

The Snacking Habits in Junior High School Students: The Nutritional Implication-a Short Report

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Abstract: Adolescents snack frequently but their choice of snacking foods may be poor. This puts them at risk of overweight. Watching TV for longer hours causes a decline in their physical activities hence liable to increase in body weight. The aim of the study was to examine the snacking and TV viewing behaviours of Junior High School students and their association with body weight. A cross-sectional study was carried out among a convenient sample of 121 adolescents (54 females and 67 males) aged between 11 and 15 years. Logistic regressions were performed to examine the association between the frequency and type of snack consumed and television viewing with overweight. The most common period of snacking was between breakfast and lunch. Snacking during watching TV was a common practice among the students. Snacking on foods high in sugar and fats were strongly associated with the likelihood of being overweight. Snacking while viewing TV and television viewing for 4-5 h a day was associated with increase in BMI. Both males and females preferred normal body image. The intake of snacks high in sugar and fat promoted an increase in BMI. Longer hours of watching television and snacking were associated with increased likelihood of being overweight.

Key words: Adolescents, body mass index (BMI), snacks, snacking behaviours, watching television

INTRODUCTION

The period of transition between childhood and adulthood is naturally perceived as adolescence and a phase of psychological, social and biological development (Millstein *et al.*, 1993). This stage of life is accompanied by rapid growth and an increased need for many nutrients especially vitamins and energy. Hence balance diet and physical activity become important during adolescence (Millstein *et al.*, 1993).

Nutritionally, unbalanced diet, both overnutrition and undernutrition can prevent normal growth and may result in overweight or underweight respectively. Furthermore, eating habits developed during childhood and adolescence are more likely to be carried over into adulthood according to Silvis (2002). Overweight adolescents as stated by Postnote (2003) and Dehghan *et al.* (2005) have 70% chance of becoming overweight or obese adults. The upsurge of the prevalence of childhood obesity worldwide has drawn much attention to the diets of adolescents and children (Savidge *et al.*, 2007). Dietary behaviours such as large portion sizes of meals and the drift to the patronage of fast-food takeaways have been linked with childhood obesity (Vader *et al.*, 2009). Also, recently, the increased frequency of snacking has been associated with childhood obesity (Savidge *et al.*, 2007) mainly because adolescents choose their diet based on taste rather than on nutrition (Johnson *et al.*, 2002).

Snacking is the consumption of food and drinks between meals (Savidge *et al.*, 2007). Wardlaw and Smith (2009) clearly stated that snacking in itself is not a problem, but poor food choices in terms of type and quantity are of great concern. Wardlaw and Insel (1996) mentioned fruits and vegetables (fresh, frozen or juice), whole grain bread and crackers as good snack choices. On the other hand, snacks that have a high content of saturated fat, salt and refined sugars such as chocolate bars, crisps, cakes and pastries are termed unhealthy and are responsible for the elevation of total cholesterol, blood pressure and body weight which are major risk factors of coronary heart diseases, stroke and diabetes (Lloyd-Williams *et al.*, 2008). Snacking on the wrong foods in addition to large portions of snacks has been shown to contribute to the increasing global overweight/obesity trends (Wardlaw and Smith, 2009). Obesity is associated with life-threatening non-communicable diseases and a major menace world-wide particularly in the areas of North America, the United Kingdom, Eastern Europe, the Middle East, the Pacific Islands, Australia and China as reported by The Global Strategy on Diet, Physical Activity and Health of the World Health Organization (2003). For example, there is an increase in the diagnosis of type 2 diabetes in childhood (World Health Organization, 2003) and Viana *et al.* (2008) attributes this directly to the obesity epidemic.

Adolescence is a channel of hope to intervene before eating habits are firmly established. It was against this background that this study was carried out to examine the snacking behaviours of adolescents and their potential contribution to the overweight/obesity burden in Ghana.

MATERIALS AND METHODS

Subject population: The study population included male and female Junior High School Students of the Roman Ridge School in Accra, Ghana aged between 11 and 15 years. A convenient sample of 121 students including 67 boys and 54 girls constituted the subject population.

