



Prevalence of Overweight and Obesity Among Adolescents in Tarqumia, Palestine

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Keywords:	Abstract
Prevalence;	<u>Background</u> The worldwide prevalence of overweight and obesity have increased drastically in recent years in both developed and developing countries, making obesity prevention an international public health priority.
Overweight;	<u>Methods</u> A descriptive cross-sectional study aimed to determine the prevalence of overweight and obesity among students aged 13–17 years was carried out for the three month period starting from February 2011 in a southern rural Palestinian community, and to compare the prevalence by gender, age-group and family income.
Obesity;	<u>Measurements</u> Anthropometric measurements and demographic data were taken from all students by the researcher. The body weight of the students in light clothes was measured to the nearest 0.1 kg using a digital scale calibrated daily. Height was measured to the nearest 1.0 cm using a metric measuring tape affixed on the wall. Students were weighed on a digital scale twice and the average was recorded.
Rural;	<u>Results</u> In a cross sectional study sample of 720 school students the prevalence of overweight (body mass index \geq 85 th percentile < 95 th percentile) and obesity (body mass index \geq 95 th percentile) was 27.8% (18.6% overweight and 9.2 % obese) and was significantly higher among male students, students with moderate income families and those aged 13 years old or younger.
Adolescents;	<u>Conclusion</u> This high prevalence of overweight and obesity is a serious concern for public health in Palestine. This health problem is rapidly increasing in developing countries including Palestine to alarming levels, which indicate an urgent need for effective intervention to deter or to curb this trend.
Palestine	

1. Introduction

The worldwide prevalence of overweight and obesity have increased drastically in recent years in both developed and developing countries, making obesity prevention an international public health

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priority [1]. The International Obesity Task Force report showed that 10% of children worldwide are overweight; a total of 155 million children and adolescents are overweight and around 30–45 million are classified as obese [2]. The main contributing factors in the increasing prevalence of overweight and obesity are difficult to pinpoint, but it is believed to be a complex interaction of the environmental, genetic and lifestyle behaviours [3].

Overweight and obesity have been considered the sixth most contributing predisposing factors to the overall burden of disease worldwide [4, 5]. If the prevalence of overweight and obesity continues to escalate at the current speed, the epidemic may reach a “point of no return” in many developed and developing countries including Palestine. Even if the current prevalence rates not increased over the coming two decades, the long term consequences for the health of Palestinian, for the health care system, and for the economy will be dramatic. Overweight and obesity are associated with a number of chronic health problems, such as type 2 diabetes, cardiovascular disease, heart disease and certain cancers [6]. These diseases are the main causes of illness and deaths in Palestine [7].

There is paucity in the available estimates of the prevalence of overweight and obesity at the national level in Palestine. Therefore, there is a need to investigate the magnitude of this problem in developing countries such as Palestine, and to implement prevention and control strategies as early as childhood by involving parents, schools and the whole society.

According to our knowledge, there was only one study which targeted this age-

group. In 2009, a study showed that the overall prevalence of obesity among adolescents aged 12-18 years old in West-Bank and Gaza Strip was 20.4% boys; 13.0% girls [8]. Therefore, the objective of the present study was to determine the prevalence of overweight and obesity among adolescent school students aged 13–17 years in southern rural area in Tarqumia, in Palestine, and to compare the prevalence by sex.

Such data will provide health care providers and school administrators with useful information about the prevalence and factors associated with overweight and obesity in order to develop tailored interventions and prevention programs.

2. Methods

A descriptive, exploratory cross-sectional study was conducted to estimate the prevalence of overweight and obesity among adolescents in Tarqumia, in Palestine. This study was part of a main descriptive cross-sectional study which was carried out for three months period starting from February 2011 at Tarqumia, Palestine.

2.2. Study setting

Data collection was conducted in the secondary and high schools of Tarqumia, in the Hebron governorate (male and female). This study included public schools, because there are no private schools in Tarqumia. Tarqumia belongs to Hebron which is situated in the south of Palestine. The total population of Palestine was around 4.29 million, and considered a youth population with 73% was under the age of 30 years. Approximately 14% of the Palestinian population reside in Hebron governorate [9].

2.2. Sample

The population for this study was all students aged 13–17 years old (i.e. 7 through 11 school grades) in Tarqumia, in Hebron governorate. A stratified random sample was used. A list of all rural towns and villages (rural areas) which contain middle and high public schools in Hebron governorate was obtained from the education directorates, and simple random sampling was used to obtain the study area. It was Tarqumia, stratification were created for male and female schools based on grades. Finally, the sample was distributed proportionately between grades based on the size of each grade, which determined by the sizes of the classes in the grade, which depends on the number of students in the classes of that grade. Then, simple random sampling without replacement was used to obtain the required number of each class. Private schools were not present in Tarqumia. The sample size was calculated by using PS software, the total sample size was 672 + 10% as non-response = 739 students, the researcher rounded it to 740.

2.3. Data collection

Demographic data including age, sex and level of student (7 through 11 grades) were collected through self-administered Arabic version of the International Global School-based Health Survey (GSHS). Since 2003, GSHS has been used periodically by Ministries of Health and Education around the world to monitor the prevalence of important health risk behaviours and protective factors among students.

