

Obesity among secondary school students in Gharian city, 2016

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Background:

Obesity is a global epidemic resulting in major morbidity and premature death. It's progressively increasing with age, Cases of obesity and overweight are increases in Libya as well as all over the world, genetic and environmental factors playing a contributory role. With its known significant morbidity and mortality, obesity should draw the attention of the healthcare community, researchers, and policy makers in Libya.

Aims of study:

To identify the prevalence of obesity among secondary school students in Gharyian city, and to study the relation between BMI and sex, education level and food habit.

Materials and methods:

This study was descriptive cross sectional study. The study was conducted in secondary schools in the city of Gharian during the year 2016. A total of 307 students were randomly selected for the study. The schools were in the center of Gharian, they were 4 schools. A multistage random sample technique was adopted where each school student chosen randomly, different number written on pieces of the paper, the odd number were chosen, permission was obtained from heads of schools directors, also from student before measuring them. The following data were obtained: gender, age, mother's job and education level, father's job and education level, income for the mother and the father, the weight

and height of the students were measured at the social worker room in the school, and BMI was calculated.

Subject and Methods:

This study was descriptive cross sectional study. The study was conducted in secondary schools in the city of Gharyian during the year 2016

The following points were considered in measuring the weight and the height of the students:

- To minimize errors in the measurement, the weight checked by scale (without heavy clot and shoes).
- The height was measured with tap fixed to the wall firmly ,object held firmly to the head, height was measured the later converted to meters
- Body mass index: BMI is a ratio measurement between weight in kilograms and height in square meters.
 - a) Underweight is defined as $BMI < 18.5$.
 - b) Normalweight is defined as $BMI 18.5-24.9$.
 - c) Overweight is defined as $BMI 25-29.9$
 - d) Obese is defined as $BMI 30-39.9$
 - e) Extremely obese defined as $BMI >40$.

Statistical analysis:

Statistical analysis was computerized using the Statistical Program for Social Sciences (SPSS version 21) that used for data entry and analysis. Descriptive statistics were used and all results are presented as frequencies, means $\pm$ standard deviation and percentages. Categorical data were compared using the Chi-square test and Fisher's exact test if appropriate. A P-value of less than or equal to 0.05was considered statistically significant.

Result:**Education level of the student:**

The current study sample was taken from three levels of the secondary school. About 55.4% of the students were in the 1st year, 31.9% of the student were in the 2nd year and 12.7% were in the 3rd year.

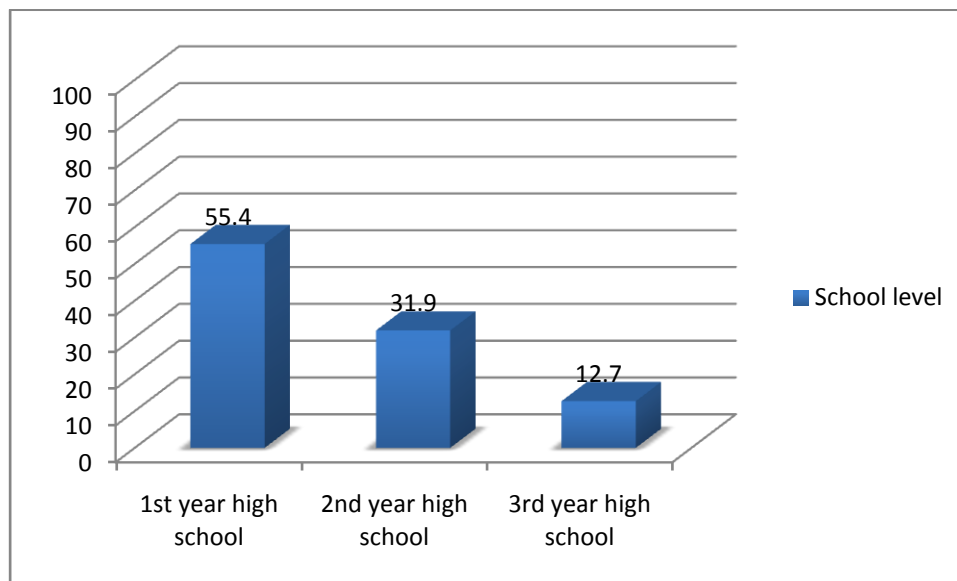


Figure 1: Distribution of education level of students, (Gharian 2016)

Sex of the student:

Regarding the sex of the student in the present study, the percentages of male and female students were nearly similar (49.8% were males and 50.2% were females). The male to female ratio was almost 1:1.

