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Author: Bernadetta Izydorczyk

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The results of research aimed at identifying psychological predictors of impulsive and restrictive behaviours in a population of females suffering from anorexia or bulimia nervosa – the author's own research report

Bernadetta Izydorczyk

Summary

Aim of the study. The results of research aimed at identifying psychological predictors of impulsive and restrictive behaviours in a population of females suffering from anorexia or bulimia.
Subject or material and methods. Eating Disorder Inventory (EDI) devised by D. Garner. Clinical group:90 Polish females with bulimia and anorexia, A control group: 121 women, who exhibited no eating disorders.
Results. Analysis of the data gathered as a result of this research demonstrated that the females comprising the clinical sample, who exhibited symptoms of bulimia or anorexia displayed inappropriate levels of all emotional and cognitive characteristics. Statistically significant differences were observed between the clinical and control subjects in terms of the variables investigated in the study.
Discussion. The data analysis revealed that low interoceptive awareness proved to be a significant predictor of impulsive and restrictive behaviors in anorexia and bulimia. Perfectionism and body dissatisfaction were found to be significant determinants of restrictive behaviors. Whereas, such variables as a tendency towards bulimia and body dissatisfaction emerged as predictive factors for the symptoms of bulimia and bulimia type anorexia.
Conclusions. Possibility that a psychological diagnosis of the emotional and cognitive characteristics displayed by females diagnosed with anorexia or bulimia nervosa is likely to facilitate the process of detecting the symptoms which are typical of the particular types of eating disorders, and thus it is a tool that can be useful at the initial stage of treatment, which involves establishing appropriate psychological interventions aimed at eliminating impulsive and restrictive behaviors developed in patients diagnosed with the aforementioned eating disorders.

bulimia nervosa / anorexia / psychological predictors / impulsive and restrictive behaviours

INTRODUCTION

The main aim of this paper is to report the results of research conducted by the present author, and to present the findings and conclusions concerning distinctive emotional and cognitive characteristics which, according to the research data presented in the subject literature, describe psychological functioning of individuals suffering from anorexia or bulimia nervosa, and are regarded as significant factors that predict the development of impulsive and restrictive behaviours in patients diagnosed with the aforementioned eating disorders. The former pattern of behaviour is characterized by episodes of consuming huge

Bernadetta Izydorczyk: Department of Clinical and Forensic Psychology, University of Silesia, Katowice. **Correspondence address:** b.izydorczyk@interia.pl

amounts of food in a short amount of time, which are referred to as bulimic cycles, commonly understood to mean uncontrollable and compulsive binge eating, followed by recurrent compensatory behaviours aimed at reducing body weight and eliminating the consequences of overeating, which include self-induced vomiting, misuse of laxatives, diuretics, or other stimulants in order to get rid of the eaten food and to lose unwanted weight.

Restrictive behaviours include regular excessive exercising, which often leads to a state of body emaciation and is detrimental to health, as well as restrictive dieting that involves fasting and using appetite-reducing substances, which is aimed at severe caloric restriction, reducing food intake, eliminating the food high in fat, and consequently reducing body weight.

The two aforementioned patterns of behaviour have certain common characteristics which include cognitive dysfunctions such as preoccupation with food, as well as a powerful impact of body weight and the body mass index BMI on self-assessment; fear of gaining weight, which is an emotional aspect of anorexia and bulimia nervosa; along with behavioral symptoms such as a tendency to engage in compensatory behaviours, especially in case of binge eating/purging type of anorexia, also referred to as bulimia-type anorexia nervosa.

Exploration of the subject literature shows that there are three major theoretical paradigms concerning the predictive factors for eating disorders, and psychological mechanisms explaining their symptomatology. According to psychoanalytical conceptions and psychodynamic paradigm described in scientific references, anorexia and bulimia nervosa are a vehicle through which the patients can resolve their inner conflicts, satisfy their own needs and relieve emotional tension [1]. Moreover, the aforementioned eating disorders are proved to develop as a result of disturbances in the body self structure and the person's body experience [2].

