ORIGINAL ARTICLE

Evaluating of Psychiatric Behavior in Obese Children and Adolescents

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Abstract

Objective

Obesity is a medical condition that may have a harmful effect on health, leading to increased illness and reduced life expectancy. This study aimed to evaluate the relationship of psychiatric disorders in overweight and obese children and adolescents.

Materials & Methods

In this case-control study, 160 children and adolescent were enrolled refered to Clinic of Pediatric Endocrinology, Imam Reza hospital, Mashhad, Iran in 2009-2011. The sampling method of this study was non-probability and biased. Study instruments were SDQ, CDI, STAI, Peds QL. All questionnaires were self-administrating completed by subjects or their parents. Differences between groups were examined using t-test and chi-square tests as appropriate.

Results

There was no significant difference on scores of anxiety between two groups. However, significant difference was on scores of depression, quality of life, and strength and difficulty between two groups. In addition, there was no significant difference in gender effect on anxiety and depression. However, emotional symptoms were more in girl. In contrast, the conduct problems were more in boys. Anxiety and depression were more in adolescents.

Conclusion

Obesity has a negative effect on the anxiety, depression, and self-esteem of children and adolescents. It might be a more important risk factor for depression, anxiety, and other psychiatric disorders. This study also emphasizes the importance of prevention of obesity.

Keywords: Life expectancy; Psychiatric illnesses; Children overweight; Obesity

Introduction

Obesity is a medical condition that may have a harmful effect on health, leading to increased illness and reduced life expectancy. That is rising in the past three decades. Today there are more children and adolescents obese worldwide (1-3). More than 10% of children are obese or have overweight (4). In the US, one-third of children

and adolescents are overweight and 17% of them are obese (5).

Obesity has become one of the most important public health problems in the world. The body mass index (BMI) is the accepted standard measure of overweight and obesity for children two yr of age and older. BMI provides a guideline for weight in relation to height and is equal to the body weight in kg divided by the height in meters squared. A consensus supports the following definitions for children between 2 and 20 yr of age: Overweight: BMI between the 85th and 95th percentile for age and sex.

Obese: BMI> 95th percentile for age and sex (6).

Obesity in children is associated with increased risks for health in both childhood and adulthood. A combination of genetic talent, excessive food intake and lack of physical activity are the main reasons for obesity. Obesity increase health risks during childhood and adulthood (7-9). Neurologic, pulmonary, gastrointestinal, circulatory, and endocrine conditions are related to children obesity and history of childhood increase risk for cardiovascular disease, diabetes, colon cancer, and all-cause mortality in adulthood. In addition, psychiatric illnesses are one of the secondary causes of obesity (4, 10-12). Obesity is one of the leading preventable causes of death (13).

Overweight and obesity have a negative effect on self-esteem, body image, and social competence and there is correlation between obesity and behavioral problems. Therefore, psychiatric disorders are more common among overweight people. In addition, the risk of overweight and obesity is higher in patients with psychiatric disorders (14). Moreover, obesity and overweight are more prevalent in low-income families, single-parent families and families with parents' aggressive behavior.

Obesity is not a mental disorder but it may increase the risk of psychiatric disorders. In addition, the rate of psychiatric disorders such as depression, personality disorder, anxiety disorders such as anxiety attacks (panic attack) and mood disorder such as mania (15). Phobia and personality disorders (paranoid and obsessive-compulsive personality) are more common in people who have modest degrees of overweight than people without it. Moreover, risky health behaviors such as smoking, drinking alcohol, and drug abuse are more in overweight people (16).

We aimed to evaluate the relationship of psychiatry disorders in overweight and obese children and adolescents with the age and gender in comparing with control group and to determine the frequency of depression, anxiety, quality of life, and strengths and difficulties in obese childhood and adolescents aged 5-17 yr in comparison with control group. In addition, the control of psychiatry disorders and increasing of quality of life in obese children and adolescents was applicable goal in this study.

Materials & Methods

In this case-control study, 160 children and adolescent were enrolled refereed to Clinic Of Pediatric Endocrinology, Imam Reza hospital, Mashhad, Iran in 2009-2011. One hundred cases were enrolled in the experimental group and 60 in the control group.

