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Dietary Pattern and Quality of Life among Obese Children

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Abstract: This observation aimed to study the dietary pattern and quality of life of obese children. 90 children with of both sexes aged from 6-12 years old, recruited from National Nutrition Institute outpatient clinics. The study was conducted on two groups a) case group: included 48 children with simple obesity. b) Control group: included 42 normal weight children. Children with pathological cause obesity (endocrinal, congenital syndromes, chromosomal defects) were excluded. A Socio-demographic characteristic of the studied cases and control groups, PedsQL 4.0 version questionnaire and anthropometric measures was taken. Results of the mean ages in normal and obese groups were $(8.1 \pm 1.6$ and $9.7 \pm 2.0)$ years. The obese group had more consumption of sweets, chips, and cola and fast foods compared to the normal group. Normal weight children consumed an acceptable ranges carbohydrate (45.2%) whereas; the obese children had overconsumption (43.7%). The consumption of calcium and vitamin A were at the unsafe level for the two groups (33.3, 61.1%) and 29.2% of obesity groups were at an unacceptable level. The normal group was at an unsafe level in vitamin C (42.8%) and vitamin B1 (38.1%) compared to (43.8%) of obese children were at overconsumption level in vitamin C. According to The quality of life: there were significant differences between the normal weight and obese children in all categories of the quality of life questionnaire. Forty four percent of the obese group were in between the bad and fair quality of life, whereas 48.0% and 46.0% of the normal group were a good and very good quality of life.

Keywords: obese, children, dietary intake, minerals, vitamins, food frequency, BMI.

Introduction

The prevalence of child obesity is increasing in the modern world, and is considered a public health problem in both developed and developing countries (WHO, 2012). Obesity is the result of caloric imbalance and is affected by various genetic, behavioral, and environmental factors. The increased incidence of obese children may be related to some factors, such as early weaning, eating disorders and impaired family relations, life style, and to the new and inadequate eating habits of modern life, which makes available a range of low cost, tasty products, with high energy content and low nutritional levels, served in huge portions, along with decreased practice of physical exercise fostered by technological advances, such as television, computers, video games, among others (CDC, 2013). For children obesity is defined as a BMI at or above the 95th percentile of the same age and sex (CDC, 2011). Obesity may lead to severe consequences in the growth of children, as well as in respiratory, cardiovascular, metabolic, orthopedic and dermatological functions. It also affects in psychosocial aspects: behavior disorders, depression, anguish, low self-esteem and feeling of guilty (Freedman et al., 2001). Almost, obese children carry their obesity into adulthood, thus there is increasing risk of developing serious complications and often life-threatening conditions (Bessesen, 2008).

Measures of healthy related quality of life (HRQOL) assess important aspects of health that are not detected by traditional physiological and clinical measurements. These aspects include the effect of a health condition on the child's daily activities, physical symptoms, social interactions, and emotional well-being (Matza et al., 2004). Therefore, the present study aimed to investigate the dietary pattern and quality of life of obese children.

Subjects and Methods:

Subjects

A case control study was carried out on total 90 children of both sex aging from six to twelve years old in National Nutrition Institute outpatient clinics. Forty-eight obese children and about 42 normal weight children were sampling. Children with pathological cause obesity (endocrinal, congenital syndromes, chromosomal defects were excluded). This study was reviewed and approved by the Confidentiality of obtained from information was kept and two consents were obtained

from participants. -The first one was verbal consent taken during recruiting process after brief explanation occurred about the study. The second one was written consent before fulfilling the questionnaire and doing the investigations.

Tools of the study

The data was collected through interviewing all participants included in the present study by different tools: questionnaire. An interview questionnaire was included two types as follow: a) PedsQL 4.0 version questionnaire, measurement model for the pediatric quality of life inventory of (Varni et al., 2005). The Pediatric Quality of Life Inventory (PedsQL) version 4.0 is a modular instrument designed to measure health related quality of life (HRQOL) in children aged from two to twelve years (Varni et al., 2005). The 23-item PedsQL 4.0 Generic Core Scales (Varni et al., 2005) encompasses physical functioning (8 items), emotional Functioning (5items), social Functioning (5 items) and school functioning (5 items). b) Dietary pattern: (form of 24 hours food recall, form of Food Frequency Questionnaire).

