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# Overweight and Obesity Prevalence Among Primary School Children in Rania City, Iraq

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A R T I C L E I N F O

*Keywords:*

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**Abstract**

**Background and Objectives:** The rising prevalence of overweight and obesity among children has become a critical public health issue globally. This study aimed to determine the prevalence of overweight and obesity among primary school children in Rania City, Iraq.

**Methodology:** A cross-sectional survey was conducted among primary school children in Rania City, Iraq. Ten schools, including 3,137 children, were selected using a cluster random sampling method. Anthropometric measurements were recorded, and sociodemographic data for a random sample of 70 obese children were collected. Statistical analyses were performed using SPSS software (version 23).

**Results:** The study found that 53.6% of children were within the normal weight range, 16.6% were overweight, and 13.2% were obese. Most participants were male (51.1%). Overweight (21.2%) and obesity (15%) were most prevalent in the younger age group (6-9 years). Regarding the parents of obese children, 35.7% of fathers and 34.3% of mothers had only a primary school education. Additionally, 50% of fathers were employed, while 75.7% of mothers were homemakers. Most families (81.4%) reported a barely sufficient economic status.

**Conclusions:** The prevalence of overweight and obesity among primary school children in Rania City is alarmingly high. Socioeconomic factors, including parental education and occupation, are significant determinants of these conditions.

**What is already known about the topic?** It is known that overweight and obesity rates among primary school children are rising globally, including in Iraq. Factors such as poor diet, lack of physical activity, and changing lifestyle habits contribute to this growing issue, which poses significant health risks for children in cities like Rania.

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## INTRODUCTION

The increasing prevalence of overweight and obesity among children represents a significant global health challenge. According to the World Health Organization (WHO), the prevalence of combined childhood overweight and obesity increased by 47.1% over the past three decades, reaching 38 million obese children under the age of five in 2019 (De Onis et al., 2010; WHO, 2016). Projections suggest that this number could rise to 70 million by 2025 if current trends continue (Khadaee & Saeidi, 2016). Unlike adults, children's body fat distribution changes with age and sex, necessitating using BMI z-scores for accurate assessment (Kautiainen, 2008). WHO defines obesity in children under five as a BMI greater than three standard deviations above the WHO Child Growth Standards median, while in children aged 5-19, it is defined as a BMI greater than two standard deviations (WHO, 2022). The Centers for Disease Control and Prevention (CDC) further defines childhood obesity as having a BMI at or above the 95th percentile for age (OAC, 2022).

This study aims to assess the prevalence of overweight and obesity among primary school children in Rania City, Iraq, and to examine the sociodemographic characteristics of obese children and their parents.

## METHOD

### *Research Design*

This study utilized a descriptive cross-sectional design to investigate the prevalence of overweight and obesity among primary school children in Rania City, Iraq. A cross-sectional design was chosen because it allows for assessing the prevalence of these conditions at a single point in time, providing a snapshot of the current situation. The study also aimed to explore the sociodemographic characteristics of a sample of obese children and their parents.

### *Study Setting*

The study was conducted in Rania City, in the Sulaymaniyah Governorate of Iraq. The city was selected due to its representative population and accessibility. Rania City has a mixture of public and private primary schools, which were included in the sampling process.

### *Population and Sample*

The target population for this study consisted of all primary school children enrolled in the first to sixth grades within Rania City. The inclusion criteria were children aged 6-12 years who were present during the data collection period. Children who were absent during data collection were excluded from the study.

Thirty-two primary schools (29 public and 3 private) were identified within the city. Using cluster random sampling, 10 schools (9 public and 1 private) were randomly selected to participate in the study. This sample represents approximately 30% of the total number of schools in Rania City, ensuring that the sample was representative of the broader population. All students enrolled in the selected schools were included in the study, resulting in a final sample size of 3,137 children.

### *Data Collection Procedures*

**Approval and Coordination:**

Before data collection, formal approval was obtained from the Rania Education Directorate. This approval allowed the researchers to conduct the study in the selected schools. Meetings were held with school principals to explain the study's purpose, procedures, and the importance of participation. Additionally, verbal consent was obtained from the principals to proceed with the data collection.

