



Research Article

Prevalence of Obesity Among Teenagers Girls in Buraidh in Al-Qassim Region

Amal MH Mackawy^{1*}, Amal Rashed Alrasheedi²

¹Department of Medical Biochemistry, Applied Medical Science college, Qassim University, Saudi Arabia

²Applied Medical Science, Qassim University, Saudi Arabia

***Corresponding author:** Amal MH Mackawy, Assistant Professor, Department of Medical Biochemistry, Applied Medical Science college, Qassim University, Saudi Arabia. Tel: +966508129407; Email: amalmackawy@hotmail.com

Citation: Mackawy AMH, Alrasheedi AR (2018) Prevalence of Obesity Among Teenagers Girls in Buraidh in Al-Qassim Region. J Obes Nutr Disord: JOND-123. DOI: 10.29011/2577-2244.100023

Received Date: 19 March, 2018; **Accepted Date:** 06 April, 2018; **Published Date:** 12 April, 2018

Abstract

Obesity is a major risk factor of illness and death. Until now no sufficient data onto the prevalence of obesity among females in Buraidah city, Saudi Arabia. To determine obesity prevalence and associated factors among Saudi females we conducted this study on obesity and their associated risk factors of high schools in Buraidah city, KSA. Methods: The Observational cross-sectional study was conducted at the high school in Buraidah city. We interviewed 87 female students, were randomly selected from school classes. A Self-reported questionnaire and an interview for the students were conducted for the collection of demographic and lifestyle data. Body Mass Index (BMI), Waist Circumference (WC) and Waist-Hip Ratio (WHR) were measured. Results: 20.69% of the students were underweight, 47.12% were normal, 20.69% were overweight, and 11.49% were obese. BMI was significantly associated menstrual cycle, use of smart devices and diet. WHR was significantly associated with fast food. Regarding the WHO, 57.47% were normal 34.48% were low risk, 3.4% were a moderate risk and 4.6% were high risk. Conclusion: The results of this study indicate an increased rate of obesity, abdominal obesity, and overweight among the teenager students with the increased use of smart devices, bad diet habits and irregular menstrual cycle. Therefore, community-based multiple strategies are required to combat with increasing rate of obesity and its subsequent complications in the teenagers to increase the awareness of obesity causes and morbidities. We have to help in changing unhealthy lifestyle habits in our community to improve health status.

Keywords: Body Mass Index; Buraidah City; Obesity; Overweight; Teenager Girls

Introduction

In the United States obesity has appeared to be epidemic and is threatening to become a global epidemic [1]. 54% of the U.S. adults and 22% of them are considered to be overweight and obese respectively according to the World Health Organization (WHO) classification [a Body Mass Index [BMI] > 25 kg/m² (BMI > 30 kg/m², respectively) [2]. The overweight and obese adolescents' proportion are rapidly increasing worldwide. Adolescence is a vulnerable period for the development of obesity and also appears to be a critical period for establishing risk factors of some chronic diseases in adulthood [3]. Available statistics indicate that an alarming proportion of people in most Arab countries suffer from obesity. Studies have reported that the prevalence of overweight and obesity among adolescents in Arab countries ranges from 18% to 44% [4]. In general, overweight has been found to be more prevalent than obesity in both boys and girls. However,

the prevalence of obesity by gender at the adolescent stage [10-18 years] does not indicate the same trend [4]. In Bahrain, Egypt, Tunisia, Kuwait, and Qatar, the prevalence of overweight is higher among girls than boys. Obesity is also higher among adolescent girls than boys in Bahrain, Egypt, and Kuwait. However, in other countries such as Lebanon and the United Arab Emirates (UAE), the overweight and obesity percentage is higher in boys than girls [5]. To manage obesity is an important step in the prevention and control of chronic non-communicable diseases, such as Cardiovascular Disease (CVD), diabetes, hypertension, and some types of cancer [6]. These diseases contribute to 60% of overall morbidity and mortality in most Arab countries [7]. Therefore, understanding the prevalence of obesity among teenager's girls is essential to any strategy for combating obesity in the community [8]. However, there are two main reservations about using the available data on obesity among teenage girls. (a) The use of such a wide age range [13-18 years] does not take into consideration the pre-puberty and puberty stages which have a significant effect on weight gain. (b) Multi-reference standards and cutoffs which are

used to assess obesity, in turn, provide different rates of overweight and obesity [9].

