, chowmein, cold drink and Sugar Sweetened Beverages (SSB). Frary et al. stated that US children and adolescents today drive 10%-15% of total calories from SSB [4-6]. These empty calories are directly related with overweight or obesity. Sweetened beverages provide carbohydrate in liquid form, which promote energy imbalance and ultimately results in weight gain. Wang et al. had also focused on calories from SSB and concluded that these excess calories, contribute to excess weight gain. It has been observed that in the last decade the outlets for the sale of SSB, fruit juices, shakes, and carbonated beverages have increased enormously and thus the consumption of such drinks. Consumption of cold drinks may lead to obesity and obesity itself results into many diseases like hypertension, diabetes, heart disease and overall increase in morbidity. Therefore, current study is conducted to highlight the adolescents dietary pattern specially SSB consumption pattern, lifestyle, and weight status [6].

Methods

Considering the fact that SSB consumption may lead to obesity or overweight. The aim of the study is to highlight changing dietary habits of adolescents specially preference of SSB over milk and other cofactors affecting the intake level. Current study was conducted including 600 adolescents (300 girls and 300 boys). In public schools, catering to the affluent segment of population residing in Jodhpur, Rajasthan.

Parameters

Sociodemographic profile: Information regarding sociodemographic profile will include gender, age, parental education and occupation, type of family and food habits.

Anthropometric measurement: These measurements included Body weight (kg), Height (cm). The measurements were taken as described by Gibson. BMI was accurately calculated using the formula as given BMI=Weight (kg)/Height (m2).

Frequency of SSB consumption: Comprehensive questions were prepared to estimate the consumption of sugar sweetened beverages, viz. Daily consumers/(>4 times/week)/(>1000 ml), Often consumers/(3-4 times/week)/(1000 to >600 ml), Less

consumers/(1-2 times/week)/(600 to 200 ml).

Sugar sweetened beverage calorie: Data gathered from 24-hour dietary recall, including 3 alternate days consumption in a week, weekday and at a weekend, were calculated. SSB caloric values were used through the information, related to calories on the brand of SSB.

Calorie comparison: Calorie of each subject, calculated from sugar sweetened beverages was compared with BMI, and weight status viz. underweight, overweight study is still lacking. Therefore, current study is conducted to highlight the adolescents dietary pattern specially SSB consumption pattern, lifestyle and weight status. or obese to evaluate the impact of SSB consumption. The comparison of calorie output from SSB vis-à-vis calorie output from regular meals is pictured to describe the contribution of calorie from SSB in a day's diet.

Dietary recall: Using 24 hour dietary recall method, 3 day dietary survey was conducted. Two weekdays and one weekend were included for the dietary evaluation. The quantity of the cooked food ingredients was converted into raw quantity to calculate the calorie content of each, using Nutritive Values of Indian Foods. To calculate energy of ready to eat food i.e., biscuits, chips and SSB consumed was referred to calculate nutritional information given on packets. Thus, total daily dietary and SSB energy intake was assessed. Consumption of SSB and milk was compared to examine the amount of milk displaced with SSB consumed from day's diet of subject [7].

Activity pattern: To assess, the activity pattern a pretested semi-structured questionnaire, cum interview schedule was administered to all the subjects to elicit information about the number of hours spent in watching TV and further compared with nutritional status of subjects viz. underweight, normal, overweight, or obese **(Figure 1)**.

Results

With age SSB consumption was maximum among working mother's adolescents (91.25%) most of them 62.53% were from joint family and (72%) vegetarian. Similarly, 2-3 hours/day, TV viewers were more than 40% and were often SSB consumers (i.e., 3-4 times/week; (1000 to >600 ml) **(Table 1)**. Han et al. also indicated that prevalence of SSB consumption had increased (≥ 500 k.cal/day) among 2 to 11 years children while sports and energy drink consumption tripled i.e., 4%-12% among 12 to 19 years aged adolescents [8-11].

With increase in per day TV viewing hours, there is uptrend in SSB consumption as compared to dietary intake among both the genders. Heavy TV user girl's SSB consumption is approximately 50% more as compared to boys (i.e., 613.63 ± 48.08 ml /day vs 312.13 ± 113.70ml/day for girls and boys respectively). While all (100%) overweight and obese girls watched TV for >2–5 hours/day and were daily soft drink consumers. With BMI TV viewing hours has increased among obese boys and girls i.e., >4 hours per day (t=58; p ≤ 0.05) while girls for >3 hours/day (t=37; p ≤ 0.05) **(Table 2)**.