Table 1: Sex of the student distribution, (Gharian 2016)

Sex of the students	No. (%)
Male	153 (49.8%)
Female	154 (50.2%)
Total	307 (100%)

Mother's occupation of the students:

Regarding the mother occupation, about (47.2%) were teachers, 36.8% were housewives, 8.8% employees, 1.6% physicians, 2.9% nurses, 0.7% engineers and 2% were retired.

Table 2 : Mothers occupationsdistribution, (Gharian 2016)

Mother job	No. (%)
Teacher	145 (47.2%)
House wife	113 (36.8%)
Employee	27 (8.8%)
Physician	5 (1.6%)
Nurse	9 (2.9%)
Engineer	2 (0.7%)
Retired	6 (2%)
Total	307 (100%)

Father's occupation of the students:

With regards the father occupation, about (39.4%) were employee. 20.8% were having free jobs, 5.2 were engineers, 9.1% policeman, 12.1% teachers, 2% physicians, 1% nurses, 0.3% lawyer and 10.1% were retired.

Table 3 : Father occupation distribution, (Gharian 2016)

Father job	No. (%)
Employee	121 (39.4%)
Free job	64 (20.8%)
Engineer	16 (5.2%)
Police man	28 (9.1%)
Teacher	37 (12.1%)
Physician	6 (2%)
Nurse	3 (1%)
Lawyer	1 (0.3%)
Retired	31 (10.1%)
Total	307 (100%)

Family income of the students:

Most of the families income in the current study were between 1500 and 2000 Libyan dinars. Approximately 24.4% of the families get between 500 and 1000 Libyan dinars, 20.2% get between 1000 and 1500 Libyan dinars, 10.4% get between 2000 and 2500 Libyan dinars and 1.6% get more than 2500 Libyan dinars.

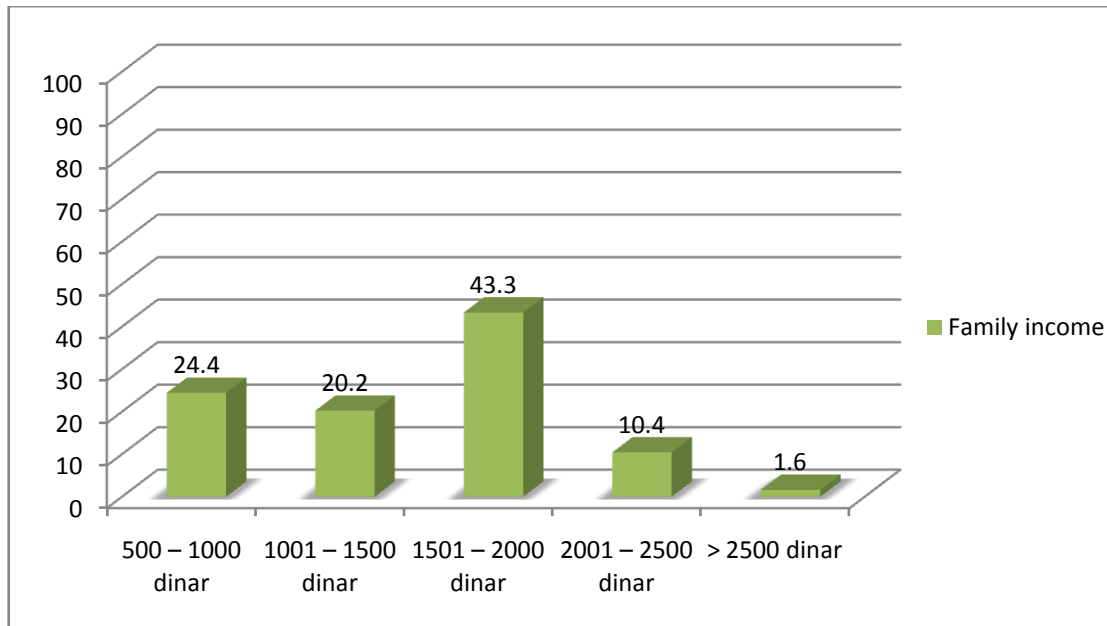


Figure 2 : Family income of the students, (Gharian 2016)

History of junk food eating:

In the present study about 16.9% of the students gave history of eating junk food. The rest of the students (83.1%) gave negative history regarding junk food eating.

