Original Article

Are obese adolescents more depressed?

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ABSTRACT

Introduction: Obesity is a growing problem in all countries which leads to various physical, psychological, and social problems. The present study aimed to assess depression in children and adolescents aged 10-18-year old compared with the control group. **Materials and Methods:** In a case-control study, from among the 10- to 18-year-old students of the five education districts of Isfahan, 100 people (50 girls and 50 boys) were selected as obese children with the Body Mass Index (BMI) of greater than 95th percentile for their age and gender and 100 others (50 girls and 50 boys) as the control group with the BMI of 5th to 85th percentile. The case and control groups were matched for age, gender, and socio-economic status. After calculating BMI based on weight (kg)/height^2 (meter), subjects were interviewed based on DSM IV criteria to diagnose clinical depression. The severity of children's depression was measured using standardized questionnaire. **Results:** The mean age of the case group was 12.2 ± 1.86-years old and that of the control group 13.06 ± 2.25. They were, respectively, diagnosed with depression of 7% and 6%. The mean depression score of the case group was 11.7 ± 5.3 and that of the control group was 10.6 ± 6.03 with no statistical significance. **Discussion:** Given our findings, the Jolly fat hypothesis applies to the case group. It seems that health policy-makers need to make intervention plans to change behavior; attitude, skill, and knowledge (BASK) of the public toward obesity and its long-term side-effects.

Key words: Adolescent, depression, obesity

INTRODUCTION

Obesity is a growing problem in all countries and is directly related to such problems as diabetes, cardiovascular diseases, chronic low back pain, etc.[1,2] Although obesity is rising across all ages, races, and educational levels, the rise is more evident among adolescents and young people.[3] Obesity during adolescence is associated with non-physical disorders like psychosocial and social problems.[4,5] Depression is usually complicated by such problems as poor patient-physician cooperation for treatment and high medical costs. As a result, the relationship between depression and obesity is of great significance for doctors, researchers, and health policy-makers.[3] Now the question is: Are obese adolescents at higher risk of depression? Large numbers of studies have been conducted in the West on the relationship between depression and obesity at different ages. Some of the studies have found a direct relationship between the two.[6-8] In a study on the relationship between obesity and its psychological outcomes, Mather *et al.*, found a positive relationship between obesity and depression of the previous year, psychosis, agoraphobia, anxiety, panic attacks, and suicidal thoughts.[8] Others did not find any relationship.[9,10] Another research was conducted

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to assess the relationship of obesity with social factors and psychological problems. The study detected no relationship between obesity and those problems including social relations, psychological disorders, and depression.[9] Some studies have found such a relationship only in women during adolescence while others even show the opposite relationship between depression and obesity in men and women.[11,12]

Conflicting results of relevant studies, the significance of the issue, and lack of information on the status quo in Iran and that depression and obesity increase disability and decrease the quality of life motivated the authors to assess obesity and depression of adolescents aged between 10 and 18 compared to the control group.

MATERIALS AND METHODS

This case-control study was conducted on two groups of 100 people each. The samples were selected by cluster random sampling from among the 10 to 18-year-old students of the five education districts of Isfahan. The study clusters were the five districts and two schools were selected randomly from each cluster. The students were selected from each school based on the random number table. This study was approved by the Ethics Committee of the Isfahan Cardiovascular Research Center.

The inclusion criteria was obesity; that is, the BMI of greater than 95th percentile for their age and gender.[13] Those that had symptoms of genetic syndrome or endocrine disorders or were on medication were excluded from the study. The control group was selected from among children and adolescents with the BMI of 5th-85th percentile matched for age, gender, and socio-economic status. Informed written consent was obtained from the students of both the case and control groups. Then, the weight of the children was measured with a Seca scale and their height with a wall-mounted measuring instrument. The BMI was calculated by dividing the weight (kg) by the square of height (meter). After the BMI was calculated for all the subjects under study, the questionnaires of personal information including age, gender, and socio-economic status were completed. A semi-structural interview based on DSM-IV criteria was performed to diagnose depression.[14] Then, a standardized questionnaire for child depression[15,16] was used to measure the severity of their depression. The reliability of the questionnaire was assessed by several members of the Academic Board of the University and its validity was also measured using Cronbach's-alpha, which was 0.70. The questionnaire involved 27 3-point items in which the respondents would check one of them based on their status over the past 2 weeks. The scores ranged from 0 to 54. Earning a score of 0 to 8 would show that the respondent was healthy; 9 to 19 indicated borderline depression; and 20-plus showed that the subject was suffering from depressive disorder. The data were analyzed using a SPSS11/WIN software through x^2 and t-student statistical tests at a meaningful level of $P < 0.05$.

