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Research paper

Disordered eating behaviors and associated factors in children and adolescents with type 1 diabetes

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ABSTRACT

Object: As part of their treatment, patients with type 1 diabetes mellitus (DM) have to be very careful with what they eat and with their insulin doses. Therefore, the risk of eating disorders increases in this patient group. In this study, we aimed to determine the disordered eating behaviors of patients with type 1 DM and to evaluate the sociodemographic characteristics, diabetes care behaviors, and quality-of-life scale results that these behaviors may be related to.

Method: The sociodemographic characteristics and diabetes treatment data of 191 patients aged 9–18 years with type 1 DM were analyzed. The Pediatric Quality of Life Inventory (PedsQL), the PedsQL 3.0 Diabetes Module, and the Diabetes Eating Problem Survey-Revised (DEPS-R) were applied.

Results: The median DEPS-R score of the patients was 18 (19.00), and 44.5 % had a DEPS-R score above 20. A significant correlation was found between age, duration of diabetes, frequency of blood glucose measurement, hemoglobin A_{1c} (HbA_{1c}) level, body mass index standard deviation score (BMI-SDS), and DEPS-R score. There was no significant difference between girls and boys. Patients with a high DEPS-R score had low scores on the PedsQL and on the PedsQL 3.0 Diabetes Module.

Conclusion: The DEPS-R scale is a diabetes-specific, easy-to-use, and effective method for screening patients with type 1 DM for disordered eating behaviors. It can help prevent the progression of disordered eating behaviors to clinical eating disorders in patients with type 1 DM. It would be beneficial to use this scale as a routine screening, especially in clinics where access to a psychologist is not possible.

1. Introduction

Type 1 diabetes mellitus (type 1 DM) is a chronic autoimmune disease associated with the selective destruction of insulin-producing pancreatic β cells and is the most common chronic endocrine disease of childhood and adolescence [1]. Diabetes treatment is a complex process that aims to reduce acute and chronic complications while providing good glycemic control. Medical nutrition therapy is one of the basic components of diabetes care and education [2,3]. Patients with type 1 DM have a different relationship with their body and food compared with other individuals, as their treatment requires them to control meal times, food amounts, and activities in daily life [4]. During the diabetes treatment process, there is an increased risk of patients developing eating disorders as a result of having to focus on the contents of the foods they consume, the nutritional labels, and the amount of energy and carbohydrates in a portion for regulation of their insulin treatment [5]. Restricted eating, calculating every bite, taking the appropriate amount of insulin, and the fact that this will continue throughout their life can become obsessions for patients. This situation increases the risk of eating disorders and depression [6,7]. Moreover, it increases the frequency of eating disorders by causing dissatisfaction with body image, especially with the changes that occur in the body during adolescence [8]. The emphasis on thinness in the media has also increased the incidence of these disorders. Although irregular eating behaviors have been mentioned mostly in connection with female patients in studies, it has been shown that these behaviors may also occur in male patients with type 1 DM [9].

Eating disorders comprise a broad spectrum of conditions ranging from subclinical disordered eating behaviors to clinical eating disorders. Each of them is seen more frequently in patients with type 1 DM than in

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their peers who do not have diabetes [10–12]. Disordered eating behaviors include dieting, excessive weight restriction, fasting, binge eating, vigorous exercise, abuse of laxatives and diuretics, and self-induced vomiting. In addition, there are reports of insulin skipping and restriction as specific behaviors in patients with diabetes [13–16]. Insulin skipping and restriction vary between 15 % and 33 % in girls and women with type 1 DM [17]. Disordered eating behaviors are associated with acute and chronic diabetes complications such as poor metabolic control, abnormal lipid profiles, ketoacidosis, retinopathy, and neuropathy in patients with type 1 DM [18–22].

If disordered eating behaviors are not detected and treated early, they progress to clinical eating disorders [11,20]. Screening methods used for general patients may result in erroneous results when applied to patients with type 1 DM. In addition, these methods may not be able to detect behaviors such as insulin restriction and skipping, which are specific to people with type 1 DM. For this reason, it would be beneficial to use the Diabetes Eating Problem Survey–Revised (DEPS-R) scale designed specifically for patients with type 1 DM. In the 2018 consensus report of the International Society of Pediatric and Adolescent Diabetes (ISPAD), the use of the DEPS-R in routine clinical evaluation was recommended [23].

