

Quality of Life in 6 to 12-Year-Old Children with Overweight and Obesity Compared To Children with Normal Weight

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Abstract

Background: The prevalence of children with overweight and obesity has increased considerably worldwide and these children have been consistently found to have a lower mental and physical health status, which may affect their quality of life. Therefore, the aim of this study was to evaluate the quality of life among 6 to 12-year-old children with overweight and obesity in comparison to children with normal weight.

Methods: This case-control study was performed on 147 cases (79 overweight or obese and 68 normal weight children). For evaluating quality of life, the original version of the Pediatric Quality of Life Inventory (PedsQL) was used.

Results: It was revealed that the average physical (32.56 ± 7.07 vs. 30.19 ± 5.68 , $P=0.026$) and emotional (20.31 ± 3.83 vs. 19.01 ± 4.04 , $P=0.049$) performance in the group of normal weight children was significantly higher than in overweight/obese children ($p<0.05$). However, the total score of quality of life did not differ significantly between the two groups ($P=0.287$).

Conclusion: These results indicate that in the studied society, children with a normal weight are more socially accepted and have a higher level of self-confidence than their overweight and obese peers. However, due to the lack of difference between the social performance score of these children and that of children with normal weight, it can be concluded that by proper treatments, we can prevent possible future injuries.

Key Words: Children, Obesity, Overweight, Quality of life.

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1- INTRODUCTION

During the last four decades, the global prevalence of children with overweight and obesity has increased considerably (1); the prevalence of overweight and obesity among children is reported to be 5.9% and 5% worldwide (2), and 8% and 9%, respectively, in Iran (3). According to a 2005 study, there are currently 937 million (23.2%) and 396 million (24.0%) cases of overweight and obesity worldwide, respectively. By 2030, these numbers are projected to rise to 1.35 billion and 573 million, respectively, however less attention has been paid to childhood obesity (4).

Childhood obesity may cause problems, such as blood lipid disorders, high blood pressure, an increased tendency to develop blood clots, chronic inflammation, endothelial dysfunction, and increased blood insulin levels (5, 6). Consequently, a child's health risks increase with their level of obesity (7).

In fact, studies repeatedly show that overweight/obese children experience a lower quality of life (8, 9). On the other side, childhood obesity also causes more musculoskeletal problems as compared to normal weight (10). Furthermore, children with overweight and obesity have psychosocial problems such as body dissatisfaction, social isolation, low self-esteem, anxiety, depression, and eating disorders (10-12).

The negative effects of childhood overweight and obesity on multiple aspects of health makes it critical to measure and evaluate their relevant risk factors for improving quality of life. (13); such understanding is one of the first steps for performing successful prevention proceedings. The present study was, thus, designed to evaluate quality of life among 6 to 12-year-old children with overweight and obesity as compared to those with normal weight.

2- METHODS AND MATERIALS

2-1. Design and Population

This case-control study was conducted on Children referred to the Pediatric Department of Kashan Shahid Beheshti Hospital, the center of Iran, from November 2021 to May 2022, for the routine pediatric check-up. The life quality of 6 to 12-year-old children with overweight and obesity were compared with that of a control group (children with normal weight).

160 children were included based on the clinical and paraclinical findings as well as inclusion and exclusion criteria (85 in overweight/obesity and 75 in normal weight). Eligible cases were enrolled, after obtaining informed consent.

2-1-1. Inclusion and exclusion criteria

Inclusion criteria consisted of 6 to 12-year-old children referred to the Pediatric Department for check-up, signed a consent form to participate in the study (patients and their family) and were in the age group of 6-12 years. Exclusion criteria consisted of cases having genetic and mental illnesses that cause obesity, taking drugs that affect weight, acute or underlying diseases and in total having any physical, medical, psychological, learning, and/or behavioral disorders that could impede their participation, being in the age ranges of less than 6 or greater than 12 years. We also excluded patients who were dissatisfied to continue participation in study and those with incomplete data.