Although the mechanism of obesity development is not fully explained, it is confirmed that obesity occurs when energy intake exceeds energy expenditure. There are multiple etiologies for this imbalance, hence, and the rising prevalence of obesity cannot be addressed by a single etiology. Genetic factors influence the susceptibility of a given child to an obesity-conducive environment. However, environmental factors, lifestyle preferences, and cultural environment seem to play major roles in the rising prevalence of obesity worldwide [10,11]. Childhood obesity may be caused by the genetic defect such as leptin deficiency or medical causes such as hypothyroidism and growth hormone deficiency or by using some drugs like steroids [12]. We aimed to highlight the prevalence rate of obesity, overweight and central obesity, moreover to detect their associated factors among females in high schools in Buraidah in Al Qassim city, Kingdom of Saudi Arabia.

Methodology

Study Design, Subjects, and Sampling Techniques

A cross-sectional study of 87 female students was randomly selected from high school in Buraidah city Al Qassim region, KSA. The study was conducted from Sept 2014 to June 2015. The students' ages ranged from 15 to 18 years. The random selection of the sample was based on a multistage stratified cluster-sampling method. At the first stage, a systematic random sampling procedure was used to select the schools, then the schools were stratified into secondary schools for girls, with further stratification into public and private schools.

The outcome variable was obesity and overweight. The Exposure variables were food lifestyle [number of meals, component of meal and response to eat, family history (if there is any member of family is obese, sleep duration (number of hours per day), physical activity [exercise walking, swimming and other physical activities), medical problems and Menstrual cycle (first menarche, its duration, irregular or not).

Inclusion Criteria

Females Students in a high school in Buraidah, Al-Qassim region.

Exclusion Criteria

Females from outside Buraidah city and outside Al-Qassim

region. Female students who were not included in the age range from 15 to 18 years. Students who were younger than 15 years and students who were older than 18 years.

Data Collection and Anthropometric Measurements

Data were collected by the interview the students and distributed questionnaires. The questionnaires consisted of close and some open questions that related to food lifestyle, physical activity, sleep duration and others. Anthropometric measurements were used to measure the weight, height, and BMI and measure waist circumference and WHR. We used measured weight and height to calculate BMI [Kg/m²]. Participants were classified into 4 groups: underweight [BMI <18.5], normal weight [BMI 18.5-24.9], overweight [BMI 25.0-29.9], or obese [BMI ≥30.0] [13].

Statistical Analysis

Statistical analysis was done using SPSS software and chi-square test (X²) used for bivariate data analysis and also we applied the logistic regression analysis to estimate the Odds Ratio (OR) of obesity and central obesity risks for different levels of demographic and lifestyle factors. We also estimated the 95% confidence interval of OR. The qualitative data were analyzed by applying descriptive statistics [frequency & percentage for categorical variables]. The quantitative data analyzed by a prevalence of exposures and estimated outcome. The results of the statistical analysis were displayed in tables and graphs [Bar charts] (Figures (1-3)) (Table (1-7)). The P-value less than 0.05 was considered as statistically significant level.

Results

The Variables Were Used for Analysis

Age, length, weight & BMI, family history, menstrual cycle, food lifestyle, sporting and physical activity, medical problems, Waist Circumference (WC), Waist to Hip Ratio (WHR). The characteristics of the study population who enrolled in the study are shown in Table 1. The study population included 87 girls from the high secondary school in Buraidah. Their ages ranged from 15 to 18 years (Figure 1). 15 years 9.1 % (8) 16 years 26.4% (23) 17 years 26.4% (23) 18 years 37.93% (33), (Figure 1) (Table 1). The frequency of BMI. Underweight <18kg (20.69%), normal 18-24 kg (47.13%), overweight 25-29 kg (20.69%), obese >30 kg (11.49%), (Figure 2) (Table 1).

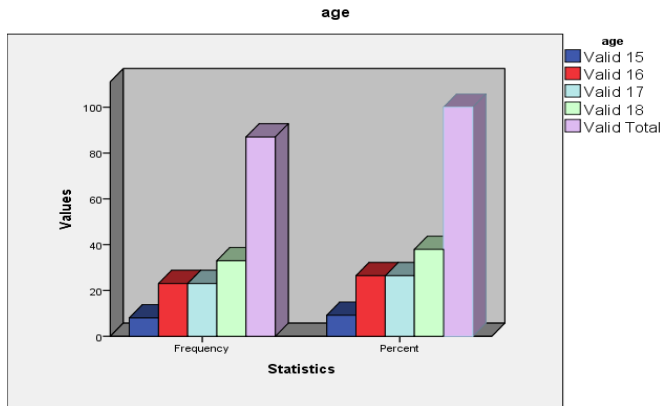


Figure 1: Age frequency of all studied students.