Data Analyses

A statistical data analysis was done at the Department of Biostatistics of the National Nutrition Institute. Data was presented as frequencies and percentages. Results were visualize the picture and came up with a strategy for improvement.

Results and Discussion:

Distribution of some food items in normal weight and obese children

Data in Figures (1 and 2) showed the distribution of some food items according to normal weight and obese children. The obese group had more consumption of these foods compared to the normal group. However, the normal weight children consumed more fruits and vegetables compared to obese children with significant difference in vegetables (28.0% of normal and 10.0% of obese) $p=0.022$. In similar study, obesity prevalence was found to be significantly higher in children who never consume green vegetables or fruits, daily consume soft drinks, bakery products, chocolate, fried foods. In addition, 26.6% of children were found to be sedentary, and physical activity level was significantly correlated with obesity prevalence (Saikia et al., 2016). Also, the present data were consisted with Garipagaoglu et al., (2008) who confirmed that the obese children consumed less from vegetable-

fruit and dairy group as compared to the non-obese children. In addition, obese children consumed more snack foods, such as cake, pastry, cookies, ice cream, fast food and soft drinks, than the non-obese children did.

Distribution of food frequency in normal weight and obese children

The distribution of food frequency according to normal weight and obese children was tabulated in **Table (1)**. Data indicated that there were no significant between the two groups in sweets, milk, meats, and vegetables. The data indicated that obese children consumed more beverages (88%), sweet (80%), condiments (72%) and fast food (72%) than normal weight children at ≥ 3 times per week. Children with normal weight eat vegetables, fruits more frequently than overweight children (**Vanhala et al., 2010**). The consumption of vegetables, cooked meals and eating dinner are negatively associated with overweight in children (**Yannakouli et al., 2010**). Moreover, overweight and obese children reported to eat healthier and to consume sweetened beverages less frequently, but skipped breakfast more often than non-obese children/adolescents.

Comparison between normal weight and obesity groups regarding daily macronutrients intake

Data in **Table (2)** illustrated the comparison between normal weight and obese children groups regarding daily macronutrients intake. It was noticed that there were significant differences between the two groups in calories, Carbohydrates, and fat ($p \leq 0.001, 0.001, \text{ and } 0.05$) respectively. Data revealed that the normal weight children percentages of consumption for calories, Carbohydrate were in the acceptable ranges, the values were 52.3%, and 45.2% compared to 56.3%, and 43.7% respectively be over consumption in the obese children. These data disagree with **Al-Kutbe et al., (2017)** who revealed that there was a significant difference in the mean daily energy intake between the obese group having the highest energy, fat, carbohydrate and protein intake. Regarding fat consumption, it was noticed that normal group 35.7% were at unacceptable ranges compared to of obese group 41.7% were at acceptable and over consumption levels. In coming with this context, **Aeberli et al., (2007)** found that neither energy from fat nor from carbohydrates was correlated with the degree of adiposity. They also reported that, the only significant differences were in intakes of meat and protein ($P < 0.05$) between normal-weight and obese children and in

percentages of energy as protein ($P < 0.05$) between normal-weight and overweight and between normal weight and obese children; intakes increased with increasing adiposity.

Comparison between normal weight and obese children regarding daily some minerals intake

Data in **Table (3)** illustrate the comparison between normal weight and obese children regarding daily some minerals as calcium, magnesium, and zinc and iron intakes. There were significant differences between the two groups in calcium and iron ($p \leq 0.05$ and 0.01). Data revealed that the consumption of calcium was at unsafe level for the two groups with 42.8% of normal weight and 25% of obese children. Also, 29.2% of obese children were at unacceptable level compared to 23.8% of normal children. In addition, it was noticed that the consumption of normal weight children for magnesium was in the range (45.2%) compared to overconsumption (41.7%) of obese children. that there was a higher intake of calcium, iron, and zinc among the obese group compared with the normal group with a significant difference (**El-Gazzar et al., 2019**) and **Bloss et al.(2004)** who reported that the majority of boys and girls got less than 50% of their RDA from calcium without significant differences among the three levels of weight status.