2-2. Data collection

Data collection was based on an assessment protocol for gathering data on sociodemographic, clinical, and quality of life variables. The study flowchart is shown in **Fig. 1**. Trained staff conducted the anthropometric measurements based on standardized methods. All anthropometric measurements were taken twice to obtain the exact value for accurate

analysis. Children' body weight and height were taken without shoes with light clothing by the use of a portable stadiometer (Iran Teb, Tehran) to an accuracy of 0.1 cm while facing forward, standing in erect position, with Frankfurt horizontal head position and bare feet without a hat or a hairstyle that could distort the measurement process (14), and body weight on a calibrated digital scale (Seca 767, Japan) with a precision of 0.1 kg. Body-Mass Index (BMI) was calculated as weight (Kg) divided by the squared height (m^2). BMI status was determined using sex- and age-specific cut-offs for normal weight (≥ 10 th percentile to ≤ 85 th percentile), overweight (> 85 th percentile) and obesity (> 95 th percentile) based on Nelson Textbook of Pediatrics (15).

For evaluating daily food consumption (nutrition pattern) according to the reports of the parents, a 24-hour dietary recall (24HR) was used which is a structured interview intended to capture detailed information about all dietary supplements and foods consumed by the respondent during the last 24 hours. A key feature of the 24HR is that, when appropriate, the respondent is asked for more detailed information than first reported.

2-3. The Pediatric Quality of Life Inventory (PedsQL)

The original version of the PedsQL quality of life questionnaire is a 23-item instrument that measures children's quality of life in 4 subscales: physical functioning (8 items), emotional functioning (5 items), social functioning (5 items) and school functioning (5 items). (16) The validation of this questionnaire in Iran has been done by Mohammadian et al. (17) who obtained a content validity index (CVI) of 0.84 and a reliability index (Cronbach's alpha coefficient) of 0.82, which indicate the appropriate psychometrics of this instrument.

Respondents indicate the frequency of adoption of each of the 23 quality of life items based on a five-point Likert scale (never, rarely, sometimes, often, and always). The total PedsQL score is obtained by averaging the total responses to 23 items. In addition, the individual's score varies based on each sub-test, which was added together and estimated independently. Obtaining higher scores indicates that children have a better quality of life (17).

2-4. Data analysis

The data was statistically analyzed using SPSS version 22 software (SPSS Inc., Chicago, IL, USA). To compare qualitative characteristics between groups, Chi-square test was performed. Kolmogorov-Smirnov test was applied to assess the normal distribution of all quantitative parameters evaluated. For variables with normal distribution, Student t-test, and for variables with non-normal distribution, Mann-Whitney U-test was used. A p-value of less than 0.05 was judged significant.

3- RESULTS

In this study, 79 overweight or obese children and 68 normal weight children were included. There was no significant difference in terms of gender and age between the two groups of children ($p > 0.05$). The results showed that the average physical (32.56 ± 7.07 vs. 30.19 ± 5.68 , $P = 0.026$) and emotional (20.31 ± 3.83 vs. 19.01 ± 4.04 , $P = 0.049$) performances in the group of normal weight children was significantly higher than those of the overweight/obese children ($p < 0.05$). However, the total score of life quality did not differ significantly between the two groups ($P = 0.287$) (**Table 1**).

Furthermore, the results showed that the average daily consumption of high-fat yogurt (0.89 ± 0.76 vs. 0.56 ± 0.72 , $P = 0.009$) and liquid oil (2.58 ± 1.46 vs. 1.8

± 1.11 , $P < 0.001$) in the group of overweight/obese children was significantly higher than that of children with normal weight. Also, the average daily consumption of low-fat yogurt (0.8 ± 0.98 vs. 0.46 ± 0.69 , $P = 0.018$) and

vegetables (1.11 ± 1.1 vs. 0.49 ± 0.56 , $P < 0.001$) in the group of children with normal weight was significantly higher than that of overweight/obese children (**Table 2**).