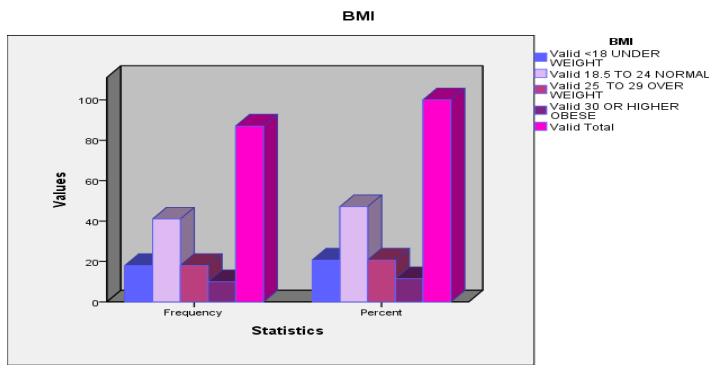


Figure 2: BMI frequency of all studied students.

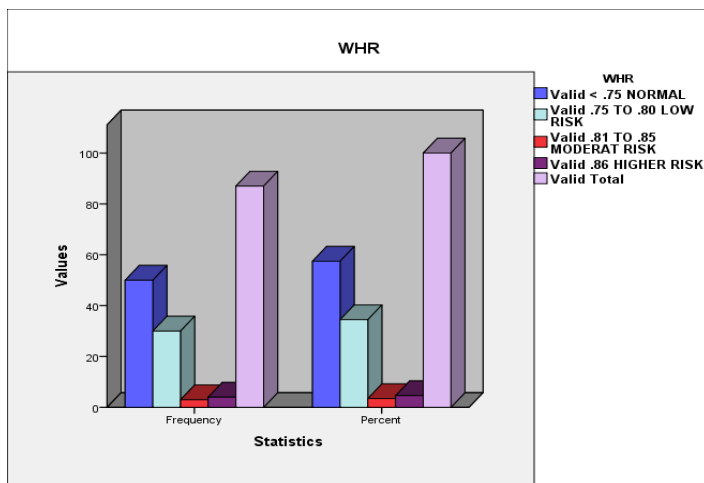


Figure 3: The frequency of WHR among the studied students.

We have detected a significant association between BMI and each of menstrual cycle, use of smart devices and diet [P<0.05]. The girls who underwent diet regime program to reduce her weight [34.5%] 30 and who did not [65.5%] 57 [P value=0.009]. Moreover, the association between WHR and fast food were significantly

associated [P<0.05]. However, there are no statistically significant differences between other study variables (Tables 6-7).

Factors	Students' characteristics N [%]	
Age [within average between 15 to 18 years]	15	[8] 9.1%
	16	[23] 26.4%
	17	[23] 26.4%
	18	[33] 37.93%
BMI	Underweight	[18] 20.69%
	Normal	[41] 47.12%
	Overweight	[18] 20.69%
	Obese	[10] 11.49%
WHR	Normal	[50] 57.47%
	Low risk	[30] 34.48%
	Moderate risk	[3] 3.4%
	High risk	[4] 4.6%

Table 1: The distribution of demographic characteristics and lifestyle-related factors of the participated students.

BMI	Menstrual cycle		Total
	Regular	Irregular	
<18 Under Weight	14 21.2%	4 19.0%	18 20.7%
18.5 To 24 Normal	37 56.1%	4 19.0%	41 47.1%
25 To 29 Over Weight	10 15.2%	8 38.1%	18 20.7%
30 Or Higher Obese	5 7.6%	5 23.8%	10 11.5%
Total	66 75.9%	21 24.1%	87 100.0%
Chi-Square [X ²]	12.373	p-value	0.006

Table 2: The association of BMI and Menstrual cycle in all girl students.

BMI	Use of smart devices			Total
	1-2 hours	3-4 hours	> 4 hours	
<18 Under Weight	6 30%	3 12.5%	9 20.9%	18 20.7%
18.5 To 24 Normal	5 25%	9 37.5%	27 62.8%	41 47.1%

25 To 29 Over Weight	7 35%	7 29.2%	4 9.3%	18 20.7%
30 Or Higher Obese	2 10%	5 20.8%	3 7%	10 11.5%
Total	20 23%	24 27.6%	43 49.4%	87 100.0%
Chi-square P value	X ² = 14.537 , P =0.024			

Table 3: The association between BMI and using hours of smart devices.

BMI	Diet regime		Total
	Yes	NO	
<18 Under Weight	4 13.3%	14 24.6%	18 20.7%
18.5 To 24 Normal	11 36.7%	30 52.6%	41 47.1%
25 To 29 Over Weight	7 23.3%	11 19.3%	18 20.7%
30 Or Hogher Obesity	8 26.7%	2 3.5%	10 11.5%

Total	30 34.5%	57 65.5%	87 100.0%
Chi-square P value	X ² = 11.586, P = 0.0009		

Table 4: The association between BMI and Diet regime.

