Alqalam Journal of Medical and Applied Sciences. 2025;8(4):2927-2931
https://doi.org/10.54361/ajmas.2584122

Original article

Childhood Obesity in Urban Libya: Insights from Primary Schools in Janzour

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Abstract
Childhood obesity has emerged as a major public health challenge worldwide, with increasing prevalence in both high-income and low- and middle-income countries. North Africa and the Middle East are experiencing a notable rise in childhood overweight and obesity, reflecting global trends. This study aimed to assess the prevalence of overweight and obesity among primary school children in Janzour, Tripoli, and to explore associations with gender, family history, and lifestyle behaviors. A cross-sectional study was conducted from 25 October to 5 November 2025 in six primary schools across Janzour. A total of 392 apparently healthy children aged 9–18 years were included. Anthropometric measurements were taken by trained intern doctors, and BMI was calculated using the WHO criteria. Questionnaires were administered to collect information on physical activity, dietary habits, and family history of obesity. Data were analyzed using Microsoft Excel, with independent samples t-tests applied to assess gender differences. Of the 392 children, 204 (52%) were boys, and 188 (48%) were girls, with a mean age of 9.18 years. The majority (46.4%) were within the normal BMI range, while 33.2% were underweight, 13.3% overweight, 4.1% obese, and 3.1% severely obese. Gender differences were observed, with underweight and severe obesity more common among males, while females were slightly more represented in the normal weight and obesity categories. Family history of obesity was reported by 26.9% of participants, and within this group, 18.8% were overweight and 14.3% obese. Lifestyle analysis revealed that overweight children often had either healthy diets without physical activity or partial diets with physical activity, whereas obese children exhibited both poor dietary habits and lack of physical activity. Childhood overweight and obesity are emerging concerns in Janzour, reflecting global and regional trends. The findings highlight the combined influence of family predisposition, unhealthy eating patterns, and insufficient physical activity. Early, multi-level interventions involving schools, families, and communities are essential to prevent progression into obesity and reduce future health burdens.
Keywords: Childhood Obesity, Overweight Prevalence, Body Mass Index, Primary School Children.

Introduction

Childhood obesity is recognized as one of the most pressing public health challenges of the 21st century (1). Overweight is defined by the accumulation of excessive fat deposits, while obesity is a chronic, multifactorial disease characterized by abnormal or excessive fat accumulation that poses a health risk (2). The global prevalence of childhood overweight and obesity has increased at an alarming rate, currently estimated at 8.5%. Although the burden is higher in high-income countries, low- and middle-income nations—particularly in urban settings—are increasingly affected (3). In 2022, more than 390 million children and adolescents were overweight, including 160 million living with obesity (2).

The etiology of childhood obesity is complex and multifactorial, involving biological, behavioral, and environmental determinants. Key contributors include unhealthy dietary patterns—especially the consumption of energy-dense foods—physical inactivity, and sedentary behaviors (4–6). Additional factors such as genetic predisposition, hormonal imbalances, socioeconomic status, psychological influences, and certain medications also play significant roles (7).

Children who are overweight or obese are more likely to remain obese into adulthood, placing them at increased risk for adverse health outcomes (8). A substantial body of evidence indicates that excessive weight during childhood and adolescence is associated with long-term consequences, including premature mortality and chronic diseases such as hypertension, dyslipidemia, metabolic syndrome, type 2 diabetes, and cardiovascular disorders (9,10). Other obesity-related conditions include asthma (11), dental problems (10), orthopedic complications (12), sleep apnea (13), and non-alcoholic fatty liver disease (10). Beyond physical health, childhood obesity is linked to psychosocial challenges such as poor body image, low self-esteem, social isolation, discrimination, depression, and diminished quality of life (14). Moreover, the economic burden of managing obesity-related diseases imposes significant pressure on healthcare systems worldwide (2). Given that overweight and obesity are largely preventable, early intervention during childhood is essential to mitigate future health risks and reduce societal costs. This study aimed to assess the prevalence of overweight and obesity among primary school children in Janzour, Tripoli, and to explore associations with gender, family history, and lifestyle behaviors

Received: *22-10-2025* - ***Accepted***: *19-12-2025* - ***Published***: *26-12-2025*

Methods

Study Setting

A cross-sectional study was conducted in primary schools located in Janzour, a coastal area situated west of Tripoli. Janzour is a residential and active district characterized by schools, health centers, and local markets, and it is experiencing ongoing population and urban growth. Its diverse community makes it a suitable setting for field studies.

Sampling and Participants

Three schools were selected from different parts of the Janzour region, and samples were taken from all classrooms. The height and weight of each student were measured, and a questionnaire was administered to every participant. The questionnaire addressed physical activities, family history of obesity and overweight, and dietary habits. After collection, the data were used to calculate the body mass index (BMI) of each student. Those identified as obese or overweight were further examined with respect to their activity levels and dietary habits.

