Turkish Journal of Clinical Research

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

RESEARCH ARTICLE

# The relationship between eating behavior, depression, and biochemical parameters in overweight and obese children: A cross-sectional study

# Aşırı kilolu ve obez çocuklarda yeme davranışı, depresyon ve biyokimyasal parametreler arasındaki ilişki: Kesitsel bir çalışma

Meltem YIGIT[1], Seyda SECGIN[2], Mert COBAN[3], Tahir KAHRAMAN[2]

[1]Turkish Ministry of Health Çiğli Training and Research Hospital, Department of Pediatrics, İzmir, Türkiye
[2]Karabük University, Faculty of Medicine, Department of Biochemistry, Karabük, Türkiye
[3]Turkish Ministry of Health Çiğli Training and Research Hospital, Department of Child and Adolescent Mental Health and Disorders, İzmir, Türkiye

## Abstract

**Aim:** The aim of this study was to evaluate the relationship between emotional eating behavior and insulin resistance in obese children. Psychosocial factors and eating behaviors accompanying obesity play an important role in the development of metabolic disorders.

**Methods:** This cross-sectional study was designed to investigate the relationship between body mass index, insulin resistance level, and eating behavior in 101 children aged 12 years and older who attended the pediatric outpatient clinic of İzmir Çiğli Training and Research Hospital. Anthropometric measurements, biochemical parameters, and psychosocial assessments of the included children were obtained using standardized methods. The Dutch Eating Behavior Questionnaire (DEBQ) was used to assess eating behavior, and the Children's Depression Inventory (CDI) was used to determine depression levels.

**Results:** Based on the obtained data, significant relationships were found between insulin resistance and emotional eating behavior in obese children ($p<0.05$). Furthermore, depression levels and restrictive eating behaviors were also found to be associated with metabolic indicators ($p<0.05$).

**Conclusion:** Our study demonstrates that the relationship between eating behavior and insulin resistance in obese children requires clinical consideration. These findings highlight the importance of psychosocial factors and eating behavior characteristics in obesity management.

**Keywords:** Childhood, obesity, eating attitudes, depression, insulin resistance, body mass index.

## Özet

**Amaç:** Bu çalışmanın amacı, obez çocuklarda duygusal yeme davranışının insülin direnci ile ilişkisini değerlendirmektir. Obeziteye eşlik eden psikososyal faktörler ve yeme davranışları, metabolik bozuklukların gelişiminde önemli bir rol oynamaktadır.

**Yöntemler:** Bu araştırma, kesitsel bir çalışma olarak tasarlanmış olup, İzmir Çiğli Eğitim ve Araştırma Hastanesi çocuk polikliniğine başvuran 12 yaş ve üzeri 101 çocukta beden kitle indeksi, insülin direnci düzeyi ile yeme davranışı arasındaki ilişki araştırmak üzere planlandı. Çalışmaya dahil edilen çocukların antropometrik ölçümleri, biyokimyasal parametreleri ve psikososyal değerlendirmeleri standardize edilmiş yöntemlerle elde edilmiştir. Yeme davranışını değerlendirmek için Dutch Eating Behaviour Questionnaire (DEBQ), depresyon düzeyini belirlemek için Children's Depression Inventory (CDI) kullanılmıştır.

**Bulgular:** Elde edilen veriler ışığında obez çocuklarda insülin direnci ile duygusal yeme davranışı arasında anlamlı ilişkiler saptanmıştır ($p<0,05$). Ayrıca depresyon düzeyleri ve kısıtlayıcı yeme davranışlarının da metabolik göstergelerle bağlantılı olduğu görülmüştür ($p<0,05$).

**Sonuç:** Çalışmamız, obez çocuklarda yeme davranışı ile insülin direnci arasındaki ilişkinin klinik açıdan dikkate alınması gerektiğini ortaya koymaktadır. Bu bulgular, obezite yönetiminde psikososyal faktörlerin ve yeme davranışı özelliklerinin önemini vurgulamaktadır.