In this study, we aimed (a) to determine the disordered eating behaviors of patients with type 1 DM by using the DEPS-R scale and (b) to evaluate the general demographic characteristics, diabetes care behaviors, and quality-of-life scores that these behaviors may be related to. In addition, the relationship between the accompanying long-term complications and disordered eating behaviors was evaluated.

2. Materials and methods

2.1. Study design and data collection

In this single-center study, patients who were followed up in the Pediatric Endocrinology Clinic and attended the outpatient clinic were enrolled in the study after obtaining their informed consent. Patients between the ages of 9 and 18 years, at least 1 year after being diagnosed with type 1 DM, and consenting to participate in the study were included. Patients with DM other than type 1 DM and those with additional chronic diseases were not included in the study. A total of 191 patients who met the inclusion criteria of the study were administered the following: a questionnaire evaluating the demographic characteristics of the patients, the Pediatric Quality of Life Inventory (PedsQL), the PedsQL 3.0 Diabetes Module, and the DEPS-R.

2.2. Identification and diagnostic procedure

The patients were diagnosed with type 1 DM according to the ISPAD 2018 guidelines [24]. Blood glucose concentration, C-peptide, glycosylated hemoglobin $A1_c$ HbA_{1c}), venous blood gas pH, and bicarbonate levels as well as the presence of autoantibodies associated with type 1 DM (presence of at least one positive result) were used for diagnosis. The latest HbA_{1c} values of the patients were recorded from the database of our hospital. Height, standard deviation score (SDS), body weight (BW), BW-SDS, body mass index (BMI), and BMI-SDS were recorded. BMI was calculated as the ratio of weight in kilograms to the square of height in meters (kg/m^2). The SDS of each anthropometric measurement was calculated according to the standards of Turkish children [25].

2.3. Psychiatric evaluation

2.3.1. Diabetes eating problem survey–revised

The DEPS-R is a scale consisting of 16 questions used to detect disordered eating behavior in people with type 1 DM. A score of 20 or more indicates disordered eating behavior, with the highest score being 80. The questionnaire is evaluated on a 6-point Likert scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*, 5 = *always*).

2.3.2. Pediatric quality of life inventory

The PedsQL is a scale developed to measure the health-related quality of life of children and adolescents. Items are scored on a scale of 0–100 as follows: 100 = *never*, 75 = *rarely*, 50 = *sometimes*, 25 = *often*, and 0 = *almost always*. The total score of physical health (TSPH) is calculated by dividing the total score of the first 8 items by 8, the total score of psychosocial health (TSPSH) is calculated by dividing the total score of the next 15 items by 15, and the total score of the scale is calculated by dividing the total score of 23 items by 23. The higher the PedsQL total score, the better the perceived health-related quality of life.

2.3.3. PedsQL 3.0 Diabetes Module

The PedsQL 3.0 Diabetes Module was developed specifically for children with diabetes and their parents. The scale includes five subscales: diabetes symptoms, treatment obstacles, compliance with treatment, anxiety, and communication. Items are scored from 0 to 100 as follows: 100 = *never*, 75 = *rarely*, 50 = *sometimes*, 25 = *often*, and 0 = *almost always*. The higher the total score, the better the health-related quality of life is perceived.

2.4. Ethics

Our cases were evaluated following the tenets of the Declaration of Helsinki. The study was approved by the ethics committee (approval date: 31.12.2021, approval no: 70,904,504/884).