**Anthropometric Measurements:**
The primary data collection involved measuring the height and weight of the children to calculate their Body Mass Index (BMI). The measurements were carried out using standardized equipment, ensuring accuracy and consistency across all participants.

**Height Measurement:** Children's height was measured using the Seca Bodymeter 206, which provides measurements to the nearest 0.1 cm. The device was placed on a flat, hard surface outside the classrooms. Children were asked to stand upright, with their backs against the measuring board, heels together, and looking straight ahead. Children were asked to remove their shoes and any heavy clothing to ensure accurate measurements.

**Weight Measurement:** Children's weight was measured using the Seca Beam Scale, which measures to the nearest 0.01 kg. The scale was calibrated daily to maintain accuracy. Children were instructed to remove their shoes and heavy outerwear before stepping onto the scale. A trained researcher recorded the measurements to ensure consistency.

The data collection period they have spanned three weeks, from January 5 to January 26, 2021. During this time, all children present in the selected schools were measured. A team of three trained nurses assisted in the data collection process. These nurses were trained by the lead researcher one week before the start of data collection to ensure uniformity in measurement techniques and data recording.

**Sociodemographic Data Collection:**
In addition to the anthropometric measurements, a random sample of 70 obese children was selected for the study's second phase, which focused on collecting sociodemographic data. An informal letter was sent to the parents of these children, inviting them to participate in the study by completing a questionnaire.

The questionnaire was designed to collect detailed information on the following variables:

**Parental Education Level:** The highest level of education completed by both parents, categorized as illiterate, able to read and write, primary school, secondary school, undergraduate, and postgraduate.

**Parental Occupation:** The current employment status of both parents, categorized as employed, self-employed, jobless, or retired for fathers, and homemaker, employed, or self-employed for mothers.

**Family Economic Status:** The family's monthly income is categorized as highly sufficient, barely sufficient, or insufficient.

Parents were asked to complete the questionnaire and return it to the school the following day. The data collected from the questionnaires were then entered into a Microsoft Excel worksheet for subsequent analysis.

*Data Analysis*

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were used to summarize the prevalence of overweight and obesity among children, as well as the sociodemographic characteristics of the obese children and their parents. The analysis included:

**BMI Categorization:**
The children's BMI was calculated and categorized into severe thinness, thinness, average weight, overweight, obese, and severely obese, based on WHO BMI-for-age standards.

**Chi-Square Tests:**
Chi-square tests assessed the association between BMI categories and variables

such as sex and age group. The significance level was set at $p < 0.05$.

**Fisher's Exact Test:**

They were used to analyze associations between small sample subgroups within the dataset.

**RESULTS**

*Prevalence of Overweight and Obesity*

The study assessed a total of 3,137 primary school children in Rania City. The results revealed that 53.6% of the children were within the normal weight range, while 16.6% were classified as overweight, and 13.2% were classified as obese (Table 1). Additionally, a small proportion of children (3.0%) were identified as severely obese. The distribution of BMI categories among the children is presented in Table 1.

*Gender Differences in Overweight and Obesity*

A gender-based analysis showed that the prevalence of overweight was slightly higher in females (16.8%) than males (16.5%). However, the prevalence of obesity and severe obesity was higher among males, with 10.8% of males being obese compared to 9.6% of females and 4.0% of males being severely obese compared to 2.0% of females. These differences between male and female children in BMI categories were statistically significant ($\chi^2 = 8.18$, $p = 0.004$).

*Age Group Differences in Overweight and Obesity*

The prevalence of overweight and obesity was also examined across different age groups. Among younger children (ages 6-9 years), 14.4% were overweight and 8.8% were obese. In contrast, older children (ages 10-12 years) had a higher prevalence of overweight (21.2%) and obesity (13.2%). However, severe obesity was more prevalent in the younger age group (3.6%) compared to the older age group (1.8%). The association between age group and BMI categories was statistically significant ($\chi^2 = 27.36$, $p < 0.001$).

*Sociodemographic Characteristics of Obese Children*

A subsample of 70 obese children was analyzed to assess the sociodemographic characteristics of their parents. Most obese children were male (69%), as illustrated in Figure 1.

