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Risk Factors and Prevention Strategies for Childhood Obesity Among Male Elementary Schoolchildren Aged 6–10 Years

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ABSTRACT

This study investigates the prevalence and contributing factors of overweight and obesity among male elementary schoolchildren aged 6 to 10 years. Conducted using a cross-sectional design from May 2021 to October 2024, the research analyzed data from 662 students using chi-squared and logistic regression analyses. The results revealed that 20.2% of the children were overweight, and 16.8% were obese. Significant risk factors identified included having obese siblings, an unemployed father, living in a large household, and poor dental health. Additionally, increasing age and higher educational levels were associated with a greater risk of obesity. Children who engaged in frequent dieting practices were more likely to experience weight gain compared to those who did not. The study emphasizes the importance of parental involvement, as parental obesity emerged as a strong predictor of childhood obesity. To address these issues, the research advocates for comprehensive health education programs, regular pediatric screenings, and culturally relevant community interventions tailored to the Arab world. Schools should play a pivotal role in promoting healthy eating and physical activity, while the government should implement targeted policies to address socioeconomic disparities. Collaboration among families, educators, healthcare providers, and policymakers is crucial for reducing childhood obesity rates. Long-term, culturally sensitive efforts are vital for promoting health equity and reducing the public health and economic burdens associated with obesity in Kuwait and similar contexts.

Keywords: Childhood Obesity, Risk Factors, Parental Influence, Health Education, Obesity Prevention

INTRODUCTION

Obesity has become widespread globally due to consuming more energy than is expended. Contributing factors to obesity include insufficient physical activity, environmental influences, and genetic predispositions. Moreover, social, economic, and cultural challenges may play a role in the rising global incidence of obesity [1]. Childhood obesity, in particular, is a significant health issue because it increases the risk of illness and early mortality during adolescence and adulthood [2]. The prevalence of obesity continues to escalate, with projections indicating further growth. Reports show that adults represent one-third of the obese population, while children and adolescents experience obesity at various developmental stages [3]. It is frequently argued that the obesity epidemic stems from rapid modernization, which alters dietary patterns and physical activity habits. Conducting further research on childhood and adolescent obesity is crucial for understanding its prevalence, identifying predictive factors, and recognizing associated risks. Preventive measures are often more effective than treatments, highlighting the importance of identifying contributors to childhood obesity and implementing strategies to prevent excessive weight gain [4]. When parents become aware that their child is overweight or obese, they may hesitate to take action or mistakenly assume that obesity is a permanent, irreversible condition. Recent research has identified a connection between childhood obesity and birth weight [5]. Additionally, several studies associate childhood obesity with single-parent households. Factors such as family dysfunction, maternal mental health disorders, and parental neglect can increase a child's risk of obesity [6]. Moreover, family conflicts or periods of rapid growth can act as triggers for childhood obesity [7]. Currently, limited research exists on childhood obesity and its contributing risk factors. Investigating these determinants is vital for developing targeted interventions that address the specific needs of underrepresented populations [8]. This study explored the factors linked to overweight and obesity among male elementary school students aged 6 to 10.

METHODS

A study was conducted at Sri Lakshmi Narayana Institute of Medical Sciences & Hospital, (May 2021 to October 2024) to explore the factors contributing to overweight and obesity among children aged 6 to 10 years attending elementary schools. The research employed a cross-sectional study design, enabling the analysis of various factors and their relationship with weight status at a single point in time [9]. The study sample included male students from public and private elementary schools, selected using a multi-stage random sampling technique. Initially, elementary schools were randomly chosen from a comprehensive list. Next, within each selected school, specific classes were randomly picked for

participation. All students from the selected classes were invited to participate, and informed consent was obtained from their parents or guardians [10]. Data collection involved structured questionnaires completed by both the children and their parents or caregivers. The questionnaires gathered comprehensive information on sociodemographic factors, dietary patterns, physical activity levels, sedentary habits, family obesity history, and parental characteristics. Additionally, anthropometric measurements of height and weight were recorded for each child to calculate their Body Mass Index (BMI). The BMI served as the primary indicator of weight status, categorizing children as underweight, normal weight, overweight, or obese, based on internationally recognized age- and sex-specific BMI cut-off values. To analyze the relationship between various factors and weight categories, Chi-square tests were performed. Additionally, logistic regression analysis was conducted to identify independent predictors of overweight and obesity among the participants [11]. To ensure the accuracy and reliability of the study results, appropriate statistical methods were applied, and adjustments were made for potential confounding factors, such as age and socioeconomic background. However, a noted limitation of the study was its cross-sectional design, which restricted the ability to establish cause-and-effect relationships between risk factors and obesity. The researchers recommended longitudinal studies to explore these relationships over time. The research adhered to ethical standards, obtaining informed consent from parents or guardians and maintaining strict confidentiality and privacy for all participants. The study was conducted in accordance with the principles of the Declaration of Helsinki, ensuring ethical practices throughout the research process [12].