Table 4 : History of junk food eating among students, (Gharian 2016)

History of junk food	No. (%)
Yes	52 (16.9%)
No	255 (83.1%)
Total	307 (100%)

Weight of students:

The mean weight of the student was 58.3 with standard deviation of 13. The weight of the students in this study were as following; about 3.6% between 31 and 40 kg, 26.7% between 41 and 50 kg, 33.6% 51 and 60 kg, 21.8% between 61 and 70 kg, 10.1% between 71 and 80 kg, 2.3% between 81 and 90 kg, 1.3% between 91 and 100 kg, and only 0.7% were more than 100 kg.

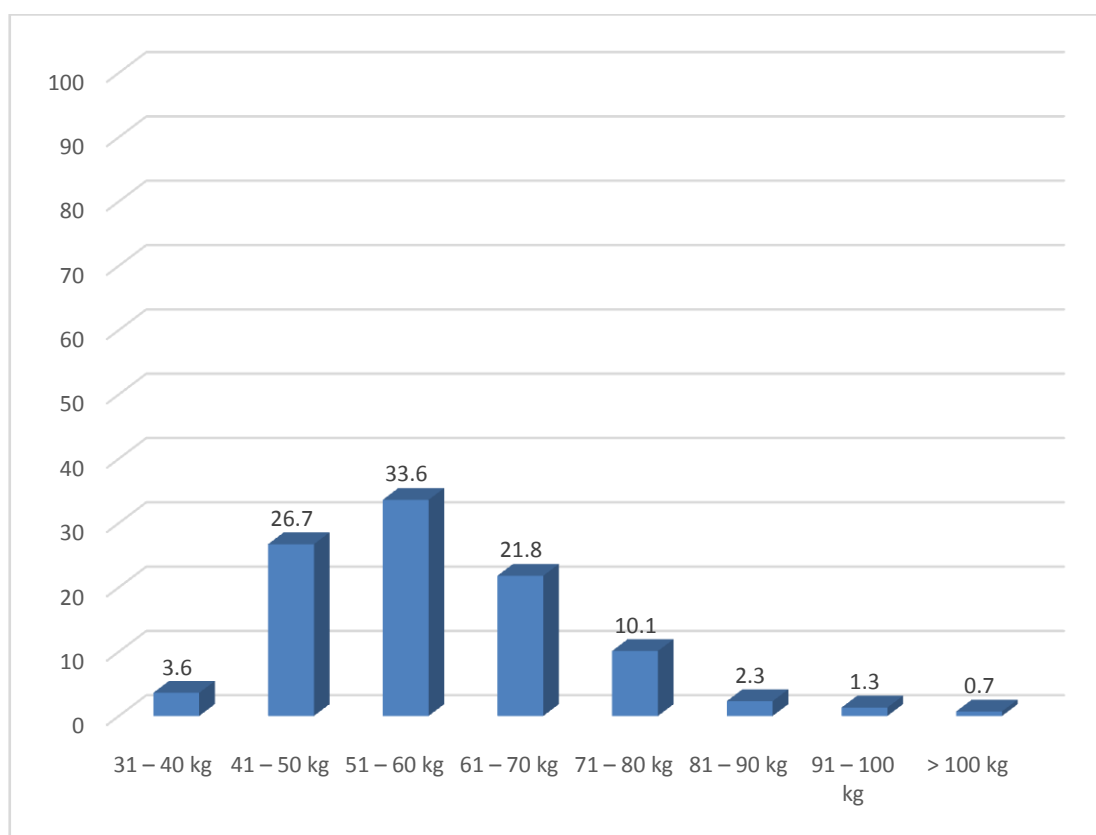


Figure3 : Weight of the students(Gharian 2016)

Height of the student:

Regarding the height of the students in the present study, about 4.6% were less than 1.5 meter, 30.6% were between 1.51 and 1.6 meter, 39.1% between 1.61 and 1.7 meter, 22.5% between 1.71 and 1.8 meter, and

only 3.3% were more than 1.8 meter. The mean height was 1.64 with standard deviation of 0.08. The minimum height was 1.47 m and the maximum height was 1.88 m.

