



Depression and alexithymia's effects on emotional eating in people with type 2 diabetes

Bulent Yaprak^a, Hacer Alatas^{b,*}, Ozgur Aytas^c, Nurgul Arslan^d

^aTurgut Ozal University, Malatya Training and Research Hospital, Department of Internal Medicine, Malatya, Türkiye

^bTurgut Ozal University, Malatya Training and Research Hospital, Department of Nutrition and Dietetic, Malatya, Türkiye

^cTurgut Ozal University, Malatya Training and Research Hospital, Department of Psychiatry, Malatya, Türkiye

^dDicle University, Ataturk Faculty of Health Sciences, Department of Nutrition and Dietetic, Diyarbakir, Türkiye

ARTICLE INFO

Keywords:

Emotional eating

Type 2 diabetes

Stress

Depression

Alexithymia

Received: Dec 31, 2022

Accepted: Jan 20, 2023

Available Online: 24.03.2023

DOI:

[10.5455/annalsmedres.2022.12.400](https://doi.org/10.5455/annalsmedres.2022.12.400)

Abstract

Aim: Examining the impact of depression and alexithymia related to emotional eating in people with type 2 diabetes is the goal.

Materials and Methods: The study included 180 people with type 2 diabetes between the ages of 18 and 65 who applied to the internal medicine outpatient clinic at Malatya Turgut zal University Training and Research Hospital. The patients were given the Toronto Alexithymia Scale (TAS-20), the Dutch Eating Behavior Scale (DEBQ), and the Depression, Anxiety, and Stress Scale (DAS-21).

Results: The study's participants had an average age of 44.21 ± 11.33 years. The study discovered a significant positive correlation between emotional eating and the challenge of defining stress and emotions ($p < 0.05$). The sub-dimensions of emotional eating of depression, extroverted thinking, female gender, difficulty identifying and differentiating emotions and bodily sensations, and regression analysis were used to explain 18% of the total variance in Type-2 diabetes patients ($R^2 = 0.18$).

Conclusion: It has been found that emotional eating in type-2 diabetes patients is influenced by the gender factor, depression, and difficulty identifying and differentiating bodily sensations.



Copyright © 2023 The author(s) - Available online at www.annalsmedres.org. This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Introduction

Depression, anxiety, and stress are all common disorders that have a high comorbidity and cause negative affect. People with high levels of symptoms exhibit more negative behaviors and emotions [1]. Depressive symptoms include loss of interest or pleasure, increased or decreased appetite, fatigue, and a depressed mood. Emotional eating is a term that needs more definition in the literature. It is commonly defined as an increase in eating behavior as a result of negative emotions [2]. Emotional eating behavior is mentioned in the literature as a symptom of eating disorders as well as a behavior displayed by overweight/obese people. Furthermore, emotional eating is used as a coping strategy in difficult situations. Emotions are important in developing healthy and balanced interpersonal relationships. Alexithymia, which means "lack of words for emotions," causes communication difficulties. Alexithymia is characterized by symptoms such as difficulty identifying

emotions, verbalizing, and dreaming. It is possible to encounter alexithymic symptoms in both normal and clinical populations [3, 4]. Depression and anxiety are twice as common in diabetic patients as in the general population. Although smoking, low socioeconomic status, and female gender are independent risk factors for depression in diabetic patients under the age of 64, poor glycemic control has been linked to depression [5]. Adapting to a new diet and medication regimen is more difficult in depressed and anxious people. Depression treatment has been shown in several controlled studies to improve glycemic control. Depression has a negative impact on the progression of chronic diseases such as diabetes. Depression has been shown to have a negative impact on lifestyle changes and treatment adherence in diabetic patients. Patients with depressive diabetes have difficulty adhering to dietary recommendations, poor glycemic control, and an increased incidence of complications and mortality when compared to non-depressed patients [5].

The purpose of study the impact of depression and alexithymia on emotional eating in people with type 2 diabetes.

*Corresponding author:

Email address: hacer_alatas@hotmail.com (Hacer Alatas)

Materials and Methods

Interviews were conducted with patients who applied to the Malatya Turgut Ozal University Education and Research Hospital Internal Medicine outpatient clinic. The individuals' general information and demographic characteristics were collected using an information collection form. Demographic Information Form, Depression, Anxiety, and Stress Scale, Dutch Eating Behavior Scale, and Toronto Alexithymia Scale were administered to participants in the following order: The average time to complete the scales was 12-18 minutes. The researcher created an information collection form to collect information about the participants' basic characteristics such as age, gender, marital status, education level, and socioeconomic status.

