

# The Relationship of Psychological Symptoms among Mothers of Children in Different Body Mass Index Categories

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Received 14 March 2016; accepted 16 May 2016; published 20 May 2016

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## Abstract

We tried to emphasize the importance of psychological status analysis of the mothers of children, who have abnormal Body Mass Index (BMI), when treating these children. **Materials and methods:** Our study enrolled mothers of 150 children in normal, high and low BMI categories who were admitted to Kagithane State Hospital. The inclusion criteria required that these children had no chronic disease, developmental defect, and diagnosed psychological or physical disease impairing the reliability of the interview. Symptom Check List (SCL-90-R) and Beck Depression Scale (BDS) were used on all mothers of these children. In this study, BDS values of high BMI children's mothers were significantly higher than those of normal BMI children's mothers and BDS values of mothers of low BMI children were found to be higher than those of mothers of normal BMI children. The SCL-90-R results between mothers of high and normal BMI, high and low BMI, normal and low BMI children were statistically significant. We observed the effect of the psychological state of the family on childhood eating habits and the higher incidence of childhood feeding problems in families with psychopathology. Currently family therapy is indicated according to guidelines in solving eating disorders in children. This approach may also be useful for children with abnormal BMI.

## Keywords

Family, Children, Body Mass Index, Feeding Problems, Depression

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## 1. Introduction

Apart from eating disorders characterized by behavioral and psychopathological symptoms which are seen in

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**How to cite this paper:** Meral, G., Uslu, A. and Bostanci, A. (2016) The Relationship of Psychological Symptoms among Mothers of Children in Different Body Mass Index Categories. *Open Journal of Pediatrics*, 6, 149-157.

<http://dx.doi.org/10.4236/ojped.2016.62022>

childhood and adolescence [1], the great majority of population are classified as underweight, normal weight, overweight or pediatric obese from nutritional point of view. We examined a sample of 150 subjects from different points of view as well as psychological backgrounds of their parents. Our goal is to show the relations between the parameters such as socioeconomic status, depressive symptoms, psychological characteristics and nourishment status which is identified according to BMI. Failure to maintain an adequate diet will be characterized by a change in BMI. A switch in BMI [might signal the onset of a medical problem, personal or family stress for the child] will disturb physical and mental development of children [1]. Feeding problems closely relate to environmental and social factors [2]. Eating patterns gained in early childhood evolve into unfavorable eating habits in late childhood and adulthood predisposing to health problems [3].

Optimal nutrition depends on the development of a positive relationship between parents and children [2]. Family understanding and cooperation are indispensable for successful treatment of children and adolescents with eating disorders [4]. We should bear in mind the importance of parents' eating habits and possible future eating patterns when we are aiming to analyze eating problems of children [2] [5]. The parent-child relation is important with respect to psychological and physical well being of the child [6] [7].

Mothers, whose children suffer eating disorders, experience depression and depressive symptoms in common [8]. Bruch also proved that mothers with denial and lack of affection had inadequate perception to the needs of her children thus diminishing the care given to children. Eating disorders indicate quality of parental interactions, parent-child relation and behavioral patterns [9].

In our study, we investigated the relation of maternal psychopathological symptoms with the alterations of BMI in children with no underlying medical condition. We chose BMI; because BMI and healthy physical fitness levels are in a direct relationship [10]. We randomly selected mothers of children who had kids with low BMI and high BMI from pediatrics clinic to assess their psychosocial status. BDS and SCL-90-R scales were applied to the mothers of children with low-BMI, normal-BMI and high-BMI. We evaluated psychopathological differences of mothers of children through the whole spectrum of BMI with Beck Depression and SCL 90 scales.

## 2. Method and Material

Our study group was formed by selection of 150 volunteer mothers with 50 BMI normal children, 50 BMI high children, and 50 BMI low children who were admitted to Kagithane State Hospital Pediatrics Clinic for various reasons during July 2010-May 2011. The inclusion criteria were that these children would be between 2 and 14 years old, would have no chronic disease and developmental defect. Mothers had no diagnosed psychological or physical disease impairing the reliability of the interview.