RESULTS

The present study was conducted on 200 people; they were divided into two groups of 100 in the case (50 boys and 50 girls) with the mean age of 12.2 ± 1.86-years old and 100 in the control group (48 boys and 52 girls) with the mean age of 13.06 ± 2.25. Table 1 shows the status of the control and case groups. The groups were matched for gender. There was no statistically significant difference between the education levels of the parents as an index of their socio-economic status.

The mean depression score of the case group was 11.7 ± 5.3 and that of the control group was 10.6 ± 6.03, but the difference was not statistically significant ($P = 0.2$).

Table 2 shows the frequency of depression according to gender. The percentage of people suffering from depression in the two groups was not meaningful ($P = 0.088$).

DISCUSSION

In the current study, the frequency of depression of the control group with the BMI of 24.1 ± 0.8 and that of the case group with the BMI of 28.2 ± 1.1 did not significantly differ.

Researchers have conducted numerous studies on the relationship between depression and obesity. A large number of the studies verify the present study's findings including Wadden *et al*., which has failed to show a relationship between the two.[17,18]

Researchers divide factors that can make the relationship significant into two groups: Biological factors and psychosocial factors.[18] There is no evidence showing a relationship between neurobiological mechanisms like serotonin and its metabolites or the hypothalamus-hypophysis-adrenal (HPA) axis one the one hand and depression and obesity. However, the effect of biological factors on the relationship is not higher than psychosocial factors.[18] Therefore, treatment, behavior-therapy methods, group psycho-therapy, and analysis of psychosocial problems play their own part in this regard.

Meanwhile, large community-based studies on the relationship between obesity and psychosocial factors contain strong

Table 1: Characteristics of subjects under study (case and control groups)

	Standard deviation ± mean		*P* value
	Control group	Case group	
Age (years)	13.06 ± 2.25	12.2 ± 1.86	0.25
BMI (weight/height^2)	24.1 ± 0.8	28.2 ± 1.1	0.001
Mother's education (year)	10.7 ± 1.1	10.4 ± 1.2	0.4
Father's education (year)	11.8 ± 0.2	11.2 ± 0.7	0.4

BMI = Body mass index

Table 2: Frequency of depression according to gender

	Control group (N)			Case group (*N*)		
	Healthy	Borderline depression	Depressed	Healthy	Borderline depression	Depressed
Girl	13	35	4	20	25	5
Boy	14	32	2	21	27	2
Total	27	67	6	41	52	7

1-Healthy-score of depression test: 0-8, 2-Borderline depression-score of depression test: 9-19, 3-Depressed-score of depression test: 20 plus

hypotheses that need to be discussed in detail.[19] Such factors as age, gender, socio-economic status, and cultural status play a key role in this respect. In the meantime, social attitude to obesity is considered very important as a cultural factor. In a community-based study on the relationship between obesity and depression and harboring suicidal thoughts in order to remove a confounding factor like the socio-economic status, researchers showed that low self-confidence is directly related to dissatisfaction with the body shape and obesity.[20] Nevertheless, in their complementary studies, the researchers said, "In a naïve diagnosis, one cannot consider attitude to obesity as negative".[21]

In Western culture, obesity is viewed as a stigma. The attitude affects one's confidence and depression.[22] However, findings show that a bigger and more muscular body is preferable and more acceptable in other societies.[23]

In our society, it seems that attitude to obesity particularly among children is based strengthening the notion that obesity of a child is a sign of health, happiness, and lack of diseases and parents convey the view to their children and consider thinner kids as ill. The Jolly fat hypothesis was used by Revah-Levy *et al*., in their study as they failed to find a relationship between obesity and depression in their subjects.[24] It appears that the hypothesis applies to our society.

In the present study, the relationship between obesity and depression was not explained separately for the female and male subjects. Meanwhile, the effect of social and nutritional factors as well as stressful life events and their relationship with obesity was not studied and we contended ourselves with assessing the relationship between obesity and depression.

CONCLUSIONS

Given our findings, there is no relationship between obesity and depression. However, Iranian health policy-makers need to make major intervention plans to change the behavior, attitude, skill, and knowledge (BASK) of the public toward obesity and its long-term side-effects. This will help people fight obesity and its dangerous side-effect, atherosclerosis, which begins at birth.

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