Comparison between normal weight and obese children regarding daily some vitamins intake

Table 4: There was significant differences between the two groups in vitamin B1 ($p \leq 0.05$). Regarding the vitamins intake, the vitamin A consumption was at unsafe level for the two groups (66.7% for normal and 56.2% for obesity).The normal group were at unsafe level in vitamin C and vitamin B₁(42.8 and 38.1% respectively) compared to (43.8and 22.9%)of obese children were at over consumption level. Such results were disagree with a cross-sectional descriptive study involving 842 children in Cairo governorate aged 6–12 years old, Regarding fat-soluble vitamins, there was a higher intake of vitamins A and E among obese the group compared with the normal group, with no significant differences. Regarding water-soluble vitamins, there was a higher intake of vitamins C and B among the normal group compared with the obese group ,with no significant differences among them however, our results in consistence with **El-Gazzar et al., and (2019)**. Regarding vitamin B2, 41.7% from obese children were in the acceptable consumption level.

Distribution of the quality of life in normal weight and obese children

Data in Table (5) showed the distribution of the quality of life according to normal weight and obese children. It could be noticed that there were significant differences between the normal weight and obese children in all categories of the quality of life questionnaire ($p \leq 0.0001$ and 0.001). Regarding to physical score as shown in table (4) 44.0% of obese group were in between bad and fair quality of life, whereas 48.0% and 46.0% of normal group were good and very good quality of life. Coming to the emotional score 24.0 and 54.0% of obese group were in between bad and fair quality of life, while 48.0 and 42.0% of normal group were good and very good quality of life. In social score 32.0% and 32.0% of obese group were recorded in between bad and good, while 76% of normal group were very good quality of life. Concerning to school score 34.0 % of obese group were fair but 28.0 % were very good while in the in normal group the most were between good and very good in school level. In total quality of life score 66.0% of normal group were very good and 52.0% of obese group were fair quality of life. These results were in agreement with a large number of studies worldwide, have used the PedsQL to assess QOL of obese children (**Varni et al., 2001**) and consistently indicated that generally, obese children had lower QOL scores in terms of physical, emotional, social and school functioning than their normal weight peers (**Khairy et al., 2016**). Also, **Nguyen et al., (2018)** measured the QOL using the PedsQL 4.0 generic score scales, they confirmed that both parents and children reported statistically significantly lower PedsQL scores for obese children as compared to that for normal weight children. Child self-reported PedsQL scores in terms of physical, emotional, social and school functioning suggest that obesity can have negative effects on children's daily life. Obese children had significantly lower scores for the total scales compared to normal weight children (80.7 versus 84.0; $p \leq 0.05$ for proxy reports and 77.6 vs 84.6; $p \leq 0.001$ for self-reports). Total scale and subscale scores reported by parents were lower compared to those reported by children. Besides, 79% of normal weight children reported having PedsQL total scores in the highest quartile ($\geq 75\%$), compared to 56.8 % of obese children ($p \geq 0.01$). Their findings were consistent with previous research conducted in the UK, Egypt and Malaysia in which obese children reported lower QOL scores in all subscales of the

PedsQL compared to normal weight ones (Riazi et al., 2010; Hamaid et al., 2011 and Eman et al., 2014).

In conclusion, obese children had high intake of fat, sweet and fast food, and over consumption of calories, carbohydrate and fat, which is likely to increase their risk of obesity and cardiovascular diseases in later life. Therefore, nutrition education programs in schools should emphasize the importance of healthy balanced diets and the risks of consuming empty calories. Parents too should be provided information on nutrients essential for the growth and health maintenance of children as well as dietary prevention of diseases. Moreover, food industries have a potential to change the eating habits of our children. They should provide healthier food choices and introduce attractive ways to market these new choices to appeal to the children. It is well known that the foundation for good health in adulthood is laid during childhood and adolescent years. The dietary patterns and quality of life derived from the current study could provide practical information for health authorities designing nutritional interventions and overweight/obesity preventive strategies targeting children.