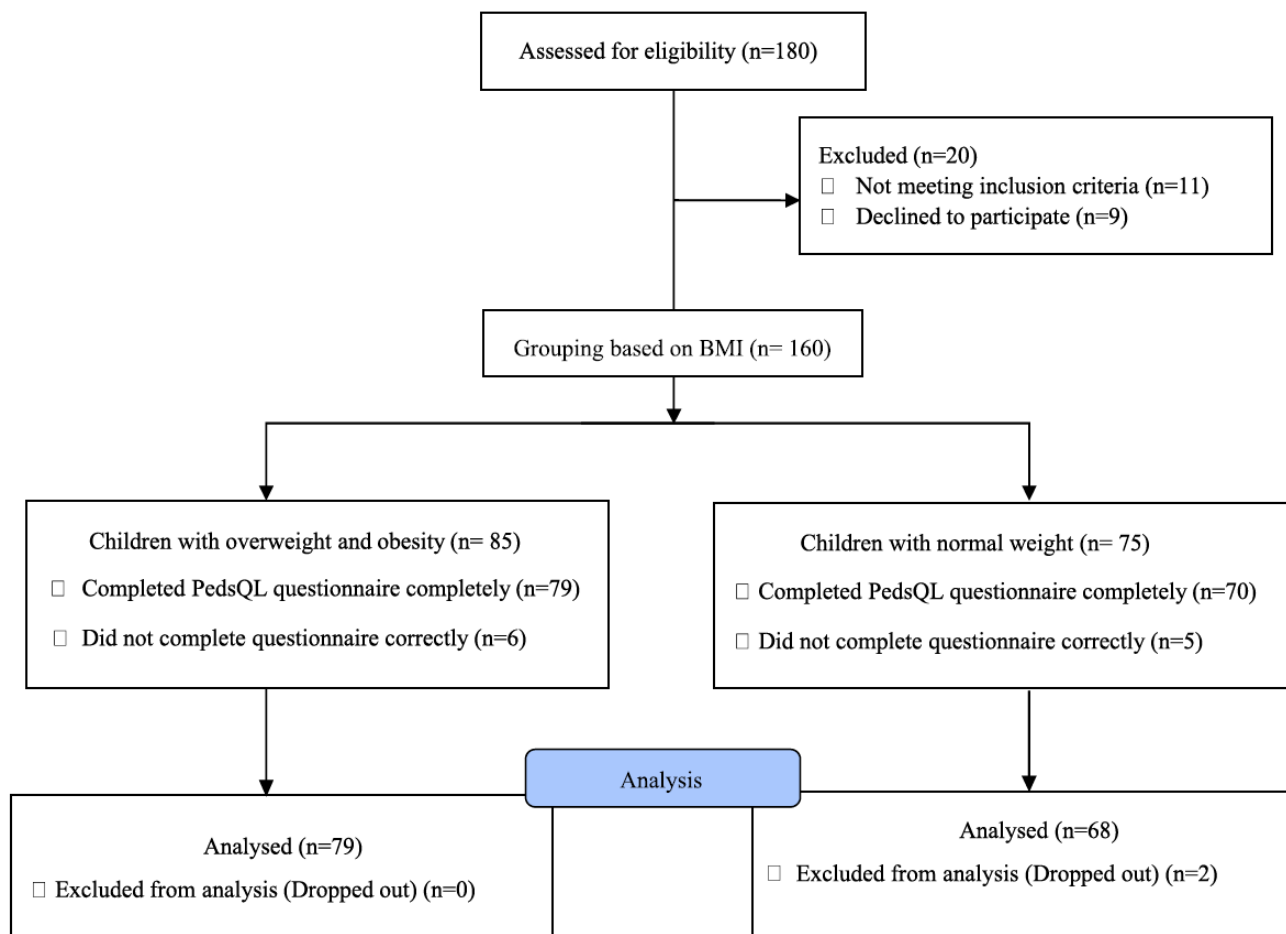


Fig. 1: Study flowchart

Table-1: Sample Characteristics and quality of life in overweight/obese and normal weight children