The study's ethical implications and participants

Malatya Turgut Özal University non-invasive research ethics committee was consulted for the study's ethical analysis. The study's ethical suitability was accepted in a session decision dated 20.10.2022 and numbered 2022-10. Individuals taking part in the study were given information about the study and asked to sign a consent form to participate. The entire study was carried out in accordance with the Helsinki Declaration of 2013. Patients with type 2 diabetes between the ages of 18 and 75 were enrolled in the study prospectively. The research was conducted between October and December of 2022. Patients diagnosed with type 2 diabetes between the ages of 18 and 75 were included in the study. Those who were pregnant or lactating at the time of enrollment, those under the age of 18 or over the age of 75, those with acute disease or infection at the time of enrollment, those with renal disease other than diabetic nephropathy, those using oral contraceptives, those with hematological disease, those with known malignancies, those taking aspirin, those receiving chemotherapy, and/or individuals receiving radiotherapy are not included.

Scale of Depression, Anxiety, and Stress (DAS-21)

Lovibond created the Depression, Anxiety, and Stress Scale (1995). It has 42 items and three sub-dimensions. Items are rated on a 4-point Likert scale, with 0 indicating "never," 1 indicating "sometimes," 2 indicating "quite frequently," and 4 indicating "always." 14 of the items fall into the depression, anxiety, and stress sub-dimensions. Depression, anxiety, and stress sub-dimension reliability scores were $=.91$, $=.84$, and $=.90$, respectively [6]. Yıldırım, Boysan, and Kefeli carried out the Turkish adaptation of the scale as well as the validity and reliability study (2018). The scale includes the original 21 items as well as three sub-dimensions of depression, anxiety, and stress. Internal consistency coefficients for the three scales were $=.89$ for depression, $=.87$ for anxiety, and $=.90$ for stress, in that order [7].

Scale of Dutch Eating Behavior (DEBQ)

It is a 33-item scale with three sub-dimensions developed in 1986 by Van Strein, Frijters, Bergers, and Defares. Cronbach's alpha reliability coefficient was for the 13-item emotional eating behavior sub-dimension, for the 10-item re-

strictive eating behavior sub-dimension, and for the 10-item external eating behavior sub-dimension. Items are rated on a 5-point Likert scale, with 1 being 'Never,' 2 being 'Rarely,' 3 being 'Sometimes,' 4 being 'Often,' and 5 being 'Very often' [8]. Bozan conducted its Turkish adaptation, validity, and reliability studies in 2009. As in the original, the scale has 33 items and three subscales. Emotional eating behavior (13 items), restrictive eating behavior (10 items), and external eating behavior are the subscales (10 items). Like the original scale, items are scored on a 5-point Likert scale.

Alexithymia Scale of Toronto (TAS-20)

Alexithymia is diagnosed using some developed scales. The Toronto Alexithymia Scale (TAS-20), which has been extensively studied and its validity and reliability have been demonstrated numerous times, is the most widely accepted measurement tool today.

Taylor, Ryan, and Bagby created it in 1985 as a measurement tool with 26 items and four sub-dimensions. The scale's reliability coefficient was determined to be $=.79$. The scale's sub-dimensions were determined as follows: (1) difficulty identifying and distinguishing emotions and bodily sensations, (2) difficulty identifying emotions, (3) scarcity of daydreaming, and (4) extroverted thinking. The scales' reliability coefficients were found to be $=.83$ for the first factor of 11 items, $=.72$ for the second factor of 7 items, $=.64$ for the third factor of 5 items, and $=.69$ for the fourth factor of 6 items, respectively. A 5-point Likert scale is used for the scale. For the first time, Beştepe (1997) conducted a Turkish reliability study of the 20-item scale. According to this study, the scale's reliability coefficient was found to be $=.81$. As a result of the research, three sub-dimensions were identified. The scale is in the form of a 5-point Likert scale, with the same scoring as in the original. The lowest possible score is 20, while the highest possible score is 100.

