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Prevalence and Determinants of Adolescent Female Overweight and Obesity

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Abstract. **General Background:** Adolescent overweight and obesity have emerged as major global public health concerns due to their strong association with long-term metabolic, cardiovascular, and psychosocial risks, particularly among female adolescents. **Specific Background:** In many low- and middle-income regions, evidence on the burden of excess body weight among school-aged girls remains fragmented, limiting effective prevention strategies. **Knowledge Gap:** Updated prevalence estimates and anthropometric correlations among female secondary school students are scarce, constraining regionally informed policy and school-based interventions. **Aim:** This study aimed to determine the prevalence of overweight and obesity and examine relationships between age, height, weight, and body mass index among female secondary school students. **Method:** A descriptive cross-sectional study was conducted among 200 female students aged 12–19 years selected through systematic random sampling from four secondary schools, with anthropometric measurements analyzed using descriptive statistics and Pearson correlation tests. **Results:** The findings showed that 21.0% of students were overweight and 9.5% were obese, while 55.0% had normal body mass index; age was significantly correlated with height but not with weight or body mass index. **Novelty:** This study provides contemporary epidemiological evidence on adolescent female overweight and obesity patterns in an underreported population. **Implications:** The results highlight the urgency of early, school-based nutrition and physical activity interventions and offer empirical support for public health policies targeting adolescent obesity prevention.

Highlights:
- Overweight prevalence exceeded obesity among female adolescents
- Most students maintained normal body mass index classifications
- Age correlated significantly with height but not with body mass index

Keywords: Adolescent Obesity; Overweight Prevalence; Body Mass Index; Female Adolescents; Public Health Nutrition

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Introduction

The prevalence of obesity and overweight among female secondary school students has become a growing concern globally. In many countries, data showed that the percentage of overweight and obese adolescents is significantly higher in females compared to males, example, a study conducted by the World Health Organization (WHO) reported that, globally, the prevalence of obesity among adolescent girls is increasing, with countries in the Middle East, North America, and some parts of Europe showing alarming rates. (1)

Adolescent obesity is thought to be associated with some psychological problems like low self-esteem, feeling of inadequacy, anxiety, social dysfunction, depression and moodiness. All of which affect the personality of the adolescents. A study reported that girls who are overweight or obese are prone to developing high-risk behaviors such as smoking and drinking alcohol, and are also less likely to engage in physical activities and exercise programmed that promote energy. (2)

Obesity can be measured by various methods such as body mass index, abdominal circumference, waist–hip ratio and skin-fold thickness. (3) BMI is sometimes used to measure total body fat and whether a person is having a healthy weight. Excess body fat is linked to an increased risk of some diseases including heart disease and some cancers. (4) People are classified as obese when their body mass index (BMI) (a person's weight divided by the square of the person's height) is over 30 kg/m^2; the range 25–29.9 kg/m^2 is defined as overweight. Some East Asian countries use lower values to calculate obesity. Obesity is a major cause of disability and is correlated with various diseases, particularly cardiovascular diseases, type 2 diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis. (5)

Psychological Symptoms

Depression and anxiety: Obesity is often linked to mental health disorders, including depression, anxiety, and low self-esteem, partly due to social stigma and discrimination.
Social isolation: People with obesity may experience social stigma, leading to feelings of isolation or withdrawal from social activities.

Body image issues: Concerns about physical appearance and body image may lead to anxiety, especially in cultures that emphasize slimness. (6)

Medical Symptoms and Conditions

Hypertension (high blood pressure): Obesity is a leading cause of high blood pressure, which can strain the heart and increase the risk of heart disease.

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Type 2 diabetes: Being overweight or obese significantly increases the risk of developing insulin resistance, leading to Type 2 diabetes.

Heart disease: Excess fat increases the likelihood of developing cardiovascular diseases, such as coronary artery disease and stroke.

Gallstones: Obesity is a risk factor for the development of gallstones, which are hardened deposits of bile that can form in the gallbladder.

Disease (NAFLD), which can progress to liver damage.