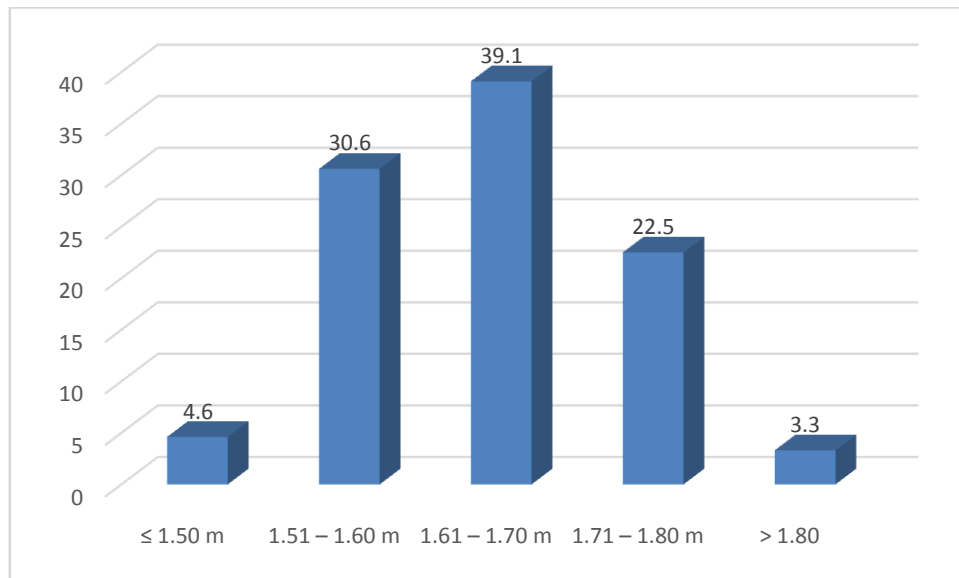


Figure 4 :Height of the students (Gharian 2016)

Body mass index of the student:

With regards the BMI in the current study, the prevalence of obesity was 4.2% ($BMI \geq 30$). The majority of the students (67.8%) had normal BMI (18.5-24.9). The rest of the students (19.2%) were under weight ($BMI < 18.5$). The mean BMI was 21.5 with standard deviation of 4.1. The BMI ranged between 13.9 and 53.4.