Cognitive and socio-cultural theories (e.g. a feminist approach) posit that the mechanisms of self-imposed restrictive dieting or overeating in eating disorders are triggered by negative body image, as well as enduring discrepancy between the actual and ideal body image [4,5]. Repetitive weight loss and restrictive dieting, which are frequently aimed at complying with the socio-cultural norms for appearance, prove to be examples of behaviours that lead to a vicious circle of slimming and overeating [6].

A review of reference literature reveals that individuals suffering from eating disorders exhibit specific psychological characteristics [7], which contribute to the development of impulsive and restrictive behaviours in this group of patients.

According to the subject literature, impulsive behaviours are triggered primarily by lack of drive and impulse control, whereas perfectionism tends to predict restrictive tendencies among individuals suffering from eating disorders [7]. The present study was aimed at establishing if there are also other psychological characteristics which are likely to contribute to the development of impulsive and restrictive behaviours in a population of Polish females suffering from anorexia or bulimia nervosa.

The current study investigated the relationship between the independent variables (i.e. psychological characteristics) and indicators of impulsive and restrictive behaviours exhibited by the research participants. Due to lack of long-term access to a research sample, the present author conducted only a cross-sectional study.

A review of the subject literature mentioned above revealed that individuals suffering from eating disorders display significantly different characteristics, depending on a type of eating disorder they are diagnosed with (e.g. a restrictive or binge eating/purging type of anorexia, or bulimia nervosa). The finding was taken into consideration by the author of the present research; therefore its participants were divided into two groups: females suffering from bulimia nervosa or bulimia-type anorexia nervosa, and individuals diagnosed with a restrictive type of anorexia nervosa. The data provided by the subject literature indicate that psychopathological symptoms exhibited by patients with a diagnosis of bulimia- type anorexia prove to be more similar to those characteristic of bulimia nervosa than to the symptoms of a restrictive type of anorexia nervosa [9].

The results of research conducted among patients diagnosed with a restrictive type of anorexia nervosa suggest that these individuals exhibit the characteristics of avoidant, dependent, narcissistic, or obsessive-compulsive (perfection-

ist) personality disorders, and they experience interpersonal difficulties [4, 12, 17].

Other scientific studies have demonstrated similarities between bulimia-type anorexia and bulimia nervosa in terms of psychopathological symptoms as well as psychological characteristics exhibited by the patients diagnosed with the aforementioned eating disorders. This refers predominantly to such symptoms as emotion-impulse regulation disorder, low frustration tolerance level, dysphoria, i.e. impulsivity combined with a tendency to isolate, and depression [7, 18-20]. Additionally, data from several sources have pointed to the fact that the profile of psychological functioning of individuals suffering from bulimia-type anorexia and bulimia nervosa includes the characteristics of obsessive-compulsive personality [19, 20].

Several Polish studies have addressed the question of psychological characteristics of individuals suffering from anorexia and bulimia nervosa. Polish literature concerning the subject describes research conducted by Mikołajczyk and Samochowiec [12], the studies undertaken by Namysłowska, Żechowski [17] as well as the research carried out by Bąk [3] in a male population. In their studies, the aforementioned researchers applied a multidimensional data analysis, involving psychometric and clinical methods of data collection such as a questionnaire and a clinical interview. One of the instruments applied in the studies was the Eating Disorder Inventory (EDI), devised by Garner. It is a popular self-report questionnaire, frequently regarded as the fundamental instrument used to measure personality traits in individuals displaying symptoms of eating disorders [7]. In 2008, the inventory was adapted by a Polish researcher Cezary Żechowski [9]. Due to the fact that the instrument reveals high score reliability and is a tool most widely used in research on eating disorders, it was also applied by the current author.

