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Prevalence's of Overweight and Obesity among Saudi Children

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Abstract: ***The purpose of the present study was to determine the prevalences of overweight and obesity among Saudi children in Riyadh, Saudi Arabia. This was a cross-sectional study conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia. Data were collected over a period of 6 months between December 2014 and May 2015. The study sample included 1000 children of Saudi nationality aged 2–14 years who visited the National Guard Comprehensive Clinic. Anthropometric measurements of weight and height were performed. The Centers for Disease Control and Prevention (CDC) 2000 growth charts were used to assess body mass index (BMI). The children were classified into the following four weight categories: underweight (BMI less than the 5th percentile for age and sex), normal weight (BMI between the 5th and 84th percentiles), overweight (BMI between the 85th and 95th percentiles), and obese (BMI more than the 95th percentile). The weight categories were then studied according to sex and age (2–4 years, 5–9 years, and 10–14 years). In boys and girls, the prevalences of overweight were 9.5% and 14.4% and those of obesity were 13.5% and 18%, respectively. The overall prevalences of overweight and obesity were higher among girls than boys. Additionally, the prevalences of overweight and obesity were the highest in the 10–14-year group. Overweight and obesity are important public health problems among Saudi children. A national prevention program is recommended to avoid obesity-related morbidity in adulthood.***

Keywords: children, obesity, overweight, public health problem, obesity-related morbidity.

1. Introduction

In recent years, the prevalence of childhood obesity has increased considerably across developed and developing countries [1]. This has prompted the World Health Organization (WHO) to designate obesity as one of the most important public health threats [2], [3]. Indeed, childhood obesity is well recognized to be associated with co-morbidities [4]–[6]. Metabolic complications associated with obesity during childhood increase the risk of type 2 diabetes and early cardiovascular disease [7]. Furthermore, obesity in children was shown to correlate significantly with an increased risk of severe obesity in adulthood [8]. Obesity may also affect psychological health, as obese children are more likely to have low self-esteem than their non-obese peers [9].

Nutrition transition with associated lifestyle-related non-communicable diseases, which was first observed in developed countries, has rapidly spread to many developing countries, including Saudi Arabia [10]–[12]. In fact, over the past three decades, Saudi Arabia has undergone an enormous lifestyle-related transformation, which has largely contributed increases in the prevalence of obesity observed among Saudi children [10]. Surveys performed in a number of different areas and provinces in Saudi Arabia have reported a high prevalence of overweight and obesity among Saudi children [13]–[15]. Accordingly, surveillance of the prevalence of overweight and obesity starting at an early age is important for their management and prevention. The present study aimed to assess the prevalence of overweight and obesity among Saudi children who visited the National Guard Comprehensive Clinic in Riyadh, Saudi Arabia.

2. Subjects and Methods

2.1 Study Design

This was a cross-sectional study conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia. Data were collected over a period of 6 months between December 2014 and May 2015.

2.2 Subjects

The study sample included 1000 children of Saudi nationality aged 2–14 years who visited the National Guard Comprehensive Specialized Clinic. These children visited the clinic for the treatment of different diseases and disorders or for vaccination. The study only considered Saudi children at the first visit. Those who visited the clinic for follow-up were excluded. Children from all socioeconomic classes, and both boys and girls were included in the study. Children below 2 years of age were excluded. Additionally, children above 14 years of age were excluded, as these children do not visit pediatric clinics for cultural and social reasons.

The study was approved by the institutional review board and it was performed in accordance with the Declaration of Helsinki. Informed consent was obtained from the parents/guardians of the children prior to the participants' inclusion in the study.

2.3 Data Collection

Trained nursing staff collected anthropometric measurements of weight and height. These nurses were well trained prior to data collection, with special emphasis on standardizing the methods of measurement. Height was measured without shoes to the nearest 0.5 cm, and weight was measured with

the subject in light clothes and without shoes to the nearest 100 g. The weighing scale used was a lever-type Health O Meter scale (Health O Meter, Inc., Bridgeview, IL), which was accurate to the nearest 100 g. The scale was placed on a hard, level, uncarpeted floor, and a single scale was used to weigh all the children. The scale was calibrated daily, and it was set to zero before weighing each child.

A data collection form was designed to gather data on age, sex, body weight, and height. Body mass index (BMI) was calculated for each child according to the formula adopted internationally:

$$BMI = \text{weight (kg)}/\text{height (m)}^2.$$

The Centers for Disease Control and Prevention (CDC) 2000 growth charts were used to assess BMI [16]. The children were classified into the following four weight categories: underweight (BMI less than the 5th percentile for age and sex), normal weight (BMI between the 5th and 84th percentiles), overweight (BMI between the 85th and 95th percentiles), and obese (BMI more than the 95th percentile) [7], [8]. The weight categories were then studied according to sex and age (2–4 years, 5–9 years, and 10–14 years).

2.4 Statistical Analysis

Data were analyzed using the chi-square test, Student's *t*-test, and analysis of variance (ANOVA). All analyses were performed using SPSS software (version 15; IBM Corp., Armonk, NY). A P-value <0.05 was considered statistically significant.