Statistical analysis

The study data was statistically analyzed using @SPSS 22.00. The Pearson chi-square test was used for comparisons of discrete variables. The Kolmogorov Smirnov test was used to determine whether continuous variables conformed to the normal distribution. The Mann Whitney U and Kruskal Wallis tests were used for intergroup comparisons of continuous variables. When a statistically significant difference between groups was discovered using the Kruskal Wallis test, the Mann Whitney U test with Posthoc Bonferroni correction was used to determine which group or groups caused the difference. The Spearman correlation test was used to determine the linear relationship between the variables. Correlation and multiple regression analysis were used to determine the relationship between all variables. The obtained results are evaluated at the 5% significance level and 95% confidence interval.

Results

Table 1 shows the general characteristics of the people who took part in the study. It was discovered that 56.11% of those taking part in the study were women, with a

Table 1. General characteristics of type-2 diabetes patients.

| General features | n | % |
|--|-------------|-------------|
| Gender | | |
| Woman/Men | 101/79 | 56.11/43.89 |
| AGE(year) | 44.21±11.33 | |
| AGE GROUPS | | |
| 18 years and under | 6 | 3.33 |
| 18-25 years old | 21 | 11.67 |
| 25-35 years | 54 | 30.00 |
| 35 years and older | 99 | 55.00 |
| Educational Status | | |
| Literate | 12 | 6.67 |
| Primary school | 88 | 48.89 |
| High school | 62 | 34.44 |
| University | 18 | 10.00 |
| Working Status | | |
| Yes/No | 135/45 | 75.00/25.00 |
| Smoking habit | | |
| Yes/No | 102/78 | 56.67/43.33 |
| Monthly Income | | |
| 3000 TL and below | 23 | 12.78 |
| 3000-5000 TL | 45 | 25.00 |
| 5000-8000 TL | 102 | 56.67 |
| 10000 TL and above | 10 | 5.56 |
| Diagnosed disease | | |
| Yes / No | 128/52 | 71.11/28.89 |
| *Diagnosed disease | | |
| Hypertension | 55 | 30.56 |
| Cardiovascular diseases | 71 | 39.44 |
| Endocrine diseases | 41 | 22.78 |
| Bone diseases | 56 | 31.11 |
| Other | 71 | 39.44 |
| BMI (kg/cm ²) | 29.11±12.33 | |
| BMI Category(kg/cm²) | | |
| Thin (18.49 and under) | 4 | 2.22 |
| Normal (18.5-24.99) | 35 | 19.44 |
| Fat (25.0-29.99) | 91 | 50.56 |
| Obese (30.0-34.99) | 35 | 19.44 |
| Morbid Obese (35.0 and upper) | 15 | 8.33 |
| Waist/hip ratio | | |
| | | P ** |
| Woman | 0.92 | 0.001 |
| Male | 0.97 | |
| Number of meals per day | | |
| 1 meal | 35 | 19.44 |
| 2 meals | 101 | 56.11 |
| 3 meals | 44 | 24.44 |
| Often skipped meals | | |
| Breakfast | 21 | 11.67 |
| Noon | 85 | 47.22 |
| Evening | 74 | 41.11 |

*multiple options answered. p **<0.05, Mann Whitney U Test.

mean age of 44.21±11.33 years. It has been discovered that 56.67% of individuals have a smoking habit. Individuals diagnosed with diseases other than type 2 diabetes were found to be 71.11%, with cardiovascular diseases being the most commonly diagnosed. The individuals' mean BMI was 29.11±12.33 kg/m², and the mean waist-hip ratio was found to be higher in men than in women, which was statistically significant (p=0.001). It was found that, on average, 56.11% of people ate two meals a day, with lunch being the meal that was most frequently skipped. When the general characteristics of type 2 diabetes patients were compared to the mean scores of the Dutch Eating Behavior Scale, Depression, Anxiety, and Stress Scale, and Toronto Alexithymia Scale, women had a higher DEBQ score than men (p=0.047), and women had higher Toronto Alexithymia Scale scores than men. The study's mean was found to be higher (p=0.001*). The depression score increased with increasing age (p=0.013*), and individuals who smoked had higher DEBQ and depression scores (p=0.023*, p=0.003*) (Table 2). Table 3 shows the Correlation Analysis of the Relationship between the Dutch Eating Behavior Scale and its subdimensions of Type 2 Diabetes Patients Participating in the Study and the alexithymia subdimensions of DASO-21 Sub-Dimensions. The Dutch Eating Behavior Scale and Depression, difficulty identifying emotions (r=.231**, r=.236**) were found to have a positive and significant relationship. A correlation was discovered between emotional eating and stress, difficulty identifying emotions, and extraverted thinking (r=.205**, r=.269**, r=.125*). There was also a positive and significant relationship between restrictive eating behavior and anxiety and difficulty defining emotions (r=.343**, r=.169**). Finally, a positive and statistically significant relationship was discovered between external eating behavior and difficulty expressing feelings of depression, stress, anxiety, and difficulty defining emotions (r=.301**, r=.128**, r=.163**, r=.469**, r=.381**).

