ISSN: 1343-4292
Volume 140, Issue 05, August, 2022

Prevalence of Obesity Among Adolescents in Telafer City: A cross-section study

Ihsan M. Afandy[1], Mazin Mahmoud Fawzi[2]

Department of Pediatrics, College of Nursing, University of Mosul, Iraq[1]
Department of Pediatrics, College of Medicine, University of Mosul, Iraq[2]

ABSTRACT— Over the past three decades, obesity has gained attention as a serious public health concern. Obesity and overweight in childhood greatly enhance the likelihood of becoming overweight as an adult. It is a condition defined by excessive fat deposition or storage in the fat tissue. Obesity is usually caused by eating more food than one's body requires. The study aims to determine the Prevalence of overweight and obesity among Telafer City adolescents. Patients and Methods: During the 2022 academic year, a cross-sectional study was conducted in Telafer City, Iraq, on adolescent students to estimate the Prevalence of obesity and overweight. All adolescents' weight and height were checked, and their body mass index (BMI) was calculated. A customized questionnaire was used to get gender, age, and school-level information. Results: Obesity was observed in 15.3% of participants, more males than females. Overweight was observed in 14.5% of participants, more females than males. Conclusion: Telfer City has high obesity and overweight among adolescents. Health centers and TV programs must work together to educate the community about the problem and how to treat it.

KEYWORDS: adolescents, Telafer City, overweight and obesity, body mass index

1. INTRODUCTION

Obesity has been more prevalent in several areas throughout the last three decades. Obesity is a significant public health issue that has sparked global concern [1].

Childhood obesity has more than doubled internationally, while adolescent obesity has tripled. Obesity and overweight in childhood greatly enhance the likelihood of becoming obese as an adult. Food intake patterns, demographic and socioeconomic factors, physical inactivity, and numerous pregnancies may all have a role in the rising frequency of obesity in the Middle East [2].

Teenagers are a crucial phase for growth and development, with higher dietary requirements than at any other time. Also, adolescence is a critical period for developing the risk of chronic diseases and illnesses associated with poor food patterns and sedentary behavior in adulthood [3].

Obesity and overweight are caused by an excess of calories consumed compared to calories burned. Increased intake of high-fat diets and less physical activity due to sedentary lifestyles are essential contributors to the global obesity epidemic [4].

Obesity is the amount of fat stored or deposited in the fat tissue. Obesity is usually caused by eating more food than one's body requires [5].

The BMI is the most common way to express body fat percentiles based on clinical measurements. BMI is

calculated by dividing body weight in kilograms by height in meters squared (kg/m2) [6].

Overweight falls between the 85th and 95th percentiles for age and gender, and obesity is above the 95th percentile [7].

Adiposity (body fat) is tightly controlled as part of the energy homeostasis process, which entails balancing energy intake (food) to energy expenditure (exercise and metabolism) and the size of the body's energy stores. Obesity is a symptom of an energy imbalance [8].

Obesity results from a complex interaction of environmental, genetic, physiological, and cultural variables. The stress and anxiety levels in the family, school, and community are ecological influences [9].

Obesity in childhood and adolescence parallels obesity in adulthood. It has been linked to numerous chronic conditions, such as type 2 diabetes, musculoskeletal disorders, cardiovascular risk factors including hypertension and hyperlipidemia, respiratory disorders like sleep apnea or asthma, and digestive ailments like nonalcoholic fatty liver disease. In addition, childhood and adolescent obesity is associated with adult mortality and early death [10], [11].

Obesity can only be diagnosed by measuring the patient's body fat. In most clinical circumstances, body composition cannot be determined adequately. Probably, the BMI might not accurately reflect an individual's total health risk. Even among adults with the same BMI, body fat has racial and ethnic differences [12].

Overweight and obesity are measured using BMI or weight-for-height ratios, depending on the person's gender and age. Based on WHO 2006 reference curves, the weight-to-length ratio is used to diagnose overweight and obesity in children under 24 months. A child's BMI is calculated using the WHO 2006 reference system after two years and up to five years after using the WHO 2007 reference system. To identify adolescents who are obese or overweight, the World Health Organization standard chart should be used, as it is more sensitive than other methods [13].

The study was accepted by the Medical Ethical Research Committee of the University of Mosul/College of Nursing/Iraq (Ref. No. 5, CCMRE-NUR-22-4)

2. Patients and Methods

This cross-sectional study was conducted in secondary schools in Telafer City, Nineveh Governorate, Iraq, between November 14, 2021, and June 24, 2022, on 1836 students aged 12 to 18. The study was conducted in eight middle schools inside Telafer city. Four were boys, and the other four were girls affiliated with the Telafer Education Directorate.