2.5. Statistical analysis

The program SPSS 23.0 was used for statistical analysis. Categorical data are presented as numbers and percentages, and continuous data as mean ± standard deviation (SD) or median interquartile range (IQR). Categorical variables were compared with the Pearson chi-square test and Fisher's exact tests. Patients with a low DEPS-R score and high DEPS-R score were compared using the chi-square test according to age groups (9–12 years old/>12 years old) and HbA_{1c} levels (<9 / >9). The Shapiro–Wilk test was used to determine whether the parameters in the study showed a normal distribution. Variables were compared between groups using independent *t* tests (for normally distributed variables) or the Mann–Whitney test (for skewed variables). A value of $p < 0.05$ was considered significant. Multivariate linear regression analysis (backward) models were performed to assess the independent determinants of psychiatric parameters.

3. Results

3.1. Characteristics of the participants

The patients' demographic characteristics and diabetes treatment data ($n = 191$) are presented in Table 1. In total, 51.3 % of the patients were female and 48.7 % were male. The median age was 14 years (5.00), the median age at diagnosis was 8 years (5.00), and the time elapsed after diagnosis was 6 years (7.00). The median height SDS of the patients was 0.24 (1.30), the median BW-SDS was 0.11 (1.61), and the median BMI-SDS was 0.20 (1.35). The median maternal age was 41 years (8.00), and the median paternal age was 44 years (7.00). The median number of siblings of the patients was 2 (1.00). In total, 25.1 % of the mothers and 28.3 % of the fathers had high school education or higher. The mean daily insulin dose used by the patients was 0.83 u/kg/day (±0.34), and the median long-acting/total daily insulin dose ratio was 0.48 (0.60). The median value of daily blood glucose monitoring frequency (times/day) was 6 times (4.00). The median HbA_{1c} value of the patients was 8.50 (2.40), and 17.8 % of the patients had an HbA_{1c} value <7.5. Overall, 25.7 % of the patients were using an insulin pump and 25.1 % were using continuous glucose monitoring (CGM). A total of 11 % of the patients had a diabetic ketoacidosis (DKA) attack once in the last year; furthermore, 10.5 % of the patients were underweight, 70.2 % were

Table 1
Participant characteristics: overall and by level of disordered eating behaviors.

	All patients (n = 191)	Low DEPS-R score<20 (n = 106)	High DEPS-R score>20 (n = 85)	p
Age, years	14.00 (5.00)	12.50 (6.00)	14.00 (4.00)	0.041
Onset of diabetes, years	8.00 (5.00)	8.00 (5.25)	8.00 (6.00)	0.283
Diabetes duration, years	5.00 (7.00)	5.00 (5.75)	6.00 (7.00)	0.006
Sex: female,%	51.3 %	45.3 %	58.8 %	0.063
Maternal age	41.00 (8.00)	40.00 (8.00)	41.56 (28.00)	0.138
Paternal age	44.00 (7.00)	43.50 (9.00)	45.00 (6.50)	0.073
Maternal education: highschool degree or higher,%	25.1 %	34 %	15.3 %	0.003
Paternal educat ion: highschool degree or higher,%	28.3 %	36.8 %	17.6 %	0.004
Number of siblings, <2,%	46.1 %	51.9 %	56.5 %	0.528
Daily insulin dose, units/kg/day	0.83 (±0.34)	0.80 (±0.33)	0.86 (±0.34)	0.272
Long acting insulin/total daily insulin	0.48 (0.60)	0.46 (0.60)	0.50 (0.62)	0.391
Insulin regimen: pump,%	25.7 %	25.5 %	25.9 %	0.949
CGM, yes,%	25.1 %	29.2 %	20 %	0.143
Blood glucose monitoring frequency: >5 times/days,%	67.5 %	75.5 %	57.6 %	0.009
HbA_{1c} (%)	8.50 (2.40)	8.15 (1.93)	9.30 (2.60)	<0.001
HbA_{1c}: <7.5,%	17.8 %	28.3 %	4.7 %	<0.001
DKA, yes,%	11 %	3.8 %	20 %	<0.001
BMI-SDS	0.20(1.35)	−0.07(1.28)	0.30(1.39)	0.006
Weight status,%				
Under weight	10.5 %	11.3 %	9.4 %	0.021
Normal weight	70.2 %	76.4 %	62.4 %	
Obese	19.4 %	12.3 %	28.2 %	
Physical PedsQL score	84.37 (25.00)	89.05 (18.75)	71.80 (28.12)	<0.001
Psychosocial PedsQL score	78.33 (30.00)	86.66 (18.33)	61.66 (32.50)	<0.001
Generic PedsQL score	79.34 (28.22)	86.95 (14.94)	63.04 (25.00)	<0.001
Diabetes PedsQL score	64.28 (37.50)	79.46 (23.00)	49.10 (22.77)	<0.001