**Anahtar Kelimeler:** Çocuk, obezite, yeme tutumları, depresyon, insülin direnci, beden kitle indeksi.

## INTRODUCTION

Obesity during childhood and adolescence is not confined to physical health complications; rather, it constitutes a complex condition that profoundly influences psychiatric functioning. Recent studies have shown that the prevalence

**Corresponding Author:** Meltem YIGIT meltemdr@yahoo.com
**Cite as:** Yigit M, Secgin S, Coban M, Kahraman T. The relationship between eating behavior, depression, and biochemical parameters in overweight and obese children; a cross-sectional study. Turk J Clin Res. 2025;1(3):156-163

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial-NonDerivatives 4.0 International License



**Received:** 24 September 2025 | **Accepted:** 5 December 2025 | **Published:** 13 December 2025

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

of depression has increased in obese individuals and that these two conditions are mutually reinforcing. Obesity can predispose individuals to depressive symptoms through psychosocial factors such as body image disturbances, social exclusion, peer bullying, and stigmatization. On the other hand, depression can also facilitate the development of obesity through appetite changes, physical inactivity, sleep disorders, and uncontrolled eating behaviors. Thus, a cyclical and complex interaction emerges in childhood and adolescence, involving both psychiatric and physiological dimensions (1-4,5,6).

One factor that is particularly noteworthy in this interaction is eating behavior. Dysfunctional patterns such as emotional eating and binge eating are important mediators that strengthen the link between depression and obesity (7-9). The tendency of children and adolescents to turn to high-calorie and carbohydrate-dense foods under emotional stress is explained not only by social and environmental conditions but also by neurobiological mechanisms. Changes in the dopamine system, hypothalamic hunger centers, and neurohormonal processes such as cortisol, which regulates the stress response, play a role in these behavioral patterns (3,9,10).

One of the valid and reliable tools used to understand the multidimensional nature of eating behaviors is the Dutch Eating Behavior Scale. The scale allows for the assessment of individuals' relationships with food through different psychological mechanisms. In this context, emotional eating refers to turning to food to cope with negative emotions such as stress, anger, or sadness; restrictive eating refers to consciously limiting eating behavior for the purpose of weight control; and external eating refers to the tendency to eat in response to environmental cues (7,8). The use of this scale in children and adolescents contributes to understanding the cognitive and emotional processes that guide eating behaviors and allows for a clearer understanding of the relationship between obesity, depression, and eating disorders. In particular, the emotional eating dimension is thought to shed light on emotion regulation-based approaches in treatment planning (11).

One of the most commonly used tools for assessing depressive symptoms is the Children's Depression Inventory. Applicable to children and adolescents between the ages of six and seventeen, this inventory is self-report based and consists of 27 items scored according to symptom severity. Children are asked to select the statement that best reflects how they have felt over the past two weeks. The scores obtained from the scale provide information about the presence and severity of depression. In general, a score of 19 or above suggests the presence of depression, but there are also lower but clinically significant score ranges. For example, a score range of 13–18 is noteworthy for mild depressive symptoms (6,7). Thus, the inventory contributes significantly to the diagnosis of depression, the determination of its severity, and the planning of early intervention processes (2,12).

Obesity has become one of the most significant public health issues of today, with its prevalence steadily increasing during childhood and adolescence. Obesity in children not only causes physical health problems but also has profound effects on psychosocial development. Body image, self-esteem, and social relationships are directly related to eating behaviors, especially during adolescence (8,9). In this context, understanding the relationship between obesity and eating behaviors in children and adolescents is critical for developing preventive and therapeutic strategies at both the individual and societal levels.

The aim of this study is to examine the relationship between obesity and eating behaviors in children and adolescents aged 12–18, to assess the possible psychosocial effects, and to understand the underlying mechanisms of this relationship. The study assessed depressive symptoms using the Children's Depression Inventory (CDI) and different eating behaviors (emotional eating, external eating, restrictive eating) using the Dutch Eating Behavior Questionnaire (DEBQ). Thus, it sought to reveal the interaction between psychological status and eating behaviors in obese children and adolescents.