Certain cancers: Obesity increases the risk of developing several types of cancer, including breast, colon, and endometrial cancer. (7)

BMI Classification

1. Underweight: BMI less than 18.5
2. Normal weight: BMI between 18.5 and 24.9
3. Overweight: BMI between 25 and 29.9
4. Obesity: BMI of 30 or higher

Class 1 (Moderate obesity): BMI 30–34.9

Class 2 (Severe obesity): BMI 35–39.9

Class 3 (Very severe or morbid obesity): BMI of 40 or higher (8)

These classifications are used by health organizations worldwide to assess potential risks related to obesity and overweight, such as cardiovascular diseases, type 2 diabetes, and certain cancers. (9)

Studies

In Kurdistan at 2014, (Prevalence of obesity and associated factors among secondary in Slimani City Kurdistan Iraq). The prevalence of overweight and obesity is high (20.6% and 11.3% respectively). The predictors of obesity among secondary school students aged between 13 to 17 years old at Slimani City Centre Kurdistan Region, Iraq were age, family income and body image dissatisfaction. (10)

In Iran at 2020, (Prevalence of obesity and overweight in Iranian student). The article addressed the prevalence of obesity and overweight in Iranian students by using meta-analysis. The prevalence of obesity among Iranian students based on body mass index (BMI) was 11% (in girls 8%). The prevalence of overweight in students based on BMI was 12% (in girls 13%). The rate of obesity was 10% in secondary school students. The prevalence rate

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of overweight was more than that of obesity with a 1% difference. The prevalence of overweight was higher in girls. (11)

In Egypt at 2019, (Obesity and Self-Esteem among School Adolescent Students). A cross sectional study to measure the prevalence of overweight and obesity and identify its relation with self-esteem among school adolescents, 26.5% of adolescents are overweight, and 13.3% are obese. Lack of physical activity is the only significant life style factor associated with overweight and obesity. The study showed that more than one fourth of adolescents are suffering from overweight and obesity. (12)

In Bahrain at 2008, (Overweight and obesity among adolescents in Bahrain). A cross-sectional study was conducted to assess the prevalence of overweight and obesity amongst adolescents in Bahrain. The subjects consisted of grades 1-3 secondary school students (336 males and 396 females) between the ages 15-18 years, the mean height in males and females ranged between 162.9-171.3 cm and 157.4-159.9 cm, while the mean weight ranged between 59-72 kg and 59-66 kg, the proportion of those underweight was higher in males (8.6%) compared to that in females (2.3%). The highest proportion of normal weight was observed at the age of 15 years in both the male and female adolescents (66.0%). The prevalence of overweight and obesity was higher in female (17.4% and 19.4%) compared to the male (15.8% and 13.7%) adolescents. (13)

In Italy in 1999, 1802 parents (66.5% of the respondents) and 1,357 students (66% of the target group) consented to participate in the study. The age range of the students was 8 years (11–19 years; mean age was 14.9, SD, 2.55). Of these, 8.4% were deemed obese; the frequency was higher in the male population (9.8%) than in the female population (6.5%). No statistically significant gender difference in the 21.4% of respondents who were deemed at risk of being overweight. Teenagers' chance of being overweight or obese was found to be statistically correlated with their parents' nutritional status, their mother's educational attainment, and their weekly physical activity levels. Obesity or the danger of being overweight does not seem to be associated with the number of children in the family, the age of the parents, or their occupation. (14)

In Malaysia in 2007, 8.2% of the 3,333 respondents were overweight, and 11.4% were at risk of being overweight. Males had a much higher frequency of overweight (10.6%) than females (6.0%). Overweight prevalence was highest among Malays (10.7%), followed by Indians (7.1%) and Chinese (5.9%). Indians had the highest prevalence of "risk of overweight" (13.7%), followed by Chinese (12.0%) and Malays (9.8%). Overweight was associated with both diastolic blood pressure ($r=0.42$, $r2=0.18$, $p<0.001$) and systolic blood

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pressure (r=0.5, r2=0.25, p<0.001) in a moderately significant way. Overweight and BMI had a very poor correlation (r=0.11, r2=0.01, and df=3331, p<0.001). [15]

Methodology

A descriptive cross-sectional study was designed involving four governmental secondary school for female in Basrah City. This study was carried out during the period from the first of November 2024 to the first of May 2025. A 200 female students of a secondary schools were involved in this study, 78 from Intermediate school and 122 from Preparatory school.

A systemic randomized sample technique was used for the purpose of the study. The total number of the selected schools was (4) which were chosen randomly from a list of schools taken from Directorate General of Education in Basrah; from the selected schools we choose three classes were randomly chosen and from each class we choose one line. The total number of selected students was 200, were from females.