Data are given as mean ± SD (standard deviation) or median (interquartile range).
DEPS-R: Diabetes Eating Problem Survey–Revised; CGM: continuous glucose monitoring; HbA_{1c}: hemoglobin A_{1c}; DKA: diabetic ketoacidosis; PedsQL: Pediatric Quality of Life Inventory; BMI-SDS: body mass index standard deviation score.

normal weight, and 19.3 % were overweight or obese (Table 1).

Patients with a DEPS-R score below 20 were classified as the low DEPS-R score group, and those with scores above 20 were classified as the high DEPS-R score group. There was no significant difference between the low DEPS-R and high DEPS-R groups in terms of diabetes diagnosis age, gender, maternal age, paternal age, number of siblings, daily insulin dose, long-acting/total daily insulin dose ratio, insulin regimen, and CGM use status. The high DEPS-R score group had a longer duration of diabetes (p = 0.006). The percentage of mothers (15.3 %) and fathers (17.6 %) whose education level was highschool graduation or higher was lower in the high DEPS-R group than in the low DEPS-R group (p = 0.003 and p = 0.004, respectively). The percentage of those who checked their blood glucose more than five times a day (57.6 %) was lower in the high DEPS-R group than in the low DEPS-R group (p = 0.009). The median HbA_{1c} value was higher in the high DEPS-R group than in the low DEPS-R group (p < 0.001). The percentage of patients with HbA_{1c} <7.5 was also lower in the high DEPS-R group (p < 0.001). In the last year, the high DEPS-R group had more DKA attacks than the low DEPS-R group (p < 0.001). The BMI-SDS of the high DEPS-R group was higher and the percentage of those who were obese was also higher when compared with the low DEPS-R group (p = 0.006 and p = 0.021, respectively) (Table 1**).**

The DEPS-R score was found to be higher than 20 in 51 % of the female patients and 37.6 % of the male patients (p = 0.063). When we evaluated the patients according to their age group, the percentage of those with a high DEPS-R score at the age of 9–12 was lower, while it was found to be higher in the 12–18 age group (32.1 % and 53.1 %, respectively; p = 0.004). When we grouped the patients according to their HbA_{1c} value, the percentage of those with a high DEPS-R score in the group with HbA_{1c}<9 was lower, while it was higher in the group with HbA_{1c}>9 (31.6 % and 64.9 %, respectively; p < 0.001) (Fig. 1).

3.2. Evaluation of DEPS-R scores and pediatric quality of life inventory

The median DEPS-R score of the patients was 18 (19.00). While 55.5 % of the patients had a DEPS-R score below 20, 44.5 % had a DEPS-R above 20. The median physical PedsQL value was 84.37 (25.00) for all patients, 89.05 (18.75) in the low DEPS-R group, and 71.8 (28.12) in the high DEPS-R group. The median value of the patients' psychosocial PedsQL was 78.33 (30.00) for all patients, 86.66 (18.33) in the low DEPS-R group, and 61.66 (32.50) in the high DEPS-R group. The median value of the patients' total PedsQL was 79.34 (28.22) for all patients, 86.95 (14.94) in the low DEPS-R group, and 63.04 (25.00) in the high DEPS-R group. The median PedsQL 3.0 Diabetes Module score was 64.28 (37.50) for all patients, while it was 79.46 (23.00) in the low DEPS-R group and 49.10 (22.77) in the high DEPS-R group. There was a significant difference between the groups for each parameter (p < 0.001) (Table 1).