Data collection and management: Permission was sort and granted by the administrator and principal of the Roman Ridge School in Accra. A questionnaire was administered to each participant. The questionnaire was used to collect information on sociodemographic characteristics, snacking habits, TV viewing habits and anthropometry.

Socio-demographic characteristics: Data was obtained on the age, gender, class standing and residence of the students and the occupation of their parents.

Snacking habits assessment: Details on the frequency of intake of 12 common snacking items such as carbonated drinks, fruits, fruit drinks, pizza, cakes, chocolate, salad, spring rolls, pastries, biscuit, fried ripe plantain, and ice cream were collected. Frequency of intake was recorded as: daily, 3-4 times a week, 1-2 times a week, occasionally and never.

Television viewing habits: Details on whether the participants watch television everyday and the length of time they watched TV daily were obtained. Information on snacking along with TV viewing and snacking on advertised foods by the subjects were also collected.

Anthropometric measurements: Weight and height were measured using standard procedures (Gibson, 1990). Weight was measured to the nearest 0.1 kg using a portable digital body weighing scale (Seca). To ensure accuracy in the measurement, the scale was checked for a zero reading before each weighing. The students were asked to take off their shoes, watches and anything from their pockets before weight measurement. Each student stood on the scale with feet slightly apart and the head in upright position during weight measurement.

Height was measured in the standing position to the nearest 0.1 cm using a portable stadiometer (Perspective

Table 1: Background characteristics of respondents by gender

Variable	Gender		Total n (%)	p-value
	Female n (%)	Male n (%)		
Class				
Form 1	12 (22.20)	16 (23.60)	28 (23.10)	
Form 2	14 (25.90)	16 (23.60)	30 (24.80)	
Form 3	13 (24.10)	16 (23.60)	29 (24.00)	
Form 4	15 (27.80)	19 (28.90)	34 (28.10)	
BMI for age				
Under weight	15 (27.80)	19 (28.40)	34 (28.10)	
Normal	28 (51.90)	36 (53.70)	64 (52.90)	0.543
Over weight	11 (20.40)	12 (17.90)	23 (19.00)	
Preferred female body profile				
Normal	30 (55.55)	49 (73.10)	79 (65.29)	
Under weight	24 (44.44)	18 (26.90)	42 (34.71)	0.043
Over weight	0 (00.00)	0 (00.00)	0 (00.00)	
Preferred male body profile				
Under weight	18 (33.30)	9 (13.40)	27 (22.30)	
Normal	36 (66.70)	58 (86.60)	94 (77.70)	0.007
Over weight	0 (00.00)	0 (00.00)	0 (00.00)	

Enterprises). The students were asked to stand without shoes, back against the scale, heels together and head in the upright position and hands by the sides. The moveable headboard was lowered until it firmly touched the crown of the subject's head and a direct reading of height obtained.

Body mass index (BMI): The BMI which is weight in kilograms divided by height in meters squared was computed and using the WHO guidelines (World Health Organization, 2007a, b) classified students using BMI-for-age for girls and boys as follows:

- **Underweight:** <5th percentile of BMI for age
- **Normal weight:** 5th to 85th percentile BMI for age
- **Overweight:** 85th to 95th percentile of BMI for age
- **Obesity:** ≥95th percentile of BMI for age

Statistical analysis: Data entry and statistical analysis was performed using SPSS for Windows (version 16.0; Chicago, IL). Descriptive characteristics of participants are reported as frequencies and proportions were reported for categorical variables. Chi-square statistics were used to examine the presence of association between variables. Odds ratio (OR) and confidence interval (CI) were used to quantify the strength of association between the overweight and obesity risk and covariate.

