

Breakfast Skipping As a Risk Correlate of Overweight, Obesity and Central Obesity among Adolescents in the State of Qatar

G Daradkeh^{1*}, Asma Al Muhannadi¹, P Chandra², Adam Fadlalla³, Moudi Al Hajr¹ and H Al Muhannadi¹

¹Department of Dietetics, Alkhor Hospital, Hamad Medical Corporation, Qatar

²Department of Medical Research, Alkhor Hospital, Hamad Medical Corporation, Qatar

³Qatar University, Qatar

***Corresponding Author:** Ghazi Daradkeh, Hamad Medical Corporation, Alkhor Hospital, Qatar.

Received: February 24, 2016; **Published:** April 26, 2016

Abstract

Background: Prevalence of overweight and obesity among children and adolescence over the past three decades reached an alarming point in both developed and developing countries. As a result of the economic boom overweight and obesity has become a major health problem in the Arabian Gulf countries particularly in Qatar. Breakfast is considered to be the first and most important meal of the day. Breakfast skipping may be one of the complexes and multi-factorial causes of obesity.

Aims: The aims of this study were (1) to examine the prevalence of breakfast skipping among adolescent in the state of Qatar. (2) Evaluate the hypothesis that breakfast skipping would be associated with increased overweight and obesity and central obesity in the study population.

Method: A cross-sectional study was carried out among 1225 adolescents (625 boys and 600 girls) aged 15 to 18 years were selected by means of a multistage stratified random sampling technique from 14 public and 7 private schools between October 2012 and February 2013. Anthropometric measurements: Weight in (kg), height in (cm), Body Mass Index (kg/m^2), waist circumference (cm) and waist to height ratio (WHtR) were measured/computed. Demographic data and Food habits were collected by using structured questionnaire.

Breakfast eating pattern was classified as: Breakfast eaters (students who ate breakfast at least 4 days in a week). Breakfast skippers (students who skipped breakfast at least 4 days in a week).

Results: Breakfast skipping is a common unhealthy habit, out of 1225 participants 766 (62.5%) consumed breakfast less than daily. 52.5% of the participants were breakfast skipper (ate breakfast less than 4 times/week). Weight, Body Mass Index (BMI), waist circumference (WC), was significantly different between participants age in both gender $p < 0.05$. The prevalence of overweight (43.0%) and obesity (39.5%) was lower among breakfast eaters than skippers (56.7% & 60.5%) respectively. In addition central obesity (WHtR ≥ 0.5) was more prevalent among breakfast skippers than eaters (59.3% vs 40.7%) respectively. A dose-response relationship was shown to exist between breakfast consumption and being overweight and obese among all students. This study showed that breakfast skippers were heavier than eater in both genders; body mass index was significantly higher among breakfast skippers.

Conclusion: Regular breakfast consumption is negatively associated with overweight and obesity among adolescents in Qatar, we found that breakfast skipping was prevalent in our study sample, and was associated with overweight, obesity and central obesity in both gender. Awareness programs about the importance of breakfast meal are needed for adolescents.

Keywords: Adolescents; Breakfast skippers; Body mass index; Waist circumference and central obesity