**Parental Education Level:**

The analysis of parental education levels revealed that many parents had only a primary school education. Specifically, 35.7% of fathers and 34.3% of mothers had completed primary school. A smaller proportion of parents had attained higher levels of education, with only 2.9% of fathers and 1.4% of mothers holding a postgraduate degree (Figure 2).

**Parental Occupation:**

Regarding parental occupation, most fathers were employed (50%) or self-employed (47.2%). Only 1.4% of fathers were either jobless or retired. Among the mothers, the vast majority were homemakers (75.7%), with a smaller proportion being employed (22.9%) or self-employed (1.4%) (Figures 3 and 4).

**Family Economic Status:**

The economic status of the families was predominantly categorized as barely sufficient, with 81.4% of families falling into this category. Only 7.1% of families had a highly sufficient economic status, while 11.4% were classified as insufficient (Figure 5).

*Statistical Associations*

Statistical analysis showed significant associations between BMI categories and both sex ($p = 0.004$) and age groups ($p < 0.001$). The data suggest that both gender and age are important factors influencing the prevalence of overweight and obesity among primary school children in Rania City. Additionally, the sociodemographic characteristics of

obese children's parents, particularly education level and occupation, may play a role in the observed prevalence rates.

**Table 1: Distribution of Children's BMI-z Score According to Sex and Age Groups**

| BMI-z Categories | Female (n = 1535) | Male (n = 1602) | Total (n = 3137) | Age Group 5-9 Years (n = 2111) | Age Group 10-12 Years (n = 1026) | p-value |
|---|---|---|---|---|---|---|
| **Severe Thinness** | 6 (0.4%) | 10 (0.6%) | 16 (0.5%) | 11 (0.5%) | 5 (0.5%) | < 0.001 |
| **Thinness** | 233 (15.2%) | 271 (16.9%) | 504 (16.1%) | 336 (15.9%) | 168 (16.4%) | < 0.001 |
| **Normal Weight** | 860 (56.0%) | 820 (51.2%) | 1680 (53.6%) | 1197 (56.7%) | 483 (47.1%) | < 0.001 |
| **Overweight** | 258 (16.8%) | 264 (16.5%) | 522 (16.6%) | 305 (14.4%) | 217 (21.2%) | < 0.001 |
| **Obese** | 147 (9.6%) | 173 (10.8%) | 320 (10.2%) | 185 (8.8%) | 135 (13.2%) | < 0.001 |
| **Severely Obese** | 31 (2.0%) | 64 (4.0%) | 95 (3.0%) | 77 (3.6%) | 18 (1.8%) | < 0.001 |

## DISCUSSION

### *Overview of Key Findings*

This study provides the first comprehensive assessment of overweight and obesity prevalence among primary school children in Rania City, Iraq. The findings indicate that the prevalence of overweight (16.6%) and obesity (13.2%) among children in this region is alarmingly high, exceeding the levels reported in previous studies conducted in other parts of the Kurdistan region, such as Erbil and Dohuk (Shabu & Al-Tawil, 2012). These results align with global trends, where the prevalence of childhood overweight and obesity has been rising steadily over the past decades (WHO, 2021).

### *Comparison with Other Studies*

The prevalence rates observed in this study are higher than those reported in previous research conducted in Iraq. For example, studies in Erbil city reported much lower rates of childhood overweight (9.3%) and obesity (1.6%) (Shabu & Al-Tawil, 2012). Similarly, in Dohuk city, the prevalence of overweight and obesity was found to be 8.3% and 7.9%, respectively. The higher rates in Rania City may reflect differences in lifestyle, dietary habits, or socioeconomic conditions that warrant further investigation.

Internationally, the results from Rania City are consistent with findings from other countries experiencing similar public health challenges. For instance, the prevalence of overweight and obesity among schoolchildren in the United States has also been reported at similar levels, particularly in low-income areas where socioeconomic disparities are more pronounced (Rogers et al., 2015). This suggests that factors contributing to childhood obesity are not unique to Iraq but are part of a broader global trend

influenced by environmental and behavioral factors.