WHR	Fast food			Total
	Rarely	Three or four times per week	Daily	
<0.75 Normal	17 47.2%	29 69%	4 44.4%	50 57.5%
0.75-0.80 Low Risk	15 41.7%	12 38.6%	3 33.3%	30 34.5%
0.81-0.85 Moderate Risk	1 2.8%	0 0.0%	2 22.2%	3 3.4
0.86 High Risk	3 8.3%	1 2.4%	0 0.0%	4 4.6%
Total	36 41.4%	42 48.3%	9 10.3%	87 100.0%
Chi-square P value	X ² = 15.52, P =0.017			

Table 5: The association between WHR and fast food.

Factors	BMI					Chi-square	P value
	<18 underweight	18-24 normal	25-29 overweight	30 or higher obese	total		
1-age							
15	0 0.0%	6 14.6%	1 5.6%	1 10%	8 9.8%		
16	5 27.8%	9 22.2%	4 22.2%	5 50%	23 26.4%		
17	5 27.8%	11 26.8%	6 33.3%	1 10%	23 26.4%		
18	8 44.4%	15 36.6%	7 38.9%	3 30%	33 37.9%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	7.53	.581

2- number of meals							
2meals per day	5 27.8%	14 34.1%	2 11.1%	4 40%	25 28.7%		
3 meals per day	10 55.6%	20 48.8%	11 61.1%	4 40%	45 51.7%		
More than 3 meals	3 16.7%	7 17.1%	5 27.8%	2 20%	17 19.5%		
Total	18 100%	41 100%	18 100	10 100%	87 100%		
3- eating when							
Angry	2 11.1%	2 4.9%	1 5.6%	0 0.0%	5 5.7%		
Sad	1 5.6%	2 4.9%	0 0.0%	0 0.0%	3 3.4%		
Hungry	15 83.3%	37 90.2%	17 94.4%	10 100%	79 90.8%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	3.203 ^a	.738
4- content of meals							
Carbohydrates	5 27.8%	14 34.1%	2 11.1%	4 40%	25 28.7%		
Proteins	10 55.6%	20 48.8%	11 61.1%	4 40%	45 51.7%		
Fats	3 16.7%	7 17.1%	5 27.8%	2 20%	17 19.5%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	4.333 ^a	.632
5- hours of sleeping /day							
4-6 hours	4 22.2%	16 39%	11 61.1%	7 70%	38 43.7%		
6-9 hours	10 55.6%	15 36.6%	6 33.3%	3 30%	34 39.1%		
More than 9 hours	4 22.2%	10 24.4%	1 5.6%	0 0.0%	15 17.2%		

Total	18 100%	41 100%	18 100%	10 100%	87 100%		
6-medical problems							
Yes	0 0.0%	1 2.4%	1 5.6%	1 10%	3 3.4%		
No	18 100%	40 97.6%	17 94.4%	9 90%	84 96.6%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	2.298 ^a	.513
7-fruit eating							
Daily	3 16.7%	9 22%	6 33.3%	0 0.0%	18 20.7%		
Three or four times per week	7 38.9%	19 46.3%	6 33.3%	3 30%	35 40.2%		
Rarely	8 44.4%	13 31.7%	6 33.3%	7 70%	34 39.1%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	7.795 ^a	.254
8- fast food							
Daily	2 11.1%	3 7.3%	4 22.2%	0 0.0%	9 10.3%		
Three or four times per week	11 61.1%	19 46.3%	8 44.4%	4 40%	42 48.3%		
Rarely	5 27.8%	19 46.3%	6 33.3%	6 60%	36 41.4%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	6.874 ^a	.333
9-sport							
I don't do exercise	6 33.3%	10 24.4%	3 16.7%	0 0.0%	19 21.8%		
Do exercise	12 66.7%	31 75.6%	15 83.3%	10 100%	68 78.2%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	4.626 ^a	.201

10-if they have any relative obese							
Yes	1 5.6%	7 17.1%	2 11.1%	3 30%	13 14.9%		
No	17 94.4%	34 82.9%	16 88.9%	7 70%	74 85.1%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	3.386 ^a	.336
11-transportation							
Yes	16 88.9%	37 90.2%	16 88.9%	7 70%	76 87.4%		
No	2 11.1%	4 9.8%	2 11.1%	3 30%	11 12.6%		
Total	18 100%	41 100%	18 100%	10 100%	87 100%	3.11	.347
12-risk knowledge							
Yes	18 100%	33 80.5%	15 83.3%	10 100%			
No	0 0.0%	8 19.5%	3 16.7%	0 0.0%			
Total	18 100%	41 100%	18 100%	10 100%	6.06	.108	

“a” represents the chi-square value of the medical problems among the female students.

