



Factors affecting yo-yo syndrome in university students with obesity

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Abstract

Aim: Millions of people of all ages around the world are overweight or obese. Although many try dieting to lose their excess weight, the success rate is 20%, and only 2% are able to control their weight. This process becomes a vicious cycle of constantly gaining and losing weight, which is called yo-yo syndrome. Previous studies have found that obesity awareness was low in samples of university students. The present study aimed to determine the reasons that obese university students develop yo-yo syndrome by analyzing their dietary histories.

Materials and Methods: This qualitative study applied a phenomenological research method. The study population consisted of nine students in various faculties at Ordu University. Semi-structured interviews were conducted, and demographic information, such as age and gender, was collected to determine the number of diets that were started and stopped. Data were collected from the Faculty of Education.

Results: The following themes emerged from the data analysis: defense mechanisms in the categories of rationalization, denial, and projection; boredom in the category of boredom; health in the categories of fear of disease and death anxiety; social-physical anxiety in the categories of bodily discontent and mockery; and social anxiety in the categories of cultural pressure, peer relationships, and close relationships.

Conclusion: The reasons that the university students in the study sample developed yo-yo syndrome were identified according to the categories and themes that emerged from the data analysis. Based on these findings, it has been suggested that psycho-education, psychiatric treatment, and follow-ups would be beneficial in treating yo-yo syndrome.



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Introduction

The global health problem of obesity causes many diseases, ranging from metabolic to cardiovascular. It also increases morbidity, which is a factor in hypertension, dyslipidemia, insulin resistance, and severe psychological stress [1]. The most significant factors of obesity are malnutrition and calorie imbalance [2]. Therefore, obese people of all ages attempt dieting to lose their excess weight. Weight management is related to lifestyle, and the goal of weight loss is to stop the progression of type 2 diabetes (T2D) and prevent cardiovascular disease [3]. However, previous research has shown that the success rate of dieters is 20%, and only 2% of dieters can control their weight [4]. In a 15-year follow-up study, the rate of maintaining permanent weight loss was < 6% [5]. In 2016, more than 1.9 billion adults and 340 million children were reported to be overweight or obese [2]. Ineffective diets and the desire to lose

weight in a short period negatively affect the treatment of obesity [6]. This process becomes a vicious cycle of constantly losing and gaining weight. Brownell [4] termed this cycle the yo-yo syndrome. In this syndrome, weight loss occurs by dieting, but weight gain usually begins within the first year. Pre-diet weight is reached and sometimes exceeded within the next two to five years [7]. The development of yo-yo syndrome depends on several factors, such as age, gender, health status, physical activity, and dietary history [7]. Other factors include attempting to lose weight quickly, diets that are not suitable for an individual's lifestyle and physical condition, unconscious drug use and exercise, frequent dieting, and low-calorie diets [8]. In yo-yo syndrome, the muscle ratio in the body decreases, and the fat ratio increases, which is accompanied by increased appetite, resistance to weight loss, and psychological problems [9]. Moreover, the constant effort to maintain weight leads to high levels of mental and physical fatigue [10]. Yo-yo syndrome also causes rapid changes in the general appearance of the body. The reason is that incorrect

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diet practices and poor nutrition lead to a rapid increase in the body's fat stores and decreased muscle gain [11]. Such practices also increase the risk of T2D and cardiovascular disease [12]. In addition, previous research has shown that yo-yo syndrome worsens metabolic responses [13].

Previous studies have found low obesity awareness in university students, and obesity rates were determined to be 8.5% [14], 11.4% [15], and 33.53% [16]. However, no previous study has been conducted to determine the reasons for the development of yo-yo syndrome in obese university students based on their dietary histories. The results of the present study will contribute to increasing the awareness of yo-yo syndrome and developing strategies for its effective treatment.

Materials and Methods

In this study, university students who had been diagnosed with obesity and who had left a diet program at least four times were considered to have yo-yo syndrome. The study was approved by the Social Sciences and Humanities Research Ethics Committee of Ordu University (Decision number: 2024-43, Date: 28.03.2024). In a successful weight loss process, it is essential that obese individuals initially reduce $\geq 10\%$ of their body weight and maintain their weight loss for ≥ 1 year [17]. This criterion was applied to select the students included in the study. The study is retrospective and comprised students who attended counseling regularly over the course of a year, with the research domain identified as yo-yo syndrome. Students who did not attend regularly within the one-year period were excluded from the evaluation. Six students were from the Faculty of Education, two were from the Faculty of Arts and Sciences, and one was from the Faculty of Music and Performing Arts. Six students were female, and three were male; their ages ranged between 18 and 23 years.