Table 4 shows the results of a multiple regression analysis of the effect of TAS-20 and DAS-21 subdimensions on the emotional eating level of type 2 diabetes patients. The difficulty of identifying emotions, stress, depression, and anxiety sub-dimensions predict the level of emotional eating in type 2 diabetes patients, according to a regression analysis examining the effects of DAS-21 sub-dimensions and TAS-20 sub-dimensions on the level of emotional eating in type-2 diabetes patients. In type 2 diabetes patients, female gender (β=.238; t(179)=4.57; p.05) predicted emotional eating level. Female gender accounts for 26% of the total variance in emotional eating (R²=0.26). The female gender (β=.248; t(177)=6.95; p.05) had a positive effect on emotional eating level; difficulty expressing emotions (β=-.167; t(179)=-4.17; p.05) had a negative effect on emotional eating level; the effect of extroverted thinking sub-dimension (β=.186; t(179)=2.99; p.05) on emotional eating level was negative; lack of imagination The depression sub-dimension (β=.302; t(177)=4.68; p.05) has a positive effect on the level of emotional eating (β=.169; t(178)=-1.79; p.05). Female gender explains 18% of the total variance in emotional eating status of the sub-dimensions of difficulty expressing emotions, extraverted thinking, and depression in type 2 diabetes patients (R²=0.18).

Table 2. Dutch eating behavior scale, depression, anxiety and stress scale, toronto alexithymia scale mean scores according to some general characteristics of type-2 diabetes patients.