Table 6: Frequency and association between BMI and associated studied factors of obesity.

Factors	WHR					Chi-square	P value
	<.75	.75-80	.81-.85	.86 higher	total		
1-Age							
15	4 8.0%	3 10.0%	1 33.3%	0 0.0%	8 9.2%		

16	15	8	0	0	23		
	30.0%	26.7%	0.0%	0.0%	26.4%		
17	15	5	1	2	23		
	30.0%	16.7%	33.3%	50.0%	26.4%		
18	16	14	1	2	33		
	32.0%	46.7%	33.3%	50.0%	37.9%		
Total	50	30	3	4	87		
	100%	100%	100%	100%	100%		
2-Number of meals							
2 meals per day	12	3	0	1	16		
	24%	10.0%	0.0%	25%	18.4%		
3 meals per day	23	16	2	2	43		
	46%	53.3%	66.7%	50.0%	49.4%		
More than 3 meals per day	15	11	1	1	28		
	30%	36.7%	33.3%	25%	32.2%		
Total	50	30	3	4	87	3.37	.761
	100.0%	100.0%	100.0%	100.0%	100%		
3- eating							
Hungry	46	26	3	4	5		
	92.0%	86.7%	100.0%	100.0%	5.7%		
Angry	2	3	0	0	3		
	4.0%	10.0%	0.0%	0.0%	3.4%		
Sad	2	1	0	0	79		
	4.0%	3.3%	0.0%	0.0%	90.8%		
Total	50	30	3	4	87	2.02	0.917
	100.0%	100.0%	100.0%	100.0%	100.0%		
4-Content of meals							
Carbohydrates	13	9	1	2	25		
	26.0%	30%	33.3%	50%	28.7%		
Proteins	27	14	2	2	45		
	54.0%	46.7%	66.7%	50%	51.7%		
Fats	10	7	0	0	17		
	20.0%	23.3%	0.0%	0.0%	19.5%		
Total	50	30	3	4	87	2.72	
	100%	100%	100%	100%	100%		
5-hours of sleeping							
4-6 hours	18	17	1	2	38		
	36.0%	56.7%	33.3%	50.0%	43.7%		

6-9 hours	20 40.0%	10 33.3%	2 66.7%	2 50.0%	34 39.1%		
More than 9 hours	12 24.0%	3 10.0%	0 0.0%	0 0.0%	15 17.2%		
Total	50 100%	30 100%	3 100%	4 100%	87 100%	6.35	
6-use of smart devices							
1-2 hours	11 22.0%	9 30%	0 0.0%	0 0.0%	20 23.0%		
3-4 hours	12 24.0%	10 33.3%	0 0.0%	2 50%	24 27.6%		
More than 4 hours	27 54.0%	11 336.7%	3 3.4%	2 50%	43 49.4%		
Total	50 57.5%	30 34.5%	3 3.4%	4 4.6%	87 100%	7.17	
7-Menstrual period							
Regular	40 80%	22 73.3%	2 66.7%	66 75.9%			
Irregular	10 20%	8 26.7%	2 50%	21 24.1%			
Total	50 100%	30 100%	3 100%	4 100%	87 100%	2.17	
8-medical problems							
Yes	1 2.0%	2 6.7%	0 0.0%	0 0.0%	3 3.4%		
No	49 98.0%	28 93.3%	3 100%	4 100%	84 96.6%		
Total	50 100%	30 100%	3 100%	4 100%	87 100%	1.49	
9-sport							
Do exercise	12 24%	5 16.7%	1 33.3%	1 25.0%	19 21.8%		
Don't do exercise	38 76%	25 83.3%	2 66.7%	3 75.0%	68 78.2%		

Total	50 100%	30 100%	3 100%	4 100%	87 100%	0.863	
10-relative obesity							
Yes	6 12.0%	6 20.0%	0 0.0%	1 25.0%	13 14.9%		
No	44 88.0%	24 80.0%	3 100.0%	3 75.0%	74 85.1%		
Total	50 100.0%	30 100.0%	3 100.0%	4 100.0%	87 100.0%	1.79	
11-diet							
Yes	17 34.0%	9 30%	2 66.7%	2 50.0%	30 34.5%		
No	33 66.0%	21 70%	1 33.3%	2 50.0%	57 65.5%		
Total	50 100.0%	30 100%	3 100.0%	4 100.0%	87 100.0%	2.07	
12-transportation							
Yes	43 86.0%	27 90.0%	3 100.0%	3 75.0%	76 87.4%		
No	7 14.0%	3 10.0%	0 0.0%	1 25.0%	11 12.6%		
Total	50 100.0%	30 100.0%	3 100.0%	4 100.0%	87 100.0%	1.26	
13-risk knowledge							
Yes	44 88.0%	26 86.7%	3 100%	3 75%	76 87.4%		
No	6 12.0%	4 13.3%	0 0.0%	1 25%	11 12.6%		