A phenomenological research method was applied in this qualitative study. In this phenomenological research, data were collected from in-depth interviews with a small number of participants. Semi-structured face-to-face interviews and a personal information form were designed to collect data on the following variables: number of diets started and stopped; level of education, gender, and age. Data were collected in face-to-face interviews with the study participants. Each interview lasted approximately 30 minutes. The participants were asked to give reasons for their unsuccessful dieting. In-depth interviews were also conducted. The validity and reliability of the findings of the study were assessed using strategies such as credibility, transferability, consistency, and confirmability. The obtained data were evaluated using inductive content analysis [18]. In this study, categories and themes were identified in the data analysis [19]. The data were coded, similar data were combined systematically, and themes were identified and categorized. Coding was performed by two experts in the field to ensure consistency. In the data analysis, five themes were identified, and 11 categories were created.

Sample size

In the measurement conducted using the single-sample proportion test in G*Power 3.1 software, the hypothesis of the study was two-tailed, with an effect size of 0.45 (large), $\alpha = 0.05$, and a study power of 0.80. Consequently, the required minimum sample size was calculated as 9 [20].

Clients' information

First client, she is an 18-year-old first-year female student studying at the Faculty of Education. The student stated that he had a weight problem since middle school (age 13) and that he went on and broke diets approximately 6 times during his high school years. She expressed that she prepared two diet programs from her friends, two from media outlets, and the others by herself, eating very little. She sought psychological help because she went on a diet again and broke it when she last started university.

Second client, she is a 22-year-old third-year female student studying at the Faculty of Education. The student stated that he had a weight problem since the third year of high school during the university preparation period and that he started and broke diets at least 3 times during his high school years and then at least 2 times during his university years. She expressed that she got diet programs from her friends, went to a dietitian in the fourth year of high school, and then went on and broke diets twice during her university years.

Third client, she is a 22-year-old third-year female student studying at the Faculty of Education. The student stated that he had a weight problem since the third year of high school during the university preparation period and that he started and broke diets at least 3 times during his high school years and then at least 2 times during his university years. She expressed that she got diet programs from her friends, went to a dietitian in the fourth year of high school, and then went on and broke diets twice during her university years.

Fourth client, she is a 23-year-old fourth-year female student studying at the faculty of education. The student stated that he had a weight problem since the second grade of secondary school (12 years old) and then went on a diet with his mother arranging meals, continued with media information, and tried to follow diet programs under the control of a dietitian during his high school years. She expressed that her unsuccessful diet attempts continued at least 3 times during university.

Fifth client, he is a 22-year-old third-year male student studying at the Faculty of Education. The student stated that he had a weight problem since his primary school years (7 years old) and that he received medical help for this reason, but he was not successful. He expressed that he went on and off diets frequently throughout his school years, and that he only went on one of these in his third year of high school under the supervision of a dietitian.

Sixth client, He is a 21-year-old second-year male student studying at the Faculty of Education. The student stated that he had a weight problem since kindergarten and tried to follow the diet programs provided by his family since secondary school, then he received help from his friends

and that he attempted to lose weight under the supervision of a dietician in his first year at university. He later expressed that, in his own experience, he went on a diet at least twice, but broke it after a while.

Seventh client, she is a 23-year-old third-year female student studying at the Faculty of Arts and Sciences. The student stated that he had a weight problem since the third grade of secondary school and that he frequently went on diets and broke them since those years. She expressed that she received dietitian support at university but was unsuccessful.

Eighth client, he is a 19-year-old second-year male student studying at the Faculty of Arts and Sciences. The student stated that he had a weight problem since his high school years and that he went on a diet three times during his high school years, twice under the control of a dietitian, and then broke it. He expressed that he had two diet attempts at university.

Ninth client, she is a 20-year-old second-year female student studying at the Faculty of Music and Performing Arts. The student stated that he had a weight problem since the third year of high school and that he attempted to diet at least 3 times during his high school years and twice during university. She expressed that she received diet programs from her friends and tried to lose weight with the support of a dietician at university but was unsuccessful.