BMI Calculation and Classification

BMI was calculated using the standard equation, weight in kilograms divided by the square of height in meters. The classification of BMI followed the World Health Organization (WHO) criteria, whereby values below 18.5 were considered underweight, values between 18.5 and 24.9 were classified as normal weight, and values from 25 to 29.9 indicated overweight. Obesity was categorized into three classes: Class I for BMI between 30 and 34.9, Class II for BMI between 35 and 39.9, and Class III for BMI equal to or greater than 40.

Study Period and Sample Size

The study included 392 apparently healthy children aged between 9 and 18 years, during the period from 25 October to 5 November 2025.

Anthropometric Measurements

Anthropometric measurements were taken by well-trained intern doctors. Students were asked to remove their shoes before stepping onto a stadiometer placed on a flat floor against the wall. They were instructed to hold their breath and maintain an erect anatomical posture while their height was measured to the nearest 0.1 cm. Weight was measured using a digital scale, with students wearing light clothing and no shoes. The reading was recorded to the nearest 0.1 kg once stabilized.

Data Analysis

Data entry and analysis were performed using Microsoft Excel, and the results were presented in tables and graphs. An independent samples t-test was applied to assess differences in BMI according to gender, with statistical significance considered at a p-value of less than 0.05.

Ethical Considerations

Ethical approval for the study was obtained from the educational directorate as well as from the principal of each participating school.

Results

The number of children involved in the study was 392, of whom 204 (52%) were boys, and 188 (48%) were girls. The mean age of the participants was 9.18 years, with ages ranging from 9 to 18 years. The study was conducted across six primary schools situated in the east, west, south, and central areas of Janzour city. The distribution of children according to schools is presented in Table 1.

Table 1. Children Distribution According to Schools with Gender and Age Group

School	Male (n, %)	Female (n, %)	Age <14 (n, %)	Age ≥14 (n, %)	Total (n, %)
Oya International School	90 (25.0%)	104 (26.5%)	110 (56.7%)	84 (43.3%)	194 (49.5%)
Al-Alamia School	114 (29.1%)	84 (21.4%)	135 (68.2%)	63 (31.8%)	198 (50.5%)
Total	204 (52.0%)	188 (48.0%)	245 (62.5%)	147 (37.5%)	392 (100%)

Body Mass Index (BMI) data for the students (N = 392) showed that the majority of the sample fell within the normal weight category. The normal BMI group represented the largest proportion, with 177 students accounting for 46.4%. The underweight category consisted of 135 students (33.2%), while the overweight category included 52 students (13.3%). Obesity was observed in 15 students (4.1%), and severe obesity was recorded in 13 students (3.1%). These findings indicate that although obesity is present among students, its prevalence remains relatively low compared to the normal weight group. The overweight category,

Received*: 22-10-2025 -* ***Accepted****: 19-12-2025 -* ***Published****: 26-12-2025*

however, represents a noticeable portion of the sample and may require targeted health interventions and awareness programs to prevent progression into obesity in the future. Table 2 presents the distribution of children according to BMI categories.

Table 2. BMI Categories with Gender Distribution and Mean Age (N = 392)

BMI Category	Percentage (%)	Male (%)	Female (%)	Mean Age (years)
Underweight	33.2	55.4	44.6	10.7
Normal weight	46.4	49.5	50.5	12.5
Overweight	13.3	53.8	46.2	13.1
Obesity	4.1	37.5	62.5	13.5
Severe obesity	3.1	66.7	33.3	14.6

The analysis of BMI categories revealed clear variations in weight status between male and female students. Underweight students represented 33.2% of the total sample, with a higher proportion of males (55.4%) compared to females (44.6%). The largest group was the normal weight category, accounting for 46.4% of students, with females slightly more represented (50.5%) than males (49.5%). In the overweight category (13.3%), males formed the majority (53.8%), while females accounted for 46.2%. In contrast, obesity (4.1%) was more prevalent among females (62.5%) compared to males (37.5%). Severe obesity accounted for 3.1% of students, with a clear male predominance (66.7% males versus 33.3% females). Overall, male students tended to dominate the extreme categories of underweight, overweight, and severe obesity, whereas females were slightly more represented in the normal weight and obesity categories. Figure 1 provides a comparison between males and females in terms of BMI interpretation.