In multiple regression analysis, a significant relationship was found between duration of diabetes (r^2 = 0.609, adjusted r^2 = 0.582, p < 0.001; β = 0.392, p = 0.028), frequency of blood glucose measurement (β = −4.160, p = 0.006), HbA_{1c} level (β = 1.520, p < 0.001), BMI-SDS (β = 1.746, p = 0.011), PedsQL 3.0 Diabetes Module score (β = −0.180, p < 0.001) [26], and DEPS-R score. There was no significant relationship between age, gender, maternal education level, paternal education level, physical PedsQL score, psychosocial PedsQL score, total PedsQL score, and DEPS-R score (p > 0.05) (Table 2).

4. Discussion

In this study, 191 patients with type 1 DM were evaluated in terms of disordered eating behaviors with the DEPS-R scale. The most comprehensive study on this subject, based on Danish and Swedish national data, shows that patients with type 1 DM are at a higher risk of subsequent eating disorders [26]. The reliability and validity of the Turkish version of this scale were previously demonstrated in children and adolescents with type 1 DM [27]. It has been suggested that screening with the DEPS-R should be used as a part of routine practice, especially in clinics where psychologists are not regularly present [28]. The DEPS-R is a self-administered, cost- and time-effective tool that helps the clinician decide whether further evaluation is necessary [28]. In most studies, a value of 20 is accepted as the cut-off for the DEPS-R score, and further

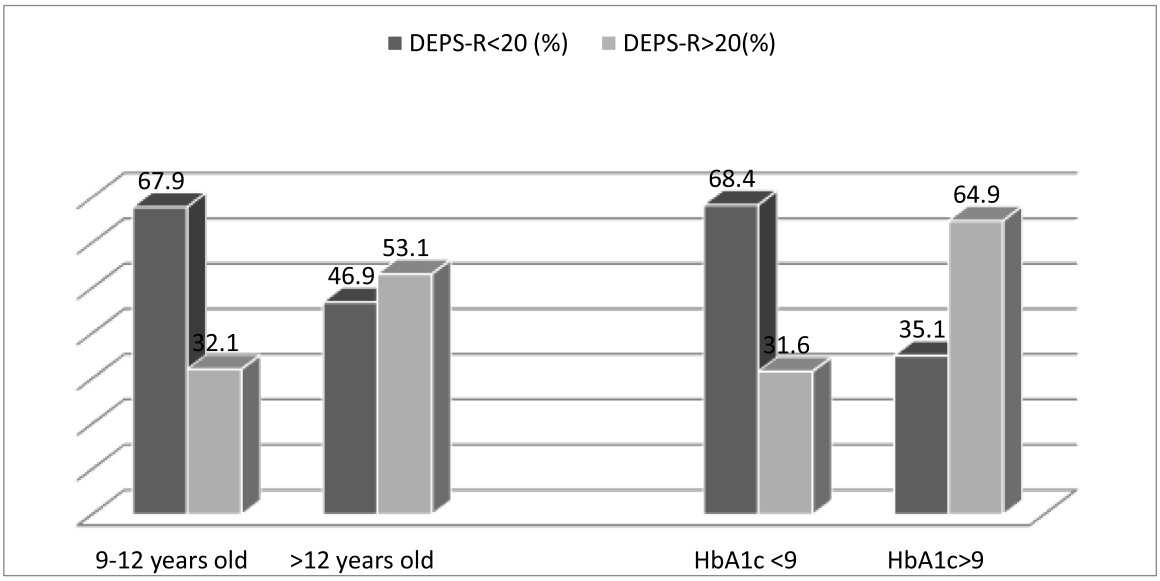


Fig. 1. DEPS-R score of patients according to age and HbA_{1c} level.
Chi-square test: $p = 0.004$; $p < 0.001$.
DEPS-R: Diabetes Eating Problem Survey–Revised; HbA_{1c}: hemoglobin A_{1c}.

Table 2
Multivariate backward linear regression analysis.