The study population consisted of male and female students from middle and secondary schools in the city of Telafar, ranging in age from 12 to 17 years.

An electronic KINLEY digital scale was used to determine body weight (Model Dt 05-cc, China). The participant's weight was measured to the nearest 0.1 kg on a digital scale with bare feet and a light garment. A wall-mounted stadiometer was used to measure height, and the following techniques were used to measure body height to the most relative 0.5 centimeters. BMI was calculated by dividing weight in kg by height in meters squared kg/m2 following the guidelines: heels together, barefoot, head contacting the ruler,

ISSN: 1343-4292
Volume 140, Issue 05, August, 2022

line horizontal.

Obesity and overweight were defined by the 95th and 85th to 95th percentiles, respectively. The 5th-85th percentiles of BMI were considered normal.

The questionnaire collected participants' age, gender, class, school, weight, height, blood pressure, BMI, and clinical history.

3. Results

Table 1: Sociodemographic Characteristics of Students

Variable	Frequency	Percentage (%)	Chi-Square Statistic	P-Value
1. Sex				
Male	913	49.7	0.102	0.749
Female	923	50.3		
2. Age (years)				
12	110	6.0	834.359	0.000**
13	373	20.3		
14	449	24.5		
15	410	22.3		
16	319	17.4		
17	175	9.5		
3. Educational Level				
Class 1	630	34.3	0.914	0.633
Class 2	615	33.5		
Class 3	591	32.2		

** Highly Significant at P ≤ 0.01

Table (1) shows the sociodemographic characteristics of the students. One thousand eight hundred and thirty-six students aged 12 -17 years participated in the study, with 913 (49.7%) and 923 (50.3%) male and female, respectively. Six hundred and thirty (630) participants (34.3%) were in the 1st class, whereas 615 (33.5%) and 591 (32.2%) participants were in the 2nd and 3rd classes. A more significant proportion of the students were in the first class. Also, the modal age was 14 years.

Table 2: Physical Characteristics of Participants by Sex

Variable	Female (n = 923)	Male (n = 913)	Total (n = 1836)	p-value
	Mean ± SD	**Mean ± SD**	**Mean ± SD**	
Age (years)	14.41 ± 1.38	14.566 ± 1.38	14.53 ± 1.39	0.000**
Height(cm)	153.01 ± 5.85	157.96 ± 9.86	155.47 ± 8.47	0.000**

Weight (kg)	50.77 ± 10.24	53.80 ± 14.03	52.28 ± 12.36	0.000**
BMI(kg/m2)	21.63 ± 3.96	21.39 ± 4.55	21.52 ± 4.27	0.000**

** Highly Significant at P-value ≤ 0.01; SD: Standard Deviation. BMI: Body Mass Index.

Table (2) illustrates the gender differences in anthropometric background. The participants' mean age was 14.53 ± 1.39 years. The Females' mean age was 14.41 ± 1.38 years, while the males' was 155.47 ± 8.47 years (p <0.01).

The mean weight of the study participants was 52.28 ± 12.36 kg. Females had a mean weight of 50.77 ± 10.24 kg, while males had 53.80 ± 14.03 kg (p <0.01).

The mean height of participants was 155.47 ± 8.47 cm. The male students were significantly taller than females, (157.96 ± 9.86 cm vs. 153.01 ± 5.85cm) (p < 0.001).

The mean BMI of the students was 21.52 ± 4.27 kg/m2. The mean BMI of females was 21.63 ± 3.96 kg/m2, whereas the mean BMI of males was 21.39 ± 4.55 kg/m^2. A higher BMI was seen among females than males (p=0.000).

Table 3: Distribution of Body Mass Index Status by Age and Education Level:

Variable		Normal (1201) (65.4%)	Overweight (267) (14.5%)	Obesity (282) (15.3%)	Chi-Square (P-Value)
Age (Years)					
12 (110)	**Male (44)**	28 (63.7)	3 (6.8)	9 (20.4)	**10.508* (0.043)**
	Female (66)	43 (65.3)	11 (16.7)	10 (15.2)	
13 (373)	**Male (171)**	116 (67.8)	19 (11.1)	23 (13.5)	**11.046* (0.042)**
	Female (202)	134 (66.3)	37 (18.3)	28 (13.9)	
14 (449)	**Male (210)**	135 (64.3)	33 (15.7)	34 (16.2)	**12.665* (0.033)**
	Female (239)	186 (77.9)	19 (7.9)	28 (11.7)	
15 (410)	**Male (212)**	135 (63.7)	29 (13.7)	34 (16.0)	**17.181* (0.041)**
	Female (198)	134 (67.7)	32 (16.2)	20 (10.0)	
16 (319)	**Male (179)**	116 (64.8)	25 (14.0)	28 (15.6)	**17.141* (0.024)**
	Female (140)	98 (70.0)	22 (15.7)	16 (11.4)	
17 (175)	**Male (97)**	62 (63.9)	11 (11.4)	20 (20.6)	**9.74* (0.05)**
	Female (78)	14 (63.4)	26 (14.9)	32 (18.3)	
Class	**Male (291)**	184 (63.3)	40 (13.7)	45 (15.5)	**8.04***