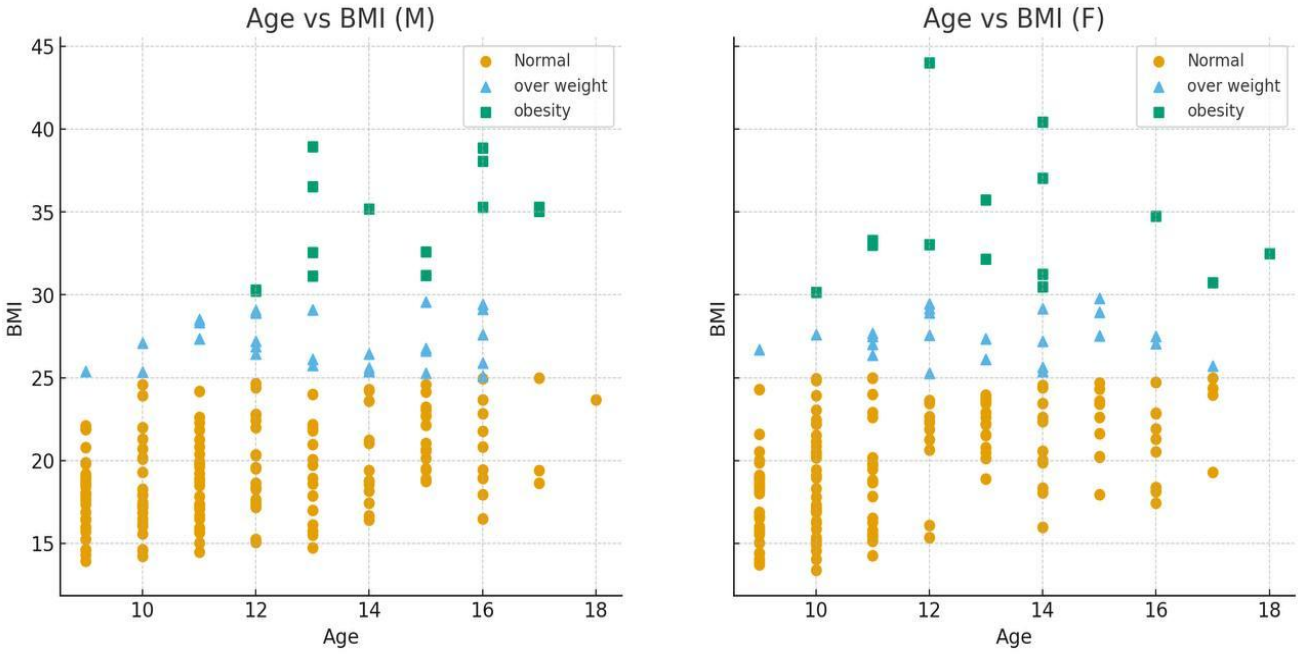

Figure 1. Comparison between males and females for BMI interpretation

The questionnaire also included a question asking: "Does any member of your family suffer from overweight or obesity?" Responses varied, with 106 students (26.9%) answering yes and 288 students (73.1%) answering no. Further analysis was conducted on the group of students who responded yes (n = 106). Among them, 60 (56.6%) were females, and 46 (43.4%) were males, with ages ranging from 9 to 18 years. Within this group, 71 students (66.9%) had a normal weight, 20 students (18.8%) were overweight, and 15 students (14.3%) were obese (Figure 2).

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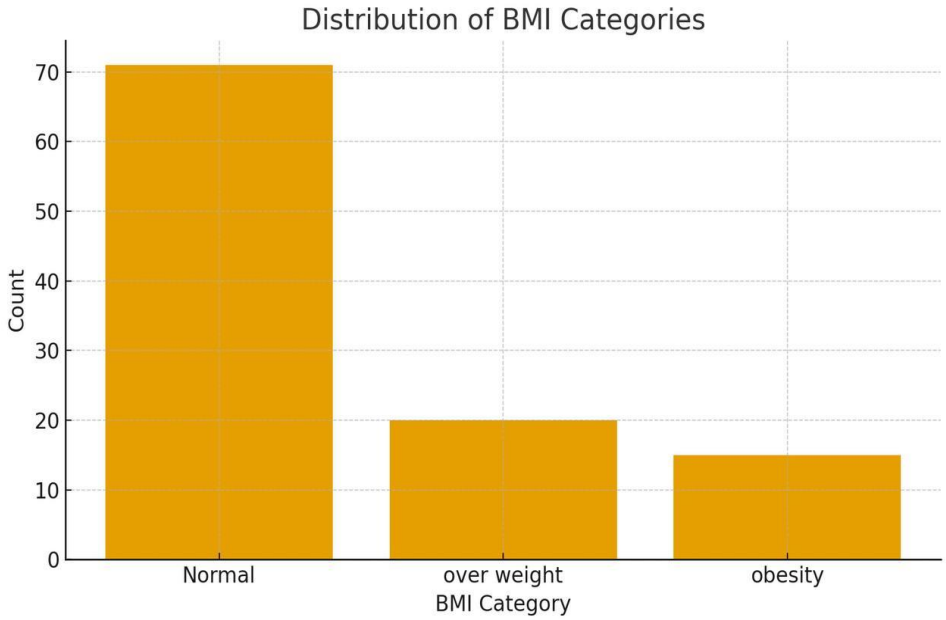