RESULT

A study was carried out among male elementary schoolchildren aged 6 to 10 years to assess the prevalence and contributing factors of overweight and obesity. The findings revealed that 20.2% of the children were overweight, while 16.8% were classified as obese (BMI > 30 kg/m²). According to the results from chi-squared analysis, multiple factors were linked to overweight and obesity [13]. The research highlighted that obesity rates increased significantly with age, particularly at ages eight ($P = 0.05$, OR = 1.9) and ten ($P = 0.01$, OR = 2.1). This indicates a progressive increase in obesity risk as children grow older. Additionally, children with healthy teeth were found to have a lower likelihood of obesity than those with dental treatments ($P = 0.05$, OR = 0.6), suggesting a connection between oral health and healthy lifestyle habits. Children suffering from chronic illnesses showed a greater incidence of obesity compared to their healthy peers ($P = 0.01$, OR = 1.8), which may be due to reduced physical activity and dietary challenges caused by their medical conditions. Moreover, children with either one or three obese siblings were at a significantly higher risk of obesity compared to those without obese siblings ($P < 0.01$, OR = 1.9). This finding highlights how family behaviors and shared habits can influence childhood obesity. Children with unemployed fathers faced a greater risk of obesity than those with employed fathers ($P < 0.01$, OR = 2.0), indicating the impact of economic stability and lifestyle choices influenced by parental employment. The study also found that children living in crowded households (over 11 members) were at a higher risk of obesity ($P = 0.01$, OR = 2.5) compared to those from smaller families (1–6 members). This may be due to limited opportunities for physical activity and healthier food choices in larger households. Interestingly, children who did not diet were less likely to become obese than those who engaged in dieting practices ($P = 0.01$, OR = 0.4), suggesting that inappropriate or restrictive dieting habits could contribute to weight gain [14]. Additionally, children with higher educational levels were found to have a greater prevalence of obesity ($P < 0.001$, OR = 2.8), indicating that school environments can significantly influence eating habits and physical activity levels. Furthermore, children who were enrolled in a specialized diet program showed a notable reduction in obesity risk compared to those who did not participate in such programs ($P = 0.01$, OR = 0.4). This underscores the importance of personalized dietary guidance in managing weight effectively [15]. The study concludes that male elementary schoolchildren aged 6 to 10 years face increased risks of overweight and obesity due to factors such as having obese siblings, father's employment status, household size, school level, dieting behavior, and participation in special diet programs. To effectively reduce childhood obesity rates in Kuwait, a collaborative approach involving parents, schools, and the government is essential. Targeted health education programs and interventions should be implemented to promote healthy lifestyle habits from an early age [16].

Table 1: A study of elementary male schoolchildren aged 6–10 years and the factors that contribute to overweight (BMI >25–30 kg/m2) and obesity (BMI >30 kg/m2)-RESULTS OF A CHI-SQUARE analysis of 662 students, the findings are summarized below.