BDS, SCL-90-R and the annexed survey form, to analyze social status of the child and family was applied to mothers of the children (Sisli Etfal Teaching and Research Hospital, ethical committee approval #99 and #100).

BMI is calculated with weight/height<sup>2</sup> formula. Obese, overweight and underweight are defined using BMI percentiles; children >2 years old with BMI >95th percentile meet the criterion for obesity, between 85th and 95th percentiles fall in the overweight range and BMI <5th percentile meet criterion for underweight [1].

In children, promotion of growth in different rates is determined and also measured by BMI. BMI changes substantially with age, rising steeply in infancy, falling during the preschool years, and then rising again into adulthood. For this reason, child BMI needs to be assessed using age related reference curves [11] [12]. The survey analyzing the children's and the families' socio-economic characteristics were filled out by researchers in interviews. BDS and SCL-90-R were filled out by mothers. The other scale we used was Information Form-I.

The Information Form-I determining the socio-economic status questioned the mother's age, child's height and weight, mother's education, mothers' occupation, mothers' marital status, families' income, mother's smoking habits, mother's alcohol use, mother's drug abuse and mother's maternal age.

**Beck Depression Scale (BDS):** The scale determines depression risks and level and intensity of depressive symptoms. It is a scale composed of 21 total self-evaluation sentences and it measures four Likert types. Depression point is attained by addition of these points. The high total point indicates the depression intensity. Although in various studies, the cut-off points for scale show differences, cut-off point of 17 can be considered adequate to determine the clinical depression. Its validity and reliability are shown by studies [13].

**Symptom Check List-90 (SCL-90-R):** The symptom Check List which is a self-evaluation test was developed by Derogatis *et al.* (1976). The scale consisting of 90 parts is constructed to evaluate 9 separate dimensions

of symptom. These symptoms are somatization, obsession-compulsion, inter-personality, sensitivity, depression, anxiety, animosity, phobic anxiety, paranoid thoughts and psychotism. Moreover, there is an extra scale as a separate dimension. Every dimension consists of 6 - 13 parts. The consistency of SCL-90-R according to date is collected from a psychiatric sampling change between 0.77 and 0.90 for various sub scales. Test-repeat test reliability is 0.78 - 0.90 for sub scales [14].

### Statistical Analysis

For Statistical Analysis NCSS (Number Cruncher Statistical System) 2007 & PASS (Power Analysis and Sample Size) 2008 Statistical Software (Utah, USA) programs were used. When evaluating study data, descriptive statistical methods (Mean, standard deviation frequency, and ratio) were used along with Student T, Chi-Square test when comparing the qualitative data. The results were evaluated at 95% confidence range and at  $p < 0.05$  significance level.

### 3. Results

The mothers of 50 normal BMI children, 50 high BMI children and 50 low BMI children were admitted to Kagithane State Hospital between 1 July 2010 and 1 May 2011.

Mothers' educational levels; as a corollary monthly income and age distribution were not significantly different among the three groups.

No statistically significant difference was observed between the mother's education, mother's occupation and the rank among siblings. Smoking showed statistically significant differences among groups. The ratio of smoking in obese cases was significantly higher than other groups (Table 1).

A statistically significant difference was found in BDS mean scores between mothers of children with high BMI and normal BMI. The mean BDS scores of mothers of children with high BMI were significantly higher than mothers of children with normal BMI (Table 2).

A statistically significant difference was observed in SCL-90-R scores between mothers of children with high BMI and normal BMI. The mean SCL-90-R scores of mothers of children with high BMI were significantly higher than mothers of children with normal BMI (Table 3).