Figure 2. Distribution of BMI Categories

Discussion

This study assessed the prevalence of overweight and obesity among primary school children in Janzour, Tripoli, and explored the relationship between BMI categories, gender, family history, and lifestyle behaviors. Although the majority of the students were within the normal BMI range, a noticeable proportion were either overweight or obese, indicating that childhood obesity is an emerging public health concern in this community. At the global level, recent evidence shows that childhood overweight and obesity have reached worrying levels. A large systematic review and meta-analysis including more than 45 million children and adolescents from 154 countries reported that the overall prevalence of obesity is approximately 8.5%, with considerable variation between regions (15). Similarly, WHO data indicate that the combined prevalence of overweight and obesity among those aged 5–19 years increased from about 8% in 1990 to around 20% in 2022, meaning that roughly one in five children and adolescents worldwide is now affected (16). These global figures align with the pattern observed in our study, where overweight and obesity were present despite the predominance of normal weight, suggesting that Janzour is not isolated from the worldwide trend.

Regionally, studies from the Middle East and Gulf countries have reported high and sometimes increasing rates of childhood overweight and obesity. A review of obesity in children and adolescents in Gulf countries showed particularly high prevalence among Kuwaiti adolescents, reaching up to 40–46% (17). Another recent review focusing on the Middle East estimated that the combined prevalence of overweight and obesity may approach or exceed one-third of children in some countries (18). These findings support the notion that North Africa and the Middle East are experiencing a significant rise in childhood obesity, consistent with the pattern identified in our sample from Janzour.

Within our study population, there was a clear variation in weight status between male and female students. Underweight and severe obesity were more common among males, whereas females were slightly more represented in the average weight and obesity categories. These differences may reflect gender-related variations in lifestyle, cultural expectations, and body image perception. Previous reviews have highlighted that girls in many settings tend to engage less in vigorous physical activity, while boys may consume more energy-dense foods and exhibit more extreme patterns of behavior (19). Such behavioral and psychosocial factors may help explain the distribution seen in our results.

Family history of overweight and obesity also appeared as an important factor. More than a quarter of the students reported having at least one family member who is overweight or obese. This finding is consistent with the literature, which emphasizes that childhood obesity is influenced by a combination of genetic predisposition and shared environmental factors at the family level. Children frequently adopt their parents' dietary habits, level of physical activity, and screen-time behaviors. Homes where sugary drinks, fast food, and fried items are commonly consumed, and where physical activity is not encouraged, tend to create an obesogenic environment that promotes excess weight gain (20).

Lifestyle behaviors in this study provided further insight into the mechanisms underlying weight differences. Among overweight students, half consumed relatively healthy diets but did not engage in regular physical activity, while the other half were physically active but had only partially healthy eating habits. In contrast, obese students showed the most unfavorable pattern, characterized by both unhealthy dietary practices and lack of physical activity. This emphasizes that diet and physical activity act together rather than separately;

Received: *22-10-2025* - ***Accepted***: *19-12-2025* - ***Published***: *26-12-2025*

improvement in only one dimension may not be sufficient to prevent excess weight if the other remains suboptimal. Reviews on the causes of childhood obesity have repeatedly highlighted the combined impact of high-calorie, ultra-processed foods, reduced physical activity, sedentary screen time, and broader environmental influences (21).

Another important observation is that, while obesity and severe obesity represented a smaller proportion of the sample compared to normal weight, their presence in primary-school children is clinically significant. Evidence suggests that overweight and obese children are more likely to remain obese into adulthood and to develop complications such as hypertension, dyslipidemia, type 2 diabetes, and cardiovascular disease later in life (22). Given that the participants in this study were relatively young, early prevention is critical to avoid progression towards more severe forms of obesity and to reduce future healthcare burden. Overall, the findings of this research are in agreement with both regional and global data, confirming that Janzour, like many other urban areas in low- and middle-income countries, is experiencing a shift from undernutrition towards overweight and obesity. The combination of family predisposition, unhealthy eating patterns, and insufficient physical activity observed among overweight and obese children underlines the necessity of implementing comprehensive, multi-level prevention strategies that involve schools, families, and the wider community.

Conclusion

Libyan medical students were found to be predominantly visual learners with moderate overall study habits, marked by strong motivation but challenges in maintaining focus. Year level influenced study methods and exam techniques, while gender and age showed no significant effects. Aligning teaching strategies with visual learning preferences and providing early study skills support may enhance academic performance and better prepare students for medical practice.

Conflict of interest. Nil

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