RESULTS

Socio-demographic background of participants: The sample comprised of 121 adolescents (54 females and 67 males). Table 1 represents the background characteristics of the study participants. The mean age was 13.04±1.31. Participants were almost equally distributed across forms 1 through 4 with 28.10% from form 1. Prevalence of underweight and normal weight was similar between

Table 2: Snacking behaviour by gender

Variable	Female n (%)	Male n (%)	Total n (%)
Carbonated drinks			
Occasionally and never	19 (15.70)	24 (19.80)	43 (35.50)
2-5 times a week	29 (24.00)	34 (28.10)	63 (52.10)
Daily	6 (5.00)	9 (7.40)	15 (12.40)
Fruit drinks			
Occasionally and never	10 (8.30)	21 (17.40)	31 (25.60)
2-5 times a week	31 (25.60)	19 (15.70)	50 (41.30)
Daily	13 (10.70)	27 (22.30)	40 (33.10)
Fruit (fresh/juice)			
Occasionally and never	10 (8.30)	25 (20.70)	35 (28.90)
2-5 times a week	28 (23.10)	21 (17.40)	49 (40.50)
Daily	16 (13.20)	21 (17.40)	37 (30.60)
Salad			
Occasionally and never	24 (19.80)	37 (30.60)	61(50.40)
2-5 times a week	20 (16.50)	20 (16.50)	40 (33.10)
Daily	10 (8.30)	10 (8.30)	20 (16.50)
Ice cream			
Occasionally and never	37 (30.60)	45 (37.20)	82 (67.80)
2-5 times a week	16 (13.20)	22 (18.20)	38 (31.40)
Daily	1 (0.80)	0 (0.00)	1(0.80)
Pizza			
Occasionally and never	40 (33.10)	50 (41.30)	90 (74.40)
2-5 times a week	14(11.60)	17 (14.00)	31(25.60)
Cake			
Occasionally and never	43 (35.50)	54 (44.60)	97 (80.20)
2-5 times a week	11 (9.10)	13 (10.70)	24 (19.80)
Spring roll			
Occasionally and never	39 (32.20)	45 (37.20)	84 (69.40)
2-5 times a week	15 (12.40)	21(17.40)	36 (29.80)
Daily	0 (0.00%)	1 (0.80)	1 (0.80)
Fried ripe plantain			
Occasionally and never	36 (29.80)	48 (39.70)	84 (69.40)
2-5 times a week	18 (14.90)	17 (14.00)	35 (28.90)
Daily	0 (0.00)	2 (1.70)	2 (1.70)
Pastries			
Occasionally and never	28 (23.10)	39 (32.20)	67 (55.40)
2-5 times a week	23 (19.00)	26 (19.00)	49 (40.50)
Daily	3 (2.50)	2 (1.70)	5 (4.10)
Biscuit			
Occasionally and never	18 (14.90)	28 (23.10)	46 (38.00)
2-5 times a week	30 (24.80)	32 (26.40)	62 (51.20)
Daily	6 (5.00)	7 (5.80)	13 (10.70)
Chocolate			
Occasionally and never	25 (20.70)	38 (31.40)	63 (52.10)
2-5 times a week	25 (20.70)	25 (20.70)	50 (41.30)
Daily	4 (3.30)	4 (3.30)	8 (6.60)

males (28.70 and 53.70%, respectively) and females (27.80 and 51.90%, respectively). While the prevalence of overweight was higher among females (20.40%) compared to males (17.90%).

The majority of the study participants took carbonated drinks (52.10%) for snack; however, this observation was skewed towards male students who consumed carbonated drinks 2 to 5 times a week. Other popular snack foods were fruit drinks, fruits and biscuits which were taken 2-5 times a week (Table 2). A greater percentage of the boys consume spring rolls, pastries and biscuits 2 to 5 times per week for snack as compared to the girls. Over seventeen percent (17.40%) of male