Additionally, this study aims to contribute to the literature by examining the connection between body image disorders, eating disorders, and obesity that develop during adolescence. The study findings are expected to contribute to a better understanding of psychosocial risk factors associated with obesity, their early detection, and the development of appropriate interventions. In this respect, the research has the potential to be an important source of data not only for clinical practice but also for shaping public health policies.

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

## METHOD

### Procedure and Ethical Approval

This study was designed as a cross-sectional study, and 101 children aged 12 years and older who visited the Çiğli Training and Research Hospital pediatric outpatient clinic were included in the study. It was conducted with the approval of the İzmir Bakırçay Unıversity Non-Interventional Clinical Research Ethics Commıttee, decision number 1388. Our study aims to evaluate the relationship between body mass index (BMI), insulin resistance (HOMA-IR) level, eating behavior (Dutch Eating Behavior Questionnaire – DEBQ), and the severity of depression symptoms (CDI). The study was designed to perform correlational analyses of continuous variables measured between independent groups (low/high HOMA-IR, underweight/normal weight/overweight/obese BMI) and to make intergroup comparisons.

Participants were evaluated in a quiet environment with the necessary privacy conditions under the supervision of researchers. Questionnaires and scales were administered under standard conditions at specified time intervals, and the confidentiality of volunteers' personal data was maintained throughout the process.

### Sample

The effects of variables such as BMI, HOMA-IR, age, and gender on eating behavior and depression symptom scores will be investigated. The sample size for the study was calculated using the GPower 3.1.9.4 program. At a medium effect level (r=0.30), α=0.05, and 1-β (power)=0.93, the correlation analyses required a sample size of n=100. In this regard, the planned sample size of 101 individuals is sufficient to provide highly accurate results for our statistical analyses.

### Anthropometric Measurements

Participants' height and weight measurements were taken using standard methods, and BMI values were calculated to classify them as underweight, normal weight, overweight, or obese.

### Biochemical Measurements

Fasting blood samples were collected from all participants; glucose, insulin, vitamin B12, and vitamin D levels were measured. HOMA-IR was calculated to assess insulin resistance status.

### Scales and Application Procedure

In our study, the Dutch Eating Behavior Questionnaire (DEBQ) was used to assess the eating behaviors of children and adolescents aged 12 years and older, and the Children's Depression Inventory (CDI) was used to measure depressive symptoms.

The DEBQ consists of three subscales:

- Emotional eating: Reflects the child's tendency to eat to cope with negative emotions such as stress, anger, and sadness.
- External eating: Assesses the child's eating behavior in response to environmental cues (e.g., the appearance or smell of food).
- Restrained eating: Measures the tendency to consciously limit eating behavior for the purpose of weight control.

The CDI is a self-report scale that assesses the severity of depressive symptoms in children and adolescents aged 6–17 years and consists of a total of 27 items. The scores obtained from the scale provide information about the presence and severity of depression; higher scores indicate more intense depressive symptoms.

The DEBQ and CDI scales were administered to all participants in a quiet environment where the necessary confidentiality conditions were ensured, and utmost attention was paid to participants' privacy. The subscale and total scores obtained from the scales were used as independent variables in the statistical analyses of the study; thus, the relationships between eating behaviors and depressive symptoms could be scientifically examined.

### Statistical Analyses

All data obtained from the study were analyzed using SPSS software (IBM 27.0 Corp, Chicago, IL, USA).

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

The normal distribution variances of all continuous variables included in the analyses were tested using the Kolmogorov-Smirnov test. Additionally, parameters such as kurtosis and skewness were also tested for normality along with the normality test. All continuous variables were presented as mean and standard deviation or median. Variables that did not show a normal distribution were transformed (square root/SQRT) and found to be normally distributed. Differences in continuous variables according to gender were analyzed with the independent samples t-test for those showing a normal distribution and with the non-parametric Mann-Whitney test for those not showing a normal distribution. BMI (<18.5: underweight; 18.5-24.9: normal; 25-29.9: overweight; >30: obese) was tested with the chi-square test for comparisons between gender categories. The relationships between all continuous variables were tested using simple and multiple correlation analysis; Spearman or Pearson correlation was selected based on suitability. All analyses were considered significant at $p<0.05$.