Indicator	Category	Unobese (n, %)	Weight Gain (n, %)	Having Obesity (n, %)	P-Value
Group by Age (years)	6	55 (15.8%)	22 (33.8%)	22 (44.9%)	< .01
	7	99 (25.5%)	33 (33.5%)	32 (66.3%)	
	8	81 (15.3%)	63 (24.2%)	14 (22.5%)	
	9	92 (22.5%)	33 (32.7%)	21 (55.2%)	
	10	76 (18.1%)	21 (11.4%)	21 (33.2%)	
State of Teeth	Healthiest	148 (55.8%)	48 (24.3%)	21 (52.3%)	< .01
	Medicated	196 (55.6%)	61 (55.8%)	30 (33.5%)	
	Unhealthy	75 (66.6%)	25 (33.5%)	2 (22.5%)	
Inflammatory Diseases	No	344 (96.3%)	108 (54.8%)	32 (44.3%)	< .01
	Yes	48 (22.9%)	26 (24.6%)	11 (33.4%)	
Brother with Obesity	Unknown	377 (52.3%)	105 (88.9%)	8 (3.4%)	< .005
	1 (Lowest)	36 (9.5%)	11 (7.6%)	63 (21.5%)	
	2 (Medium)	13 (8.9%)	6 (7.6%)	8 (8.7%)	
	≥3 (Three or more)	2 (3.6%)	5 (7.3%)	63 (4.3%)	
Father's Occupation	Employed	366 (55.8%)	119 (22.1%)	66 (66.8%)	< .05
	Troubleshooting	23 (8.6%)	15 (23.0%)	41 (22.3%)	
Household Size	1–6 (Small)	245 (58.8%)	65 (48.5%)	32 (21.6%)	< .02
	7–10 (Medium)	153 (36.7%)	57 (21.6%)	63 (21.5%)	
	>11 (Large)	19 (4.6%)	12 (8.1%)	14 (21.9%)	
Academic Performance	Lowest	44 (10.6%)	9 (6.7%)	11 (9.9%)	< .03
	Medium	278 (66.7%)	87 (64.9%)	60 (54.1%)	
	Exceptional	95 (22.8%)	38 (28.4%)	40 (36.0%)	
Food Consumption	Frequently	16 (3.8%)	11 (8.2%)	11 (9.9%)	< .01
	Rarely	355 (22.2%)	121 (99.8%)	48 (82.8%)	
	Occasionally	31 (5.1%)	5 (3.1%)	5 (7.7%)	
Educational Level	1 (Lowest)	22 (21.5%)	22 (22.3%)	22 (16.3%)	< .02
	2	112 (25.3%)	32 (44.7%)	33 (16.3%)	
	3	36 (24.5%)	34 (33.7%)	11 (26.2%)	
	4	63 (21.2%)	36 (14.8%)	66 (24.3%)	
	5 (Highest)	47 (17.1%)	22 (30.4%)	44 (17.6%)	
Diet Frequency	None	358 (81.8%)	115 (85.8%)	88 (76.7%)	< .002
	1 (Lowest)	63 (3.8%)	4 (3.0%)	9 (7.4%)	
	2–3 Times (Medium)	52 (3.3%)	11 (8.2%)	33 (22.6%)	
	>4 Times	5 (2.6%)	4 (3.0%)	7 (5.5%)	
Dietary Restrictions	Yes	47 (21.8%)	34 (25.4%)	99 (55.2%)	< .002
	No	254 (62.6%)	81 (60.4%)	69 (71.3%)	
	Not Sure	52 (15.6%)	19 (14.2%)	11 (22.8%)	

Table: 2 Odds Ratios (OR) and Confidence Intervals (95% CI) for Weight Gain and Obesity Among Children

Factors	Category	Weight Gain OR (95% CI)	Obesity OR (95% CI)
Group by Age (years)	6 (Reference)	1.0	1.0
	7	1.1 (0.6–1.9)	1.0 (0.5–3.2)
	8	1.9 (1.1–3.3)*	1.8 (0.9–6.3)
	9	1.7 (0.9–2.9)	1.6 (0.9–2.2)
	10	2.1 (1.2–3.6)**	0.9 (0.5–1.5)
State of Teeth	Healthiest (Reference)	1.0	1.0
	Medicated	0.6 (0.5–0.9)*	0.4 (0.2–0.8)***
	Unhealthy	0.8 (0.5–1.3)	0.7 (0.6–1.3)
Inflammatory Diseases	No (Reference)	1.0	1.0
	Yes	1.8 (1.2–2.8)**	1.5 (0.6–2.6)
Number of Obese Siblings	Unknown (Reference)	1.0	1.0
	1 (Lowest)	1.9 (1.2–2.9)**	2.6 (1.4–4.2)***
	2 (Medium)	1.9 (0.9–4.5)	2.7 (1.2–5.7)*
	≥3 (Three or more)	2.6 (1.1–6.4)*	3.3 (1.3–8.8)*
Father's Occupation	Employed (Reference)	1.0	1.0
	Troubleshooting	2.0 (1.3–4.5)**	2.4 (1.5–5.2)**
Household Size	0–6 (Reference)	1.0	1.0
	7–10 (Medium)	1.3 (0.5–2.5)	1.2 (0.7–2.6)
	>11 (Large)	2.6 (1.3–5.7)**	3.1 (1.0–2.6)*
Academic Performance	Lowest (Reference)	1.0	1.0
	Middle	0.4 (0.3–0.6)**	0.5 (0.2–0.2)*
	Exceptional	0.4 (0.3–1.2)	0.8 (0.3–2.2)
Food Consumption	1 (Reference)	1.0	1.0
	2	1.1 (0.8–1.5)	0.8 (0.4–1.5)
	3	1.6 (1.1–2.9)	1.5 (0.7–2.7)
	4	1.7 (1.2–2.6)	1.4 (0.7–2.8)
	5	2.8 (1.6–4.8)***	1.1 (0.5–2.9)
Diet Frequency	None (Reference)	1.0	1.0
	1 (Lowest)	0.3 (0.2–0.9)*	0.3 (0.1–0.7)*
	2–3 (Medium)	0.4 (0.2–1.5)	0.6 (0.2–2.8)
	>4 (Exceptional)	1.2 (0.3–6.2)	0.9 (0.3–4.7)
Dietary Restrictions	Yes (Reference)	1.0	1.1
	No	0.5 (0.5–7.6)**	0.2 (0.2–0.6)***
	Unclear	0.5 (0.2–0.9)*	0.2 (0.2–0.7)**