Table 3: Snacking behaviour by BMI

Variable	BMI for age			Total n (%)
	Underweight n (%)	Normal n (%)	Overweight n (%)	
Snacking time				
Mid morning	24 (19.80)	39 (32.20)	14 (11.60)	77 (63.60)
Late afternoon	9 (7.40)	23 (19.00)	7 (5.80)	39 (32.20)
After supper	1 (0.80)	2 (1.70)	2 (1.70)	5 (4.10)
Frequency of snacking				
Once	10 (8.30)	30 (24.80)	9 (7.40)	49(40.50)
Twice	10 (8.30)	27 (22.30)	10 (8.30)	47 (38.80)
Thrice	14 (11.60)	7 (5.80)	4 (3.30)	25(20.70)
TV viewing				
Yes	20 (16.50)	36 (29.80)	18 (14.90)	74 (61.20)
No	14 (11.60)	28(23.10)	5 (4.10)	47 (38.80)
Length of TV viewing				
1 hour or less	12 (9.90)	19 (15.70)	5 (4.10)	36 (29.80)
2-3 hours	17 (14.00)	32 (26.40)	12 (9.90)	61 (50.40)
4-5 hours	5 (4.10)	13 (10.70)	6 (5.00)	24 (19.80)
Snacking with TV viewing				
Yes	19 (15.70)	38 (31.40)	14 (11.60)	71 (58.70)
No	15 (12.40)	26 (21.50)	9 (7.40)	50 (41.30)
Advertised snacks				
Yes	8 (6.60)	11(9.10)	4 (3.30)	23 (19.00)
No	26 (21.50)	53 (43.80)	19 (15.70)	98 (81.00)

*BMI-for-age: World Health Organization (2007a, b)

participants reported to consume fruits daily for snacks compared to only 13.20% of their female counterparts. Conversely, more female participants (23.10%) reported eating fruits 2 to 5 times per week compared to 17.40% of their male counterparts with 20.70% of the males reporting to never or occasionally consume fruits for snack. Salad as a snack was not popular among this group. Of the 121 respondents interviewed, 63.60% reported snacking usually snack during mid morning, 32.20% snack between lunch and supper and 4.10% take their snacks after supper (Table 3).

As represented in Table 3, a greater number of the study participants (61 out of 121) reported to watch an average of 2-3 h of TV daily. The respondents with normal BMI recorded highest percentages (15.7, 26.4 and 10.7%, respectively) for the three categories of the length of TV viewing by BMI category. Among the 4-5 h TV viewers, there were more overweight (5.0%) than underweight participants (4.1%). A greater proportion of the respondents (71 out of 121) snacked along with TV viewing. The higher percentage (53.50%) of those who snacked along with TV viewing had a normal BMI. More of the overweight respondents (14) watched TV accompanied with snacking as compared to those who did not (9).

Table 4 represents the crude association between snacking habits and BMI among the study participants. Daily fruit drink consumption for snack was associated with overweight among the students (OR: 1.676; CI: 0.499-5.633) compared with never or occasional fruit drink consumption. Surprisingly, our results show that

Table 4: The risk of obesity with snack foods

Variable	N	Or (95% CI)	p-value
Carbonated drinks			
Occasionally	42	1.000	
2-5 times/week	63	0.654 (0.122-2.703)	1.000
Daily	15	0.654 (0.122-3.495)	0.619
Fruit drink			
Occasionally	32	1.000	
2-5 times/week	50	1.029 (0.304-3.475)	0.964
Daily	38	1.676 (0.499-5.633)	0.404
Fruit juice			
Occasionally	33	1.000	
2-5 times/week	50	1.400 (0.431-4.543)	0.575
Daily	37	1.307 (0.371-4.597)	0.677
Salad			
Occasionally	60	1.000	
2-5 times/week	38	2.350 (0.793-6.965)	0.123
Daily	22	2.839 (0.834-9.669)	0.095
Ice cream			
Occasionally	83	1.000	
2-5 times/week	36	0.451 (0.141-1.444)	0.180
Daily	1	-	
Pizza			
Occasionally	90	1.000	
2-5 times/week	30	1.974 (0.734-5.312)	0.178
Cake			
Occasionally	96	1.000	
2-5 times/week	24	2.224 (0.787-6.281)	0.131
Chocolate			
Occasionally	63	1.000	
2-5 times/week	49	1.719 (0.673-4.393)	0.258
	8	-	
Toffee and biscuit			
Occasionally	44	1.000	
2-5 times/week	63	1.170 (0.439-3.116)	0.753
Daily	13	0.375 (0.042-3.314)	0.378
TV viewing			
No	47	1.000	
Yes	73	2.550 (0.871-7.467)	0.088
Length of TV viewing/day			
1 hour	36	1.000	
2-3 h	60	1.392 (0.441-4.391)	0.573
4-5 h	24	2.067 (0.551-7.747)	0.282
Snacking & TV viewing			
No	49	1.000	
Yes	71	1.259 (0.483-3.277)	0.637