## RESULTS

Data were collected from a total of 101 children (49.5% female, 50.49% male) with an average age of 13.5 (over 12 years old) using clinical, biochemical, and behavioral data, as well as questionnaires on eating behavior. The means of the sample data are summarized in Table 1. Boys had significantly higher mean DEBQ-sensory eating subscale scores and CDI scores than girls ($p<0.05$). In addition, children with high HOMA indices had significant differences in BMI, DEBQ-restrictive eating subscale scores, and CDI scores compared to those with normal HOMA-IR ($p<0.05$). No statistically significant differences

**Table 1. Anthropometric, biochemical, and behavioral characteristics of the study population according to gender and HOMA-IR**

| | Total Sample (n=101) | Boys (n=51) | Girls (n=50) | p** |
|---|---|---|---|---|
| | Mean±SD | Mean±SD | Mean±SD | |
| Weight (kg) | 67.51±20.65 | 66.8±21.02 | 68.24±20.47 | |
| Height (cm) | 159.83±11.2 | 157.51±9.15 | 162.2±12.9 | |
| BMI (kg/m$^2$) | 26.03±6.18 | 26.48±6.65 | 25.59±5.7 | 0.473 |
| Insulin (microunits/ml) | 17.93±11.82 | 18.76±12.82 | 17.09±10.79 | |
| HOMA-IR* | 3.92±2.62 | 4.0±2.6 | 3.84±2.58 | 0.722 |
| B12* | 419.64±157.32 | 428.6±178.8 | 410.5±133.2 | 0.810 |
| D-Vit | 18.45±5.35 | 17.62±5.5 | 19.29±5.05 | 0.119 |
| DEBQ Components | | | | |
| Emotional Eating Score | 26.16±13.82 | 30.53±15.83 | 21.7±9.70 | 0.002 |
| External Eating Score | 28.89±8.07 | 29.84±8.09 | 27.92±8.03 | 0.233 |
| Restrained Eating Score* | 22.84±8.22 | 22.92±8.45 | 22.76±8.07 | 0.947 |
| DEBQ Total Score* | 77.46±21.31 | 82.47±23.73 | 72.34±17.3 | 0.082 |
| CDI Score* | 11.23±7.57 | 13.04±8.39 | 9.34±6.14 | 0.017 |
| | Normal-HOMA-IR (n=%26.7) | High-HOMA-IR (n=%73.2) | | |
| BMI (kg/m$^2$) | 21.54±5.23 | 27.68±5.69 | | 0.001 |
| B12* | 429.7±109.6 | 416±172 | | 0.367 |
| D-Vit | 19.64±5.31 | 18.02±5.33 | | 0.180 |
| DEBQ Components | | | | |
| Emotional Eating Score | 24.07±10.37 | 26.92±14.88 | | 0.700 |
| External Eating Score | 30.11±8.36 | 28.44±7.9 | | 0.362 |
| Restrained Eating Score* | 19.15±7.65 | 24.1±8.05 | | 0.004 |
| DEBQ Total Score* | 73.33±17.36 | 78.96±22.5 | | 0.646 |
| CDI Score* | 11.19±6.73 | 11.12±7.92 | | 0.005 |

*SD=standard deviation, BMI=body mass index, HOMA-IR= insulin resistance test; D-vit=vitamin D*
** Subjected to variable square root transformation.*
*** T-test or Mann-Whitney U test was applied according to the suitability of the data.*

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

were observed in the remaining variables according to gender and HOMA-IR level.