3. Results

The study included 1000 Saudi children, and the mean age of the children was 5.9 years (standard deviation 2.8). The proportions of boys and girls were 55.5% and 44.5%, respectively (Table 1).

Table 1: Distribution of body mass index (BMI) categories by sex, age, and nationality

Categories	Under weight		Normal weight		Overweight		Obese		Total		P-value
	No.	%	No.	%	No.	%	No.	%	No.	%	
Sex											
Male	127	22.9%	300	54%	53	9.5%	75	13.5%	555	55.5%	
Female	85	19.1%	216	48.5%	64	14.4%	80	18%	445	44.5%	P < 0.05
Age (years)											
2 - 4	112	52.8%	206	40 %	26	22.2 %*	16	10.3%*	360	36 %	
5 - 9	87	41.1%	272	52.7%	41	35%*	63	40.6 %*	463	46.3 %	*P < 0.05
10 - 14	13	6.1 %	38	7.3 %	50	42.7 %*	76	49%*	177	17.7 %	
Total	212	21.2%	516	51.6%	117	11.7%	155	15.5%	1000	100%	

On classifying the children according to BMI, 21.2% were underweight for age and sex, 51.6% had normal weight, 11.7% were overweight, and 15.5% were obese (Figure 1).

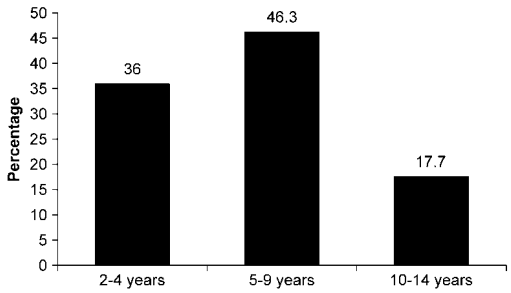

Figure 1: Weight distribution of the study sample

On classifying the children according to age, 36% were 2–4 years of age, 46.3% were 5–9 years of age, and 17.7% were 10–14 years of age (Figure 2).

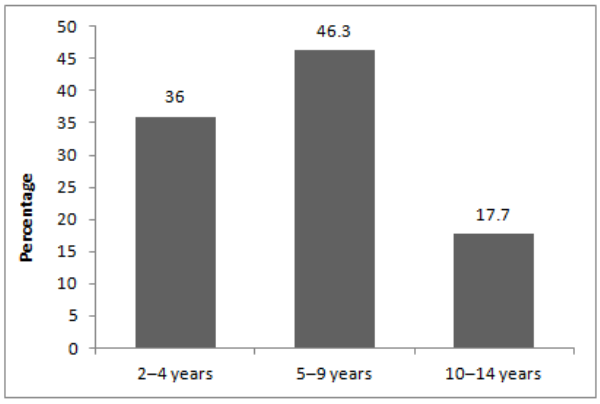

Figure 2: Age distribution of the study sample

The prevalence of overweight and obesity increased progressively with age (P = 0.02689; Table 1, Figure 3).

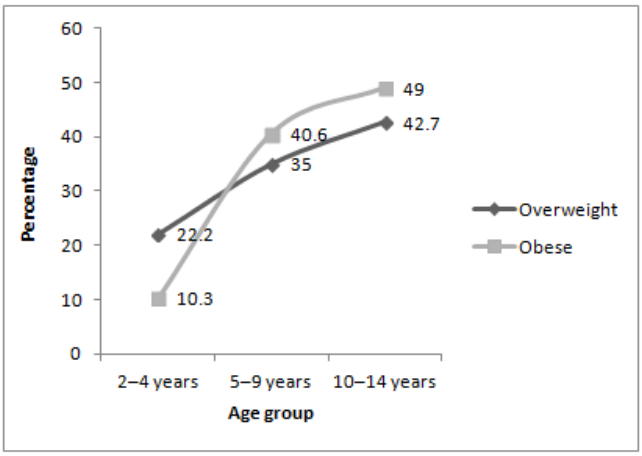

Figure 3: Distribution of overweight and obesity according to age

The prevalence of obesity was significantly higher than that of overweight in the 5–9-year group (obesity: 40.6% versus overweight: 35%; P = 0.02884; Table 1). Additionally, the prevalence of obesity was significantly higher than that of overweight in the 10–14 year group (obesity: 49% versus overweight: 42.7%; P = 0.0055; Table 1, Figure 4).