**Table 1.** Evaluation of characteristics of family.

	High BMI (n = 50)	Normal BMI (n = 50)	Low BMI (n = 50)	<sup>†</sup> p	
	Mean ± SD	Mean ± SD	Mean ± SD		
Income (TL)	1363.14 ± 543.56	1411.63 ± 676.37	1235.70 ± 522.49	<b>0.715</b>	
Maternal Age	22.62 ± 5.21	22.24 ± 3.37	22.02 ± 3.66	<b>0.766</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b><sup>++</sup>p</b>	
Smoking	27 (54.0%)	7 (14.0%)	9 (18.0%)	<b>0.001**</b>	
Illiterate	3 (6.0%)	6 (12.0%)	4 (8.0%)		
Primary school	35 (70.0%)	32 (64.0%)	40 (80.0%)		
Mother's Education	Junior high school	4 (8.0%)	3 (6.0%)	3 (6.0%)	<b>0.454</b>
	Senior high school	7 (14.0%)	8 (16.0%)	1 (2.0%)	
	Community college	1 (2.0%)	1 (2.0%)	2 (4.0%)	
Mother's Occupation	Housewife	45 (90.0%)	46 (92.0%)	48 (96.0%)	
	Employee	3 (6.0%)	3 (6.0%)	2 (4.0%)	<b>0.764</b>
	Official	1 (2.0%)	0	0	
	Self employed	1 (2.0%)	1 (2.0%)	0	
The Rank Among Siblings	1	27 (54.0%)	22 (44.0%)	19 (38.0%)	
	2	12 (24.0%)	21 (42.0%)	18 (36.0%)	<b>0.221</b>
	3 and over	11 (22.0%)	7 (14.0%)	13 (26.0%)	

<sup>†</sup>One way ANOVA test; <sup>++</sup>Chi-Square; \*\*p < 0.01.

**Table 2.** Evaluation of the SCL-90-R and BDS according to groups.

		Groups		<sup>†</sup> <i>p</i>
		High BMI (n = 50)	Normal BMI (n = 50)	
		Mean ± SD	Mean ± SD	
SCL-90-R Score		113.24 ± 53.04	66.68 ± 34.79	<b>0.001**</b>
BDS Score		15.84 ± 9.56	7.68 ± 4.85	<b>0.001**</b>
Symptom	Yes	n (%)	n (%)	
	No	33 (66.0%)	9 (18.0%)	
BDS	No depression	17 (34.0%)	41 (82.0%)	
	Mild depression	14 (28.0%)	40 (78.0%)	
	Moderate depression	9 (18.0%)	6 (12.0%)	
	Severe depression	25 (50.0%)	5 (10.0%)	
		2 (4.0%)	0 (0.0%)	

<sup>†</sup>Student t Test; \*\**p* < 0.01.

**Table 3.** Evaluation of the results of SCL-90-R according to groups.

		Groups		<i>p</i>
		High BMI (n = 50)	Normal BMI (n = 50)	
		N (%)	N (%)	
Somatization	No problem	17 (34.0%)	41 (82.0%)	<b>0.001**</b>
	Moderate problem	9 (18.0%)	5 (10.0%)	
	Psychological problem	24 (48.0%)	4 (8.0%)	
Obsession	No problem	17 (34.0%)	41 (82.0%)	<b>0.001**</b>
	Moderate problem	5 (10.0%)	3 (6.0%)	
	Psychological problem	28 (56.0%)	6 (12.0%)	
Interpersonal Sensitivity	No problem	18 (36.0%)	41 (82.0%)	<b>0.001**</b>
	Moderate problem	11 (22.0%)	5 (10.0%)	
	Psychological problem	21 (42.0%)	4 (8.0%)	
Depression	No problem	17 (34.0%)	41 (82.0%)	<b>0.001**</b>
	Moderate problem	6 (12.0%)	1 (2.0%)	
	Psychological problem	27 (54.0%)	8 (16.0%)	
Anxiety	No problem	35 (70.0%)	49 (98.0%)	<b>0.001**</b>
	Moderate problem	1 (2.0%)	0 (0.0%)	
	Psychological problem	14 (28.0%)	1 (2.0%)	
Anger and Animosity	No problem	35 (70.0%)	47 (94.0%)	<b>0.001**</b>
	Psychological problem	15 (30.0%)	3 (6.0%)	
	no problem	26 (52.0%)	44 (88.0%)	
Phobic Anxiety	moderate problem	17 (34.0%)	5 (10.0%)	<b>0.001**</b>
	psychological problem	7 (14.0%)	1 (2.0%)	
	No problem	19 (38.0%)	42 (84.0%)	
Paranoid Disorder	Moderate problem	15 (30.0%)	6 (12.0%)	<b>0.001**</b>
	Psychological problem	16 (32.0%)	2 (4.0%)	
	No problem	41 (82.0%)	49 (98.0%)	
Psychotism	Psychological problem	9 (18.0%)	1 (2.0%)	<b>0.001**</b>
	No problem	18 (36.0%)	43 (86.0%)	
Additional Scale	Moderate problem	18 (36.0%)	4 (8.0%)	<b>0.001**</b>
	Psychological problem	14 (28.0%)	3 (6.0%)	