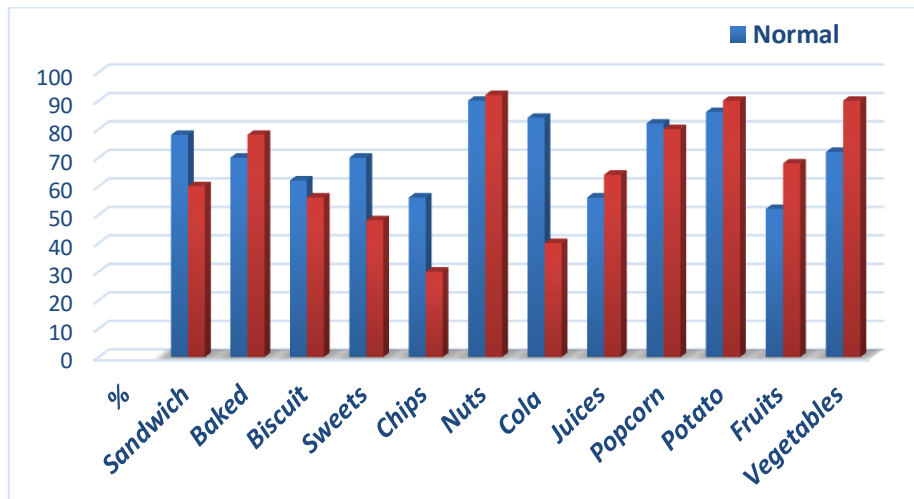


Figure (1) percentage distribution of some food items did not eaten by normal weight and obesity groups.

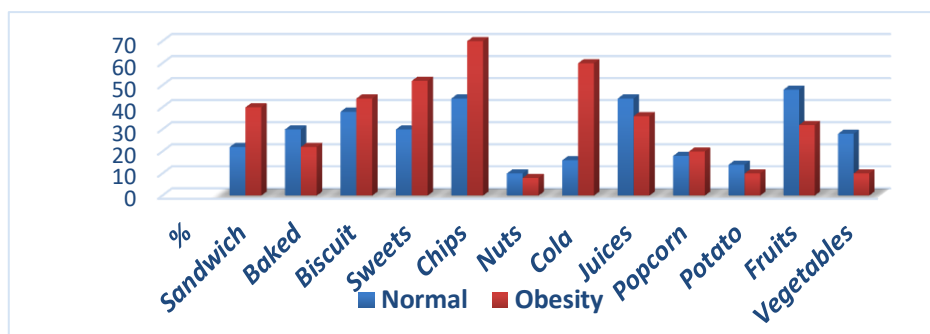


Figure (2) percentage distribution of some food items eaten by normal weight and obesity groups.

Table (1): Percentage distribution of food frequency according to normal weight and obese children.

	Normal weight children		Obese children		Total		χ^2	P
	No	%	No	%	No	%		
Starch								
≥ 3 times per week	42	100.0	48	100.0	90	100.0	-	-
Legumes								
< 3 times per week	5	11.9	10	20.8	15	16.7	1.286	0.25
≥ 3 times per week	37	88.1	38	79.2	75	83.3		
Vegetables								
< 3 times per week	2	4.8	1	2.1	3	3.3	0.499	0.480
≥ 3 times per week	40	95.2	47	97.9	87	96.7		
Fruits								
≥ 3 times per week	42	100.0	48	100.0	90	100.0	-	-
Meats								
< 3 times per week	2	4.8	0	0.0	2	2.2	2.338	0.126
≥ 3 times per week	40	95.2	48	100.0	88	97.8		
Milk								
< 3 times per week	2	4.8	1	2.1	3	3.3	0.499	0.480
≥ 3 times per week	40	95.2	47	97.9	87	96.7		
Fat								
< 3 times per week	3	7.1	1	2.1	4	4.4	1.350	0.245
≥ 3 times per week	39	92.9	47	97.9	86	95.6		
Beverages								
< 3 times per week	10	23.8	4	8.3	14	15.6	4.084	0.043
≥ 3 times per week	32	76.2	44	91.7	76	84.4		
Sweets								
< 3 times per week	12	28.6	8	16.7	20	22.2	1.837	0.175
≥ 3 times per week	30	71.4	40	83.3	70	77.8		
Condiments								
< 3 times per week	31	73.8	12	25.0	43	47.8	21.388	0.000
≥ 3 times per week	11	26.2	36	75.0	47	52.2		
Fast foods								
< 3 times per week	20	47.6	11	22.9	31	34.4	6.053	0.014
≥ 3 times per week	22	52.4	37	77.1	59	65.6		

Table (2): Comparison between normal weight and obese children regarding daily macronutrients intake