Anthropometric measurements were performed by the researcher. Body weight was measured to the nearest 0.1kg using calibrated portable scales. Measurements were done with minimal clothing and

without shoes. Height was measured to the nearest 1.0 cm while participants were in a full standing upright without shoes. Participants' heights were measured using a metric measuring tape fixed on the wall. Students were weighed on a digital scale twice and the average was recorded. Participants removed shoes and jackets before heights and weights were measured. The reliability of the anthropometric measures was checked during the data collection period and the digital scale was calibrated and checked daily.

Due to the issues of growth and development, a healthy weight-to-height ratio varies throughout childhood. BMI-for-age charts take this into account and evaluate the weight status based on norms for a child specific to age and gender. BMI ratings are expressed as percentiles, and those percentiles rather than the raw score are then compared to cut points. For children, a BMI-for age < 5th percentile would be classified as underweight. A BMI-for-age \geq 5th and < 85th percentiles is considered normal weight, and a BMI-for-age \geq 85th and < 95th percentiles is considered overweight. A child with a BMI-for-age \geq 95th percentile is would be classified as obese based on the International Obesity Task Force [10].

2.4. Ethical Considerations

A permission to use the GSHS was obtained from WHO through Mrs Leanne Riley, the WHO team leader surveillance. Permission was obtained from Department of research at the Palestinian Ministry of Education. Students' privacy was protected by allowing for anonymous and voluntary participation; in addition, students signed informed consent prior to initiation of the study. Students were informed that their participation was voluntary and they could

withdraw prior to submitting their completed surveys.

2.5. Statistical analysis

The BMI values were fed into WHO AnthroPlus software that produced z-scores which adjusted for gender and age of the children. SPSS, version 20 was used to analyze the data. Descriptive statistics such as frequencies and percentages were used. Pearson Chi- Square was performed to compare the different association between variables. $P < 0.05$ was considered as the cut-off value for significance.

3. Results

3.1. Description of the sample

Twenty students were withdrawn from the study, giving a response rate of 97.3%. Of the 720 who participated, 357 (49.6%) were female and 363 (50.4%) were male, with same mean age and standard deviation 15.1 (SD = 1.4) (Table 1).

The results showed that, 252 (35.0%) of the sample reported having a low family income, 404 (56.1%) middle income and 64 (8.9%) high income.

Table 1. Demographic characteristics of the students (n = 720)

Characteristics	Number of respondents	(n%)
Age-group (years)		
≤13	122	16.9
14-15	299	41.5
≥16	299	41.5
Gender		
Male	363	50.4
Female	357	49.6
Grades		
7 th	121	16.8
8 th	148	20.6
9 th	155	21.5
10 th	148	20.6
11 th	148	20.6
Family income*		
≤1000 low	254	35.3
1100-2400 moderate	402	55.8
≥ 2500 high	64	8.9

*Family income - Low ≤ 1000NIS per month, Moderate 1100-2400NIS per month, High ≥2500NIS per month.

3.2. Prevalence of overweight and obesity

Data on BMI showed that 2.5% of the total sample was underweight, 69.7% normal weight, 18.6 % overweight and 9.2% obese. Thus, the overall prevalence of overweight and obesity among these students was 27.8%. The rate of overweight and obesity was highest among students' age-group 14-15 years old

(30.8%) and the rate obesity was the lowest among students' age-group ≥ 16 years old (4.7%) see Table 2. Finally, the prevalence of overweight and obesity was highest among students in moderate income families (30.8%) see table 2.

3.3. Prevalence of overweight and obesity by gender

There was a statically significant difference between male and female students in terms of overweight ($X^2 = 16.3$, $df = 3$, $P = 0.001$) and whereas, no significant difference between male and female in terms of obesity ($X^2 = 3.0$, $df = 1$, $P = 0.082$). *The prevalence of overweight and obesity was higher in male than female students* (23.4%, 13.7%) and (11.0%, 7.3%) respectively see Table 2.

3.4. Prevalence of overweight and obesity by family income

The prevalence of overweight and obesity in the present study among students in low, moderate and high income families was 24.0%, 30.8% and 23.5% respectively.

However, there was a statistically significant association between weight and family income ($X^2 = 19.79$, $df = 6$, $P = 0.003$) see Table 2.

3.5. Prevalence of overweight and obesity by age-group

The prevalence of overweight and obesity in the present study among students in age-group ≤ 13 years old, between 14-15 years old and ≥ 16 years old was 36.9%, 34.1% and 17.7% respectively. The differences between students age-groups was statistically significant for overweight ($X^2 = 7.04$, $df = 2$, $P = 0.030$) and for obesity ($X^2 = 21.03$, $df = 2$, $p < 0.001$) see Table 2.