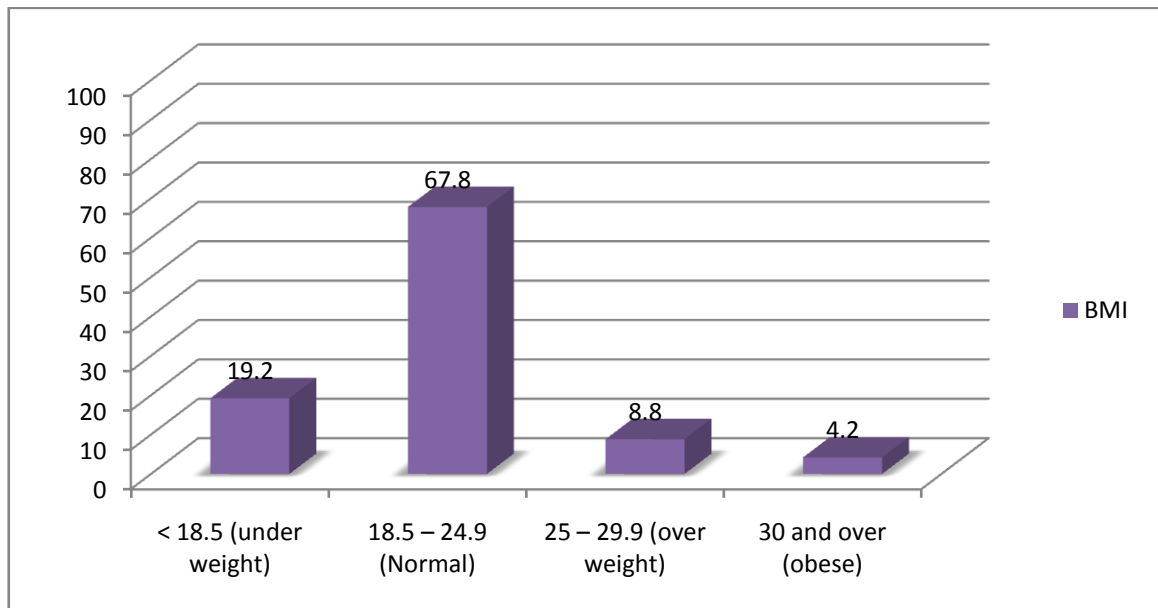


Figure 5: BMI of the students(Gharian 2016)

Relation between student school level and BMI:

The current study showed that among the 1st year secondary school students, about 61.8% had normal BMI, 23.5% were underweight, 10.6% were overweight and only 4.1% were obese. Regarding the 2nd year, about 70.4% had normal BMI, 15.3% were underweight, 8.2% were overweight and only 6.1% were obese. The 3rd year students were as following; 87.2% of students had normal BMI, 10.3% were underweight and 2.6% were overweight. The relation was statistically significant with p value of 0.05.

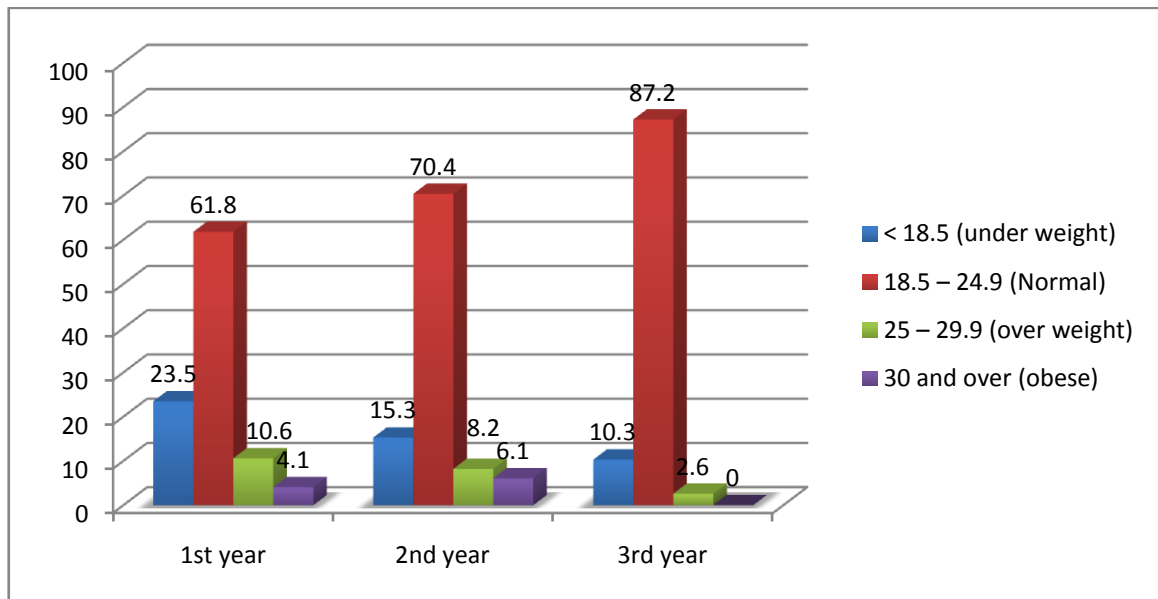


Figure 6: Relation between student's school level and BMI (Gharian 2016)

Relation between BMI and the sex of the student:

Regarding the relation between the BMI and the sex of the student, the result was statistically insignificant with p value of 0.839. The result showed that among the males about 65.4% had normal BMI, 20.9% were underweight, 9.2% were overweight and 4.6% were obese. On the other hand the females were as following; 70.4% had normal BMI, 17.5% were underweight, 8.4% were overweight and 3.9 were obese.

