Prevalence of junk food consumption, overweight/obesity and self-rated health and fitness in high school adolescent girls: a cross sectional study in a deprived area of Qom

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Abstract

Background: Junk food intake is associated with high salt and high caloric intake and is one of the causes of overweight/obesity.

Objectives: To assess the prevalence of junk food consumption in snack times and its association with obesity and overweight in high school girl students in a deprived area of Qom.

Method: A cross-sectional study was done in 638 high school girls who were selected using the multi-stage random sampling method. Overweight/obesity was measured using body mass index (BMI) and a questionnaire was used to ascertain the daily, weekly, monthly, three monthly and occasional junk food consumption. Chi square test and t-test were used to analyse the collected data.

Results: Mean age of participants was 15.77±0.73 years (range 15-18 years). The prevalence of underweight and overweight in study subjects was 23.2% and 11.4% respectively. BMI was not significantly related to some junk foods (p>0.05). Nevertheless, chocolate/soft drinks were associated with higher prevalence of underweight (75.8%) compared to overweight/obesity (57.6%).

Conclusions: Junk food consumption prevalence was high among the studied population of high school girls in a deprived area of Qom. There was no significant association between junk food consumption and BMI in this study population.

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Introduction

Prevalence of obesity is increasing globally[1]. According to the World Health Organisation (WHO) more than 300 million children 5-19 old were overweight or obese in 2016[2]. Global studies show an increased prevalence of overweight and obesity in children and adolescents[3,4]. A systematic review in children under 18 years of age in Iran found a prevalence of overweight and obesity of 5.0-13.5 and 3.2-11.9 respectively[1,5]. Obesity and overweight have a close relationship with diabetes, heart disease, malignancy, asthma, low back pain and depression[6]. Lack of physical activity, lifestyle changes, prolonged television viewing, playing computer games, as well as nutritional factors, such as consumption of fast food / junk food, consumption of calorie dense food, and a family history of obesity are the main causes of obesity and overweight in adolescent girls[7,8]. Low-nutrition high-energy food are known as junk food. Junk food has high energy content that reduces appetite, reduces the chances of feeding with more nutritious foods, and most importantly, causes diseases such as obesity, diabetes and hypertension at an older age[9,10]. Availability, low price, television advertising, diversity, and attractiveness of the package and lack of parental awareness are the main causes of students' tendency to consume junk food[11]. However, the lifestyle in students, especially high school girls, is not appropriate due to consumption of low-value foods and the trend of obesity and overweight prevalence among adolescents is increasing[1,11].

Objectives

To assess the prevalence of junk food consumption

in snack times and its association with obesity and overweight in a deprived area of Qom.

Method

This cross-sectional study was performed on high school girl students in Qom in spring 2017. Random multi-stage sampling was used. First, one of the deprived areas was selected from 4 different educational areas in Qom and then 16 different high schools were selected as stratum based on different majors and governmental versus non-governmental schools. Finally, in each school, 40 students were selected by simple random sampling.

A pilot test was conducted on 50 students to confirm the reliability of the questionnaire and Cronbach's alpha value was computed as 0.871. The questionnaire used was based on food frequency and included demographic characteristics including age, marital status and family income. Sixteen different questions were asked to assess the consumption of junk foods, homemade sandwiches and nuts. Sample size calculation was based on the junk food consumption in previous studies and alpha error was 0.05. Therefore, minimum sample size calculated was 580 subjects. We assessed 640 high school girls and 638 ones completed the questionnaires.

Part A of questionnaire assessed demographic information such as study field, age, weight, height, waist circumference, parental educational level, parental occupation, economic and cultural status, self-reported health (SRH) and self-reported fitness (SRF). Part B included questions about consumption of snacks, including puff, chips, biscuits, cakes, chocolates, industrial juices, sausages, home sandwich and nuts. Consumption frequency for junk foods was categorized as daily, weekly, monthly, 3 monthly and occasional options. In addition, the availability of each of these snacks was asked at the school buffet. Moreover, SRH and SRF were assessed by a 5 point Likert Scale as these questions. How you evaluate your general health and fitness? That varied the responses from very good: 5, good: 4, moderate: 3, weak: 2 and very weak: 1.