Chi-Square test; \*\**p* < 0.0.

No statistically significant difference was found between the BDS mean scores of the mothers of children with low BMI and high BMI in the study (Table 4).

A statistically significant difference was found between the mean scores of SCL-90-R of the mothers of children with low BMI and high BMI (Table 5).

A statistically significant difference was found between the BDS mean scores of mothers of children with low BMI and normal BMI. BDS mean scores for mothers of children with low BMI were found to be higher than that of mothers of children with normal BMI (Table 6).

A statistically significant difference was found between the mean SCL-R-90 scores of mothers of children with low BMI and normal BMI. The mean symptom scores for mothers of children with low BMI were found to be higher than that of mothers of children with normal BMI (Table 7).

#### 4. Discussion

Eating is a sensitive indicator of parent-child relationship and emotional state. The incidence of food refusal is higher in children raised in an unhealthy family environment [15]. Children addicted to eating disorders frequently use eating as a tool to cope with anger, sadness, hurt, loneliness, desertion, fear and sense of pain. If they cannot express their childhood emotions, they change their eating patterns according to their emotional state [16].

The psychopathological evaluation shows that the early period of eating disorder is accepted to be a determining factor in interpersonal communication regarding the mother-child relationship [17].

The overly protective parents or parents in distant relationship with their children or parents preferring emotional distance may somehow affect eating behaviors of their children [18] [19].

Parents of children with eating disorders are found to be less empathetic, less supportive and more problematic than families with normal weight children. Moreover, success expectation of these families from their children is higher than that of children with normal weight [20].

Depression, anxiety, alcoholism and other psychiatric disorders are frequently seen in families with problems and conflicts. Eating disorders are more likely in children exposed to severe distressed life [21]. The untruthful love bond between mother and child is believed to have an effect on eating disorders [22].

In this study, the socio-economic state of low, normal and high BMI children was analyzed and no significant differences were found in these groups. Although a direct correlation was found between low income, low education and eating disorders in some studies, our study showed no significant difference [23] [24].

Researchers revealed the fact that depression and depressive symptoms were frequently seen in mothers of children with eating disorders and that parent depression was important in children's eating disorders etiology [25]. In this study, BDS scores of mothers of low and high BMI children were found to be statistically higher when compared to mothers of normal weight children. This result is in compliance with other studies.

**Table 4.** Evaluation of SCL-90-R and BDS according to groups.

		Groups		†p
		High BMI (n = 50)	Low BMI (n = 50)	
		Mean ± SD	Mean ± SD	
SCL-90-R Score		113.24 ± 53.04	87.14 ± 40.10	<b>0.007**</b>
BDS Score		15.84 ± 9.56	12.60 ± 8.22	<b>0.072</b>
		n (%)	n (%)	
Symptom	Yes	33 (66.0%)	20 (40.0%)	
	No	17 (34.0%)	30 (60.0%)	
BECK Depression	No depression	14 (28.0%)	21 (42.0%)	
	Mild depression	9 (18.0%)	13 (26.0%)	
	Moderate depression	25 (50.0%)	13 (26.0%)	
	Severe depression	2 (4.0%)	3 (6.0%)	

†Student t Test; \*\*p < 0.01.