Table 2. Prevalence of overweight and obesity among the sample of adolescents by age, gender and family income (n = 720)

Demographic data	Underweight		Normal weight		Overweight		Obesity		Total No.
	No.	%	No.	%	No.	%	No.	%	
Age-group (years)^a									
≤ 13	2	1.6	75	61.5	30	24.6	15	12.3	122
14-15	9	3.0	188	62.9	61	20.4	41	13.7	299
≥ 16	7	2.3	239	79.9	43	17.7	10	3.3	299
Gender^b									
Male (n = 363)	8	2.2	230	63.4	85	23.4	40	3.3	363
Female (n = 357)	10	2.8	272	76.2	49	13.7	26	11.0	357
Family income^c									
Low	4	1.6	189	74.4	37	14.6	24	9.4	254
Moderate	8	2.0	270	67.2	85	21.1	39	9.7	402
High	6	9.4	43	67.2	12	18.8	3	4.7	64
Total	18	2.5	502	69.7	134	18.6	66	9.2	720

^a $X^2 = 33.21$, $df = 6$, $P < 0.001$ (overweight); $X^2 = 21.03$, $df = 2$, $p < 0.001$ (obesity).

^b $X^2 = 16.3$, $df = 3$, $P = 0.001$ (overweight); $X^2 = 3.0$, $df = 1$, $P = 0.082$ (obesity).

^c $X^2 = 19.79$, $df = 6$, $P = 0.003$.

4. Discussion

The prevalence of overweight and obesity is unprecedented and continues to escalate with epidemic proportion in many developed and developing countries worldwide. The prevalence of overweight

and obesity among Palestinian students aged 13-17 years old was 27.8% (18.6% overweight and 9.2% obese). The results indicated that overweight and obesity have become one of the main health problems among Palestinian students in Tarqumia as

they are in some other parts of the world, such as among United States [11].

Also the prevalence of overweight and obesity in the current study results are concurring with previous regional studies found: in Lebanon, (15.8% and 3.0%), in Jordan, where (14.3% and 3.9%), and in Morocco, where (14.1% and 2.5%).

It is widely believed that the nutritional habits in the Eastern Mediterranean Region including Palestine has changed during the past few decades due to urbanization; the traditional diet has been replaced by a more Westernized diet that contains high calories and fat and low vegetables and fiber [12].

The results of this study showed that, the socioeconomic gradient that is seen in many health conditions [13] appears not to apply to childhood overweight and obesity: students from middle income families had a higher prevalence of overweight and obesity (30.8%) than those from low income families (24%). Similar findings have been reported in the US [14].

The literature showed that, overweight and obesity are often consequences of overeating and physical inactivity. In recent years, energy-dense food has become a competitive food among adolescents. Competitive food typically contains a high-fat and energy-dense foods, often accompanied by a high consumption of sweetened drinks and a decreased intake of fiber and vegetables. This results in energy imbalance, as they ingest more calories than they use to meet energy needs. Overweight and obesity happen over time when more energy is taken in than is used.

Moreover, the low cost and the portion size of energy-dense, high-sugar, and high-fat food has decreased, which has increased consumption. Frequently, it is the food of

choice in day schools. These changes toward the food, however, are found in all social backgrounds. Children and adolescents in intact families also confronted these changes: A “revolution in food preparation” has enabled people to have more food options and to eat more meals during the day [15], where the families usually used to eat outside, thus reducing the amount of cooking at home.

In addition to the changes in dietary habits, also daily physical activities and recreational activities have changed drastically over the past 20 to 30 years. The urban sprawl, combined with the ubiquity of modern technology and the motorization has made it necessary for families to drive to work or school instead of walking or using the bicycle, leading to a decrease in physical activity and significantly reduced energy expenditure. Moreover, there is an increased availability and easier access to elevators and escalators in workplaces, apartment buildings, and shopping malls.

Another comparison, the prevalence of overweight and obesity in the current study was found to be higher among males than females. Our findings were supported by previous study which reported that, obesity in adolescents varies by gender around the world [16]. This difference may be because female adolescents are more concerned about their weight and bodies than their male counterparts. Teenage girls are more likely to be watching their weight and dieting than teenage males. There is considerable interest among girls to lose weight and maintain thin bodies because it helps them to be attractive in order to get married. And Palestinian females might be influenced by beauty standard and body shape that have been imported from the

western society through easy access to the internet, and global mass media.

Similar results were found in previous study, where the prevalence of overweight in Chinese adolescents has tripled from 4.8 % in 1991 to 15.4 % in 2006 and overweight and/or obese boys were higher than girls [17]. But the results of this study were disagree with studies conducted in Saudi Arabia [18], in Bahrain [19], and in Iran [20] where overweight and/or obesity were higher among females.

The results cannot be generalized to whole Palestine because this study was conducted only in the southern rural area of Palestine. The sample consisted of students enrolled in the 7th to 11th grades, which make it hard to generalize to students in other grades.

5. Conclusions

This study reported a relatively high prevalence rate of overweight and obesity among male and female students aged 13–17 years old in a rural Palestinian community. These results are considered a serious problem for public health in Palestine. This health problem is rapidly increasing in developing countries including Palestine to alarming levels, which indicate an urgent need for effective intervention to deter or to curb this trend.

Conflict interest

All authors declare that, there are no potential conflict interests. And also, this paper has not been presented in any conferences /or scientific meetings, neither not considering elsewhere, nor even after open accepted.

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