After obtaining the necessary coordination and obtaining permission from the ethical committee of Qom University of Medical Sciences, the research team was referred to the selected schools and the questionnaire distributed among eligible subjects after taking informed consent. Statistical analyses were performed using the SPSS software. The prevalence rate of overweight/obesity, junk foods consumption and SRH and SRF were computed using descriptive statistics. The qualitative variables were reported as number and percentage and quantitative variables and mean and standard deviation. The analysis of categorical variables was performed using the person Chi square test. $p < 0.05$ was considered significant.

Results

The demographic characteristics of studied high school girls in Quom city in 2017 are shown in Table 1. The response rate in the current study was 99.7% (638/640). The age range of participants was 15-18 years. Based on WHO classification the prevalence of underweight and over weight in study subjects was 23.2% (120 girls) and 11.4% (59 girls) respectively. However, 65.4% (338 girls) had normal BMI. Asthma (0.6%), hypothyroidism (0.6%) and heart problems (0.5%) were the most common chronic diseases in studied participants.

Table 1

Demographic characteristics of study population

Qualitative Variable	**Number (%)**
Educational year	
Tenth	568 (88.9)
Eleventh	71 (11.1)
Marital status	
Single	616 (96.4)
Married	23 (03.6)
Major	
Experimental sciences	246 (38.5)
Human sciences	175 (27.4)
Mathematical/Skill sciences	218 (34.1)
Mother's job	
Staff	31 (04.9)
Homemaker	574 (90.4)
Other	30 (04.7)
Mother's education	
Illiterate	105 (16.5)
Elementary	290 (45.7)
High school	168 (26.5)
College	72 (11.3)
Father's education	
Illiterate	50 (08.0)
Elementary	238 (38.1)
High school	223 (35.7)
College	114 (18.2)
Income level per month (\$)	
249 or less	312 (53.4)
250-499	144 (24.7)
500-750	64 (11.0)
750 or more	64 (11.0)
Quantitative Variable	**Mean (SD)**
Age (years)	15.77 (0.73)
BMI (kg/m^2)	20.85 (03.29)
Weight (kg)	54.33 (08.95)
Height (cm)	161.86 (07.29)
Moderate physical activity (minutes)	25.13 (26.93)
Severe physical activity (minutes)	12.29 (19.42)

The results in table 2 and Figure 1 showed that the consumption prevalence in some junk foods was very high.

Table 2: ***Prevalence of junk food consumption in studied population***

	None	Every day	Every week	Every month	Every Season (Sometimes)	Previous month	CI
Biscuits	94(14.7)	231(36.2)	180(28.2)	38(5.9)	96(15)	449(70.3)	(0.687-0.718)
Chocolate/Soft drinks	189(29.6)	55(8.6)	168(26.3)	93(14.6)	134(20.9)	316(49.5)	(0.476 – 0.513)
Puff (Poffak)	146(22.8)	57(8.9)	195(30.5)	86(13.5)	155(24.2)	338(52.9)	(0.510 – 0.547)
Chips	147(23.0)	55(8.6)	188(29.4)	85(13.3)	164(25.7)	328(51.3)	(0.494 – 0.531)
Popcorn	132(20.7)	69(10.8)	174(27.2)	91(14.2)	173(27.1)	334(52.3)	(0.504 – 0.541)
Fruit leather/ /Indian stamp	133(20.8)	121(18.9)	178(27.9)	79(12.4)	128(20)	378(59.2)	(0.573 – 0.610)
Ice Cream	155(24.3)	76(11.9)	148(23.2)	86(13.5)	174(27.2)	310(48.5)	(0.466 – 0.503)
Candy/ Chewing Gum	146(22.8)	123(19.2)	150(23.5)	66(10.3)	154(24.1)	339(53.1)	(0.512 – 0.549)
Industrial Sandwich	160(25.0)	51(8.0)	142(22.2)	110(17.2)	176(27.5)	303(47.4)	(0.455 – 0.492)
Industrial Juice	145(22.7)	58(9.1)	154(24.1)	97(15.2)	185(29)	309(48.4)	(0.465 – 0.502)
Industrial Nuts	142(22.2)	51(8.0)	146(22.8)	99(15.5)	201(31.5)	296(46.3)	(0.444 – 0.481)
Sausage Sandwich	326(51.0)	13(2.0)	47(7.4)	60(9.4)	147(30.2)	120(18.8)	(0.176 – 0.199)
Milk/Chocolate Milk	93(14.6)	185(29.0)	207(32.4)	55(8.6)	99(3.5)	447(70)	(0.684 – 0.715)
Homemade Sandwich	106(16.6)	132(20.7)	151(23.6)	112(17.5)	138(21.6)	395(61.8)	(0.600 – 0.635)
Homemade Nuts	96(15.0)	143(22.4)	148(23.2)	103(16.1)	149(23.3)	394(61.7)	0.599 – 0.634)