**Table 5.** Evaluation of SCL-90-R results according to groups.

		Groups		<i>p</i>
		High BMI (n = 50)	Low BMI (n = 50)	
		n (%)	n (%)	
Somatization	No problem	17 (34.0%)	30 (60.0%)	<b>0.020*</b>
	Moderate problem	9 (18.0%)	3 (6.0%)	
	Psychological problem	24 (48.0%)	17 (41.0%)	
Obsession	No problem	17 (34.0%)	30 (60.0%)	<b>0.023*</b>
	Moderate problem	5 (10.0%)	5 (10.0%)	
	Psychological problem	28 (56.0%)	15 (30.0%)	
Interpersonal Sensitivity	No problem	18 (36.0%)	30 (60.0%)	<b>0.009**</b>
	Moderate problem	11 (22.0%)	2 (4.0%)	
	Psychological problem	21 (42.0%)	18 (36.0%)	
Depression	No problem	17 (34.0%)	30 (60.0%)	<b>0.014*</b>
	Moderate problem	6 (12.0%)	1 (2.0%)	
	Psychological problem	27 (54.0%)	19 (38.0%)	
Anxiety	No problem	35 (70.0%)	31 (62.0%)	<b>0.354</b>
	Moderate problem	1 (2.0%)	4 (8.0%)	
	Psychological problem	14 (28.0%)	15 (30.0%)	
Anger and Animosity	No problem	35 (70.0%)	35 (70.0%)	<b>0.050*</b>
	Moderate problem	0 (0.0%)	5 (10.0%)	
	Psychological problem	15 (30.0%)	10 (20.0%)	
Phobic Anxiety	No problem	26 (52.0%)	36 (72.0%)	<b>0.072</b>
	Moderate problem	17 (34.0%)	12 (24.0%)	
	Psychological problem	7 (14.0%)	2 (4.0%)	
Paranoid Disorder	No problem	19 (38.0%)	30 (60.0%)	<b>0.075</b>
	Moderate problem	15 (30.0%)	8 (16.0%)	
	Psychological problem	16 (32.0%)	12 (24.0%)	
Psychotism	No problem	41 (82.0%)	33 (66.0%)	<b>0.002**</b>
	Moderate problem	0 (0.0%)	11 (22.0%)	
	Psychological problem	9 (18.0%)	6 (12.0%)	
Additional Scale	No problem	18 (36.0%)	32 (64.0%)	<b>0.018*</b>
	Moderate problem	18 (36.0%)	9(18.0%)	
	Psychological problem	14 (28.0%)	9(18.0%)	

Chi-Square test; \* $p < 0.05$ ; \*\* $p < 0.01$ .

In this study, no significant difference was observed when we compared the BDS scores of the mothers of low and high BMI children and this showed that mothers both of high and low BMI children (whom we defined as those with feeding problem) had depression and depressive signs which was in compliance with other studies [25]-[27].

In studies conducted, SCL-90-R scores of mothers of children with eating disorders were found to be higher than the scores of mothers of normal weight children and this shows compliance with our study. In this study, when subgroups of SCL-90-R were analyzed, the symptoms of anxiety, depression, anger and animosity were higher compared to normal weight group [28]. In our study, when we compared the test results of mothers of children with high and normal BMI in subgroups of SCL-90-R, a statistically significant difference was observed in the areas of somatization, obsession, interpersonal sensitivity, depression, anxiety, anger, animosity,

**Table 6.** Evaluation of SCL-90-R and BDS according to groups.

		Groups		<sup>†</sup> <i>p</i>
		Normal BMI (n = 50)	Low BMI (n = 50)	
		Mean ± SD	Mean ± SD	
SCL-90-R Score		66.68 ± 37.79	87.14 ± 40.10	<b>0.005**</b>
BDS Score		7.68 ± 4.85	12.60 ± 8.22	<b>0.001**</b>
Symptom	Yes	n (%)	n (%)	
	No	9 (18.0%)	20 (40.0%)	
BECK Depression	Mild depression	41 (82.0%)	30 (60.0%)	
	Moderate depression	39 (78.0%)	21 (42.0%)	
	Severe depression	6 (12.0%)	13 (26.0%)	
	No depression	5 (10.0%)	13 (26.0%)	
	No depression	0 (0.0%)	3 (6.0%)	

<sup>†</sup>Student t Test; \*\**p* < 0.01.