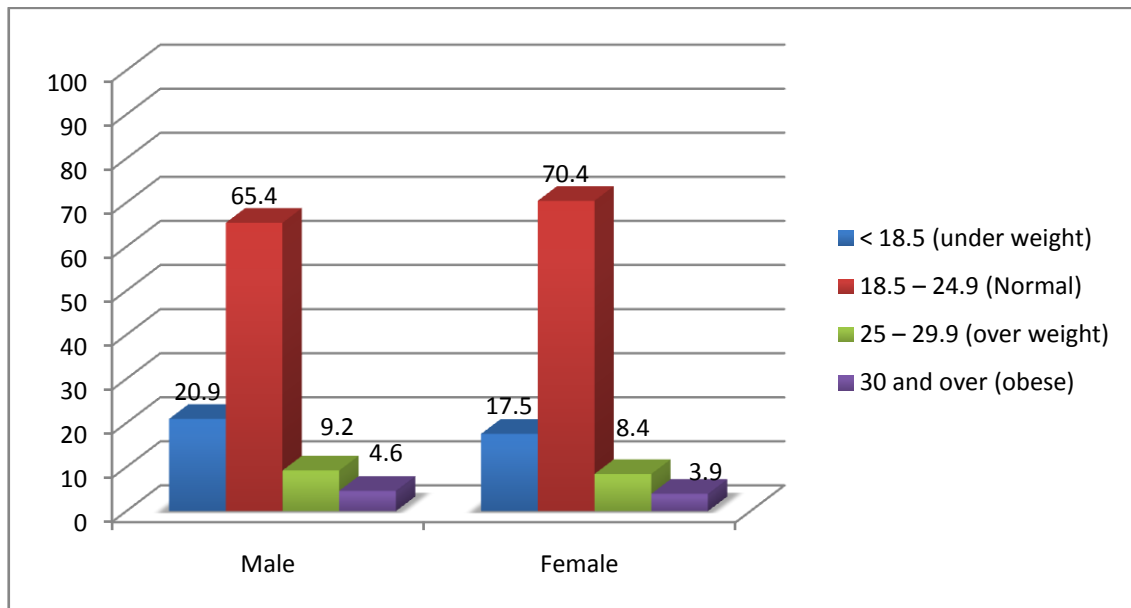


Figure 7: Relation between BMI and the sex of the students (Gharian 2016)

Relation between BMI and junk food eating:

The relation between BMI and junk food eating was statistically significant with p value = 0.0001. About 53.8% of obese students were eating junk food, 37% of the overweight students were eating junk food, 13% of the students with normal BMI were eating junk food and about 13.5 of underweight students were eating junk food. The percentage of eating junk food decreased with the decrease in the BMI.

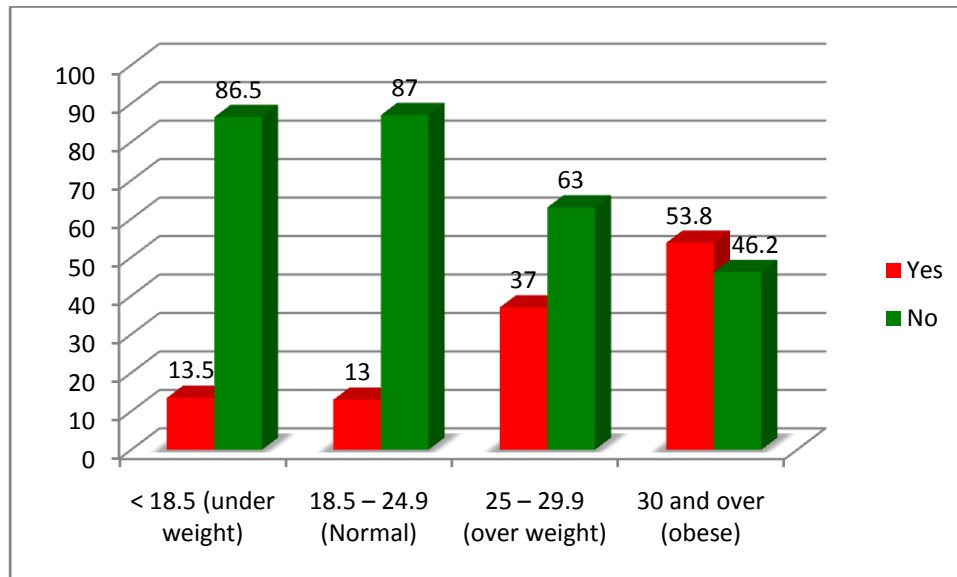


Figure 8: Relation between BMI and junk food eating (Gharian 2016)

Relation between obesity and overweight with family income:

The relation between obesity and overweight with family income was statistically insignificant with p value of 0.599. the result showed that about 55.6% of obese students and 46.2% of overweight students had family income between 1500 and 2000 dinars, about 38% of obese students and 22.2% of overweight students had family income between 500 and 1000 dinars, 7.7% of obese students and 14.8% of overweight students had family income between 1000 and 1500 dinars, and 7.7 of obese students and 7.4% of overweight students had family income between 2000 and 2500 dinars.