Introduction

Prevalence of overweight and obesity among children and adolescence over the past three decades reached an alarming point in both developed and developing countries. [1,2]. Worldwide 10% of school - aged children is overweight or obese; the prevalence of overweight/obesity in American school-children was 32%, followed by 20% and 16% in Europe and Middle East respectively [3]. As a result of the economic boom overweight and obesity has become a major health problem in the Arabian Gulf countries particularly in Qatar and United Arab of Emirate [4]. Recent research suggests that the prevalence of childhood obesity is increasing dramatically, already surpassing the high levels of obesity found amongst children and adolescents in the USA and Europe [5]. Breakfast is considered to be the first and most important meal of the day. At least breakfast meal has been skipped by more than half of school children on at least some days of the week [6]. Inadequate intakes of macronutrients like energy and protein as well as micronutrients like vitamin A, C, and iron have been common among breakfast skippers [6,7]. To date, no published studies have explored whether breakfast consumption is related to overweight status among adolescents in Qatar. Through this study, we aimed to (a) describe the frequency of breakfast consumption among adolescents in Qatar; (b) evaluate the association of breakfast skipping with overweight, obesity and central obesity. The consumption of breakfast may be one of the complexes and multi-factorial causes of obesity in both developed and developing countries [8-10]. The frequency of breakfast consumption is inversely associated with Body Mass Index (BMI) among school children and adolescents as suggested by many studies in developed countries [11-15], and in some developing countries, like Iran [16]. Infrequent or never breakfast consumers are at higher risk of being overweight and obese as reported by a systematic cross- sectional and longitudinal studies in Europe [17]. Abdominal adiposity, have been related to cardio metabolic risk in children and adolescents [18], waist circumference (WC) and waist-to-height ratio (WHtR), have been used to identify at-risk children [19]. Overweight and normal children with abdominal obesity showed a higher cardio metabolic risk compared to overweight children without excessive abdominal fat accumulation [20]. 20% of abdominally obese adolescents were classified as overweight [21], as showed by are presentative study from the Balearic Islands. Significant relationships between missing breakfast and weight status of female adolescents are reported among adolescents in Brazil and in the Gulf region [22,23]. 32% of US female college students aged 18 to 24 years skip breakfast as means of weight control [24], missing breakfast among adolescents females tend to consume greater amounts of food at lunch thereby gaining weight.

Methods

Subjects: The study population included boys and girls adolescence, aged 15 to 18 years. A representative sample of these adolescents (1225 students, 625 males and 600 females) were selected from public and private schools using a multistage stratified random sampling technique and stratified by sex and school type (public and private). Both national and non-national adolescents were included in the study. The study was approved by the Research Ethics Committee of Medical Research Center - Hamad Medical Corporation and Supreme Counsel of Education, state of Qatar. All adolescents, parents and school principals were clearly informed about the purpose and content of the study and written consent was obtained from the parents one week prior the study implementation and from the students as well on the day of data collection.

Anthropometric measurements

Weight and height were measured using the standard procedure. 15 Weight was measured to the nearest 0.1 kg using an electronic portable scale (Seca). The scale was checked before each weighing and calibrated with a known weight every morning. To avoid inter-personal error weight and height measurements were carried out by one person. The height was measured, in the standing position, without shoes and socks, back against the scale, heels together and head in the upright position to the nearest 0.1 cm using a portable stadiometer which was attached to the weighing scale. The movable head board was gently lowered until it firmly touched the upper part of the subject's head and a direct reading of height was obtained. Body Mass Index (BMI) (the ratio between weight in (kg) and height in (m²)) was computed to determine overweight and obesity among adolescents using the cut-off values as recommended by the World Health Organization (WHO, 1995) as follows: Underweight < 5th percentile of BMI for age, Normal weight 5th to < 85th percentile of BMI for age, Overweight: 85th to < 95th percentile of BMI for age and obese: ≥ 95th percentile of BMI for age. Waist circumference (WC) was measured using plastic, non-stretchable measuring tape, at the level of the umbilicus to the nearest 0.1cm while student standing and

following normal expiration. Waist to height ratio (WHtR) was calculated as the ratio between WC (cm) and height (cm). Central obesity was defined as WHtR \geq 0.5 cm [25].

Dietary habits assessment

Data was collected by using a structured questionnaire which consisted of two parts: demographic data such as: age, sex, school type, class, and nationality. Food habits which include question about how many times did you eat breakfast per week. The answers were ranges between (0 = never, and 7 times = every day). The questionnaire was pre-tested twice, during the development stage and prior to data collection and it was translated into Arabic language. Breakfast eating pattern was classified as: breakfast eaters (students who ate breakfast at least 4 days in a week) and breakfast skipper (students who skipped breakfast at least 4 days in a week).

A statistical analysis was performed using the SPSS (Version 15) software package. Chi- square statistics were used to determine the presence of an association between the variables.