consumption of salad was associated with the likelihood of being overweight (daily, OR: 2.839; CI: 0.834-9.669; and 2-5 times per week, OR: 2.350; CI: 0.793-6.965) compared to never or occasional consumption. Both pizza and cake consumption for snack was associated with the likelihood of being overweight. For TV viewing our results show association with being overweight.

DISCUSSION

Halting the overweight and obesity trend in the world is an important agenda in the nutrition and public health arena. The observations from the present study compare well with other studies. The occurrence of adolescent overweight observed in males in this study is in agreement with a study conducted in Taiwan that showed

that the range of overweight and obesity was between 9.9 and 18.3% in boys (Huang *et al.*, 2003). The prevalence of overweight observed among adolescent females in the present study was similar to observation by Kimani-Murage *et al.* (2010) in rural South African female adolescents and also observed by bin Zaal *et al.* (2009) in adolescents in Dubai, United Arab Emirates.

The higher weight status resulting from the frequent consumption of foods high in sugar such as fruit drinks, cake and chocolate as snack in this study was in accordance with a cohort study conducted in selected developed countries by Dehghan *et al.* (2005). A report put together by Galal and Hulett (2003) indicated an association between overweight/obesity and chronic diseases such as hyperinsulinemia and poor glucose tolerance thus this could raise the risk of type 2 diabetes in the adolescents. The findings in this study that the frequency of eating pizza or cake was related to an increase in BMI may be attributed to the high fat density of this snack. As observed by bin Zaal *et al.* (2009), snacks that are fat dense have a high caloric content and thus a direct relationship between the frequency of snacking on such foods and overweight.

Daily consumption of fruits and vegetables is an indispensable feature of a healthy diet and its positive effect of lowering the risk of obesity has been well established in the United Kingdom population according to Llyod-Williams *et al.* (2008). However, contrary to expectations, the outcome of this analysis points out that the daily consumption of salad is associated with overweight among the adolescents. A plausible justification to this could be the addition of toppings or condiments such as salad cream to the mixed vegetables resulting in increased calorie consumption.

Similar to reports by Savige *et al.* (2007) as well as (Silvis, 2002), there exist a positive relationship between obesity and snacking along with television viewing in this study. Further, the length of time spent watching television was strongly linked with overweight thus, confirming a survey by an independent television commission which indicated that there was a strong correlation between the number of hours spent watching television and the increased risk of overweight (Postnote, 2003). As a sedentary activity, interest in television viewing can cause a decrease in a child's energy expenditure because it may replace the desire for more physically active recreation. Furthermore, presently physical activity for children is even more limited since communities often lacked the facilities or space to exercise or play sports. There hardly are any parks or playgrounds therefore, children become essentially sequestered in their homes focusing on television, video-games, or the computer and this may account for their increasing susceptibility for excess weight gain.

The findings of the study showed an inverse relationship between the frequency of snacking daily and the increase in BMI. Various studies have shown that, adolescents who frequently snacked were at greater risk of skipping meals (Savige *et al.*, 2007; Silvis, 2002). According to Savige *et al.* (2007), although evidence is limited, snacking may also be associated with less frequent consumption of meals, which may be detrimental to health and may also lead to lesser weight status since regular meal patterns are associated with greater dietary diversity, healthier food choices and better nutrient intakes.

CONCLUSION

Overweight and/or obesity were higher in female adolescents than in males. The frequent intake of snacks high in sugar and fat may explain the high BMI trend observed among the participants. Limiting the intake of snacks high in sugar and fats or substituting them with healthier snack choices would be very effective way of minimising the steady upsurge of obesity cases among adolescents. Students should be educated on the essence of snacking right so that they can make appropriate choices on their own.

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