| General features | Dutch Eating Behavior Scale (DEBQ) | Depression | Anxiety | Stress | Toronto Alexithymia Scale (TAS-20) |
|--------------------------------|------------------------------------|------------|-----------|-----------|------------------------------------|
| Gender | Mean SD | Mean SD | | | Mean SD |
| Woman | 8.02±1.86 | 6.38±4.43 | 5.17±3.59 | 6.18±3.41 | 48.71±10.62 |
| Men | 7.84±1.89 | 5.21±3.39 | 5.19±3.21 | 6.80±3.18 | 43.21±10.01 |
| p * | 0.047 | 0.167 | 0.299 | 0.178 | 0.001* |
| Age groups | | | | | |
| 18 years and under | 7.30±1.78 | 4.33±2.06 | 4.98±3.41 | 6.56±3.21 | 44.13±9.19 |
| 18-25 years old | 8.17±1.95 | 4.99±2.21 | 4.76±2.51 | 6.19±2.29 | 47.29±10.25 |
| 25-35 years | 7.48±1.82 | 5.67±2.05 | 4.15±3.89 | 6.34±3.16 | 46.13±9.09 |
| 35 years and older | 7.29±1.82 | 5.89±2.24 | 5.19±3.51 | 6.46±3.44 | 42.17±8.01 |
| p ** | 0.225 | 0.013* | 0.320 | 0.389 | 0.001* |
| Educational Status | | | | | |
| Literate | 7.63±2.01 | 4.13±1.99 | 6.35±3.01 | 6.20±3.89 | 34.33±7.04 |
| Primary school | 7.35±1.83 | 5.21±2.36 | 6.01±2.21 | 6.27±3.20 | 41.22±9.34 |
| High school | 8.36 ±2.08 | 5.01±3.86 | 5.72±3.44 | 6.71±3.44 | 40.14±9.01 |
| University | 7.30±1.78 | 5.25±4.57 | 5.25±3.20 | 6.29±3.75 | 29.21±6.15 |
| p ** | 0.261 | 0.148 | 0.068 | 0.144 | 0.189 |
| Smoking habit | | | | | |
| Yes | 8.66±2.31 | 7.21±3.16 | 5.18±3.01 | 6.45±3.95 | 40.15±10.29 |
| No | 7.31±1.80 | 4.34±1.96 | 5.32±3.44 | 6.34±3.55 | 44.23±11.34 |
| p * | 0.023* | 0.003* | 0.349 | 0.056 | 0.067 |
| Monthly Income | | | | | |
| 3000 TL and below | 7.11±1.21 | 6.19±3.24 | 5.87±3.18 | 6.72±3.41 | 38.21±9.47 |
| 3000-5000 TL | 7.67±2.29 | 6.89±3.18 | 5.19±3.67 | 6.01±3.99 | 29.13±5.19 |
| 5000-8000 TL | 8.07±2.31 | 5.08±3.99 | 5.29±3.89 | 5.91±3.75 | 31.24±6.62 |
| 10000 TL and above | 7.35±1.80 | 6.78±3.41 | 5.35±3.18 | 6.62±2.44 | 26.45±4.41 |
| p ** | 0.156 | 0.231 | 0.209 | 0.145 | 0.431 |
| BMI Category | | | | | |
| Thin | 6.82±1.66 | 6.44±2.11 | 5.23±2.29 | 6.24±3.75 | 31.13±7.23 |
| Normal | 7.06±1.08 | 6.56±2.18 | 5.26±3.31 | 7.01±3.15 | 24.26±6.18 |
| Fat | 7.37±1.84 | 7.01±3.82 | 5.18±4.47 | 7.13±3.82 | 25.19±5.91 |
| Obese | 8.37±1.95 | 6.27±3.86 | 5.22±2.87 | 7.75±2.87 | 27.89±5.39 |
| Morbid Obese | 7.58±1.86 | 6.90±3.20 | 5.77±2.78 | 6.79±3.75 | 29.11±5.19 |
| p ** | 0.134 | 0.129 | 0.076 | 0.099 | 0.211 |
| Number of meals per day | | | | | |
| 1 meal | 8.25±2.31 | 4.13±1.99 | 5.34±2.34 | 6.88±2.08 | 41.23±11.67 |
| 2 meals | 7.59±2.24 | 5.21±2.11 | 5.45±3.19 | 6.78±3.95 | 38.37±10.33 |
| 3 meals | 7.18±2.14 | 5.99±2.18 | 5.78±3.71 | 5.24±2.24 | 34.21±8.77 |
| p ** | 0.376 | 0.290 | 0.272 | 0.078 | 0.101 |
| Often skipped meals | | | | | |
| Breakfast | 8.63±1.99 | 4.38±2.33 | 5.11±2.75 | 5.24±2.22 | 35.25±6.55 |
| Noon | 7.63±2.03 | 6.20±2.21 | 5.39±3.59 | 6.29±2.31 | 28.75±4.12 |
| Evening | 8.45±2.01 | 5.23±2.88 | 5.99±3.30 | 6.01±3.75 | 32.24±11.12 |
| p ** | 0.206 | 0.230 | 0.059 | 0.191 | 0.294 |

SD= Standard Deviation *Mann Whitney U test. ** Kruskal Wallis test.

Discussion

The connection between alexithymia and emotional eating Alexithymia is linked to a variety of conditions, including depression, anxiety, obsessive compulsive disorder,

schizophrenia, and post-traumatic stress disorder [9]. Emotional eating behavior is one of these disorders, and it is the focus of this research. It is stated that alexithymia is associated with unhealthy eating behavior in the non-

Table 3. Correlation analysis of the relationship between Dutch eating behavior scale and sub-dimensions of type-2 diabetes patients and alexithymia sub-dimensions of DAS-21 sub-dimensions.

| Eating behavior | DAS-21 | | | | TAS-20 sub-dimensions | |
|-----------------------------|------------|--------|---------|-------------------------------------|---------------------------------|----------------------|
| | Depression | Stress | Anxiety | Difficulty expressing your feelings | Difficulty identifying emotions | Extroverted thinking |
| DEBQ | .231** | .094 | .159 | .074 | .236** | .088 |
| Emotional eating | .018 | .205** | .038 | .086 | .269** | .125* |
| Restrictive eating behavior | .189 | .194 | .343** | .027 | .169** | .078 |
| Extrinsic eating behavior | .301** | .128** | .163** | .469** | .381** | .081 |

* The Spearman correlation test, *p<.05. **p<.01. ***p<.001.