	Normal weight children		Obese children		Total		χ^2	P
	N	%	N	%	N	%		
Calories								
Unacceptable	13	31.0	5	10.4	18	20.0	15.938	0.000
Acceptable	22	52.3	16	33.3	38	42.2		
Over consumption	7	16.7	27	56.3	34	37.8		
Protein								
Acceptable	7	16.7	5	10.4	12	13.3	0.757	0.384
Over consumption	35	83.3	43	89.6	78	86.7		
Carbohydrate								
Unsafe	2	4.8	0	0.0	2	2.2	13.493	0.004
Unacceptable	16	38.1	9	18.8	25	27.8		
Acceptable	19	45.2	18	37.5	37	41.1		
Over consumption	5	11.9	21	43.7	26	28.9		
Fat								
Unsafe	3	7.2	2	4.2	5	5.6	8.085	0.044
Unacceptable	15	35.7	6	12.4	21	23.3		
Acceptable	14	33.3	20	41.7	34	37.8		
Over consumption	10	23.8	20	41.7	30	33.3		

< 50% unsafe level of consumption, ≥ 50-75% Unacceptable, ≥ 75-120% acceptable level of consumption, ≥ 120 over consumption

Table (3): Comparison between normal weight and obese children regarding daily minerals intake

	Normal weight children		Obese children		Total		χ^2	P
	N	%	N	%	N	%		
Calcium								
Unsafe	18	42.8	12	25.0	30	33.3	7.775	0.051
Unacceptable	10	23.8	14	29.2	24	26.7		
Acceptable	12	28.6	11	22.9	23	25.6		
Over consumption	2	4.8	11	22.9	13	14.4		
Magnesium								
Unsafe	8	19.0	7	14.6	15	16.7	8.529	0.036
Unacceptable	7	16.8	11	22.9	18	20.0		
Acceptable	19	45.2	10	20.8	29	32.2		
Over consumption	8	19.0	20	41.7	28	31.1		
Zinc								
Unacceptable	4	9.5	0	0.0	4	4.4	8.326	0.016
Acceptable	15	35.7	10	20.8	25	27.8		
Over consumption	23	54.8	38	79.2	61	67.8		
Iron								
Unsafe	2	4.8	1	2.1	3	3.3	3.783	0.286
Unacceptable	6	14.2	3	6.3	9	10.0		
Acceptable	13	31.0	11	22.9	24	26.7		
Over consumption	21	50.0	33	68.7	54	60.0		

< 50% unsafe level of consumption, ≥ 50-75% Unacceptable, ≥ 75-120% acceptable level of consumption, ≥ 120 over consumption

Table (4): Comparison between normal weight and obese children regarding daily vitamins intake

	Normal weight children		Obese children		Total		χ^2	P
	No	%	No	%	No	%		
Vitamin A								
Unsafe	28	66.7	27	56.2	55	62	2.050	0.562
Unacceptable	4	9.5	9	18.8	13	14		
Acceptable	3	7.1	5	10.4	8	9		
Over consumption	7	16.7	7	14.6	14	15		
Vitamin C								
Unsafe	18	42.8	18	37.5	36	40.0	4.676	0.197
Unacceptable	7	16.7	4	8.3	11	12.2		
Acceptable	7	16.7	5	10.4	12	13.3		
Over consumption	10	23.8	21	43.8	31	34.5		
Vitamin B1								
Unsafe	16	38.1	6	12.5	22	24.4	8.391	0.039
Unacceptable	8	19.0	11	22.9	19	21.1		
Acceptable	13	31.0	20	41.7	33	36.7		
Over consumption	5	11.9	11	22.9	16	17.8		
Vitamin B2								
Unsafe	12	28.6	8	16.7	20	22.2	4.828	0.185
Unacceptable	12	28.6	10	20.8	22	24.4		
Acceptable	9	21.4	20	41.7	29	32.2		
Over consumption	9	21.4	10	20.8	19	21.2		

< 50% unsafe level of consumption, ≥ 50-75% Unacceptable, ≥ 75-120% acceptable level of consumption, ≥ 120 over consumption

Table (5): Percentage distribution of quality of life in children normal weight and obese children.