### *Gender Differences in Overweight and Obesity*

The study identified significant gender differences in the prevalence of overweight and obesity. While the prevalence of overweight was slightly higher among females (16.8%) compared to males (16.5%), the prevalence of obesity and severe obesity was notably higher among males. These findings are consistent with other studies that have observed higher rates of obesity among boys than girls in various contexts (Matthiessen et al., 2014). This gender disparity could be attributed to differences in physical activity levels, dietary habits, and possibly genetic factors. Boys may consume higher calorie intake and less physical activity, leading to more significant weight gain. However, further research is needed to explore these potential explanations in the context of Rania City.

### *Age-Related Differences*

Age was also found to be a significant factor influencing the prevalence of overweight and obesity. Older children (10-12 years) exhibited higher rates of both overweight and obesity compared to younger children (6-9 years). This trend may be related to the onset of puberty, where hormonal changes contribute to increased body fat. Additionally, older children may have more autonomy over their food choices and physical activities, potentially leading to less healthy behaviors.

Interestingly, severe obesity was more prevalent among the younger age group (3.6%) than the older age group (1.8%). This finding is concerning as early-onset severe obesity is associated with a higher risk of long-term health complications, including type 2 diabetes, cardiovascular disease, and metabolic syndrome (Kautiainen, 2008). Early intervention strategies targeting younger children could be critical in preventing the progression of severe obesity.

### *Sociodemographic Factors*

The sociodemographic analysis of obese children's parents revealed significant associations between parental education, occupation, and the prevalence of obesity. The majority of obese children had parents with only a primary school education, with very few parents having attained higher education levels. This finding is consistent with international research that suggests a strong inverse relationship between parental education level and childhood obesity (Santiago et al., 2012; Matthiessen et al., 2014). Parents with lower educational attainment may have less access to health information and fewer resources to provide a healthy lifestyle for their children.

Parental occupation was also a factor, with most fathers being employed or self-employed and most mothers being homemakers. The occupation of parents, particularly mothers, has been linked to childhood obesity in several studies (Gautam & Jeong, 2019). Mothers who are homemakers may have more control over their children's diet and physical activity. Nevertheless, this control might not always translate into healthier outcomes if they lack the knowledge or resources to promote healthy behaviors.

Moreover, the study found that the majority of families of obese children reported a barely sufficient economic status. This finding aligns with research from other contexts, showing that low socioeconomic status is associated with higher childhood obesity rates (Chen et al., 2021; Rogers et al., 2015). Families with limited financial resources may have reduced access to healthy foods and

recreational opportunities, which can contribute to weight gain in children.

*Public Health Implications*

The high prevalence of overweight and obesity among primary school children in Rania City has significant public health implications. These conditions are associated with a range of adverse health outcomes, including an increased risk of chronic diseases, such as diabetes and cardiovascular disease, later in life (Khadaee & Saeidi, 2016). The findings underscore the need for urgent public health interventions aimed at reducing the prevalence of overweight and obesity among children in this region.

Potential strategies could include nutrition education programs for parents and children, initiatives to increase physical activity in schools, and community-based interventions to promote healthier eating habits. Additionally, policies aimed at reducing socioeconomic disparities, such as improving access to healthy foods and recreational facilities in low-income areas, could be crucial in addressing the obesity epidemic.

*Limitations and Future Research*

While this study provides valuable insights into the prevalence of overweight and obesity among children in Rania City, several limitations should be acknowledged. The study's cross-sectional design limits the ability to infer causal relationships between sociodemographic factors and obesity. Longitudinal studies would be needed to establish causality and explore the long-term effects of obesity on health outcomes.

Furthermore, the reliance on self-reported data for sociodemographic characteristics may have introduced response bias. Future research could benefit from more objective measures of socioeconomic status and parental education. Additionally, exploring the children's dietary habits and physical activity levels could provide a more comprehensive understanding of the factors contributing to overweight and obesity in this population.

## CONCLUSIONS

The findings of this study highlight the urgent need for public health interventions to address the high prevalence of overweight and obesity among primary school children in Rania City, Iraq. Gender, age, and sociodemographic factors, particularly parental education and economic status, play significant roles in shaping these outcomes. Addressing these factors through targeted public health strategies could help mitigate the growing burden of childhood obesity in this region.

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## AUTHOR'S CONTRIBUTIONS

Study the concept, and write and review the final edition by all authors.

## DISCLOSURE STATEMENT:

The authors report no conflict of interest

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