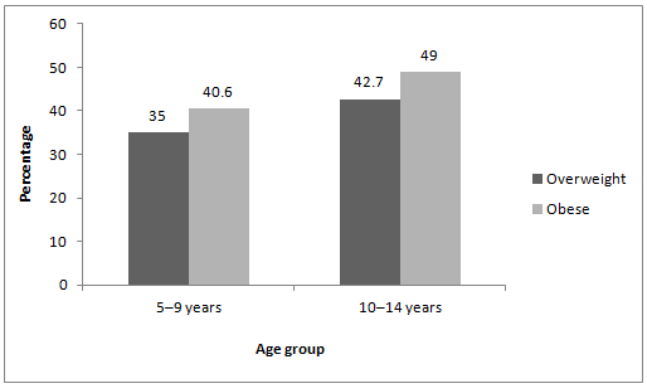

Figure 4: Comparison between overweight and obesity in the 5–9-year and 10–14-year groups

The prevalences of overweight and obesity were higher among girls than among boys (overweight: 14.4% versus 9.5%, obesity: 18% versus 13.5%; P = 0.01056; Table 1). The overall proportions of obese boys and girls were higher than the proportions of overweight boys and girls (P = 0.0158). Additionally, the proportion of obese boys was significantly higher than the proportion of overweight boys (13.5% versus 9.5%, P = 0.0485). However, no significant difference was observed for girls (obese: 18% versus overweight: 14.4%; P = 0.1722; Table 1).

4. Discussion

The present study found that in boys and girls, the prevalences of overweight were 9.5% and 14.4% and those of obesity were 13.5% and 18%, respectively. The overall prevalences of overweight and obesity were higher among girls than among boys. Additionally, the prevalences of overweight and obesity were the highest in the 10–14-year group.

Obesity is one of the main health care concerns worldwide. In 2001, the WHO stated that 10% of the world's children were obese and that the prevalence of obesity was rising in developing countries, with 155 million children of school age being overweight and 22 million under 5 years of age being overweight [3]. According to the 2002 WHO statistics, there has been a broad shift in disease burden, with the majority of deaths worldwide now related to non-communicable diseases, many of which can be linked to imbalances in nutrition, diet, and physical activity [17].

In Saudi Arabia, many studies have been performed to evaluate the prevalences of overweight and obesity among Saudi children. The latest national data revealed that the prevalences of overweight and obesity among school-age children have reached 23% and 9.3%, respectively, while the prevalences of overweight and obesity among preschool children have been reported to be approximately 15% and 6%, respectively [18]. The prevalences of overweight and obesity were higher in the present study than in the national data. Variations in the prevalences of obesity and overweight in children among the geographical regions of Saudi Arabia have been reported. A recent study found that the prevalences of obesity and overweight were highest in the Eastern province and lowest in the Southern province of Saudi Arabia [14]. Both regional and national studies have shown an increasing trend of obesity with time [19]–[23].

The present study found that the weight of Saudi children increased at 5–9 years of age, with 35% of children overweight and 40.6% obese, and the weight continued to increase at 10–14 years of age. This increase may be attributed to the fact that children start going to school at that age and, hence, there is less control over their eating habits and nutrition. Moreover, children in Saudi Arabia have become less active. Few children walk to school, and most spend a lot of time on sedentary entertainment activities, such as watching television, using computers, and playing video games. On average, a child in Saudi Arabia spends 6 hours a day in front of screens [24].

The results of the present study are similar to those of previously published studies that showed a low prevalence of obesity in both sexes among preschool children and the highest prevalence of obesity in both sexes among adolescents [13], [18], [25]. In the present study, the peak prevalence of obesity was observed at 10–14 years of age (49%), while the lowest was at 2–4 years of age (10.3%). A study has shown that 80% of obese adolescents continue to remain obese in adulthood [26]. Adolescence has been described as the "critical period for the development of adult obesity" [27]. Hence, intervention before this stage is vital for both future health and the ability to sustain long-term weight control [24]. In the present study, the prevalences of overweight and obesity were higher in girls than in boys, and this may be explained by social and cultural factors. In the adolescent period, girls become self-conscious about their weight and avoid progressing to obesity, and a study has shown that obesity is more common among adolescent boys than among adolescent girls [15]. Additionally, in Saudi Arabia, adolescent boys can drive cars, which gives them easy access to unhealthy diets (e.g., fast foods that contain

40%–45% fat and soda drinks instead of water) and less time to eat at home where meals would be more nutritious. However, adolescent boys and girls over 14 years of age were not included in this study.

Environment, lifestyle, and lack of physical activity are important contributing factors for obesity [25]. Studies of Saudi children in the Eastern province found that they were not as engaged in sporting activities as their American counterparts [25], [28].

The prevention of obesity in children should start from birth, with more emphasis placed on exclusive breastfeeding for the first 6 months of life. The establishment of preschool, school, and adolescent health programs, with emphasis on increasing the number of hours of physical education and the consumption of healthy food, and incorporating health messages into the school curricula, will help reduce obesity [29].

5. Conclusion

The high prevalences of overweight and obesity among Saudi children noted in the present study are a major public health concern and should make a strong case for greater efforts to be directed at the prevention and treatment of childhood obesity in Saudi Arabia. If strong measures are not taken to reduce the prevalence of obesity among Saudi children and youth, we may likely experience a fair reduction in the absolute life expectancy of Saudi adults in the future. To combat childhood obesity in this part of the world, fundamental changes in public policies, food habits, and health systems are required. The primary prevention of obesity through the promotion of a healthy diet and an active lifestyle should be the priority of the national public health policy. Additionally, a national prevention program is recommended to avoid obesity-related morbidity in adulthood.

6. Acknowledgments

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7. Conflict of Interest

None

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