Results

Skipping breakfast is a common unhealthy habit, the present study showed that 625 (51.1%) were boys and 600 (48.9%) were girls, 91.8% of them were belonged to a public schools while only 8.2% were from private schools. The highest proportion (35.3%) of participants was at age of 16 while the lower proportion was at age of 18 years. Overall prevalence of breakfast skipper (ate breakfast less than 4 times/week) was 52.5%, and who consumed breakfast less than daily were 766 (62.5%), Daily skipping breakfast was more common among boys 51.0% than among girls 49% table 1.

	Variable (n)	%
Gender		
Boys	625	51.1
Girls	600	48.9
Age		
15	287	23.4
16	433	35.3
17	330	26.9
18	175	14.2
School type		
Public	112.5	91.8
Private	100	8.2
Breakfast consumption		
Eaters	582	47.5
Skippers	643	52.5

Table 1: Demographic characteristic of participants n = (1225).

Higher prevalence of overweight (56.7%), obesity (60.5%) and central obesity (59.3%) were observed among breakfast skipper adolescents in Qatar. Table 2 Shows that Weight, Body Mass Index (BMI), Waist Circumference (WC), were significantly different between participants age in both gender, while Waist - Height Ratio (WHtR) was significantly different between ages of girls only

	Age (yr) Mean±SD	n	weight (kg) Mean±SD	height (cm) Mean±SD	BMI (kg/m ²) Mean±SD	WCWhtR Mean±SD
Boys						
15	70.8 ± 22.81	110	66.4 ± 7.72	5.4 ± 7.6	77.8 ± 17.3	0.47 ± 0.10
16	70.7 ± 18.91	217	68.8 ± 6.4	24.8 ± 6.3	76.9 ± 13.5	0.46 ± 0.08
17	72.8 ± 21.21	205	69.2 ± 6.7	25.4 ± 7.4	77.5 ± 15.0	0.46 ± 0.09
18	82.6 ± 27.0	96	172.2 ± 6.9	27.8 ± 8.7	82.7 ± 16.6	0.48 ± 0.09
P - Value		0.000	0.000	0.008	0.017	0.128
Girls						
15	58.3 ± 13.5	178	158.3 ± 6.2	23.3 ± 5.2	73.1 ± 10.2	0.46 ± 0.06
16	58.2 ± 13.6	215	157.9 ± 6.3	23.3 ± 5.1	72.8 ± 10.9	0.46 ± 0.07
17	62.1 ± 18.5	125	158.2 ± 6.3	24.7 ± 6.6	75.5 ± 13.7	0.48 ± 0.08
18	63.5 ± 16.4	79	157.4 ± 6.7	25.6 ± 6.2	76.0 ± 12.1	0.48 ± 0.08
P - Value		0.008	0.737	0.003	0.052	0.034

Table 2: Descriptive statistics by age and sex of the participants n = (1225).

n: number of participants; M±SD for weight, height, body mass index, waist circumference (WC), waist-height ratio (WhtR) for males and females adolescence 15- 18 years in Qatar.

This study showed significantly different between breakfast skipper and eaters p < 0.05 for weight, BMI and WC Table 3. An inverse relationship was exist between breakfast consumption and being overweight and obese among all students, the prevalence of overweight (43.0%) and obesity (39.5%) was lower among breakfast eaters than skippers (56.7% & 60.5%) respectively. In addition central obesity (WhtR ≥ 0.5) was more prevalent among breakfast skippers than eaters (59.3% vs 40.7%) respectively figure 1A, B, C.

There was no significant difference between age, gender and school type with frequency of breakfast consumption; daily breakfast consumption was lower among older ages as compared to younger ages. A dose–response relationship was shown to exist between breakfast consumption and being overweight and obese among all students, prevalence of overweight was 32.7% and 39% when breakfast consumption was ≥ 5/ week and ≤ 3 times / week respectively, as well prevalence of obesity was 30.4% and 41.8% when the breakfast consumption was ≥5/week and < 3 times/week respectively (P=0.03). In addition central obesity was negatively correlated with the frequency of breakfast consumption; the present study showed that the prevalence of central obesity was increased as breakfast consumption decreased, 40% vs 31% when the frequency was < 3 time’s vs ≥ 5 times/ week. Table 4