Table 4. Multiple regression analysis of the effects of TAS-20 and DAS-21 sub- dimensions on emotional eating levels in type 2 diabetes patients.

| | Model 1 | Model 2 |
|-------------------------------------|---------|---------|
| Constant | 31.44 | 32.01 |
| Woman | 0.39** | .44*** |
| TAS-20 sub-dimensions | | |
| Difficulty expressing your feelings | | -.33* |
| Extroverted thinking | | .68 |
| DAS-21 sub-dimensions | | |
| Depression | | -.16* |
| Stress | | .35*** |
| Anxiety | | .20 |
| R ² | .26 | .18 |

Note: Standardized regression coefficients were used. N=180.

*p<.05. **p<.01. ***p<.001.

clinical sample [10, 11]. It has been discovered that low self-awareness is a predictor of eating disorder persistence. According to study, women with high alexithymia consume more nutrients after stressful situations than women with low alexithymia, and they also prefer more palatable foods (carbohydrates and fats) [12]. Furthermore, in a study of obese women with and without binge eating disorder, alexithymia was found to be a predictor of emotional eating in the group that did not have eating disorders [13].

It has been discovered that being female increases emotional eating. Many studies on the relationship between gender and emotional eating have found similar results [14]. Cotter and Kelly discovered that women are more prone to emotional eating, eat under stress, and gain weight, whereas Thompson and Romeo discovered that depression, stress, and anxiety affect overeating in women more than men. (Emotional eating in depressed patients and its influencing factors) [15]. In this study, it was found that there were more female participants than male participants, and the majority of participants were middle-aged. It was discovered that some people had diabetes and other illnesses as well. Additionally, it's been established that people are overweight, which increases their risk of developing type 2 diabetes. It is well known that diabetes sufferers who skip meals will experience poor metabolic health.

This study found that people frequently skip lunch and experience chronic hunger.

It was discovered that patients with type 2 diabetes' emotional eating was unaffected by their gender, age, education level, socioeconomic status, or employment status. According to the research done by Arslantaş et al., the students' family income level had no bearing on their emotional eating [16]. According to studies by Crow et al. (1998) and Üstünsoy obanolu et al. (2008), the diagnosis of impaired eating behavior or an eating disorder is made in 90% of type-2 diabetes patients before the diagnosis of diabetes [17, 18]. Patients with type 2 diabetes start to exhibit worsening eating habits between the ages of 15 and 35. It is well known that patients engage in binge eating to prevent hypoglycemic seizures, which leads to obesity in the individual. Type 2 diabetes is brought on by obesity-related insulin resistance [17, 19]. Impaired eating habits are a risk factor for patients in this perspective. In a study with 820 patients who had type-2 diabetes, depression and anxiety were found in 48.2% and 55.1%, respectively [20]. In a different study with 80 type 2 diabetes patients, it was discovered that while healthy people had a lifetime prevalence of depression of 13.3%, type 2 diabetes patients had a prevalence of 43.3% [21]. In this study, it was found that women scored higher on the alexithymia scale and the dutch eating behavior scale than did men. It was found that women experienced emotional eating more frequently than men did, and that women also had a harder time expressing themselves.

According to the study's findings, especially in terms of the sub-dimensions of recognizing and identifying emotions, an increase in the symptoms of depression, anxiety, and stress leads to an increase in alexithymia [4]. The relationship between diabetes mellitus and alexithymia has been noted. People who have alexithymic diabetes are said to be more likely to develop disorders later on and experience higher levels of stress because their capacity to control bodily and emotional signals is impaired [22]. Additionally, 48% of young patients with Type 1 diabetes were found to have alexithymia [23]. The study looked at the connections between alexithymia and stress, anxiety, and depression in 304 participants receiving addiction treatment. The study's findings showed a correlation between alexithymia and depression of 53%, anxiety of 54%, and stress of 46%. [24]. A correlation between alexithymia and depression was discovered in the study by Dalbudak (2013) et al. 85 male and 234 female participants. According to