The sampling method was non-probability and biased. The children and adolescents aged 5 to 12 and 12 to 17 yr old, respectively. The exclusion criteria included subjects with acute medical illness such as epilepsy, hematologic and gastrointestinal diseases, patients with any major psychiatric disorders, consumption of any medicine that can cause overweight, and subjects whose IQ scores was less than about 70.

Equipment

SDQ

The strengths and Difficulty Questionnaire (SDQ) is a behavioral screening questionnaire for children and adolescents ages 4 through 16 yr old. All versions of SDQ ask about 25 attributes, some positive and others negative. These 25 items include emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and pro-social behavior. In addition, this questionnaire includes two sections to be completed by children and adolescents and the parents or teachers (17).

CDI

Children's Depression Inventory (CDI) is a brief self-report test that helps to diagnose cognitive, affective and behavioral signs of depression in children and adolescents 7 to 17 yr old. The CDI 2 is a revision of

the Children's Depression Inventory (CDI™). The CDI 2 can be used to assess depressive symptoms in children and adolescents and can be used in both educational and clinical settings (18).

PedsQL

Pediatric Quality of Life Inventory (PedsQL) is a questionnaire consists of 23 items. This questionnaire is designed for use with community, school, and clinical child (19).

STAIC

The State-Trait Anxiety Inventory (STAIC) is a commonly used measure of anxiety. It consists of two 20-item scales that measure state and trait anxiety in children between the ages of 8 and 14. It can be used in clinical diagnosis of anxiety and distinguish it from depressive syndromes (20).

Design

In phase one, the participants' BMI was calculated by weight/height2 (kg/m2) formula. Diagnosis of obesity was based on BMI greater than the 95th percentile. The diagnosis was performed by a pediatric endocrinologist. In addition, the intelligence score (IQ) of all subjects was greater than 70.

Psychiatric disorders were evaluated using clinical questionnaire. The evaluation of strengths and difficulties of children was performed with SDQ questionnaire by gathering data from both the subjects and their parents. Then CDI, STAI, and PedsQL questionnaires were used for evaluation of depression, anxiety, and quality of life, respectively. All questionnaires were self-administrating and completed by subjects and their parents.

All subjects were taken the informed consent and the study was approved by Ethics Committee of the university.

Statistical analysis

We used statistical analysis with SPSS 19.0 (Chicago, IL, USA) to evaluate whether there were any significant differences between obesity and psychiatric disorders. Differences between groups were examined using t-s and K-square as appropriate. P-value less than 0.05 were considered significant in all measurements.

Results

The study sample consisted of 160 children and their parents, of them 100 were allocated in the experimental and 60 in the control groups.

Gender distribution

In general, 52.5% of participated were male. The gender distribution was 53%, 51.17% males and 47%, 48.3% females in experimental and control groups, respectively. The k-square showed no significant differences in population distribution between two groups (P=0.870).

Age

The maximum and minimum age was 17 and 6 yr, respectively. The mean and standard deviation of age for all subjects were 12.58±3.1. In addition, the means and standard deviation of age in experimental and control groups were 12.47 ± 3.24 and 12.75 ± 2.85, respectively. According to Mann-Whitney test, there was no statistically significant difference between control and experimental groups in case of these variables (P=0.661).

A comparison between psychology tests in two groups

Anxiety

Participants' anxiety was assessed using State-Trait anxiety inventory. The results showed 36% and 50% of subjects were in Low Trait-High State, and 15% and 18.3% of subjects were in High Trait-High State, in experimental and control groups, respectively (Table 1). This difference was not significant based on k-square between two groups (P=0.171).

Depression

CDI evaluated participants' depression. About 21% of case group and 8.3% of control group were depressed. According to k-square, there was statistically significant difference between control and experimental groups (P=0.035) (Table 1).

Quality of Life

The quality of life was assessed by Pediatric Quality of Life Inventory (PedsQL). In case of group 1%, 11%, 77%, and 11% were in weak, moderate, good

Table 1. The comparison between anxiety and depression in case and control groups

Groups		Case (n (%))	Control (n (%))	P-value
Status of anxiety	Low T- High S (%)	36(36)	30(50)	0.171
	High T-High S (%)	15(15)	11(18.3)	
Status of depression	Depressed patients (%)	21(21)	8.53	0.035
	Normal person (%)	79(79)	55(91.7)	

and excellent state of quality of life respectively while these rates were 0%, 1.7%, 30% and 68.3% in control group. This was significantly based on k-square test (P-value<0.001).