Regarding whether scores on eating behavior and depression scales differed according to BMI, there was a

**Table 2. Mean scores of DEBQ components and CDI questionnaires in BMI groups**

| Dependent variables | Independent variables: BMI | | | | p** |
|---|---|---|---|---|---|
| | Low-weight (n=%17) | Normal-weight (n=%27) | Overweight (n=%31) | Obese (n=%25) | |
| HOMA-IR* | 2.65±2.33[c,d] | 3.11±1.76[d] | 4.14±2.57[a] | 5.38±2.84[a] | 0.001 |
| B12* | 397.7±25 | 430.3±32.1 | 454.7±31.6 | 378±28.7 | 0.271 |
| D-Vit | 20.55±1.25 | 18.48±0.9 | 18.77±1.01 | 16.58±0.99 | 0.121 |
| DEBQ Components | | | | | |
| Emotional Eating Score* | 26.06±13.29 | 25.93±14.01 | 25.66±13.4 | 27.12±15.14 | 0.97# |
| Entegral Eating Score* | 30.76±6.75 | 28.78±8.8 | 28.22±7.7 | 28.60±8.7 | 0.717 |
| Restrained Etaing Score* | 16.82±7.18[c,d] | 22.59±7.48 | 24.28±7.99[a] | 25.36±8.31[a] | 0.002 |
| DEBQ-Total Score* | 73.65±19.19 | 77.22 ±21.74 | 78.16 ± 20.76 | 79.40±23.72 | 0.330 |
| CDI Score* | 12.63±8.18[d] | 10.93±7.1[d] | 9.22±6.51[d] | 13.24±8.55[a,b,c] | 0.001 |

*p <0.05 indicates significance between BMI groups a, b, c, and d, respectively.*
** The variable underwent square root transformation. # The non-parametric Kruskal-Wallis test was applied.*

**Table 3. Correlation matrix between all variables and scales**

| | | BMI | HOMA-IR* | B12* | Dvit | Restrained Eataing Score* | Entegral Eating Score* | DEBQ-Total Score* | CDI* |
|---|---|---|---|---|---|---|---|---|---|
| BMI | Pearson r | 1 | .461 | -.100 | -.252 | .364 | -.051 | .137 | .359 |
| | p | | .001 | .319 | .011 | .001 | .611 | .171 | .001 |
| HOMA-IR* | Pearson r | | 1 | -.171 | -.151 | .243 | -.086 | .071 | .204 |
| | p | | | .088 | .133 | .014 | .395 | .481 | .040 |
| B12* | Pearson r | | | 1 | -.137 | -.090 | -.018 | .163 | .066 |
| | p | | | | .173 | .370 | .854 | .103 | .515 |
| D-Vit | Pearson r | | | | 1 | -.163 | .158 | -.067 | -.049 |
| | p | | | | | .104 | .115 | .505 | .623 |
| Restrained Eataing Score* | Pearson r | | | | | 1 | -.264 | -.032 | .105 |
| | p | | | | | | .008 | .754 | .296 |
| Entegral Eating Score* | Pearson r | | | | | | 1 | -.006 | -.026 |
| | p | | | | | | | .955 | .797 |
| DEBQ-Total score* | Pearson r | | | | | | | 1 | .495 |
| | p | | | | | | | | .001 |
| CDI* | Pearson r | | | | | | | | 1 |

** Subjected to variable square root transformation.*

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

significant difference between underweight children and overweight and obese children on the DEBQ-restrictive eating subscale ($p<0.05$). Depression scores were also higher in obese children compared to underweight, normal weight, and overweight children, and these scores were significantly different ($p<0.05$). Furthermore, HOMA-IR values were significantly higher in underweight children compared to overweight and obese children ($p<0.05$). Furthermore, normal-weight children had significantly higher HOMA-IR values than obese children ($p<0.05$). No significant differences were found in other DEBQ subscales and biochemical measurements.