Variables		Overweight/obese	Normal weight	P-value
Gender (male)		30 (38)	29 (49.6)	0.684
Age (year)		8.95 ± 1.94	9.22 ± 1.82	0.386
PedsQL	Physical	30.19 ± 5.68	32.56 ± 7.07	0.026
	Emotional	19.01 ± 4.04	20.31 ± 3.83	0.049
	Social	22.09 ± 3.6	20.72 ± 5.09	0.067
	Academic	20.8 ± 2.94	21.25 ± 4.54	0.483
	Quality of life (total score)	92.09 ± 12.83	94.84 ± 17.56	0.287

Table-2: Comparing daily food consumption (nutrition pattern) between overweight/obese and normal weight children

Variables	Overweight/obese	Normal weight	P-value
low-fat milk	0.54 ± 0.81	0.65 ± 0.63	0.397
full fat milk	1.02 ± 1.2	0.76 ± 0.93	0.148
low-fat cheese	0.74 ± 1.27	1.06 ± 1.02	0.101
high-fat cheese	1.11 ± 1.66	0.78 ± 1.06	0.15
Low-fat yogurt	0.46 ± 0.69	0.8 ± 0.98	0.018
Full fat yogurt	0.89 ± 0.76	0.56 ± 0.72	0.009
White meat	2.75 ± 2.67	3.04 ± 1.5	0.402
Red Meat	2.25 ± 1.99	2.26 ± 1.35	0.956
Fruit	3.4 ± 1.68	3.47 ± 1.35	0.774
Vegetable	0.49 ± 0.56	1.11 ± 1.8	<0.001
bread and cereals	3.71 ± 2.11	3.51 ± 1.4	0.507
Liquid oil	2.58 ± 1.46	1.8 ± 1.11	<0.001
Solid oil	0.83 ± 1.05	0.97 ± 1.05	0.439
Sweets	3.12 ± 1.71	2.66 ± 1.35	0.386

4- DISCUSSION

Recently, in most countries, including Iran, with the transition from the traditional lifestyle to the modern lifestyle, lifestyle-related diseases such as cancer, diabetes, high blood pressure, overweight, and obesity are increasing (18). Since most of the eating habits are formed and stabilized in the lifestyle of childhood and adolescence, nutrition awareness and eating habits are very important in their obesity (19). The prevalence of obesity in the world is increasing rapidly (20). In various studies, it has been reported that obesity in children has many negative effects on physical and mental health (21). In addition, behavioral factors, including quality of life and lack of physical activity, can generally affect children's diet and physical activity (22).

One of the most important issues raised in relation to obesity is its relationship with lifestyle, which is closely related to quality of life (23). Previous studies have shown that overweight/obese children's quality of life is significantly different from that of normal weight children (24).

In the present study, we found that the average quality of life was not significantly different between the two groups (obese/overweight and normal weight). This finding is consistent with the results obtained in a study conducted in the state of Ohio, USA, conducted on children aged 8 to 11 with overweight compared to children in the normal weight (25). In contrast, Beharizadeh et al. (26) showed that all aspects of the quality of life in children suffering from overweight and obesity were significantly lower in comparison to control children. Similar results have been obtained in case of obese children aged 5 to 16 compared to the non-obese control group (27, 28). Also, in a study by Khairy et al. (29), it has been stated that the BMI score, waist circumference and weight of children were correlated with the quality of life index. The difference between the results of these studies can be attributed to the difference in sample size, culture, and economic states of the people.

In this study, we found that the average physical and mental performances in the group of normal weight children were significantly higher (better) than those of

the overweight/obese children. Similar to this finding, Beharizadeh et al. (26) reported that the score of physical performance in overweight and obese children was significantly lower compared to the control group. Other studies have also reported similar results (30-36). For instance in a similar study, Alinejad et al. (37) reported that overweight and obese children compared with their peers who had normal BMI showed poorer performance in most factors of physical fitness and health-related fitness.