RESEARCH OBJECTIVES

Two research questions were asked:

1. Which of the psychological characteristics exhibited by the examined individuals with anorexia and bulimia nervosa are likely to predict the development of impulsive behaviours in this group of patients?
2. Which of the psychological characteristics exhibited by the examined individuals with anorexia and bulimia nervosa are likely to predict the development of restrictive behaviours in this group of patients?

The first phase of the research aimed at measuring the level of cognitive and emotional characteristics of psychological functioning of females diagnosed with anorexia or bulimia nervosa, who comprised a clinical population, which was followed by measuring indicators of impulsive and restrictive behaviours in this group of study participants. Based on the data obtained in the first stage, using a questionnaire, the level of the aforementioned variables was diagnosed and classified as either appropriate or inappropriate for maintaining health. In order to show differences between the females suffering from eating disorders and individuals exhibiting no symptoms of the aforementioned disorders in terms of the level of emotional and cognitive characteristics examined in this research, the current author recruited a control group, comprising females exhibiting no symptoms of eating disorders, to have a standard of comparison.

The second stage of the study involved identifying the emotional and cognitive characteristics which are most likely to contribute to the development of impulsive and restrictive behaviours in anorexia and bulimia nervosa.

The main independent variable examined in the research was a cluster of psychological characteristics describing individuals suffering from the aforementioned eating disorders. The profile was created based on the data provided by the subject literature [18]. The major components of the variable included:

(1) body dissatisfaction – which refers to the person's dissatisfaction with his or her general body shape as well as specific body parts,

(2) drive for thinness – described as fear of gaining weight, and excessive concern with dieting as well as extreme preoccupation with weight, and intense desire to be slimmer,

(3) bulimia – referred to as preoccupation with food and overeating as a result of frustration and emotional dejection, usually followed by recurring episodes of binge eating and purging,

(4) interoceptive awareness – interpreted as the ability to recognize and respond to emotional states and body sensations (the feeling of

perplexity accompanying the process of recognizing and responding to emotional states and body sensations),

(5) perfectionism – referred to as the tendency to hold exceptionally high expectations, and to live up to the highest possible standards in order to gain personal achievements in life,

(6) maturity fears – understood to mean the fear of facing the demands of adult life experienced by an individual, that is, the person's approval of psychosexual development, which is related to the process of entering the stage of maturity, and to body image change as well as loss of the sense of childhood security),

(7) ineffectiveness – defined as the feeling of inadequacy, insecurity, worthlessness and having no control over life,

(8) interpersonal distrust – described as an individual's feeling of social alienation, and reluctance to form close relationships, as well as discomfort with expressing personal thoughts and feelings in the company of other people.

An additional control variable was body mass index BMI. It is usually used to estimate a healthy body weight based on a person's height. The BMI index value is calculated as an individual's body weight divided by the square of his or her height. It has been announced that individuals who fall into the BMI range of 19.5 to 24.5 have a healthy weight. A BMI of under 19.5 is usually referred to as underweight. A Body Mass Index reading over 24.5 is considered overweight.

Impulsive and restrictive behaviours characteristic of eating disorders were used as dependent variables.

Measuring the dependent variable involved examining its major indicators such as: frequency of imposing dietary restrictions, intensity of various forms of physical activity (indicators of restrictive behaviours); as well as compensatory behaviours which include self-induced vomiting, misuse of laxatives, diuretics, or other stimulants in order to get rid of the eaten food and to lose unwanted weight (indicators of impulsive behaviours).

Impulsive behaviours are defined as symptoms of bulimia nervosa (the F.50.02 code, according to the ICD criteria of psychiatric classification) and the symptoms meeting the DSM IV criteria for binge eating/purging type of anorexia nervosa.

Restrictive behaviours are referred to as symptoms of a restrictive type of anorexia nervosa (according to the DSM IV criteria of psychiatric classification).