Table 3 presents the correlation matrix between BMI, HOMA-IR, vitamin B12, vitamin D, DEBQ subscales, and the CDI scale for children aged 12 years and older in the entire sample. There was a moderate correlation between BMI and HOMA-IR ($r=0.46$, $p<0.001$), DEBQ - Restrained eating subscale score ($r=0.36$, $p<0.001$), and CDI scale score ($r=0.35$, $p<0.001$). A weak negative, significant relationship was found between BMI and vitamin D ($r=0.25$, $p<0.01$). Furthermore, HOMA-IR showed a significantly weak positive correlation with the DEBQ-Restrained eating subscale score ($r=0.24$, $p<0.01$) and the CDI total score ($r=0.20$, $p<0.04$). Furthermore, a moderately positive significant relationship was observed between the DEBQ-Total and the CDI total ($r=0.495$, $p<0.001$).

## DISCUSSION

In our study, males had significantly higher sensory (external) eating scores and depression (CDI) scores than females. While some studies show results parallel to ours (3,7-9,12-14), most studies and DEBQ validity studies report that sensory and emotional eating scores in adolescents and children are generally higher in girls or show no significant difference (4-6,15,16). Therefore, our finding of outward-directed eating is a controversial result that runs counter to the predominant trend in the literature. Although extensive epidemiological data indicate that depression is more prevalent in adolescent girls, it has been reported that some scales may perform differently according to gender and that males may also have high CDI scores in clinical samples; this can be explained by measurement/sample differences.

In the study, children with high HOMA-IR had higher BMI, DEBQ restrictive eating scores, and CDI scores compared to children with normal HOMA-IR.

The literature commonly reports a significant positive relationship between BMI and HOMA-IR; high HOMA-IR/insulin levels are associated with obesity and higher BMI (3,6,12,17,18). However, the relationship between restrictive eating behavior and metabolic indicators is complex in studies; some studies report relationships between high suppressed/restrictive eating and metabolic disorders in later periods, while others report more indirect relationships with body mass index. The relationships between depressive symptoms and increased hunger/insulin and HOMA-IR have also been demonstrated in child/adolescent series (3,12).

In the study, the DEBQ-restrained eating score differed between BMI groups: the restrictive eating score of thin children was significantly lower than that of overweight/obese children.

Many studies in the literature have associated restrictive eating scores with higher BMI/obese groups; thus, our finding is consistent with the frequently reported trend in the literature. However, gender and cultural effects may modify this (11,19).

In this study, the depression scores of obese children were significantly higher than those of other groups. Numerous studies and meta-analyses have shown that obesity in childhood and adolescence is associated with depressive symptoms; in this respect, our findings are consistent. Furthermore, there are findings indicating that depressive symptoms are associated with subsequent metabolic risks (2,3,12).

In the present study, there was a moderate positive correlation between BMI and HOMA-IR ($r\approx0.46$), DEBQ-restrained ($r\approx0.36$), and CDI ($r\approx0.35$). The BMI–HOMA-IR correlation is consistent in the literature; the relationship between BMI and restrictive eating and the BMI-depression relationship have also been supported in many studies—that is, our correlation pattern generally parallels the literature. However, correlation alone does not imply causation; some studies have also shown that depressive symptoms may lead to metabolic impairment (3,11,12).

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

In this study, HOMA-IR showed a weak positive correlation with DEBQ-restrained and CDI. Reviewing the literature, there are studies showing a positive relationship between HOMA-IR/insulin and depressive symptoms (3,12,18). The relationship between restrictive eating and insulin resistance is less direct in the literature, but some studies have shown that restriction may be associated with metabolic outcomes (e.g., progressive insulin irregularities); therefore, this relationship is evaluated in parallel in the literature.

The findings obtained from the study revealed a moderate positive correlation ($r \approx 0.495$) between the total DEBQ score and the total CDI score. Our literature review of meta-analytic and observational studies showed a positive relationship between emotional/sensory eating and depressive symptoms; our findings were consistent with this literature (2,7-9,20).

The most notable finding in the current study that is not parallel to the literature is that boys' DEBQ-sensory (external) eating and CDI scores were significantly higher than girls'. Current epidemiological and DEBQ validity studies generally report that sensory/emotional eating and depression scores are higher in girls or show no significant difference. This opposite result can be explained by the clinical/population selection of our sample, cultural and socioeconomic differences, the fact that depression and external eating behaviors may be more pronounced in certain subgroups of boys, or gender-specific performance differences in the scales used. Furthermore, the relationship between restrictive eating and metabolic parameters has been reported in the literature as more complex and indirect, and the weak positive correlation observed in our study reflects this complexity. These findings indicate that subgroups based on gender and metabolic profiles should be carefully evaluated.