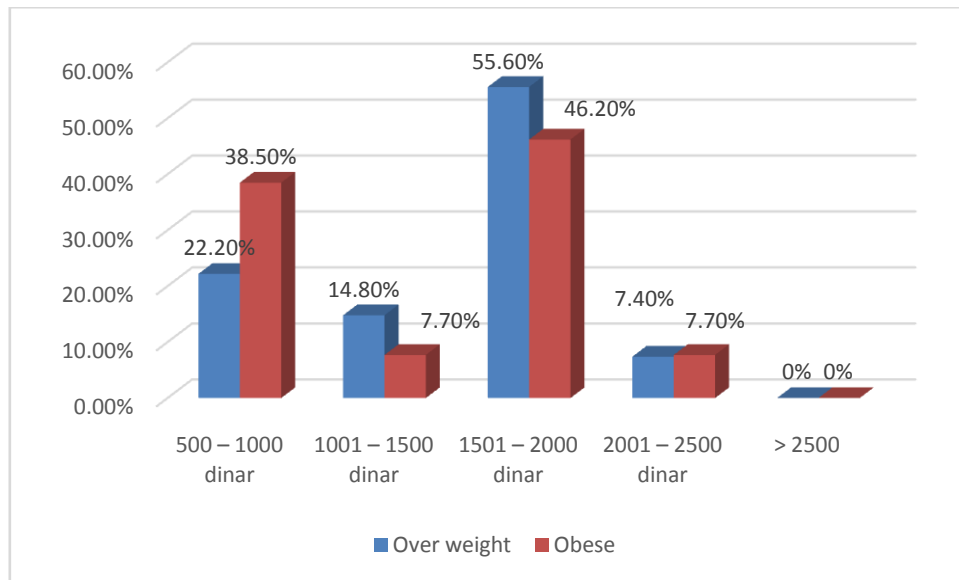


Figure 9: Relation between obesity and overweight with family income(Gharian 2016)

Discussion:

Obesity has long been considered as a predisposing factor that affects an individual's health. Yet, the importance of obesity and overweight among students has only been highlighted relatively recently. Worldwide, there are a total of 155 million (1 in 10) students overweight, and around 30–45 million classified as obese.⁽¹⁴⁾ Available studies in the Mediterranean countries indicate that obesity has reached an alarming level among both students and adults. Consequently, the incidence of non-communicable diseases is also very high, and represents more than 50% of total causes of death.⁽¹⁵⁾ In Libya the economic development during the last 3 decades has changed the nutritional and lifestyle habits, food has become more affordable to a larger number of people with the substantial decrease in the price relative to income, and the concept of food has changed from a means of nourishment to a determinant of lifestyle and a source of pleasure,

coupled with physical inactivity have likely contributed to the increase in the prevalence of overweight and obesity in the students.⁽¹⁵⁾

The present study result showed that the highest percentage of students (55.4%) that were selected for the study were in 1st year of secondary school, about 31.9% of the students were in the 2nd year and 12.7% of the students were in the 3rd year. The result was similar to a study conducted in Dubai which showed that the highest percentage was students in 1st year of secondary school (39.8%) followed by 2nd year (34.7%) then 3rd year (25.5%).⁽¹⁶⁾ The study of *Petribú M et al* also showed similar result, in which the percentage of 1st year students (47.3%) was higher than the 2nd (31.5%) and 3rd (21.2%) year students.⁽¹⁷⁾

Regarding the sex of the students in the present study, the percentages of male students and female students were almost equal (49.8% were male and 50.2% were females). The result of Hussain HY et al showed that the percentage of males was 50.3% and the percentage of females was 49.7%.⁽¹⁶⁾ The result of *Petribú M et al* showed that the percentage of females was 62.5% and the percentage of males was 37.5%.⁽¹⁷⁾