MATERIAL AND METHOD

A clinical population consisted of 90 Polish females diagnosed with bulimia nervosa, aged 20-25. A control group comprised 121 women at the same age, who exhibited no eating disorders. The study participants were similar in terms of socio-demographic and socio-cultural variables such as place of residence (they all lived in the urban or rural environment), level of education, as well as social, economic and marital status. The females comprising a clinical population were selected intentionally. The selection criteria included symptoms of medically diagnosed anorexia or bulimia nervosa (according to the ICD 10: F.50.0 - F.50.2 criteria of psychiatric classification). The clinical population comprised 60 women, medically diagnosed with bulimia nervosa or binge eating/purging type of anorexia nervosa (according to the DSM IV criteria of psychiatric classification), who exhibited impulsive symptoms; as well as 30 females with a medical diagnosis of anorexia nervosa (according to the DSM IV criteria for a restrictive type of anorexia nervosa), who displayed restrictive behaviors.

A mean age in the clinical population of 60 females suffering from bulimia or bulimia type anorexia was 22. The subjects' mean BMI reached the value of 17.08 (in case of 25 individuals diagnosed with bulimia type anorexia), and 20.3 (in case of 35 patients suffering from bulimia nervosa). A mean age in the group of 30 clinical subjects exhibiting symptoms of a restrictive type of anorexia nervosa was 21.3. The females' mean BMI was 17.38. Prior to the research, all the subjects comprising the clinical population had been receiving regular medical and psychological care (at least twice a month) for at least 6 months. The females suffering from eating disorders were examined in outpatient clinics for neurosis and eat-

ing disorders treatment as well as in neurosis and eating disorder treatment centres.

This study is part of a broader research project carried out in the years 2007-2012, which was aimed at examining psychological functioning of females suffering from eating disorders. The research was conducted according to the rule of confidentiality, and with informed consent obtained from all study participants. The study was approved by the Ethics Committee of the University of Silesia.

In an attempt to answer the research questions, the current author applied two questionnaires: a Polish version of the Eating Disorder Inventory (EDI) devised by D. Garner, and the Body-Related Behaviours Questionnaire (BRBQ) which was designed by the present author to measure major indicators of impulsive and restrictive behaviours in females suffering from eating behaviours.

The Eating Disorder Inventory (EDI) devised by D. Garner is one of the most widely used instruments designed to measure psychological characteristics and behaviours describing the psychological functioning of individuals diagnosed with anorexia or bulimia nervosa[7]. The inventory reliability was estimated using the method of internal consistency. High Cronbach alpha values were reported for all scales of the inventory, which points to high reliability of the measurement instrument [9].

The Body-Related Behaviours Questionnaire (BRBQ) was designed by the present author for the purpose of this research, since no information is found in subject literature on research instruments which could be used to examine the dependent variable investigated in this study.

In the initial stage of the questionnaire development a list of items was generated based on the subject literature and the present author's clinical experience gained while conducting therapy for patients suffering from eating disorders. The items were intended to diagnose the respondents' preferences regarding their eating behaviours (i.e. the frequency of using restrictive diets and engaging in compensatory behaviours such as self-induced vomiting, misuse of laxatives, diuretics, or other stimulants). The questionnaire statements were also designed to examine type, frequency and intensity of physical activity undertaken by the study subjects. Prior to applying the questionnaire in full-scale research, a pilot study was conducted in a population of 140 females, which was aimed at testing adequacy of the aforementioned measurement instrument.

The questionnaire was completed by all respondents. The study participants indicated their responses on a 6-point rating scale. The *response* categories included: "*always*", "usually", "often" (which were assigned a score of 3, 2 and 1, respectively); "sometimes", "rarely" and "never" (which generated a score of 0).

The Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity were applied to assess the sampling adequacy. The KMO measure reached the value of 0.771. The Bartlett's test results were as follows: chi square=2894.531; df=465; p<001. The aforementioned results provided grounds for performing an exploratory factor analysis, using the principal-axis factoring method, employing Varimax rotation with Keiser Normalization.