Variable	Breakfast Eater (n) Mean ± SD	Breakfast Skipper (n) Mean ± SD	P-value
Age(Years)	(582) 16.2 ± 1.0	(643) 16.4 ± 1.0	0.015
Weight (kg)	(582) 64.9 ± 18.9	(643) 68.2 ± 21.2	0.004
Height (cm)	(582) 163.5 ± 8.6	(643) 163.8 ± 8.7	0.525
BMI (Kg/m ²)	(582) 24.1 ± 6.1	(643) 25.3 ± 7.0	0.002
Waist circumference (cm)	(582) 74.8 12.9	(643) 77.2 ± 14.4	0.002

Table 3: Descriptive statistics by anthropometric measurements of breakfast eaters and skippers n = (1225).

Variable Breakfast Consumption Frequency times/week				
	<3	3 - 4	≥5	P - value
Age				0.636
15	95(33.0)	78(27.1)	115(39.9)	
16	157(36.3)	108(24.9)	168(38.8)	
17	115(34.8)	95(28.8)	120(36.4)	
18	68(38.9)	50(28.6)	57(32.6)	
Sex				0.936
Boys	223(35.5)	172(27.4)	233(37.1)	
Girls	212(36.5)	159(26.6)	227(38)	
School type				0.481
Public	404(35.9)	304(27)	417(37.1)	
Private	31(30.7)	27(26.7)	43(42.6)	
Body mass index				0.036
<18.5	49(34.5)	35(24.6)	58(40.8)	
18.5-24.9	199(31.9)	167(26.8)	257(41.3)	
25.0-29.9	87(39)	63(28.3)	73(32.7)	
≥ 30	99(41.8)	66(27.8)	72(30.4)	
Waist height ratio				0.009
≥0.5	142(40)	103(29)	110(31)	
<0.5	292(33.6)	228(26.2)	350(40.2)	

Table 4: Demographic and Anthropometric Characteristics with Breakfast Consumption Frequency n = (1225).

This study found that breakfast skippers were heavier than eater in both genders (p=0.047 for boys and 0.038 for girls) respectively, body mass index was significantly higher among skippers (p=0.06 and 0.01) for boys and girls respectively table 5.

Discussion

The prevalence of obesity and overweight among adolescents is sharply increasing in Middle East countries, particularly in Gulf Countries because of rapid improvement of socio-economic status which makes their life more sedentary and physically inactive [4,28]. This study explored the patterns of breakfast consumption among adolescents 15-18 years in Qatar and its association with overweight, obesity and central obesity. An important finding was that high prevalence 62.5% of adolescents in Qatar did not consume their breakfast daily. The overall prevalence of breakfast skipper (ate breakfast less than 4 times/week) was 52.5%, this prevalence are high compared to the prevalence of breakfast skipper in US children which ranges 10-30% depending on age group, gender, race and definition of breakfast skipping [26].

Our study showed that boys are more skipper of their breakfast than girls but the difference was not significant; which is consistent with prior literature which suggest that regular breakfast consumption is more common among girls Chitra *et al.* 2007 [6], Croezen *et al.* 2009 [14], and Rampersaud GC *et al.* 2005 [26]. Our study found that skipping breakfast was positively correlated with age, the highest rate was at age of 17 followed by age of 16 and 15 years respectively, and this result was consistent with other studies [14,26].

Variable	Boys						Girls						
	Breakfast Eater			Breakfast Skipper			Breakfast Eater			Breakfast Skipper			
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	P-value
AGE (year)	293	16.34	0.948	335	16.56	0.946	289	16.15	0.987	309	16.20	1.019	0.528
Weight (kg)	293	71.33	20.327	335	74.85	23.389	289	58.44	14.779	308	61.01	15.513	0.038
Height (cm)	293	168.68	7.148	335	169.34	6.867	289	158.22	6.359	308	157.78	6.243	0.396
BMI (kg/m ²)	293	24.98	6.545	335	26.06	7.923	289	23.30	5.509	308	24.46	5.784	0.012
WC (cm)	293	76.89	14.213	335	79.23	16.187	289	72.68	11.116	308	74.99	11.873	0.014
WHtR	293	0.46	0.082	335	0.47	0.095	289	0.46	0.067	308	0.48	0.073	0.006
Overweight (%)	42 (41.6%)			59 (58.4%)			54 (44.3%)			68 (55.7%)			
Obesity (%)	65 (40.9%)			94 (59.1%)			29 (37.2%)			49 (62.8%)			