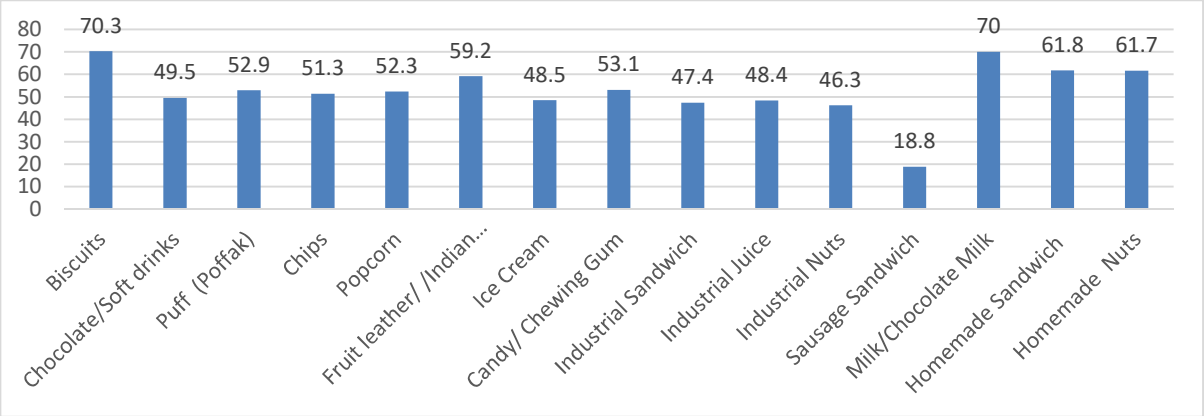

Figure 1: ***Prevalence of consumption of junk foods in studied subject previous month***

Based on the results the prevalence of consumption of biscuits was 70.3% (CI (0.687-0.718)) in the previous month. However, less than 25% of studied girl students in high schools did not consume puff, chips, popcorn, fruit leather/Indian stamp, ice cream, candy/chewing gum, industrial sandwich, industrial juice and nuts. However, the prevalence of sausage sandwich consumption was 18.8% (CI (0.176 – 0.199)) and 61.8% (CI (0.600 – 0.635)) consumed homemade sandwich in the previous month. In addition, 61.7% (CI (0.599 – 0.634)) reported that they consumed homemade nuts in the last month.

According to Chi Square results in table 3, there was no significant association of BMI with consumption of biscuits, puff, chips, popcorn, fruit leather/Indian stamp, ice cream, candy/ chewing gum, industrial sandwich, industrial juice, industrial nuts, sausage sandwich, milk/chocolate milk and homemade nuts ($p>0.05$). Nevertheless, chocolate/soft drinks were associated by higher prevalence of underweight (75.8%) (CI (0.744– 0.771)) compared to lower prevalence of overweight/obesity (57.6%) (CI (0.557 – 0.594). Moreover, homemade sandwich consumption was associated with higher overweight/obesity (96.6%) (CI (0.963 – 0.968)) compared to normal weight girls (79.3%) (CI 0.780 – 0.805).

Figure 2 shows that the most portions of subjects have good and very good SRH and Self Rated Fitness (SRF).