**Table 7.** Evaluation of SCL-90-R results according to groups.

		Groups		<i>p</i>
		Normal BMI (n = 50)	Low BMI (n = 50)	
		n (%)	n (%)	
Somatization	No problem	41 (82.0%)	30 (60.0%)	
	Moderate problem	5 (10.0%)	3 (6.0%)	<b>0.006**</b>
	psychological problem	4 (8.0%)	17 (41.0%)	
Obsession	No problem	41 (84.0%)	30 (60.0%)	
	Moderate problem	3 (6.0%)	5 (10.0%)	<b>0.048*</b>
	psychological problem	6 (12.0%)	15 (30.0%)	
Interpersonal Sensitivity	No problem	41 (82.0%)	30 (60.0%)	
	Moderate problem	5 (10.0%)	2 (4.0%)	<b>0.003**</b>
	psychological problem	4 (8.0%)	18 (36.0%)	
Depression	No problem	41 (82.0%)	30 (60.0%)	
	Moderate problem	1 (2.0%)	1 (2.0%)	<b>0.045*</b>
	psychological problem	8 (16.0%)	19 (38.0%)	
Anxiety	No problem	49 (98.0%)	31 (62.0%)	
	Moderate problem	0 (0.0%)	4 (8.0%)	<b>0.001**</b>
	psychological problem	1 (2.0%)	15 (30.0%)	
Anger and Animosity	No problem	47 (94.0%)	35 (70.0%)	
	Moderate problem	0 (0.0%)	5 (10.0%)	<b>0.005**</b>
	psychological problem	3 (6.0%)	10 (20.0%)	
Phobic Anxiety	No problem	44 (88.0%)	36 (72.0%)	
	Moderate problem	5 (10.0%)	12 (24.0%)	<b>0.134</b>
	psychological problem	1 (2.0%)	2 (4.0%)	
Paranoid Disorder	No problem	42 (84.0%)	30 (60.0%)	
	Moderate problem	6 (12.0%)	8 (16.0%)	<b>0.009**</b>
	psychological problem	2 (4.0%)	12 (24.0%)	
Psychotism	No problem	49 (98.0%)	33 (66.0%)	
	Moderate problem	0 (0.0%)	11 (22.0%)	<b>0.001**</b>
	psychological problem	1 (2.0%)	6 (12.0%)	
Additional Scale	No problem	43 (86.0%)	32 (64.0%)	
	Moderate problem	4 (8.0%)	9(18.0%)	<b>0.038*</b>
	psychological problem	3 (6.0%)	9(18.0%)	

Chi-Square test; \**p* < 0.05; \*\**p* < 0.01.

phobic anxiety, paranoid disorder, psychotism, sleep and eating disorders.

In this study, when the SCL-90-R test's results of mothers of children with low and normal BMI were analyzed, a statistically significant difference was observed in the areas of somatization, obsession, interpersonal sensitivity, depression, anxiety, anger, and animosity, paranoid disorder, psychotism, sleep and eating disorders.

In this study, when the SCL-90-R test's results of mothers of children with high and low BMI were analyzed, a statistically significant difference was observed in the areas of somatization, obsession, interpersonal sensitivity, depression, anxiety, anger, and animosity, paranoid disorder, psychotism, sleep and eating disorders.

Researches analyzing the mother's psychological characteristics and the familial characteristics show that these elements play an important role in the process of the disease whether it is the reason or the result of the eating disorder [25] [29] [30].

In this study we observed the effect of the psychological state of the family on child eating habits and the higher incidence of child feeding problems in families with psychopathology. In our study we aimed to emphasize the importance of treating the mother in collaboration with a change of eating habits by in-family education and management of in-family conflicts by therapy. We also stress the importance of improving psychological states of mothers who are innately committed to their children while solving the feeding problems of children.

The purpose of this study was to emphasize the importance of family therapy according to relative BMI in children with feeding problems. Small sample size and being a cross sectional study are limitations of this study but there are few researches in the literature elaborating psychiatric aspects of nutrition. Researches show that in order to solve eating disorders in children, psychosocial approach, including family therapy, is indicated. This approach may also be useful for children with abnormal body mass indexes.

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