Variable	B (95 % CI)	SRC(β)	*T*	*p*
DEPS-R score (r^2 =0.609, $p < 0.001$, Durbin–Watson=2.006)				
Age	−0.184 (−0.692 /0.324)	−0.041	−0.716	0.475
Sex	−0.759 (−3.383 / 1.866)	−0.028	−0.570	0.569
Diabetes duration	0.392 (0.043 / 0.741)	0.123	2.217	0.028*
Maternal educational level	−2.340 (−6.426 / 1.746)	−0.075	−1.130	0.260
Paternal educational level	−0.330 (−4.316 / 3.656)	−0.011	−0.163	0.871
Blood glucose monitoring frequency	−4.160 (−7.137 / −1.184)	−0.143	−2.758	0.006*
HbA_{1c}	1.520 (0.840 / 2.200)	0.225	4.412	<0.001*
BMI-SDS	1.746 (0.408 /3.084)	0.129	2.576	0.011*
Physical PedsQL score	0.031 (−0.828 / 0.890)	0.042	0.070	0.944
Psychosocial PedsQL score	0.065 (−1.535 / 1.665)	0.101	0.081	0.936
Generic PedsQL score	−0.357 (−2.825 / 2.111)	−0.494	−0.285	0.776
Diabetes PedsQL score	−0.180 (−0.276 /−0.084)	−0.293	−3.698	<0.001*

DEPS-R: Diabetes Eating Problem Survey–Revised; HbA_{1c}: hemoglobin A_{1c}; BMI-SDS: body mass index standard deviation score; PedsQL: Pediatric Quality of Life Inventory; B: coefficient of regression; SRC: standardized regression coefficient.
* Statistically significant correlation.

psychiatric evaluation is recommended for values above this point. However, in a few studies, definitions of mild-, moderate-, and high-score cases were made, and it was recommended to examine moderate cases for eating behaviors [17,19,29].

In our study, the median DEPS-R score of our patients was 18, which is different from other studies that have reported median values of 12, 9.8, 15, and 8 [14,17,28,30]. In addition, while the DEPS-R score was above 20 in 44.5 % of the patients ($n = 85$) in our study, this rate was 15 % in the study by Costa et al. [29]. In another study conducted in Canada in which 116 adolescents participated, 21 % of the patients had a DEPS-R score above 20 [31]. On the other hand, in a recent study in Denmark, it was shown that one third of the patients had excessive and binge eating behavior [32]. The high median DEPS-R score in our study and the greater percentage of those with higher scores than in previous studies may be explained by the COVID-19 pandemic. Similarly, in a recent study, it was shown that disordered eating behaviors have increased in the whole of society after the COVID-19 pandemic [33]. In a multicenter Italian nationwide study conducted during the COVID-19 pandemic, 28.1 % of individuals with type 1 DM were found to have disordered eating behaviors [34]. These results may show a tendency for an increased incidence of eating disorders in patients with type 1 DM. Further studies will be needed to address this issue.

In our study, a significant correlation was found between duration of diabetes, frequency of blood glucose measurement, HbA_{1c}, BMI-SDS, and DEPS-R score, in line with other studies [25,27]. Markowitz et al. [17] also showed a positive correlation between DEPS-R score and BMI-SDS and a negative correlation between diabetes care and blood glucose measurement. While there was a correlation between female gender and high DEPS-R scores in some studies, no significant difference was found between male and female patients in our study [14,16,35]. Similar to our data, Altınok et al. [27] also showed that while there was no significant difference between male and female patients, male patients exhibited more insulin-skipping behavior. While physical appearance and body perception may be the main problem for girls, depressed mood and low self-esteem may be the main cause of disordered eating behavior in boys. For this reason, disordered eating behaviors should be examined without ignoring the male population, and if necessary, they should be referred for further psychiatric evaluation.