According to version of Parent Proxy-Report of same test (PedsQL) in control group, 5%, 28.3%, and 66.7% were weak moderate, prepare, and high, respectively. Moreover, none of them was weak. In the same way, in the experimental group 1%, 11%, 74%, and 14% were weak, moderate, prepare, and high, respectively. Besides, the k-square showed a significant difference between two groups.

To compare among two child self-report and Parent Proxy-Report versions showed that achieved results of these tests are reliable. The result of k-square showed no significant difference in quality of life scores between data obtained by children and their parents (P =0.925). Results in Table 2 show the score of quality of life in data gathered from the children and their parents in the experimental group

Table 2. Distribution of quality of life in information reported by children and parents in experimental group

	Quality of life (%)				Total (%)
Group	Weak	Middle	Good	Perfect	
Children and adolescents	1	11	77	11	100
Parents	1	11	74	14	100
Total	1.2	11	75.15	12.5	100

Strengths and Difficulties Questionnaires (SDQ)

According to k-square the results of version of child self-report of SDQ test showed no significant difference in hyperactivity/inattention, conduct problems, and pro-social behavior sub-scores between experimental and control groups.

However, the other results showed a significant difference in emotional symptoms and peer relationship problems between two groups (P <0.05) (Table 3).

In addition, the symptoms reported by parents in the experimental group were more prevalent than the control group. The achieved results of Parent Proxy-Report showed significant difference in emotional symptoms, conduct problems, peer relationship problems and total symptoms in two groups (P <0.05). The results of SDQ are shown in Table 4.

We also assessed the distribution of total symptom of SDQ. According to child self-report version, 31%,

Table 3. Distribution of hyperactivity/inattention, prosocial behaviour, emotional symptoms, prosocial behavior, conduct problems and total symptom in two groups (version of child self-report)

Group		Experimental (%)	Control (%)	P-value
Prosocial behaviour	Normal	88	91.7	0.292
	Borderline	8	8.3	
	Abnormal	4	0	
Hyperactivity/inattention	Normal	95	91.7	0.504
	Borderline	5	8.3	
	Abnormal	0.0	0	
Emotional symptoms	Normal	85	95	0.031
	Borderline	6	5	
	Abnormal	9	0	
Conduct problems	Normal	74	85	0.067
	Borderline	11	11.7	
	Abnormal	15	3.3	
Peer relationship problems	Normal	68	88.3	0.015
	Borderline	22	8.3	
	Abnormal	10	3.3	
Total symptom	Normal	94	98.3	0.550
	Borderline	5	1.7	
	Abnormal	1	0	

Table 4. Distribution of hyperactivity/inattention, prosocial behaviour, emotional symptoms, prosocial behavior, conduct problems, total symptom in two groups

Group		Experimental (%)	Control (%)	P-value
Prosocial behaviour	Normal	82	88.3	0.560
	Borderline	15	10.0	
	Abnormal	3	1.7	
Hyperactivity/inattention	Normal	94	83.3	0.056
	Borderline	6	15	
	Abnormal	0.0	1.7	
Emotional symptoms	Normal	65	83.3	0.037
	Borderline	24	13.3	
	Abnormal	11	3.3	
Conduct problems	Normal	58	28	0.067
	Borderline	28	13.3	
	Abnormal	14	6.7	
Peer relationship problems	Normal	66	86.7	0.015
	Borderline	21	13.3	
	Abnormal	13	0	
Total symptom	Normal	88	98.3	0.550
	Borderline	7	1.7	
	Abnormal	5	0	

43%, and 26% of the subjects were normal, borderline, and abnormal, respectively. Also according to Parent Proxy-Report version, 30%, 33%, and 37% of subjects were normal, borderline, and abnormal, respectively. In general, 30.5%, 38%, and 63% of subjects were normal, borderline and abnormal.

The k-square showed no significant difference between achieved results of child self-report and Parent Proxy-Report (P=0.197), respectively.