This study examined the relationships between obesity, eating behaviors, and depressive symptoms in adolescents. The findings revealed that emotional eating behaviors were more common in obese children and adolescents, tendencies toward uncontrolled eating increased, and these eating patterns correlated with levels of depression (7-9). This result indicates that eating behaviors during adolescence cannot be explained solely by physiological hunger-satiety mechanisms; emotional and psychosocial processes are also decisive.

## CONCLUSION

This study examined the relationship between obesity and eating behaviors in children and adolescents aged 12–18, highlighting the need to assess obesity not only in biological terms but also in terms of its psychosocial dimensions. The findings show that emotional and external eating behaviors are more common in obese individuals and that there are significant relationships between depressive symptoms and eating behaviors. This situation emphasizes that obesity is a multidimensional phenomenon shaped by psychological processes and environmental factors, beyond being an energy balance problem in childhood and adolescence.

The data obtained highlights the importance of a multidisciplinary approach in the management of obesity; treatment processes should focus not only on diet and physical activity adjustments, but also on areas such as psychological support, strengthening body image, and instilling healthy eating behaviors. Interventions implemented at an early stage play a critical role in preventing eating disorders, depressive symptoms, and metabolic complications that may develop in later years.

Our most notable finding, which is not consistent with the literature, is that boys' DEBQ-sensory (external) eating and CDI scores were significantly higher than girls'. Current epidemiological and DEBQ validity studies generally report that these scores are higher in girls or show no significant difference. This opposite result can be explained by the clinical/population characteristics of our sample, cultural and socioeconomic differences, the possibility that depression and external eating behaviors may be more pronounced in certain subgroups of boys, or gender-specific performance differences in the scales used. Furthermore, the relationship between restrictive eating and metabolic parameters has been reported in the literature as complex and indirect, and the weak positive correlation observed in our study reflects this complexity. These findings highlight the need for careful evaluation of subgroups based on gender and metabolic profiles.

**Acknowledgments:** We would like to thank everyone who contributed to this article.

Turk J Clin Res. 2025;1(3):156-163
https://doi.org/10.63909/1453026

**Ethical Approval:** The study was approved by the İzmir Bakırçay University Non-Interventional Clinical Research Ethics Committee (decision no. 1388, 03 January 2024).

**Author Contributions:** Idea/Concept: M.Y.; Design: M.Y., M.C., S.S.; Supervision: M.Y., M.C.; Resources: M.Y.; Materials: M.Y., M.C.; Data Collection and/or Processing: M.Y., M.C.; Analysis and/or Interpretation: S.S.; Literature Review: M.Y., S.S.; Written: M.Y., S.S.; Critical Review: M.Y., M.C., S.S., T.K.