In line with the findings of other studies, age and duration of diabetes affected the DEPS-R score in our study [14,17,27,29]. While no significant correlation was found between maternal and paternal age, number of siblings, and DEPS-R score, the percentage of those with high

maternal and paternal educational level was found to be low in those with high DEPS-R scores, similar to the literature [29]. While planning the study, we hypothesized that an increase in the daily insulin doses and the ratio of long-acting insulin/total daily insulin dose might be associated with disordered eating behaviors, but no significant relationship was found. In addition, no significant difference was found between those who used continuous subcutaneous insulin infusion (CSII) therapy, those who used CGM, and those who did not. In the recently published study by Salah et al. [36], it was shown that fewer patients using CSII developed eating disorders compared with patients using an insulin pen. Another recent trial investigated risk factors for disordered eating behaviors among insulin pump-treated individuals with type 1 DM and the clinical characteristics of hybrid closed-loop system users according to disordered eating behavior level. Disordered eating behaviors were found in 42.5 % of individuals, and they were positively associated with female sex, BMI, HbA_{1c}, and a higher rate of pump discontinuation [37]. In the future, with the use of the latest technologies such as algorithms without meal announcements, fewer young patients with type 1 DM will perhaps develop eating disorders.

In the literature, clinical eating disorders are mostly associated with anorexia nervosa and therefore with low BMI and SDS. However, in patients with type 1 DM, on the contrary, high DEPS-R scores were associated with high BMI and SDS [14,20,35,38]. In the study by Costa et al. [29], the DEPS-R score was found to be higher in cases with excessive weight and obesity. In this study, it was shown that BMI-SDS and DEPS-R score were correlated, and a significantly higher percentage of obese patients had a DEPS-R score above 20. Clinical characteristics at the time of the diabetes diagnosis may predict the development of disordered eating behaviors. Disordered eating behaviors were found to be associated with high BMI at diagnosis and marked postdiagnosis weight gain. Efforts to prevent disordered eating behaviors in at-risk adolescents should begin at the time of the diagnosis [39].

In this study higher DEPS-R scores were identified in particular among patients with a low PedsQL 3.0 Diabetes Module score. This shows that children and adolescents who are not at ease with type 1 DM are more prone to disordered eating behaviors. Similar to previous studies, in our work the results from the quality-of-life scales showed that those with high DEPS-R scores had a lower psychosocial status [20,38,40]. It has been reported that people with type 1 DM and disordered eating behavior exhibit less positive attitudes toward life, lower self-esteem, more depressive symptoms, and false somatic complaints [38]. On the other hand, in the study by Olmsted et al. [20], in which they followed up girls with type 1 DM and impaired eating behavior for 5 years, none of the patients developed a clinical eating disorder. However, it has been shown that these patients are more anxious about body image, more depressed, and have lower self-esteem.

Ripoli et al. [41] showed that emotional eating is related to metabolic control in patients with type 1 DM using the Emotional Eating Scale, and individuals with disordered eating behaviors have a higher emotional eating score than those without disordered eating behaviors. This study is also important in terms of evaluating patients with emotional eating behavior, which is a different group of eating disorders. It is significant to identify the most appropriate tools to screen for eating disorders in type 1 DM, since this plays a crucial role in effective prevention and consequently can help decrease morbidity and mortality as well as improve treatment outcomes. Calcaterra et al. [42] evaluated four subscales comprising the original DEPS-R subscales for detection of early feeding and eating disorders. The proposed subscales may be useful in screening for disturbed eating behaviors in patients with a DEPS-R score $\geq$ 20 and could additionally help in defining a proper clinical classification.

4.1. Limitations

The limitations of this cross-sectional study are the lack of long-term follow-up of the patients and the inability to evaluate whether the patients went on to develop clinical eating disorders. In addition, the patients were not evaluated by the psychiatry department, and it was not possible to assess whether the patients with a high DEPS-R score in the screening had a true psychiatric diagnosis. This was a single-center study, and we believe that a multicenter study evaluating a larger patient population will contribute more to the literature.

5. Conclusion

The DEPS-R scale is an easily applicable and effective method for screening of disordered eating behaviors in patients with type 1 DM. False results can be obtained with general screening methods, especially in type 1 DM due to factors such as food types, amounts, and carbohydrate counting. This scale is also important in that it is specific to diabetes. It would be beneficial to use it as a routine screening tool, especially in clinics where access to a psychologist is not always possible. It will contribute to preventing the progression of eating behaviors to clinical eating disorders in patients with type 1 DM.

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Declaration of competing interest

No potential conflict of interest.

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