Table 3: ***Relationship between junk foods consumption and general obesity based on BMI***

	Underweight	Normal	Overweight/Obesity	Total	CI	*p* value
Biscuits	104(86.7)	286(84.6)	50(84.7)	440(85.1)	(0.841 – 0.860)	0.860
Chocolate/Soft drinks	91(75.8)	214(63.3)	34(57.6)	339(65.6)	(0.639 – 0.672)	0.018
Puff (Poffak)	88(73.3)	254(75.1)	52(88.1)	394(76.2)	(0.748 – 0.775)	0.068
Chips	93(77.5)	250(74.0)	50(84.7)	393(76.0)	(0.746 – 0.773)	0.183
Popcorn	99(82.5)	266(78.7)	47(79.7)	412(79.7)	(0.784 – 0.809)	0.673
Fruit leather/ /Indian stamp	96(80.0)	261(77.2)	49(83.1)	406(78.5)	(0.772 – 0.797)	0.545
Ice Cream	87(72.5)	248(73.4)	50(84.7)	385(74.5)	(0.730 – 0.759)	0.154
Candy/ Chewing Gum	96(80)	274(73.1)	49(83.1)	392(75.8)	(0.744 – 0.771)	0.122
Industrial Sandwich	90(75.0)	246(72.8)	49(83.1)	385(74.5)	(0.730 – 0.759)	0.245
Industrial Juice	95(79.2)	247(73.1)	48(81.4)	390(75.4)	(0.740 – 0.767)	0.220
Industrial Nuts	95(79.2)	255(75.4)	50(84.7)	400(77.4)	(0.760 – 0.787)	0.250
Sausage Sandwich	62(51.7)	158(46.7)	28(47.5)	248(48.0)	(0.461 – 0.498)	0.648
Milk/Chocolate Milk	102(85.0)	285(84.3)	54(91.5)	441(85.3)	(0.843 – 0.862)	0.351
Homemade Sandwich	104(86.7)	268(79.3)	57(96.6)	429(83.0)	(0.819 – 0.840)	0.002
Homemade Nuts	104(86.7)	286(84.6)	53(89.8)	443(85.7)	(0.847 – 0.866)	0.539