Data analysis

The collected data were evaluated using the inductive content analysis method. Concepts and relationships were determined based on the data obtained from observations and interviews [21]. In the inductive content analysis, the data were evaluated in three stages, as follows:

Coding the data

In the first stage, each participant was assigned a number (P1, K2, K3, etc.). The interviews were transcribed, and the data obtained from the participants were analyzed within the framework of the research. The findings were divided into sections, their conceptual meanings were identified, and a list was created based on the coding. This code list was key to the organization of the data. Only the data collected from the interview questions were included in the coding.

Finding themes

In this stage, each code determined during the coding phase of the data was deemed a separate category, and similar categories were converted into themes in line with the literature.

Interpretation of findings

The data obtained were interpreted by the researcher. In the last stage, the findings were discussed and supported by the literature.

Results

The findings obtained as a result of the analysis of the data of the study were given in the form of tables (Table 1 and 2) below. According to this.

As shown in Table 1, two themes and four categories of reasons emerged from the data analysis. An interesting finding was that the most frequent reason was related to the rationalization defense mechanism.

As shown in Table 2, three themes and seven categories of reasons for resuming a diet emerged from the data analysis. A crucial finding was that the effects of the social environment were considered more motivating than the health problems caused by obesity.

Discussion

Discussion The participants were asked to give their reasons for unsuccessful dieting. The theme of defense mechanisms emerged in line with the categories of rationalization, denial, and projection. In 1894, Freud discussed defense mechanisms for the first time. He defined them as

Table 1. Reasons for unsuccessful dieting.

Theme	Category	Example thoughts on codes	Number (Percentage)
Defense mechanisms	Denial	I forget I'm dieting.	16 (25.8)
	Rationalization	I have an important exam to pass today.	22 (35.5)
	Projection	They make me angry. When I get angry, I can't help myself.	9 (14.5)
Boredom	Getting bored	I'm fed up now; how far!	15 (24.2)
Total			62 (100)

Table 2. Reasons for resuming a diet.

Theme	Category	Example thoughts on codes	Number (Percentage)
Health	Fear of disease	If it goes on like this, I'm going to get sick.	20 (18.5)
	Death anxiety	I'm afraid of dying young.	6 (5.6)
Social-physical anxiety	Body dissatisfaction	I look so bad; I'm drooling all over.	22 (20.4)
	Mockery	I'm sick of mocking smiles, it's driving me crazy.	18 (16.6)
Social anxiety	Cultural pressure	It is said that I look like a mother, not a young girl.	15 (13.9)
	Peer relationships	Who would want to befriend me?	8 (7.5)
	Close relationships	No girl likes me the way I am.	19 (17.5)
Total			108 (100)

general mental mechanisms used unconsciously in conflict situations. He did not consider them pathological until 1915 [22]. Subsequently, he explained that defense mechanisms were a basic function of the ego that provided psychological balance. Currently, according to the third edition of the *Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association*, defense mechanisms are included in evaluations of mental disorders. Defense mechanisms are automatic responses to an unconsciously perceived threat [23]. However, when these responses occur consistently and rigidly, they are considered inappropriate and abnormal [24].

The rationalization, denial, and projection defense mechanisms frequently described by the participants in this study are problematic behaviors; moreover, they are considered immature defense mechanisms [25]. Immature defense mechanisms are primitive responses associated with the prelinguistic period, and their emergence in adulthood is considered to indicate a defective ego structure [26]. In rationalization, there is an effort to get rid of tension by manifesting unacceptable instinctive wishes in a rational form [26]. Eating behavior is a primitive instinctive desire, and its rationalization was determined to be a problematic behavior among the adult university students in this study. In the denial defense mechanism, the subject unconsciously suppresses the situation that causes tension and acts as if it does not exist [26]. The denial mechanism, which is thought to form the basis of defense mechanisms, was also identified as an immature defense mechanism in this study. In the projection defense mechanism, the individual transfers unacceptable feelings and thoughts to others [26]. In this study, the findings showed that this defense mechanism was also used by the participants. Similarly, previous studies have found a direct association between immature defense mechanisms and psychological problems [26]. In another study, an association was found between obesity and immature defense mechanisms [27].