Total	50 100%	30 100%	3 100.0%	4 100%	87 100.0%	1.01	
14-BMI							
< 18 underweight	13 26%	3 10%	2 66.7%	0 0.0%			
18-24 normal	25 50%	13 43.3%	1 33.3%	2 50%			
25-29 overweight	9 18%	8 26.7%	0 0.0%	1 25%			
30 or higher obese	3 6%	6 20%	0 0.0%	1 25%			
Total	50 100%	30 100%	3 100%	4 100%	12.069	.209	

Table 7: Frequency and association between WHR and associated studied factors of obesity.

Discussion

Obesity is the unwanted outcome of changing lifestyle and behavior [14]. It is also a major risk factor for the development of diabetes, hyperlipidemia, and osteoarthritis [15]. Genetic and environmental factors with lifestyle can predispose to overweight and obesity. In Saudi Arabia many families, especially in urban cities like Buraidh city, the children spend more time watching T.V, using computers and playing electronic games for many hours, with more and more sedentary life and less energy expenditure [16]. The eating habits of Saudi children and adolescents show excessive ingestion of soft drinks, sweet diet and fast food [16]. Also, female schoolchildren are not engaged in any sports activity at school. In fact, one study showed that the increase in BMI among Saudi Arabian children and female adolescents aged 10-20 years at the 85th percentile and the 95th percentile was apparent in all age groups [17].

In the present study, we examined the associations between several lifestyle factors and overweight/obesity or abdominal obesity in teenager's girls aged 15-18 years living in Buraidh city Al-Qassim region, who were randomly selected from secondary high school in Buraidh City. The overall prevalence of overweight girls was 20.69% whereas the obese girls constituted 11.49%. The prevalence of overweight is higher than reported in Elhamzi et al. [18] was 10.6% while obesity is close to 13.5 %. Our results

were higher than those reported in a national household screening program the study involved 12701 children aged 1-18 years in different areas of Saudi Arabia from 1994 to 1998 applying the same cut-off point [18]. In that study, the prevalence of overweight among 6- to 18-year-old girls was 13.78% and obesity was 6.32%. This result supports the finding that the prevalence of obesity in children and adolescents at school is much greater than that observed in national population-based surveys [9]. The prevalence of overweight and obesity among adolescents in the present study was higher than that reported among female adolescents aged 12-19 years in Al-Khobar, Eastern Province [19].

This discrepancy in the prevalence rates in different provinces in Saudi Arabia and other countries may be due to the variability of environmental factors and genetic background. It could also be due to the type of diet, life style and extent of physical activity. In a study from United States of America (USA) on the similar representative sample of children conducted from 2003 to 2006 using cut-off values of the WHO, the prevalence of overweight and obesity in children from 2 to 19 years of age was 31.9% and 11.3%, respectively [20]. This was much higher than the prevalence rates of 20.69% for overweight but close to obesity prevalence 11.49 % reported in our study. However, the difference is difficult to interpret because of the different age groups and gender factor between the two studies. In a study from Mexico on a nationally

representative sample of 10- to 17-year-old children collected in the year 2000, there was a lower prevalence of overweight and obesity in Mexican girls 14.3% and 10.8% Vs 20.69% and 11.49 %, respectively in our study [21].

In a report of El Mouzan et al. [22] on Saudi adolescents, the prevalence of overweight in the girls was much higher than ours (28.4% vs 20.69%) but the obesity prevalence in our study was higher than their report results (11.49% vs 10.0%). In our study we have detected non-significant differences in BMI status according to moderate physical activities such as walking and swimming, this is in agreement with Fayssal et al. [23]. The girls in this study have been reported to have a good knowledge about overweight and obesity and more information about the health complications of overweight, that was in contrary of what reported in Mohamed and Fayad [24] who stated that Saudi young girls have been reported to have poor knowledge about overweight and obesity and a lack of information about the health complications of overweight. Girls' dieting behavior was significantly related to their weight status and BMI [$P < .009$]. Overweight obese girls were less likely to go on weight reduction diets than normal-weight girls this result was in agreement with a study of Elham et al. [25].

In our report, the relationship between BMI and use of smart devices are significantly associated, the girls who are using the devices for more than 4 hours for entertainment they more likely to be overweight, previous study have observed that the girls who were exposed to screen time for two hours or more and girls who were believing in TV promotion, were more likely to be overweight [25]. The current study revealed an increase of fast food consumption lead to increase WHR and abdominal obesity this result was similar to Al-Hazzaa et al. study [26].