	Normal weight children		Obese children		Total		χ^2	P
	No	%	No	%	No	%		
Physical score								
< 25%	0	0.0	22	45.8	22	24.4	64.151	0.000
25 – 50%	2	4.8	20	41.7	22	24.4		
50 – 75%	20	47.6	6	12.5	26	28.9		
≥ 75%	20	47.6	0	0.0	20	22.3		
Emotional score								
< 25%	0	0.0	10	20.8	10	11.1	51.792	0.000
25 – 50%	1	2.4	27	56.3	28	31.1		
50 – 75%	20	47.6	7	14.6	27	30.0		
≥ 75%	21	50.0	4	8.3	25	27.8		
Social score								
< 25%	1	2.4	16	33.3	17	18.9	37.655	0.000
25 – 50%	5	11.9	11	22.9	16	17.8		
50 – 75%	6	14.3	16	33.3	22	24.4		
≥ 75%	30	71.4	5	10.5	5	38.9		
School score								
< 25%	0	0.0	8	16.7	8	9.2	13.423	0.004
25 – 50%	7	17.9	17	35.4	24	27.6		
50 – 75%	12	30.8	11	22.9	23	26.4		
≥ 75%	20	51.3	12	25.0	32	36.8		
Total score								
< 25%	1	2.4	11	22.9	12	13.3	47.057	0.000
25 – 50%	3	7.1	24	50.0	27	30.0		
50 – 75%	10	23.8	11	22.9	21	23.3		
≥ 75%	28	66.7	2	4.2	30	33.3		

≤25% bad quality of life, 25 to ≤50% fair, 50 to ≤75% good, (≤75%-100%) very good

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النمط الغذائي وجودة الحياة بين الأطفال البدناء

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الملخص العربي:

أجريت الدراسة الحالية بهدف معرفة النمط الغذائي وجودة حياة للأطفال المصابين بالسمنة. وتمت الدراسة على 90 طفل من كلا الجنسين تتراوح أعمارهم بين 6-12 سنة، من المترددين على العيادات الخارجية للمعهد القومي للتغذية. أجريت الدراسة على مجموعتين (أ) مجموعة الاولى: شملت 48 طفلاً يعانون من السمنة البسيطة. (ب) المجموعة الثانية: ضمنت 42 طفلاً بالوزن الطبيعي. تم استبعاد الأطفال الذين يعانون من الامراض، وتم جمع البيانات من خلال إجراء وعمل الآتي: أ-استبيان تناول الخصائص الاجتماعية لحالات السمنة والاطفال ذوي الاوزان الطبيعية مثل العمر والجنس ورقم التليفون وعنوان السكن. ب-استبيان لقياس جودة الحياة للأطفال. ج-استبيان النمط الغذائي التقييم الإكلينيكي من خلال القياسات الجسمية: (قياس الوزن والطول وحساب مؤشر كتلة الجسم(BMI)). أظهرت النتائج أن غالبية الفئات الطبيعية والسمنة تتراوح أعمارهم بين 6-9 سنوات كان متوسط الأعمار في المجموعتين الطبيعية والسمنة (1.6 ± 8.1 و 2.0 ± 9.7) سنة. كان الأطفال البدناء أطول من الوزن الطبيعي. كان لدى المجموعة البدنية استهلاك أكبر للحلويات والرقائق والكولا مقارنة بالمجموعة العادية. كان هناك اختلاف طفيف بين المجموعتين في الحلويات والحليب واللحوم والخضروات والمشروبات. في حين استهلكت مجموعة السمنة المزيد من التوابل والأطعمة السريعة. كانت نسب استهلاك السعرات الحرارية والكربوهيدرات للوزن الطبيعي للأطفال في النطاقات المقبولة (45.2) بينما كانت مجموعة السمنة المفرطة في الاستهلاك (43.7). كان استهلاك الكالسيوم وفيتامين أ على المستوى غير الآمن للمجموعتين 33.3-61.1 % و 29.2% من مجموعات السمنة على مستوى غير مقبول، وكانت المجموعة الطبيعية على مستوى غير آمن في فيتامين ج 42.8 وفيتامين ب 1(38.1) مقارنة بـ 43.8% من السمنة. كان الأطفال في مستوى الاستهلاك الزائد. بحسب نوعية الحياة: كانت هناك فروق ذات دلالة إحصائية بين الوزن الطبيعي والأطفال البدناء في جميع فئات استبيان جودة الحياة. كانت 44.0% من المجموعة المصابة بالسمنة بين نوعية الحياة السيئة والعادلة، في حين كانت 48.0% و 46.0% من المجموعة الطبيعية ذات نوعية حياة جيدة وجيدة للغاية .

الكلمات المفتاحية: الأطفال البدناء، جودة الحياة، المأخوذ الغذائي، مؤشر كتلة الجسم.