With regards the weight of the students, the result showed that the mean weight of the students was 58.3 with standard deviation of 13. The result also showed that most of the students were between 50 and 60 kg. comper with the result of Musaiger AO (2012) reported that the mean weight in seven Arabic countries was as following; 61.4 kg in Algeria, 63.3 kg in Jordan, 73.9 kg in Kuwait, 62 kg in Libya, 59 kg in Palestine, 62.4 kg in Syria and 62.3 kg in UAE.⁽¹⁸⁾

Regarding the height of the students in the current study, The result showed that the mean height was 1.64m with standard deviation of 0.08. The height in the current study ranged between 1.47m and the 1.88m.

The result of Musaiger AO reported that the mean height of students in seven Arabic countries was as following; 1.67m in Algeria, 1.66m in Jordan, 1.65m in Kuwait, 1.63m in Libya, 1.65m in Palestine, 1.66m in Syria and 1.64m in UAE (18) which give no significant differ between Libyan student mean height and Arabic student mean height.

With regards to the BMI in the current study, the prevalence of obesity was 4.2% ($BMI \geq 30$) and the prevalence of overweight (BMI between 25 and 29.9) was 8.8%. The mean BMI was 21.5. which showed difference with prevalence of obesity and over weight in Musaiger AO result where in Algeria 12.85% were overweight and 4.3% were obese, in Jordan 19.5% were overweight and 7.3% were obese, in Kuwait 22.9% were overweight and 26.7% were obese, in Libya 22% were overweight and 9.8% were obese, in Palestine 12.6% were overweight and 4.1% were obese, in Syria 20% were overweight and 6% were obese, in UAE 15.2% were overweight and 13% were obese. ⁽¹⁸⁾

Our study showed that overweight was more in the 1st year students than in the 2nd and 3rd year. On the other hand, the prevalence of obesity was more in the 2nd year students than in the 1st year, the result showed no obese child in the 3rd year students. Compare with result of Hussain HY et al study reported the same relation regarding the overweight, in which the percentage of overweight students was higher in 1st year students than in the 2nd and 3rd year. On contrary Hussain HY et al study showed different result from the current study regarding the obesity, in which the percentage of obese students was higher in the 1st year students than in the 2nd and 3rd year. ⁽¹⁶⁾ The study of *Petribú M et al* reported that overweight was higher in the 2nd year students and obesity was higher in 3rd year student. ⁽¹⁷⁾

Regarding the relation between BMI and sex of the students, the result showed that 9.2% of the males were overweight and 8.4% of the females were overweight. The result also showed that 4.6% of the males were obese while 3.9% of the females were obese. While study of Musaiger AO et al. reported the following; in Algeria overweight was 9.3% in males and 15.5% in females while obesity was 4.1% in males and 4.5% in females, in Jordan overweight was 21.6% in males and 17.5% in females while obesity was 10.2% in males and 4.6% in females, in Kuwait overweight was 25.6% in males and 20.8% in females while obesity was 34.8% in males and 20.6% in females, in Libya overweight was 16.4% in males and 26.6% in females while obesity was 9.6% in males and 10% in females, in Palestine overweight was 12.7% in males and 12.5% in females while obesity was 5% in males and 3.5% in females, in Syria overweight was 20.3% in males and 20.1% in females while obesity was 6.7% in males and 5.3% in females, in UAE overweight was 16.8% in males and 13.6% in females while obesity was 19.1% in males and 6.6% in females(18)these results go with our study results which show the obesity is more in male than female pupils.

Conclusions:

The prevalence of overweight and obesity in secondary school students in Gharyian city was relatively low (4.2%) compared with other Arabic countries. The relation between BMI and education level and eating habits was significant. The prevalence of overweight and obesity was higher in males than in females and it was higher in the 1st year and 2nd year students..

Recommendations:

- 1-Health education programs directed to the whole community, especially parents and children on developing healthy eating patterns should be implemented.
- 2- Schools should provide healthy food, physical exercise and nutritional education to the students and to the staff.
- 3- The schools also should involve family and community in supporting and reinforcing nutritional education.

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