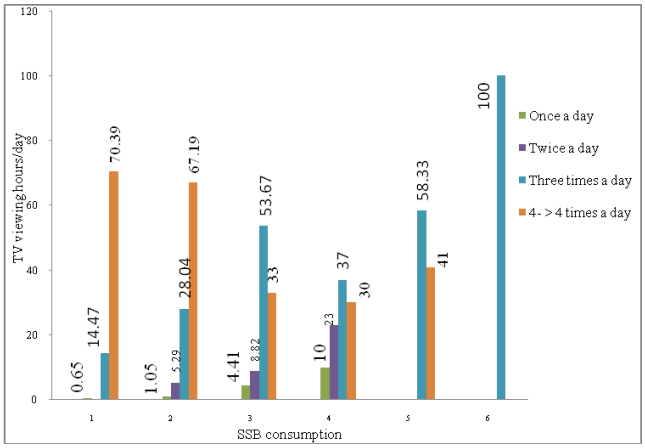

Figure 1 Indicated that when per day SSB consumption was studied it was notices that with increased in TV viewing time consumption also increased among all boys (100%).

Table 1: Sociodemographic variables, TV viewing hours and frequency of SSB consumption.

Sociodemographic variables and TV viewing hours	Daily consumers/ (>4 times/week) / (>1000 ml) 2.16%	Often consumers/ (3-4 times/week) /(1000 to >600 ml) 57.83%	Less consumers/ (1-2 times/week) / (600 to 200 ml) 40%
Age: 13	3 (23)	27(11.25)	142(40.92)
14	2(15.38)	47(19.58)	91(26.22)
15	8(61.53)	166(69.16)	114(32.85)
Joint family	7(53.84)	217(62.53)	144(60)
Nuclear family	6(46.15)	130(37.46)	96(40)

Vegetarian	10(3)	175(72.91)	217(62.53)
Non- vegetarian	3(23.07)	65(27.08)	130(37.46)
Working mother	7(53.84)	219(91.25)	297(85.59)
Non-working mother	6(46.15)	21(8.5)	50(14.40)
(Father)Business	9(69.23)	231(96.25)	297(85.59)
Service	4(30)	9(3.75)	50(14.40)
T.V hours/day 0-2	2(15.38)	96(40)	147(42.36)
2-3	4(30.76)	103(42.91)	156(44.95)
>3-4	3(27.07)	29(12.08)	34(9.7)
>4	3(27.07)	12(5)	10(2.88)

Table 2: TV viewing hours, dietary, SSB calories and Daily, Non-daily SSB consumption

T.V viewing hours/day	BOYS				GIRLS			
	Dietary intake/ day(K. calories)	SSB Ml/day (k.calories)	Soft drink (Daily)	Soft drink (Non daily)	Dietary intake / day (K.calories)	SSB Ml/day (k.calories}	Soft drink consumption (Daily)	Soft drink consumption (Non-daily)
0-2(limited users) Underweight-normal (73.5%)	1421.79 ± 262.91	289.12 ± 107.49 (t=32.97;p≤0.05)	7(46.71)	81(53.28)	1458.79 ± 319.48	223.11 ± 108.71 (t=18.84;p≤0.05)	187(62.33)	2 (0.66)
>2-4(moderate users) OVERWEIGHT (18.67 %)	1370.93 ± 242.73	283.55 ± 113.06	96(70.58)	40(29.41)	1420.53 ± 288.30	253.77 ± 130.03	100 (33.33)	-
>4-5(heavy users) OBESE (7.83 %)	1385.63 ± 279.80	312 ± 123.33 (t=9.37;p≤0.05)	11(91.66)	1(8.33)	1443.88 ± 285.85	613 ± `116.37 (t=8.59;p≤0.05)	11(3.66)	-

Discussion

Drinks consumption is mainly driven by children aged 2 to 18 years. The percentage of overweight reported among Indian children ranges from 9%-27.5% and obesity 1%-12.9%. Recent reports by WHO, represented that during 2016 more than 1.9 billion adults aged 18 years older where overweight and over 650 million were obese Similarly just under 1% of children and adolescents aged 2-19 years were obese in 1975 more 124 million children and adolescents (6% of girls and 8% of boys) were obese in 2016. Between 5 to 19 years of age group 340 million children and adolescents were overweight or obese in 2016. Highly qualified parent's adolescent boys and girls has consumed more SSB (i.e.,657.42 ± 98.65; p ± 0.05) for boys and 579.76 ± 2.26.17 (p ± 0.05) for girls) belonging to joint family and were vegetarians. Similarly, highly educated mother's adolescents consumed lesser milk/day (221 ± 248.37ml) while SSB consumed was182.17 ± 57.26 ml/day. Most of them were non vegetarians 637.05 ± 215.48 **(Table 3)**. In contrast, Ludwig et al. reported that soft drink consumption was higher among boys compared with girls (P=03), and intake increased with age (P<001). Several studies had shown an association between beverage consumption and risk of obesity and weight gain [12-15].