the study, more emotional eating leads to an increase in alexithymic traits [25]. The sub-dimensions of recognizing and identifying emotions of alexithymia were found to be positively correlated with emotional eating brought on by an anxious mood in a study with 344 high school students investigating the effects of emotional eating on eating behavior disorders [26]. In a study by Tan and Chow (2014) involving 345 young adults, it was found that individuals who struggle with emotion recognition and definition turn to emotional eating [27]. The outcome of this study is consistent with that of previous studies in the literature. People with eating disorders like anorexia or bulimia frequently exhibit high levels of alexithymia, particularly those who have trouble identifying and defining their own emotions. Those who suffer from these eating disorders might find the emotions repugnant or terrifying. There is a positive and significant relationship between emotional eating and stress, difficulty identifying emotions, and extroverted thinking in this study's correlation analysis using the sub-dimensions of the Dutch eating behavior scale. There is also a positive and significant relationship between restrictive eating behavior and anxiety, difficulty identifying emotions. the inability to express feelings of depression, stress, anxiety, and difficulty defining emotions were all positively and significantly correlated with external eating behavior.

The majority of studies on eating disorders have shown that those with eating disorders and eating disorders have higher levels of alexithymia than healthy controls. Deficits in defining and expressing the emotions of those with eating disorders are seen when the personal characteristics of alexithymia are examined [28, 29]. In 413 obese male and female participants, Larsen et al. (2006) looked at the connection between alexithymia and emotional eating [30]. Alexithymia was discovered to be linked to emotional eating, particularly when the sub-dimension of difficulty in recognizing and identifying emotions was taken into consideration. The association between emotional eating and depressive symptoms was investigated in a study with 2035 female and 1679 male participants. The findings of this study showed a correlation between increased emotional eating behavior and high levels of depressive symptoms. Additionally, research has shown that depressive symptoms and emotional eating can influence food preferences [30, 31]. According to Konttinen et al. (2010), participants with depressive symptoms and emotional eating behaviors frequently turned to unhealthy foods [31]. An investigation into the connection between depressive symptoms, anxiety, and frustration, and emotional eating involved 59 overweight and 100 non-overweight participants. Following this review, it was discovered that symptoms of anxiety, depression, and reactions to frustration resulted in modifications in eating habits [32]. This study found that emotional eating in type 2 diabetes patients is influenced by sub-dimensions of depression, extraversion, difficulty expressing emotions, and female gender.

Conclusion

When the study's emotional eating behavior is considered within the context of DAS and alexithymia symptoms, it has been observed that it is used as a coping strategy in

individuals. This is because DAS and alexithymia symptoms cause negative emotions in the person. When working with people who exhibit emotional eating behavior in a clinical setting, the person's coping strategies should be addressed, as well as the methods for employing coping strategies.

Ethical approval

Ethical approval was obtained for the study from Malatya Turgut Özal University Non-Interventional Research Ethics Committee (Date: 20.10.2022 session number: 2022-10).

References

1. Semenkovich K, et al. Depression in type 2 diabetes mellitus: prevalence, impact, and treatment. *Drugs*, 2015. 75(6): p. 577-587.
2. Darwish L, et al. Depression in people with type 2 diabetes: current perspectives. *Diabetes, metabolic syndrome and obesity: targets and therapy*, 2018. 11: p. 333.
3. Asuzu CC, et al. Pathways for the relationship between diabetes distress, depression, fatalism and glycemic control in adults with type 2 diabetes. *Journal of Diabetes and its Complications*, 2017. 31(1): p. 169-174.
4. Martino G, et al. The relationship between alexithymia and type 2 diabetes: a systematic review. *Frontiers in psychology*, 2020. 11: p. 2026.
5. Luca A, et al. Alexithymia, more than depression, influences glycaemic control of type 2 diabetic patients. *Journal of endocrinological investigation*, 2015. 38(6): p. 653-660.
6. Lovibond PF. and SH. Lovibond, The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, 1995. 33(3): p. 335-343.
7. Yıldırım A, M. Boysan, and MC. Kefeli, Psychometric properties of the Turkish version of the Depression Anxiety Stress Scale-21 (DASS-21). *British Journal of Guidance & Counselling*, 2018. 46(5): p. 582-595.
8. Van Strien T, et al. The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International journal of eating disorders*, 1986. 5(2): p. 295-315.
9. Lyvers M, et al. Parental bonding, adult attachment, and theory of mind: A developmental model of alexithymia and alcohol-related risk. *Journal of Clinical Psychology*, 2019. 75(7): p. 1288-1304.
10. Godart N, et al. Comorbidity studies of eating disorders and mood disorders. *Critical review of the literature. Journal of affective disorders*, 2007. 97(1-3): p. 37-49.
11. Deger VB, et al. Relationship Between School Performance and Breakfast Quality in Refugee Children: Case Study of Mardin Region. *Iran J Pediatr*, 2021. 31(3): p. e109584 DOI: 10.5812/ijp.109584.
12. van Strien T, et al. Mediation of emotional and external eating between dieting and food intake or BMI gain in women. *Appetite*, 2020. 145: p. 104493.
13. Pinaquy S, et al. Emotional eating, alexithymia, and binge-eating disorder in obese women. *Obesity research*, 2003. 11(2): p. 195-201.
14. Bohon LM, et al. The theory of planned behavior as it predicts potential intention to seek mental health services for depression among college students. *Journal of American college health*, 2016. 64(8): p. 593-603.
15. Cotter EW, et al. An investigation of body appreciation, ethnic identity, and eating disorder symptoms in Black women. *Journal of Black Psychology*, 2015. 41(1): p. 3-25.
16. Öner K. and H. Arslantaş, Internet addiction in high school students, affecting factors and relationship between internet addiction and depression risk. 2018.
17. Çobanoğlu ZSÜ, et al. Tip 1 ve tip 2 diyabetes mellitus hastalarında yeme bozuklukları ve bozulmuş yeme davranışı. *Düşünen Adam*, 2008. 21(1-4): p. 24-31.