The reason for the relationship between obesity and physical activity can be the fact that as a child's weight increases, his ability for physical activity decreases, and it leads to a decrease in energy demand and activity of skeletal muscles, as well as a decrease in fat oxidation in body tissues. As a result, it is accompanied by weight gain and causes an increase in obesity in these children (27). Despite some studies like the one by Fiveash, no difference was observed in the physical performance of different weight groups; such differences in findings might be related to differences in samples. For example this study was conducted on African and American children who were stronger than whites in terms of physical strength (38). However, in a study conducted in Tehran, overweight children compared with children with normal weight had a significantly higher physical performance score (39).

Similar to the present study, Beharizadeh et al. (26) reported that the psychological performance score in overweight and obese children was significantly lower compared to the non-obese control group. A similar result was also reported in a study conducted in London on obese children and adolescents aged 5 to 16 years compared to a non-obese control group (28). However, in a study conducted in Tehran, overweight children had a lower psychological performance score

compared to children with normal weight, but this difference was not statistically significant (39). The lower psychological scores of overweight and obese children may be related to a lower level of self-confidence among them (40).

Our results also demonstrated that the social performance in overweight and obese children was not significantly different from that of the normal weight children. Incongruent with this finding, Beharizadeh et al. (26), reported that the social performance score in overweight and obese children was statistically lower than that of the non-obese control group. Some other studies have also reported that the score of social functioning in obese children was lower than that of the non-obese children (31, 32), although the difference was not statistically significant in one study (30). However, the study performed in Tehran, similar to ours, stated the score of social functioning was the same in children with overweight and children with normal weight (39).

Furthermore in our study, the academic performance of children with normal weight was found to be significantly better than that of overweight or obese children. In the same line, Anisan et al. (21) and Beharizadeh et al. (26) in 2010 showed that the academic performance of overweight or obese children was significantly weaker than that of normal weight children.

Moreover, we found that the average daily consumption of high-fat yogurt and liquid oil in the group of overweight/obese children was significantly higher than that of children with normal weight. Also, the average daily consumption of low-fat yogurt and vegetables in the group of children with normal weight was significantly higher in comparison to overweight/obese children. Investigating the consumption of different food groups, Fadakar (41) reported that lack of fruits consumption, vegetables, and breakfast

along with consumption of chocolate, fast food and beans had a statistically significant relationship with obesity. The results of another study conducted by Karimi et al. (42) indicated that only 17.4% of the cases with overweight and obesity always consumed vegetables and 34.1% consumed fruits. Moreover, Tormo et al. (43) in Spain and Khan et al. (44) in Bangladesh showed that the frequency of fruit, vegetable, fish, dairy and egg consumption among overweight/obese children was lower as compared to normal weight children.

4-1. Limitations of the study

This study had some limitations, first we did not evaluate different confounding variables such as parent's economic status, level of education, income per month, marital status, etc., which may have effects on the results of study; and the groups of children were not matched together based on these confounding variables. Moreover, due to low sample size in the obese children and the imbalance of the groups in sample size, overweight and obese children were not studied separately, which led to a weak p-value, especially in the obese group.

5- CONCLUSION

The results of this study revealed that, in comparison to normal weight children, overweight and obese children scored lower in physical, academic, and mental performance; however, the total score of life quality was not significantly different between the two groups. These results may suggest that in the studied society, children with a normal weight are more socially accepted and may have a higher level of self-confidence than their overweight and obese peers. However, due to the lack of difference between the social performance score of these children and that of the normal weight children, it can be concluded that by proper treatments, we can prevent possible future injuries.

6- ETHICAL CONSIDERATIONS

The study received approval from the Ethics Committee of the Kashan University of Medical Sciences (IR.KAUMS.NUHEPM.REC.1399.076), and all participants gave written informed consent.

7- ACKNOWLEDGMENTS

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