Table 3: Sociodemographic variables and dietary, beverage calories vs SSB, milk/day ml consumption.

Sociodemographic variable	Dietary intake(k.calories)		Beverage intake ml(k. calories)		SSB/day(ml)		Milk/day(ml)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Father education Graduate	1370.73 ± 263.62	1434.08 ± 356.137	258.16 ± 108.73	220.90 ± 126.05	644.76 ± 178.121	543.04 ± 197.49	165.23 ± 105.43	254..86 ± 239.53
Postgraduate	1424.18 ± 223.45	1456.33 ± 234.28	319.97 ± 102.57	248.58 ± 107.60	663.15 ± 166.62	614.63 ± 237.96	151.75 ± 171.65	195.20 ± 246.73
Uneducated	1393.88 ± 283.13	1360.89 ± 339.53	279.89 ± 111.17	202.29 ± 83.30	633.95 ± 184.19	605.76 ± 242.62	191.97 ± 38.28	361.53 ± 266.94
Mother education post Graduate	1386.58 ± 233.96	1416.19 ± 311.53	285.49 ± 98.65	227.54 ± 111.82	657.42 ± 98.65 (p ± 0.05)	579.76 ± 2.26.17 (p ± 0.05)	182.17 ± 57.26	221 ± 248.37
Graduate	1499.98 ± 265.82	1511.39 ± 297.38	298.50 ± 118.32	233.97 ± 117.03	652.10 ± 174.59	580.41 ± 232.41	138.23 ± 152.15	237.11 ± 246.99

Uneducated	1370.53 ± 266.67	1430.76 ± 294.65	279.28 ± 93	302.31 ± 127.23	581.81 ± 141.87	547.36 ± 176.94	200 ± 0	267.58 ± 270.96
Joint family	1423.75 ± 239.85	1447.95 ± 315.05	306.87 ± 110.36	239.63 ± 113.37	652.10 ± 174.59	562.14 ± 202.04	186.46 ± 98.86	254.03 ± 257.23
Nuclear family	1379.89 ± 263.50	1453.76 ± 289.43	274.79 ± 108.31	219.91 ± 120.41	646.68 ± 174.53	650.94 ± 282.88	186.46 ± 98.86	118.92 ± 167.96
Vegetarian	1414.86 ± 263.50	1446.10 ± 299.88	291.86 ± 108	236.62 ± 111.51	660.68 ± 174.02	554.20 ± 217.97	174.54 ± 134.08	235.60 ± 257.14
Non-Vegetarian	1348.97 ± 224.44	1464.90 ± 343.29	272.83 ± 99	223.46 ± 132.37	616.25 ± 171.88	637.05 ± 215.48	147.5 ± 94.09	219.91 ± 167.41

Conclusion

The new era drinks, sugar- sweetened beverages being first choice for adolescents, their consumption is creeping day by day without knowing their hazards. Unlimited and injudicious use of soft drink is definitely putting them at the edge of sward. There is as adolescent obesity has dramatically increased, so too has the ubiquity of TV and other screen media in adolescent's lives. TV viewing has displaced the physical activity hours with sedentary lifestyle. Current study indicated that, the average TV watching by overweight was found to be 2.39 hours per day and for obese 3.14 hours/day the time spent is greater than that of normal weight and underweight subjects. Observed that, more than 2 hours of TV viewing per day was associated with high mean BMI and was associated with significantly higher energy intakes at dinner and from snacks than 1 hour of TV viewing. In the study, it is clear that the consumption of milk was comparatively less than SSB intake among boys and girls. During the present study, it was noted that generally adolescents skipped their bedtime milk with SSB or with other soft drinks, which was generally taken with dinner or post dinner. Similar findings that adolescents many factors, playing their role to ensure such a risk like lack of awareness, environmental influences, parental drinking, vending machines availability at school pocket money and impact of advertisements during TV watching. Tended to replace milk with soft drinks during meals and throughout the day. The study indicated higher intensity of SSB (613 ± 116.37 SSB ml/day consumed by girls) leads to obesity among boys and girls. Also, the pattern of consumption is being affected by age, gender, more preference to soft drinks, parental education and occupation with increasing television viewing hours and less consumption of milk. To prevent the epidemic of overweight and obesity overall changes are necessary including combined efforts by parents, dieticians about dietary and lifestyle modifications. The rising contributing factor sugar- sweetened beverages should be replaced with non- caloric alternatives seems to be a promising approach. TV viewing hours should be limited to not more than 1 hour per day.

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