18. Crow S, et al. Binge eating and other psychopathology in patients with type II diabetes mellitus. *International Journal of Eating Disorders*, 2001. 30(2): p. 222-226.
19. Meltzer LJ, et al. Disordered eating, body mass, and glycemic control in adolescents with type 1 diabetes. *Diabetes care*, 2001. 24(4): p. 678-682.
20. Tovilla-Zarate C, et al. Prevalence of anxiety and depression among outpatients with type 2 diabetes in the Mexican population. *PloS one*, 2012. 7(5): p. e36887.
21. Pradeep A, et al. Comparison of efficacy of three commercially available dentifrices on dentinal hypersensitivity: a randomized clinical trial. *Australian dental journal*, 2012. 57(4): p. 429-434.
22. Martino G, et al. Alexithymia and psychological distress affect perceived quality of life in patients with type 2 diabetes mellitus. *Mediterranean Journal of Clinical Psychology*, 2019. 7(3).
23. Melin EO, et al. Depression, obesity, and smoking were independently associated with inadequate glycemic control in patients with type 1 diabetes. *Eur J Endocrinol*, 2013. 168(6): p. 861-869.
24. Nezhad S, et al. The relationship of alexithymia with depression, anxiety, stress, and fatigue among people under addiction treatment. *Annals of Tropical Medicine and Public Health*, 2017. 10(6).
25. Dalbudak E, et al. Alexithymia and personality in relation to social anxiety among university students. *Psychiatry research*, 2013. 209(2): p. 167-172.
26. Khodabakhsh MR. and F. Kiani, Effects of emotional eating on eating behaviors disorder in students: The effects of anxious mood and emotion expression. *International Journal of Pediatrics*, 2014. 2(4.1): p. 295-303.
27. Tan CC. and CM. Chow, Stress and emotional eating: The mediating role of eating dysregulation. *Personality and individual differences*, 2014. 66: p. 1-4.
28. Nowakowski ME, T. McFarlane, and S. Cassin, Alexithymia and eating disorders: a critical review of the literature. *Journal of eating disorders*, 2013. 1(1): p. 1-14.
29. Karukivi M, et al. Alexithymia and eating disorder symptoms in adolescents. *Eating Disorders*, 2010. 18(3): p. 226-238.
30. Larsen JK, et al. Gender differences in the association between alexithymia and emotional eating in obese individuals. *Journal of psychosomatic research*, 2006. 60(3): p. 237-243.
31. Kontinen H, et al. Emotional eating, depressive symptoms and self-reported food consumption. A population-based study. *Appetite*, 2010. 54(3): p. 473-479.
32. Tanofsky-Kraff M, et al. Validation of the emotional eating scale adapted for use in children and adolescents (EES-C). *International Journal of Eating Disorders*, 2007. 40(3): p. 232-240.