Gender effect

Anxiety

Thirty-six percent and 15% of cases group and 50% and 18.3% of control group were in low trait-high state and high trait-high state respectively. This difference was not significant based on chi-squared test (P=0.171)

Depression

The k-square test for controlling the effect of variation in gender effect between groups demonstrated below findings. As shown in Table 5, 13.2% of males were depressed in comparison with 29.8% of females, which was significant (P=0.042). Depression in females was more than males in obese children.

Quality of life

In experimental group, distribution of quality of life showed 11.63%, 77.441%, 11.63% of subjects were perfect, good and moderate, respectively. However, no one of them was weak. Moreover, in control group, 10.65%, 76.336%, 10, 65% and 2.11% of subjects were perfect, good, moderate, and weak, respectively. Accordingly, there was no significant difference in

Table 5. Distribution of depression, prosocial behaviour, hyperactivity/inattention, emotional symptoms, conduct problem, prosocial behavior and total symptom in two genders

Group		Male (%)	Female (%)	P-value
Depression	Normal	86.8	70.2	0.042
	Borderline	13.2	29.8	
Prosocial behaviour	Normal	83	93.6	0.390
	Borderline	11.3	4.3	
	Abnormal	5.7	2.1	
Hyperactivity/inattention	Normal	94.3	95.7	1.000
	Borderline	5.7	4.3	
	Abnormal	0.0	0.0	
Emotional symptoms	Normal	96.2	72.3	0.003
	Borderline	0	12.8	
	Abnormal	3.8	14.9	
Conduct problems	Normal	56.6	93.6	0.001>
	Borderline	17.0	4.3	
	Abnormal	26.4	2.1	
Peer relationship problems	Normal	67.9	68.1	0.972
	Borderline	22.6	21.3	
	Abnormal	9.4	10.6	
Total symptom	Normal	28.3	34.0	0.815
	Borderline	45.3	40.4	
	Abnormal	26.4	25.5	

quality of life between two groups (P=0.765).

Comparison of the achieved results of SDQ and gender showed that emotional symptoms were more common in girls. In contrast, the conduct problems were more prevalent in boys (P<0.05) (Table 5).

The study of psychology and age test in two groups

Anxiety

To assess the relationship between the anxiety and age of 27.1% of children were in Low Trait-High State and 12.5% were in High Trait-High State. Moreover, 44.2% of adolescent were in Low Trait-High State and 17.3% were in High Trait-High State. According to k-square, the adolescents were more commonly in Low Trait-High State and High Trait-High State compared with the children and this difference was significant (P =0.049).

Depression

According to k-square, there was a significant difference between depression and age (P =0.045). Therefore, the rate of depression in adolescent was more than children. To assess the relationship between depression and age, 12.6% of children were depressed and 87.4% were normal. Besides, 87.4% of adolescent were depressed and 17.3% were in High Trait-High State.

Quality of life

In assessing of relationship between age and quality of life, the results showed 2.11%, 10.54%, 79.238%, 8.43% of subjects were weak, moderate, good, and perfect, respectively. According to k-square results, there was no significant difference between children and adolescent (P =0.660).

The results of k-square showed no significant difference

in pro-social behavior, hyperactivity/inattention, emotional symptoms, peer relationship problems, and total symptom between two age groups. Nevertheless, there was a significant difference in conduct problems between two groups and was more common in adolescent ($P < 0.05$) (Table 5).

Discussion

Comparing psychology tests in two groups

Anxiety

The result of our study showed obese children and adolescents had more anxiety problems than normal subjects. However, the score of anxiety had no significant difference in obese children and adolescents compared with normal subjects.

The girls had anxiety problems more than the boys did and the adolescents had anxiety more than the children did. These findings demonstrated the role of the gender and age in children and adolescents' anxiety. Adolescents are very sensitive to their changing body shape and frequently monitor their physical appearance and skills. Lack of fitness is an important factor in decrease of adolescent self-esteem. These factors can cause anxiety.

Depression

CDI was used to assess the relationship between depression and obesity. Our findings revealed that depression is common in obese children and adolescents. In addition, they seem to have depression more than the normal subjects do. Obese children and adolescents are less able to do physical activity and it might increase the risk of depression (21).

Quality of life

In our study, obese children and adolescents had lower quality of life compared with normal weight subjects. Furthermore, lower quality of life has a negative effect on social functioning and school performance. Besides, poverty, food insecure and low-income especially make the people vulnerable to obesity.