From another point of view, the inability to restrain constant eating behavior could be considered addiction. Previous studies in the literature have found that denial, rationalization, and projection defense mechanisms are related to addiction. Neurobiological changes in food addiction, which are characterized by the pursuit of pleasure and the consequent loss of control, have been detected at high rates in obese patients [28]. Studies have also shown that the ventral striatum, prefrontal cortex, and amygdala regions of the brain are sensitive to the pleasurable aspects of food. Here, the reward system is mediated by dopamine. In addition, genetic studies have determined that the Taq1A A1 allele of the DRD2 reward gene is associated with obesity, and that DRD2 receptor disorders trigger the risk of multiple addictions in addition to impulsive and compulsive behavior. In addition, it has been found that in consumer societies, fast-food is prevalent in all areas of life (e.g., schools, restaurants, markets, etc.) and that environmental factors play an important role in food addiction. Thus, genetic, behavioral, and environmental factors have been found to play a role in food addiction [29,30]. In this case, the reasons for the rationalization, denial, and projection defense mechanisms found in the present study can be attributed to genetic, behavioral, and environmental factors.

The findings of this study showed that the theme of boredom emerged. The second theme included the reasons for unsuccessful dieting. Similarly, in a previous study conducted on university students, boredom was the most significant factor leading to yo-yo syndrome. A previous study concluded that a person who goes on a diet feels very limited and stops dieting because of simple distractors and frequent, unsuccessful dieting [31]. In addition, the inability to make dieting a part of an individual's lifestyle has also been shown to be an important factor [31].

The second question asked the participants to describe their reasons for restarting a diet. The health theme and the categories of fear of disease and death anxiety emerged from the data analysis. Although fear and anxiety are related concepts, their anatomical and biological processes differ. Nonetheless, it is difficult to distinguish between them in threat situations [32]. According to the conditioning approach, a threat situation induces the following: as a result of the binding of neutral stimuli with painful stimuli, similar responses to fear and anxiety occur. In the present study, a meaningful finding was that the theme of health emerged in the fear of disease and death anxiety categories, which is in line with the behavioral immune system theory. According to this theory, an individual develops negative emotions (e.g., reluctance, anxiety, fear, etc.) and negative cognitive evaluations as protection against a life-threatening situation. Thus, behavioral responses to the threat emerge [33,34]. Similarly, the findings indicated that health concerns triggered by fear and anxiety were important factors in the participants' dieting behavior and were reasons that they had developed yo-yo syndrome.

The social-physical anxiety theme also emerged in the participants' responses to the second question, which fell within the category of body dissatisfaction and mockery. According to this theme, social-physical anxiety is experienced in relation to body image. The findings showed that social-physical anxiety emerged when the participants thought that others in their social environment did not like them because of their physical appearance. This response can be explained by self-presentation theory, according to which every person is naturally motivated to be liked by other people. According to this theory, social-physical anxiety occurs when individuals cannot create an image of their bodily appearance. Previous studies have found that social-physical anxiety is related to both body dissatisfaction and eating attitudes [35,36]. Similarly, in the present study, because social-physical anxiety was a motivating factor in resuming a diet, it can be considered a factor that triggers yo-yo syndrome.

The last theme that emerged regarding the resumption of a diet was social anxiety. Its related categories were cultural pressure, peer relationships, and close relationships. Similarly, it has been shown that social and cultural factors affect eating attitudes and behaviors in young people. In the present study, combined with other social factors, the association between peer relationships and eating disorders emerged. The factors of less peer acceptance, criticism, and mockery emerged in relation to poor body image. Moreover, the findings showed that peer bullying was associated with obesity in addition to other factors (e.g.,

avoidance of relationships, introversion, constant feeling of exclusion, etc.) [36-38].

Conclusion

As a result, it has been determined that the reasons for university students to get yo-yo syndrome are denial, rationalization and projection defense mechanisms, as well as boredom caused by frequent diets in the cycle of failing the diet. On the other hand, in the cycle of re-starting the diet, fear of disease and death anxiety came to the fore in terms of health. In addition, other factors include mockery of students' physical discontent due to obesity within the framework of social physical anxiety. Moreover, cultural pressures experienced, bullying situations in peer relationships and problems encountered in close relationships can be listed under the title of social anxiety.

Obesity is a multisystem disease with metabolic and psychiatric components. Previous studies showed that pharmacological and psychotherapeutic applications were ineffective in treating obesity. However, psychiatric treatment with strict follow-up could be beneficial. Other studies have emphasized that same-gender peer pressure is an effective social-cultural factor in weight-loss [39,40]. In this direction, psycho-educational group studies with a large number of cases, programmed according to the themes created on the basis of the categories reached in the research, will also be effective in the treatment of yo-yo syndrome.

Ethical approval

The study was approved by the Social Sciences and Humanities Research Ethics Committee of Ordu University (Decision number: 2024-43, Date: 28.03.2024).

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