Based on the results of factor analysis, four factors were extracted. Taking into consideration the content of individual items making up the factor groupings, the following subscales were created: "dietary behaviours", "restrictive eating behaviours", "compensatory behaviours" and "physical activity".

The reliability indicators for the particular subscales of the questionnaire, measured by means of Cronbach's alpha ratio, reached the following values: 0.801 ("dietary behaviours"); 0.735 ("restrictive eating behaviours"); 0.860 ("physical activity"); and 0.622 ("compensatory behaviours"). A 32-item BRBQ questionnaire was created based on the four-factor structure. The instrument was applied to examine restrictive and impulsive behaviours in a population of 90 females participating in a full-scale study conducted by the current author.

The Dietary Behaviours subscale consisted of 12 items, describing various types and frequency of dietary behaviours among the study participants. The scale was used to measure the variable: "body-related behaviours involving dieting" (restrictive behaviours).

The Restrictive Eating Behaviours subscale comprised 7 items. It described various methods of regulating food intake among the examined individuals. The scale was applied to assess

the variable: "body-related behaviours involving restrictive dieting" (restrictive behaviours).

The Physical Activity subscale consisted of 9 items, describing the frequency and type of physical activity aimed at reducing body weight and changing body image. The scale was used to measure the variable: "body-related behaviours involving excessive physical activity" (restrictive behaviours).

The Compensatory Behaviours subscale comprised 4 items, which were intended to diagnose frequency of such behaviours as self-induced vomiting, using laxatives, diuretics or other stimulants, which are aimed at body weight loss and changing body image (impulsive behaviours).

Cognitive and emotional characteristics describing a psychological profile of females diagnosed with eating behaviours were measured using a Polish version of the EDI inventory which comprises 64 items divided into the following eight subscales: (1) *drive for thinness*, (2) *bulimia, (3) body dissatisfaction*, (4) *ineffectiveness, (*5) *perfectionism,* (6) *interpersonal distrust*, (7) *interoceptive awareness* and (8) *maturity fears*. Each item was rated on a 6-point scale (the responses ranged from 3 = "always", 2 = "usually", 1 = "often", 0 = "sometimes, seldom, never"). Some of the items were reverse-scored. Higher scores obtained by the study participants in the particular subscales denoted increased (inappropriate) levels of the particular emotional and cognitive characteristics examined in the research.

Clinical analysis of the research data was conducted using measures of central tendency as well as a quartile method.

Analysis of the EDI items indicates that the responses prevailing among the study participants who received abnormal scores (denoting the symptoms of anorexia or bulimia nervosa) were those which had been assigned the highest number of points (e.g. "always", "usually" or "never"). This was consequently reflected in higher mean values for the particular emotional and cognitive characteristics examined in the study using the aforementioned instrument. Whereas the responses which had received the lowest number of points (e.g. "seldom", "sometimes" or "never") prevailed in the group of the research subjects who obtained normal scores, which was reflected in lower mean values for the cognitive and emotional characteristics exhibited by the examined females comprising the clinical as well as the control population. The mean and the median values obtained in the study were compared with a distribution of raw scores received by all research subjects, considering their quartile ranks. The participants' mean scores lying within quartiles 3 and 4 were interpreted as extremely high or high, and denoted an inappropriate level of the particular cognitive or emotional characteristic investigated in the study. The mean scores falling at the second quartile were regarded as above normal. The subjects' mean scores lying in the first quartile were in-

Table 1. Descriptive statistics for the mean values and median, aimed at examining emotional and cognitive charakteristics exhibited by the clinical (N=90) and control (N=121) participants of the research