Low-income families, including children, may confront high levels of stress due to the financial and emotional pressures. In these families, unhealthy eating habits are common.

In general, the score of assessment of SDQ test in the present study revealed that the obese children and adolescents had more problems and less ability than normal subjects in all sub-scores in both Parent Proxy-Report and child self-report version of SDQ (22).

There was no significant difference between achieved results from Parent Proxy-Report and child self-report version. In general, quality of life of obese children and adolescents was less than normal subjects. Perhaps because these children are aware of their weakness, they cannot manage their emotions and are incapable of constructive communication with their peers.

In general, our study showed overweight/obese children and adolescents had more anxiety, depression and poorer social skills compared with normal children. This study showed that low self-esteem in children is often linked to obesity. The results of the current study and similar studies support the fact that psychiatric comorbidity is common among obese children and adolescents (23).

There was correlation between obesity and the presence of mental disorders, social problems, and low- esteem (24). In addition, our findings are similar to other (10, 25-27) studies. Therefore, abovementioned studies confirm the results of our study.

Our result showed that depression in obese children was more than normal children ($P=0.035$). In a study, 30 obese and 30 normal children were reviewed and found that depression in case group was significantly more than control group (28). Depression, behavioral problems, and low self-esteem were more common in obese adolescent in compare with normal adolescent (25).

The relationship of mothers' mental disorder was evaluated with children's competence and feeling of well-being in 59 obese children. The rate of depression and anxiety in mothers of the obese children had a significant relationship with mental and behavioral disorders in their children (29). In this regard, parents of normal children had lower rates of mental and behavioral problems compared with obese children's parents (30).

In our study, the quality of life in control group was better than case group. The relation between bad eating behavior and weight of body was studied and reported that there is correlation between them. Children that live with low education and income level family were obese in comparison to others (31).

In a study, 991 children and adolescents aged 9-16 yr were assessed for height, weight, and mental disorders. That study showed a relationship between psychiatric disorders and obesity. In contrast to our study, there was

reported that the depression in the obese boys was more prevalent than in the obese girls (32).

In addition, in one study, the rate of self-esteem, depression, anxiety and body image was evaluated in obese children. In that article, relationship chronic obesity and mental disorders were showed. In addition, 26% of adolescents had suicidal thoughts and 9% of them committed suicide (33). We saw that prevalence of depression in obese girls is more than obese boys (34).

Related to the findings of this study, obesity might be a more important risk factor for depression, anxiety, and other psychiatric disorders. Therefore, obesity plays a role in the development of mental disorders. In addition, incidence of comorbid psychiatric disorders in obese children might lead to low self-esteem and social difficulties.

This study has linked stress to obesity in children and adolescents. Stress may lead to weight gain through stress-induced hormonal and metabolic changes as well as unhealthful eating behaviors. Chronic stress may lead to anxiety and depression, which are both in relationship with child and adult obesity.

In addition, there was a relationship between overweight and obesity with poverty. The obesity is more in food insecure people and low-income people because they have a greater degree of stress, anxiety, and depression.

Obese children and adolescents are also more likely to suffer from anxiety and depression because it is important because it may lead to reduced participation in school activities and self-esteem.

There are a number of limitations to our study. We had not enough information concerning acute or chronic obesity of the subjects. This problem led to decreased quality of our study. The other limitation was the small sample size. The last limitation was collecting our sample from a single location.

In conclusion, as obesity has a negative effect on the anxiety, depression, and self-esteem of children and adolescents. The rate of psychopathology is high in obese children and adolescents. Therefore, obesity can be regarded as a risk factor for the development of psychopathologies and mental disorders. Therefore, it is necessary to consider psychiatric consultation and follow-up in routine care of these people, not only for the aim of treatment but also to prevent comorbid mental disorders.

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Author`s contribution

Nosrat Ghaemi and Fatemeh Mohareri conceived the original idea.

Samaneh Noroozi Asl designed the experiments and collected the data.

Fatemeh Behdan and Samaneh Noroozi Asl carried out analysis of data.

Fatemeh Mohareri drafted the manuscript and Samaneh Noroozi Asl revised it.

Fatemeh Behdan, Fatemeh Mohareri and Nosrat Ghaemi approved the final version that was submitted.

All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of interest

The authors declare that there is no conflict of interest.

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