The association between obesity and lifestyle as resulted in the present study was also noticed in other studies from different countries [27-29]. Lifestyle-related factors, including the changes in food patterns of the people living in this region, may have played important roles in creating the obesogenic environment for Saudi children and adolescents mainly the girls [30]. Hot weather discourages outdoor activities and may increase the prevalence of physical inactivity. Recent data indicate that 60% of children and 71% of Saudi youths do not engage in any physical activity of enough duration. [31,32] Major factors that contributed to youths' inactivity in Saudi Arabia include a dependence on cars rather than walking [33]. Insufficient vigorous physical activity was shown to be a risk factor of higher BMI for adolescent boys and girls [34]. Results from a cross-sectional survey involving youths aged 10-16 years from 34 countries demonstrated that physical activity levels were lower and television-viewing times were higher in overweight youths compared to youths with normal weights [35].

Conclusion

In conclusion, there was the high prevalence of overweight

[20.69 %] and obesity [11.49 %] among the teenager school students with the increased use of smart devices, bad diet habits and irregular menstrual cycle. Therefore, a community-based multiple strategies and coordinated efforts at all levels [family, school, community and government must be established with a long-term commitment to promote healthy nutrition and physical activity behaviors and to combat with increasing rate of obesity and its subsequent complications in the teenagers to increase the awareness of obesity causes and morbidities. Further analytical studies in this field are required to examine other risk factors. We have to help in changing unhealthy lifestyle habits in our community which are the major contributing factors for this health problems.

Study Limitations

Our study has some limitations. First, the time limitation for study. Second, some students did not respond to the survey. Third, not all schools did not give us permission to participate in the study. Fourth, our dietary questions were not designed to provide total caloric intake, so we were not able to control for the effect of specific food while dietary regimen.

Recommendation

Using larger study samples and an extended time period is recommended. The research should be extended to include different areas in KSA, to evaluate the real situation in the KSA. We are highly recommending physical exercises lessons and activities in the girl schools here in Buraidah City KSA to help to decrease the risk of overweight and obesity among female school teenagers. Boys should also be included in other studies and compared to girl's studies to confirm if obesity is a real risk factor for girls only boys only or both.

References

1. World Health Organization (1977) Obesity: Preventing and Managing the Global Epidemic. Report of a WHO consultation of obesity. WHO, Geneva. Pg No: 3-5.
2. Flegal KM, Carrol MD, Kuczmara RJ, Johnson C (1998) Overweight and obesity in the United States: prevalence and trends, 1960-1994. *L Int J Obes* 22: 39-47.
3. Campbell KJ, Crawford DA, Salmon J, Carver A, Garnett SP, et al. (2007) Associations between the home food environment and obesity-promoting eating behaviors in adolescence. *Obesity* 15: 719-730.
4. Musaiger AO, Sadeq A, Obeid O (2011) The paradox of nutrition-related diseases in the Arab countries. *Journal of Environmental Research and Public Health* 8: 3637-3671.
5. Musaiger AO (2011) Overweight and obesity in eastern Mediterranean region: prevalence and possible causes. *Journal of Obesity Article* 2011: 407237.
6. Sibai AM, Nasreddine L, Mokdad AH, Adra N, Tabet M, et al. (2011) Nutrition transition and cardiovascular disease risk factors in middle