Table 5: Comparison between breakfast eaters and skippers with, overweight, obesity and central obesity by sex.

High prevalence of overweight (58.4%) and obesity (59.1%) among boy's skippers was observed while it was (55.7% & 62.8%) of overweight and obesity among girls respectively, similarly as reported by Jonas J *et al.* 2010 among Fijian adolescent [27]. In this study we found that frequency of breakfast consumption is associated with a lower likelihood of overweight and obesity among adolescents in Qatar. Regular breakfast consumers were significantly less overweight or obese compared to breakfast skipper. This finding is consistent with the finding of Berkey CS *et al.* 2003 [11], Vanelli M *et al.* 2005 [12], Timlin MT *et al.* 2008 [13], Croezen S *et al.* 2009 [14] and Sandercock GR *et al.* 2010 [15]. This might be explained as those who are overweight or obese try to skip their breakfast meal as an intentional weight loss strategy. Excess weight and breakfast consumption are inversely related in some longitudinal studies as reported by Berkey CS *et al.* 2003 [11] and Timlin MT *et al.* 2008 [13]. Such these studies are still lacking in Qatar.

Limitation of the study

The data were self-reported and were dependent on the students' recall which has the likelihood to recall bias. The assessment of dietary habits was qualitative and based on frequency of intakes; nevertheless, this study described the life style behaviors and provides valuable and significant information for the public health.

Conclusion

A higher prevalence of overweight, obesity and central obesity was reported among adolescents in both genders. Adolescence in Qatar. Skipping breakfast was prevalent in our study sample and positively correlated with obesity and overweight which emphasizes that breakfast skipping is associated with adverse health outcomes. Promoting of healthy eating habits and encourage of daily breakfast consumption among Qatari adolescents by conducting of educational programs is highly recommended. Environmental and socioeconomic factors associated with obesity and lifestyle among adolescents should be studied in future research.

Acknowledgments

The authors would like to acknowledge the medical research center at Hamad Medical Corporation and the supreme council of higher education and all participating schools for their support to conduct this study.

Bibliography

1. De Onis M and Blössner M. "Prevalence and trends of overweight among preschool children in developing countries". *American Journal of Clinical Nutrition* 72.4 (2000): 1032-1039.
2. Samuelson G. "Dietary habits and nutritional status in adolescents over Europe. An overview of current studies in the Nordic Countries". *European Journal of Clinical Nutrition* 54.1S (2000): S21-S28.
3. Lobstein T, *et al.* "IASO International Obesity Task Force. Obesity in children and young people: a crisis in public health". *Obesity Reviews* 5.Suppl1 (2004): 4-104.
4. Musaiger AO. "Overweight and obesity in the Eastern Mediterranean region: can we control it?" *The Eastern Mediterranean Health Journal* 10.6 (2004): 789-793.
5. Westerbeek H and Smith A. "Corporate social responsibility and community health in the UAE: The case of the Al Jazira sport and health foundation". *Middle East Journal of Business* 1.1 (2005).
6. Chitra U and Reddy CR. "The role of breakfast in nutrient intake of urban school children". *Public Health Nutrition* 10 (2007): 55-58.
7. Sethi M and Dangwal R. "Breakfast eating patterns of school children and their impact on nutritional status". Nutrition in disease management series 10. Edited by Gopalan S. New Delhi: Centre for Research on Nutrition Support Systems (2001): 8-16.
8. Skelton JA, *et al.* "Etiologies of obesity in children: nature and nurture". *Pediatric Clinics of North America* 58 (2011): 1333-1354.