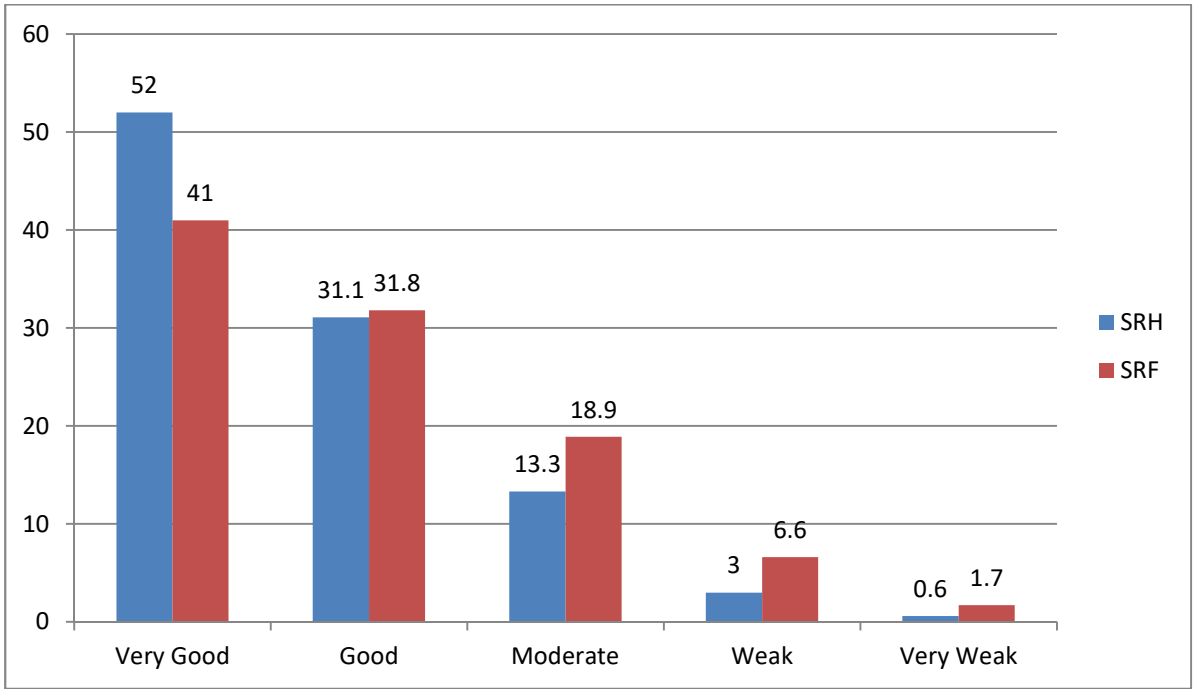

Figure 2: ***Prevalence of self-reported health and self-reported fitness in studied girls***

Discussion

Based on our results, 65.4% of studied high school girls were of normal BMI based on WHO BMI classification, 23.2% had overweight/obesity and 11.4% were underweight. The obesity and underweight prevalence in our study population is considerable as these girls are in pubertal age and are of marriageable age. Hemmati *et al* in a study in Urmia showed that the prevalence of overweight and obesity in high school girls was 20.5% and 10.9% respectively which is consistent with the results of our study[12]. Bibiloni *et al.* in a review study on adolescents all over the world showed that, the prevalence of overweight and obesity is high[13]. Studies showed that differences in socioeconomic status, differences in individual, environmental, access to health care, beliefs and lifestyles are related to obesity/overweight[14-16].

The present study showed that the consumption of sausage and home-made sandwiches is high among girls. According to one study in Iran, sausages are one of the favourite foods of Iranian people[17]. Our results were compared with other studies and we concluded that there was a higher prevalence of obesity among girls[18,19]. However, high prevalence of junk food consumption and low health literacy in health workers and families and differences in lifestyle among girls compared to other age-sex groups could cause a normal BMI rather than a high BMJ.

The prevalence of junk food consumption in high school girls in Qom was high. Almost 70.3% and 61.8% of girls consumed biscuits and home sandwiches in the last month. Furthermore, less than 25% did not consume chips, puffs, popcorns, fruit leather/ /Indian stamp, ice cream, and other junk foods showing the high prevalence of junk food

consumption in this population that are in pubertal age[14,20]. Results of other studies showed that fast food intake is associated with high salt and high caloric intake, fat and food poverty[15,21]. Moreover, it is one of the most important causes of overweight/obesity, cardiovascular disease, metabolic syndrome and violent behaviour[22-24].

Our findings indicate that there is no meaningful relationship between junk foods and BMI. The results of our study have been accordance with previous studies on the prevalence of junk foods and fast food consumption[23,25]. A study by Arif Habib *et al*. showed no significant relationship between fast food consumption and BMI, which is similar and consistent with our results[26]. Nevertheless, other studies have shown that with increasing consumption of fast food and junk foods, BMI also increases[10,27]. However, fast food consumption is associated with high energy consumption and low dietary quality, as a result of the increase in BMI[28].

Our findings indicate that a high percentage of the studied girls have reported good and very good SRH and SRF. According to the other studies low SRH is associated with different cardiovascular diseases, visual impairment, psychological and mental disorders[29,30]. Philips and colleagues showed that people with low SRH and SRF are likely to die earlier than people with good SRH[31].

This cross-sectional study was unable to explain the causal relationship between independent variables and junk foods. However, girls who consumed homemade sandwich have higher BMI and the obesity/overweight was not related to puff, chips, popcorn, fruit leather/Indian stamp, ice cream, candy/ chewing gum, industrial sandwich, juice and nuts. This inverse phenomenon in our study could relate to the food size of junk foods such as puff, chips, popcorn or other industrial foods[32]. It is demonstrated that industrial foods are absorbent and the consumer has false fullness after eating these junk foods[33]. Moreover, adolescents are more interested in eating these junk foods and most times they have no desire to eat homemade foods. Consumption of diet high in sugar, salt and calorie content in adolescents can lead to early cardiovascular diseases. Therefore, intervention programmes to prevent junk foods consumption in students is essential

Conclusions

Junk food consumption prevalence was high among the studied population of high school girls in a deprived area of Qom. There was no significant association between junk food consumption and BMI in this study population.

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