The studied variables

Age: the secondary school age, extending from 12-20 years. Sex: females. Weight: in kilogram. Height: in meter. BMI: in kg/m^2.

Statistical analysis

SPSS Version 26 was used for the purpose of statistical analysis of the data. The statistical measures were in form of means, standard deviation, frequencies, percentages, and Pearson correlation.

Results

Table (1) Frequency distribution of the study sample according to demographic features

Categories	Frequency	Percent
Age interval		
12-15	81	**40.5**
16-19	119	**59.5**
Schools		
Intermediate school	78	39

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Preparatory school	122	61
Total	200	**100.0**

The table showed the distribution of the students according to age intervals, 40.5 % of the students were at age interval 12-15 years old and 59.5 % at age interval 16-19 years old. 39% at Intermediate school and 61 % at Preparatory school.

Table (2) Frequency distribution of the study sample according to anthropometric measures

Categories		Frequencies	Percentage
Height interval (CM)	139 – 148 cm	9	4.5
	149 – 158 cm	94	47
	159-168 cm	89	44.5
	169- 178 cm	8	4
Weight interval (kg)	37-46	33	16.5
	47-56	68	34
	57-66	55	27.5
	67-76	24	12
	77-86	9	4.5
	87-96	3	1.5
	97-106	2	1
	107 and above	5	2.5
Total		200	100

The table 2 showed that 4.5% of the study sample were within the height interval of 139 – 148 CM, 47% of the study sample were within the height interval of 149 – 158 CM, 44.5% of the study sample were within the height interval of 159 – 168 CM, 4% of the study sample were within the height interval of 169 – 178 CM, we found that most of the students (91.5%) were within the second and third group of age interval.

Also The table 2 showed that 16.5% of the sample were within the weight interval of 37-46 Kg, 34% of the sample were within the weight interval of 47-56 Kg, 27.5% of the sample were within the weight interval of 57-66 Kg, 12% of the sample were within the

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weight interval of 67-76 Kg, 4.5% of the sample were within the weight interval of 77-86 Kg, 1.5% of the sample were within the weight interval of 87-96 Kg, 1% of the sample were within the weight interval of 97-106 Kg, 2.5% of the sample were within the weight interval of 107 Kg and above.

Table (3) Frequency distribution of the study sample according to the categories of body mass index

Categories	Range	Frequencies	Percentages
Underweight	Less than 18.5	29	14.5
Normal weight	18.5-24.9	110	55
Overweight	25-29.9	42	21
Obese	More than 30	19	9.5
Total		200	100

The table showed the distribution of the study sample according to BMI categories, 14.5 % were underweight, 55% were normal weight, 21 % were overweight and 9.5 % were obese.

Table (4) The correlation between height and weight of the students

Height	Pearson Correlation	1	.038
	Sig. (2-tailed)		.590
	N	200	199
Weight	Pearson Correlation	.038	1
	Sig. (2-tailed)	.590	
	N	199	199

The table showed that there was no significant correlation between the height and weight of the study sample.

Table (5) the correlation between height and age of the students

	Age	**Height**

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Age	Pearson Correlation	1	.141*
	Sig. (2-tailed)		.046
	N	200	200
Height	Pearson Correlation	.141*	1
	Sig. (2-tailed)	.046	
	N	200	200
*. Correlation is significant at the 0.05 level (2-tailed).			

The table showed that there was significant correlation between the height and age of the study sample.

Table (6) correlation between weight and age of the students

		Age	**Weight**
Age	Pearson Correlation	1	-.015
	Sig. (2-tailed)		.833
	N	200	199
Weight	Pearson Correlation	-.015	1
	Sig. (2-tailed)	.833	
	N	199	199

The table showed that there was no significant correlation between the age and weight of the study sample

Conclusions

1. (21%) from female students were overweight within the BMI interval of 25-29.9.
2. (9.5%) from female students were obese within the BMI interval of more than 30.
3. The variables weight and BMI showed there was no significant correlation with age.
4. Our study showed that there is a significant correlation between age and height.

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Recommendations

Increase knowledge about the negative effects of overweight and obesity among members of society, specifically school students, through scientific and educational seminars, and listening to advice and guidance that raise awareness about the need to adhere to appropriate physical activity, adopt healthy nutrition, and avoid unhealthy eating habits.

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