9. Stouffer K and Dorman SM. "Childhood obesity: a multifaceted etiology". *International Electronic Journal of Health Education* 2 (1999): 66-72.
10. Philippas NG and Lo CW. "Childhood obesity: etiology, prevention, and treatment". *Nutrition in Clinical Care* 8 (2005): 77-88.
11. Berkey CS., et al. "Longitudinal study of skipping breakfast and weight change in adolescents". *International Journal of Obesity* 27 (2003): 1258-1266.
12. Vanelli M., et al. "Breakfast habits of 1,202 northern Italian children admitted to a summer sport school. Breakfast skipping is associated with overweight and obesity". *Acta Biomedica* 76 (2005): 79-85.
13. Timlin MT., et al. "Breakfast eating and weight change in a 5-year prospective analysis of adolescents: project EAT (Eating among Teens)". *Pediatrics* 121 (2008): e638-e645.
14. Croezen S., et al. "Skipping breakfast, alcohol consumption and physical inactivity as risk factors for overweight and obesity in adolescents: results of the E-MOVO project". *European Journal of Clinical Nutrition* 63 (2009): 405-412.
15. Sandercock GR., et al. "Associations between habitual school-day breakfast consumption, body mass index, physical activity and cardiorespiratory fitness in English school children". *European Journal of Clinical Nutrition* 64 (2010): 1086-1092.
16. Maddah M and Nikooyeh B. "Factors associated with overweight in children in Rasht, Iran: gender, maternal education, skipping breakfast and parental obesity". *Public Health Nutrition* 13 (2010): 196-200.
17. Szajewska H and Ruszczynski M. "Systematic review demonstrating that breakfast consumption influences body weight outcomes in children and adolescents in Europe". *Critical Reviews in Food Science and Nutrition* 50 (2010): 113-119.
18. Lee CM., et al. "Indices of abdominal obesity are better discriminators of cardiovascular risk factors than BMI: a meta-analysis". *Journal of clinical epidemiology* 61 (2008): 646-653.
19. de Moraes AC., et al. "Prevalence of abdominal obesity in adolescents: a systematic review". *Obesity Reviews* 12 (2011): 69-77.
20. Mokha JS., et al. "Utility of waist-to-height ratio in assessing the status of central obesity and related cardio metabolic risk profile among normal weight and overweight/obese children: the Bogalusa Heart Study". *BMC Pediatrics* 10 (2010): 73.
21. Bibiloni Mdel M., et al. "Defining body fatness in adolescents: a proposal of the AFAD-A classification". *PLoS One* 8 (2013): e55849.
22. Terres NG., et al. "Prevalence and factors associated to overweight and obesity in Adolescents". *Revista de Saúde Pública* 40.4 (2006): 627-633.
23. Musaiger AO. "Height, weight and menarcheal age of adolescent girls in Oman". *Annals of Human Biology* 18.1 (1991): 71-74.
24. Malinauskas BM., et al. "Dieting practices, weight perceptions, and body composition: A comparison of normal weight, overweight, and obese college females". *Nutrition Journal* 5 (2006): 11.
25. Browning LM., et al. "A systematic review of waist-to height ratio as a screening tool for the prediction of cardiovascular disease and diabetes: 0-5 could be a suitable global boundary value". *Nutrition Research Reviews* 23 (2010): 247-269.
26. Rampersaud GC., et al. "Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents". *Journal of the American Dietetic Association* 105 (2005): 743-760.
27. Jonas J Thompson-McCormick., et al. "Breakfast skipping as a risk correlate of overweight and obesity in school-going ethnic Fijian adolescent girls". *Asia Pacific Journal of Clinical Nutrition* 19.3 (2010): 372-382.

28. Al-Saeed WY, *et al.* "Prevalence and socioeconomic risk factors of obesity among urban female students in Al-Khobar city, Eastern Saudi Arabia, 2003". *Obesity Reviews* 8.2 (2007): 93-99.

Volume 3 Issue 6 April 2016

© All rights reserved by Ghazi Daradkeh., *et al.*