ISSN: 1343-4292
Volume 140, Issue 05, August, 2022

1 (630)	**Female (339)**	241 (71.1)	42 (12.4)	43 (12.7)	**(0.05)**
Class 2 (615)	**Male (320)**	184 (57.5)	54 (16.9)	66 (20.6)	**7.44* (0.047)**
	Female (295)	197 (66.8)	43 (14.6)	46 (15.6)	
Class 3 (591)	**Male (302)**	195 (64.7)	45 (14.8)	44 (14.6)	**9.655 (0.044)***
	Female (289)	200 (69.2)	43 (14.8)	38 (13.2)	

* Normal Significant at $P \leq 0.05$

Note:

- ✓ Body Mass Index = Weight / $(Height)^2$.
- ✓ Obesity BMI ≥ 95%.
- ✓ Overweight BMI > 85 - < 95 %.
- ✓ Normal BMI 5 - 85 %.

Table 3 shows the distribution of BMI by age and education level. Of those, 282 students were obese, giving participants a 15.3% obesity prevalence. The Prevalence of being over or average weight was 14.5% and 65.4%, respectively. Obese and overweight students constituted 29.8% of the respondents.

According to the World Health Organization's "BMI guidelines for age growth reference chart," BMI was classified as usual, overweight, and obese. The higher percentages of obese and overweight students were located in the second intermediate stage and more in males than females, and the result was statistically significant (p = 0.047).

4. Discussion

There were a total of 1836 students who participated in the study. The ratio of females to males was 50.3% to 49.7%, which is closely equal to the other research conducted by Basiratnaa (52.3% female and 47.7% male) [14].

The ages of the students ranged from 12 to 17 years. The most significant proportion of students was in the 14-year-old age group (24.5%). Like Mohan's previous studies, his study's most influential age group was 13–14 [15].

The first grade had the most students (34.3%), followed by the second and third grades (33.5% and 32.2%, respectively). This lower number of students in the third grade could be attributed to dropouts from school, particularly among girls, during the school year.

The mean weight of participants in our survey was 52.28 kg, with males weighing more than females (p 0.000). This conclusion is comparable to the Basiratna study, in which the mean weight was reported to be 52.1 kg [16].

The average height of students in this study was 155.4 cm. Male was taller than female (157.9 cm vs. 153 cm) (p 0.000). This result contradicted research conducted by [16]; this may be the result of ethnic differences.

The average BMI was 21.5, with females getting a greater BMI (21.6) than males (21.3). The distinction

was statistically significant (p 0.000). The result is similar to [4], who reported a BMI of 21.4, indicating that a female was heavier than a male.

When comparing the results of this study to those of another, it was discovered that the Prevalence of overweight is comparable to that of the [17], which indicated that 13.7% of children and adolescents were overweight. The results are similar to Maria's study, which found the Prevalence of obesity to be 14.1% (16.1 % for males and 14.9 % for females) [18], and lower than the results found by Danok and Ma'ala in Kirkuk, who found the Prevalence of obesity to be 22.3% (55.8% for males and 42.5 % for females) [19].

In our study, the Prevalence of normal body mass index was 69.0% greater among girls than among boys (61.8 %). The Prevalence of obesity among boys was 15.1%, which was greater than the Prevalence among girls, which was 13.9%. This is lower than the Prevalence of overweight reported by [2], which was 20.6%. (20.7% male and 20.5% female). While males are more likely than females to be obese, males have a larger prevalence (16.9% vs. 13.8%). The Prevalence of overweight and obesity was 29.8%, which is greater than the Prevalence reported by [20], which was 26.9 %.