- East and North Africa countries: reviewing the evidence. *Annals of Nutrition and Metabolism* 57: 193-203.
7. Habib SH, Saha S (2010) Burden of non-communicable disease: global overview. *Diabetes and Metabolic Syndrome* 4: 41-47.
 8. Musaiger AO, Al HM, Al-Qahtani A (2011) Strategy to combat obesity and to promote physical activity in Arab countries. *Diabetes, Metabolic Syndrome and Obesity* 4: 89-97.
 9. Lobstein T, Baur L, Uauy R (2004) Obesity in children and young people: a crisis in public health. *Obesity Reviews*, Supplement 5: 4-104.
 10. Hill JO, Peters JC (1998) Environmental contributions to the obesity epidemic. *Science* 280: 1371-1374.
 11. Grundy SM (1998) Multifactorial causation of obesity: implications for prevention. *Am J Clin Nutr* 67: 563S-572S.
 12. Link K, Moell C, Garwicz S, Cavallin-Stahl E, Bjork J, et al. (2004) Growth hormone deficiency predicts cardiovascular risk in young adults treated for acute lymphoblastic leukemia in childhood. *J Clin Endocrinol Metab* 89: 5003-5012.
 13. World Health Organization (2000) Obesity: Prevention and Managing the Global Epidemic. WHO Obesity Technical Reports Series 894. WHO, Geneva, Switzerland.
 14. Groessl EJ, Kaplan RM, Barrett-Connor E, Ganiats TG (2004) Body mass index and quality of well-being in a community of older adults. *Am J Prev Med* 26: 126-129.
 15. Ridker PM, Genest J, Libby O (2001) Risk factors for atherosclerotic disease. In: Braunwald E, Zipes DP, Libby P. *Heart Disease: A Text Book of Cardiovascular Medicine* ((6th edition). W.B. Saunders Co.: Philadelphia, PA. Pg No: 1024.
 16. Al-Rukban MO (2003) Obesity among Saudi male adolescents in Riyadh, Saudi Arabia. *Saudi Med J* 24: 27-33.
 17. Abalkhail B (2002) Overweight and obesity among Saudi Arabian children and adolescents between 1994 and 2000. *East Mediterr Health J* 8: 470-479.
 18. El-Hazmi MAF, Warsy AS (2002) The prevalence of obesity and overweight in 1-18 year-old Saudi children. *Ann Saud Med* 2002; 122: 303-307.
 19. Abahussain NA, Musaiger AO, Nicholls PJ, Stevens R (1999) Nutritional status of adolescent girls in the eastern province of Saudi Arabia. *Nutr Health* 13: 171-177.
 20. Ogden CL, Carroll MD, Flegal KM (2008) High body mass index for age among US children and adolescents, 2003-2006. *JAMA* 299: 2401-2405.
 21. Del Río-Navarro BE, Velázquez-Monroy O, Sánchez-Castillo CP, Lara-Esqueda A, Berber A, et al. (2004) The high prevalence of overweight and obesity in Mexican children. *Obes Res* 12: 215-223.
 22. El Mouzan MI, Foster PJ, Al Herbish AS, Al Salloum AA, Al Omer AA, et al. (2010) This difference among different reports may be referred to time factors in data collection or a truly higher prevalence in our populations. Prevalence of overweight and obesity in Saudi children and adolescents. *Ann Saudi Med* 30: 203-208.
 23. Fayssal ME, Farahat E, Kamlesh P, Joshi F, Falah F, et al. (2007) Assessment of nutritional status and lifestyle pattern among Saudi Arabian school children. *Saudi Medical Journal* 28: 1298-1300.
 24. Mohamed NMH, Fayad EMA (2011) Nutritional profile of adolescence Saudi girl at Riyadh city. *Life Science Journal* 8: 124-136.
 25. Al-Jaaly E, Lawson M, Hesketh T (2011) Overweight and its Determinants in Adolescent Girls in Jeddah City, Saudi Arabia. *International Journal of Food, Nutrition and Public Health* 4: 95-108.
 26. Al-Hazzaa HM, Abahussain NA, Al-Sobayel HI, Qahwaji DM, Alsulaiman NA, et al. (2014) Prevalence of Overweight, Obesity, and Abdominal Obesity among Urban Saudi Adolescents: Gender and Regional Variations. *J Health Popul Nutr* 32: 634-645.
 27. Ramos de Marins VM, Varnier Almedia RM, Pereira RA, Barros MB (2001) Factors associated with overweight and central body fat in the city of Rio de Janeiro: results of a two stage random sampling survey. *Public Health* 115: 236-242.
 28. Sibai AM, Hwalla N, Adra N, Rahal B (2003) Prevalence of and covariates of obesity in Lebanon: finding from the first epidemiological study. *Obes Res* 11: 1353-1361.
 29. Al-Nuaim AA, Bamgboye EA, al-Rubeaan KA, al-Mazrou Y (1977) Overweight and obesity in Saudi Arabian adult population, role of socio-demographic variables. *J Community Health* 22: 211-223.
 30. Musaiger AO (2011) Manamah: Arab Center for Nutrition. Food consumption patterns in Eastern Mediterranean Region. 98.
 31. Al-Hazzaa HM (2002) Physical activity, fitness and fatness among Saudi children and adolescents: implications for cardiovascular health. *Saudi Med J* 23: 144-150.
 32. Al-Hazzaa HM (2004) Prevalence of physical inactivity in Saudi Arabia: a brief review. *East Mediterr Health J* 10: 663-670.
 33. Al-Hazzaa HM (2006) School backpack. How much load do Saudi school boys carry on their shoulders? *Saudi Med J* 27: 1567-1571.
 34. Tremblay M, Willms J (2003) Is the Canadian childhood obesity epidemic related to physical inactivity? *Int J Obes Relat Metab Disord* 27: 1100-1105.
 35. Janssen I, Katzmarzyk PT, Boyce WF, Vereecken C, Mulvihill C, et al. (2005) Health Behaviour in School-Aged Children Obesity Working Group. Comparison of overweight and obesity prevalence in school-aged youth from 34 countries and their relationships with physical activity and dietary patterns. *Obes Rev* 6: 123-132.