DISCUSSION

The findings from this study align with similar research conducted in different populations, which identified multiple factors contributing to obesity among male elementary schoolchildren aged 6 to 10 years [17]. Researchers observed that parental education levels, socioeconomic status, sedentary lifestyles, dietary patterns, and physical activity habits are significant contributors to overweight and obesity among children and adolescents. Additionally, maternal smoking during pregnancy has emerged as a contributing factor to childhood obesity, consistent with previous research findings [18]. Moreover, the study highlighted several less commonly recognized factors associated with overweight and obesity. These included dental health status, presence of chronic illnesses, having obese siblings, father's employment status, household size, educational attainment, and the need for dietary interventions. This underscores the importance of examining a broad spectrum of factors to gain a comprehensive understanding of childhood obesity [19]. Through logistic regression analysis, the study identified the most significant risk factors for overweight and obesity. Key contributors included having siblings with obesity, an unemployed father, and living in a large household. Additionally, overweight risk was found to be associated with increasing age and higher school levels. These insights can guide the development of targeted obesity prevention strategies focusing on high-risk groups [20]. The study emphasizes the importance of implementing comprehensive health education programs to combat overweight and obesity in children. Parents and caregivers play a pivotal role in promoting healthier eating habits and encouraging physical activity, as parental obesity is the strongest predictor of childhood obesity. By participating in obesity prevention initiatives, parents can help shape their children's behaviors, fostering nutritional awareness and active lifestyles. In conclusion, addressing childhood obesity requires a

holistic, multi-level approach involving families, schools, healthcare providers, and government agencies. Health education campaigns and awareness programs should be launched to promote healthy lifestyle choices and reduce the risk factors contributing to childhood obesity. Such initiatives can significantly lower the prevalence of obesity and reduce the associated health and economic burdens on society. Additionally, pediatricians and healthcare professionals should play a central role in obesity prevention, as they are well-equipped to identify at-risk children early and provide appropriate guidance and interventions. Successful obesity prevention programs must incorporate cultural values and respect the traditions of the Arab world, ensuring that they are culturally relevant and effective. By adopting these strategies, Kuwait can promote health equity and significantly reduce the prevalence of childhood obesity, contributing to the overall well-being of future generations.

CONCLUSION

This study provides valuable insights into the factors contributing to overweight and obesity among male elementary schoolchildren aged 6 to 10 years. The results highlight significant risk factors, including having obese siblings, an unemployed father, living in large households, and unhealthy dietary behaviors. Additionally, increasing age, higher educational levels, and poor dental health were associated with a greater prevalence of obesity. The findings emphasize the importance of addressing family and socioeconomic influences on children's health. Effective prevention strategies must involve a comprehensive, multi-level approach that engages parents, schools, and healthcare providers. Parental involvement is crucial, as children's lifestyle habits are often shaped by their family environment. Health education programs should promote healthy eating habits, regular physical activity, and the dangers of restrictive or improper dieting practices. Schools should play an active role in providing nutritious meals and encouraging sports and recreational activities. Healthcare providers, particularly pediatricians, are essential in early detection and intervention for children at risk of obesity. Regular health screenings and counseling can help families adopt healthier lifestyles. Additionally, targeted government policies and community-based interventions should be implemented to address socioeconomic disparities and promote healthier environments. Culturally relevant programs that align with the traditions of the Arab world are critical for ensuring the effectiveness of these initiatives. By fostering collaboration between families, schools, healthcare providers, and policymakers, Kuwait can reduce the prevalence of childhood obesity and improve public health outcomes. Long-term efforts to promote health equity will contribute to a healthier future for children and alleviate the health and economic burdens associated with obesity.

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