5. Conclusions

According to the study, many adolescents in Telafer City, Nineveh governorate, northern Iraq, were overweight or obese. It has been proven that overweight and obesity are prevalent among adolescents. Overweight and obesity among adolescents are increasingly becoming significant public health issues in Telafer City. In addition, 14.5% of adolescents were overweight, and 15.3% were obese. This adolescent group is at high risk for obesity, requiring special attention. This is the first study in Telafer City to establish the predictive ability of overweight and obesity, which may be used to diagnose and screen adolescents for obesity in an ambulatory care setting.

6. Recommendation

Parents and guardians should ensure that their children consume nutritious diets and engage in enough physical activity. They should also limit their kids' time using mobile devices and watching television. Adolescents should be supported in developing healthy behaviors and leading active lifestyles. Schools should have recreation areas and encourage adolescent participation in sports.

7. Reference

[1] SS MA. A review of Prevalence of obesity in Saudi Arabia. J Obes Eat Disord. 2016;2(2):1-6.

[2] Qadir MS, Rampal L, Sidik SM, Said SM, Ramzi ZS. Prevalence of obesity and associated factors among secondary school students in Slemani City Kurdistan Region, Iraq. Malays J Med Health Sci. 2014;10(2):27-38.

[3] Musaiger AO, Nabag FO, Al-Mannai M. Obesity, dietary habits, and sedentary behaviors among adolescents in Sudan: alarming risk factors for chronic diseases in a poor country. Food and nutrition bulletin. 2016;37(1):65-72.

[4] Abdul-Jalil I. Obesity and hypertension among adolescents in senior high schools in the Asante Akim North District, Ghana: University of Ghana; 2018.

[5] Mohammed H, Vuvor F. Prevalence of childhood overweight/obesity in basic school in Accra. Ghana medical journal. 2012;46(3):124.

[6] Styne DM. Childhood and adolescent obesity: prevalence and significance. Pediatric Clinics of North America. 2001;48(4):823-54.

[7] Farman WH, Majeed HM. Overweight and Obesity Among Children and Adolescents in Baladrouz City. Diyala Journal of Medicine. 2019;16(2):31-8.

[8] Mukhopadhyay A, Bhadra M, Bose K. Human obesity: A background. Human obesity: A major health burden Delhi: Kamla Raj Enterprise. 2005:1-9.

[9] Tiwari A, Balasundaram P. Obesity in Pediatric Patients. 2021.

[10] Lee CG. The emerging epidemic of hypertension in Asian children and adolescents. Current hypertension reports. 2014;16(12):1-9.

[11] Ells LJ, Rees K, Brown T, Mead E, Al-Khudairy L, Azevedo L, et al. Interventions for treating children and adolescents with overweight and obesity: an overview of Cochrane reviews. International journal of obesity. 2018;42(11):1823-33.

[12] Marcdante K, Kliegman RM. Nelson essentials of pediatrics e-book: Elsevier Health Sciences; 2014.

[13] Valerio G, Maffeis C, Saggese G, Ambruzzi MA, Balsamo A, Bellone S, et al. Diagnosis, treatment and prevention of pediatric obesity: consensus position statement of the Italian Society for Pediatric Endocrinology and Diabetology and the Italian Society of Pediatrics. Italian journal of pediatrics. 2018;44(1):1-21.

[14] Basiratnia M, Derakhshan D, Ajdari S, Saki F. Prevalence of childhood obesity and hypertension in south of Iran. Iranian journal of kidney diseases. 2013;7(4):282.

[15] Mohan B, Verma A, Singh K, Singh K, Sharma S, Bansal R, et al. Prevalence of sustained hypertension and obesity among urban and rural adolescents: a school-based, cross-sectional study in North India. BMJ open. 2019;9(9):e027134.

[16] Basiratnia M, Derakhshan D, Ajdari S, Saki F. Prevalence of childhood obesity and hypertension in south Iran. Iranian journal of kidney diseases. 2013;7 4:282-9.

[17] Yan-li C. Prevalence of obesity and hypertension among children and adolescents in Xi'an. Chinese Journal of School Health. 2012.

[18] Maria Aiello A, Marques de Mello L, Souza Nunes M, Soares da Silva A, Nunes A. Prevalence of obesity in children and adolescents in Brazil: a meta-analysis of cross-sectional studies. Current pediatric reviews. 2015;11(1):36-42.

[19] Danok AS, Ma'ala EG. Prevalence of obesity among adolescents at secondary schools in Kirkuk city. Iraqi National Journal of Nursing Specialties. 2013;26(2).

[20] Al-Ani RK, Al-Ani SK, Al-Hadeeth RQ. The Prevalence of Overweight and Obesity among

Secondary School Students in Ramadi City, West of Iraq. International Medical Journal. 2020;27(5):531-4.