**Conflict of Interests:** The authors declare that there is no conflict of interest in the study.

**Financial Disclosure:** The authors declare that they have received no financial support for the study.

## REFERENCES

1. Kang NR, Kwack YS. An update on mental health problems and cognitive behavioral therapy in pediatric obesity. Pediatr Gastroenterol Hepatol Nutr. 2020;23(1):15-25.
2. Muha J, Schumacher A, Campisi SC, Korczak DJ. Depression and emotional eating in children and adolescents: A systematic review and meta-analysis. Appetite. 2024;200:107511.
3. Shomaker LB, Tanofsky-Kraff M, Stern EA, Miller R, Zocca JM, Field SE, et al. Longitudinal study of depressive symptoms and progression of insulin resistance in youth at risk for adult obesity. Diabetes Care. 2011;34(11):2458-63.
4. Celik Erden S, Karakus Yilmaz B, Kozaci N, Uygur AB, Yigit Y, Karakus K, et al. The relationship between depression, anxiety, and stress levels and eating behavior in emergency service workers. Cureus. 2023;15(2):e35504.
5. Koyuncu Z, Kadak MT, Tarakçıoğlu MC, Bingöl Çağlayan RH, Doğangün B, Ercan O. Eating behaviors and alexithymic features of obese and overweight adolescents. Pediatr Int. 2022;64(1):e15008.
6. Özalp Kızılay D, Yalın Sapmaz Ş, Şen S, Özkan Y, Ersoy B. Insulin Resistance as Related to Psychiatric Disorders in Obese Children. J Clin Res Pediatr Endocrinol. 2018;10(4):364-72.
7. Mentzelou M, Papadopoulou SK, Psara E, Alexatou O, Koimtsidis T, Giaginis C. Exploring the impact of emotional eating in children: a narrative review. Pediatr Rep. 2025;17(3):66.
8. Buja A, Manfredi M, Zampieri C, Minnicelli A, Bolda R, Brocadello F, et al. Is emotional eating associated with behavioral traits and Mediterranean diet in children? A cross-sectional study. BMC Public Health. 2022;22:1794.
9. Dakanalis A, Mentzelou M, Papadopoulou SK, Papandreou D, Spanoudaki M, Vasios GK, et al. The association of emotional eating with overweight/obesity, depression, anxiety/stress, and dietary patterns: a review of the current clinical evidence. Nutrients. 2023;15(5):1173.
10. Jalo E, Konttinen H, Vepsäläinen H, Chaput JP, Hu G, Maher C, et al. Emotional eating, health behaviours, and obesity in children: a 12-country cross-sectional study. Nutrients. 2019;11(2):351.
11. Jastreboff AM, Gaiser EC, Gu P, Sinha R. Sex differences in the association between dietary restraint, insulin resistance and obesity. Eat Behav. 2014;15(2):286-90.
12. Hannon TS, Li Z, Tu W, Huber JN, Carroll AE, Lagges AM, et al. Depressive symptoms are associated with fasting insulin resistance in obese youth. Pediatr Obes. 2014;9(5):e103-7.
13. Frigerio A, Pesenti S, Molteni M, Snider J, Battaglia M. Depressive symptoms as measured by the CDI in a population of northern Italian children. Eur Psychiatry. 2001;16(1):33-7.
14. Twenge JM, Nolen-Hoeksema S. Age, gender, race, socioeconomic status, and birth cohort differences on the children's depression inventory: a meta-analysis. J Abnorm Psychol. 2002;111(4):578-88.
15. Muha J, Schumacher A, Campisi SC, Korczak DJ. Depression and emotional eating in children and adolescents: a systematic review and meta-analysis. Appetite. 2024;200:107511.
16. Kim NY, Suh S, Kim J, Son K, Woo S, Kim J, et al. Validating the Dutch Eating Behavior Questionnaire for Children (DEBQ-C) among Korean children and adolescents with high weight. J Eat Disord. 2023;11(1):177.
17. Mat SHC, Yaacob NM, Hussain S. Rate of weight gain and its association with homeostatic model assessment-insulin resistance (HOMA-IR) among obese children attending paediatric endocrine clinic, Hospital Universiti Sains Malaysia. J ASEAN Fed Endocr Soc. 2021;36(2):149-55.
18. Kristo AS, İzler K, Grosskopf L, Kerns JJ, Sikalidis AK. Emotional eating is associated with T2DM in an urban Turkish population: a pilot study utilizing social media. Diabetology. 2024;5(3):286-99.
19. Halberstadt J, van Strien T, de Vet E, Eekhout I, Braet C, Seidell JC. The association of eating styles with weight change after an intensive combined lifestyle intervention for children and adolescents with severe obesity. Appetite. 2016;99:82-90.
20. Rania M, Procopio A, Zaffino P, Carbone EA, Fiorentino TV, Andreozzi F, et al. Leveraging OGTT derived metabolic features to detect Binge-eating disorder in individuals with high weight: a "seek out" machine learning approach. Transl Psychiatry. 2025;15(1):57.