Cognitive and emotional characteristics	Mean	Low scores Quartile I	Above-normal scores Quartile II	Median	High scores Quartile III	Extremely high scores Quartile IV
Body dissatisfaction	15.59	9.00	9.01	14.00	22.99	23.00
Interoceptive awareness	10.15	3.00	3.01	10.50	15.99	16.00
Maturity fears	9.00	5.00	5.01	9.00	12.99	13.00
Drive for thinness	13.82	13.00	13.01	17.00	17.99	18.00
Bulimia	10.29	2.00	2.01	12.00	17.99	18.00
Ineffectiveness	11.86	7.00	7.01	13.00	16.99	17.00
Perfectionism	12.01	8.00	8.01	13.00	15.99	16.00
Interpersonal distrust	11.49	3.00	3.01	16.00	17.99	18.00

terpreted to denote a normal level of the particular psychological characteristics that were investigated in the study. Table 1 presents the mean values obtained in the entire research population, concerning a diagnosis of the levels of psychological characteristics examined using the EDI inventory.

RESEARCH RESULTS

The first stage of statistical analysis of the data obtained as a result of this research was aimed at drawing conclusions which would allow to answer the first question addressed in the present study.

Table 2 displays a comparative analysis of the research data collected in the clinical population and in the group of control subjects, concerning the mean values describing the levels of cognitive and emotional characteristics, and intensity of body-related behaviours in the two groups of the study participants. Statistical analysis aimed at comparing the research data obtained in the aforementioned samples was based on the Mann-Whitney U test. Statistical significance of the differences was determined by calculating the probability of error (p value). P-values below 0.05 were considered statistically significant. The comparative analysis of the research data obtained as a result of the Mann-Whitney U test revealed significant differences between the two groups of subjects in terms of the independent variables diagnosed in this study, and confirmed an inappropriate level of emotional and cognitive characteristics exhibited by the females suffering from anorexia or bulimia nervosa.

Analysis of the mean values concerning the level of cognitive and emotional characteristics, as well as intensity of eating and body-related behaviours investigated in the current study demonstrated statistically significant differences between the two groups of examined females. The data obtained in the clinical sample proved that the subjects exhibited a significantly higher, and inappropriate for maintaining health, level of all emotional and cognitive characteristics which were examined in the study using the EDI inventory. Similar differences were detected between the two samples of research participants in terms of intensity of restrictive and impulsive (compensatory) behaviours investigated in the study. The p-ratio for the significance of the differences was found to reach the value of 0.001.

Clinical interpretation of the research data collected in the sample of females exhibiting various types of eating disorders confirmed inappropriate intensity of body-related behaviours in this group of research subjects. The analysis

Table 2. The main characteristics of the research data gathered in a clinical sample (N=90) and in a control population (N=121), aimed at making comparisons between the two sets of sample data, concerning the mean values obtained in the sub-scales of the EDI inventor and the Body-Related Behaviour Questionnaire (BRBQ).

Emotional and cognitive characteristics of psychological functioning	Control sample M	Clinical sample M	U value	p value
Body dissatisfaction	12.60	17.88	3941.00	0.001
Drive for thinness	8.74	17.73	1466.00	0.001
Bulimia	3.58	13.45	942.50	0.001
Interoceptive awareness	4.70	14.35	1571.00	0.001
Perfectionism	7.59	15.40	862.50	0.001
Maturity fears	6.33	11.05	3109.00	0.001
Ineffectiveness	5.86	16.46	92.50	0.001
Interpersonal distrust	3.75	17.44	244.00	0.001
Body-related behaviours involving dieting	13.67	23.97	256.00	0.001
Body-related behaviours involving restrictive dieting	12.82	23.40	34.00	0.001
Compensatory behaviours	2.98	10.48	22.00	0.001
Body-related behaviours involving excessive physical activity	10.45	20.63	206.50	0.001

revealed an increased tendency among the females towards engaging in such behaviours as restrictive dieting and excessive exercising. All the mean values for the particular eating and body-related behaviours investigated in this study turned out to be high, and were interpreted as inappropriate and denoting the symptoms of disease.

Thus, on the basis of the above data, it is possible to conclude that the females with a medical diagnosis of anorexia or bulimia nervosa not only engage in impulsive or restrictive behaviours, but also are likely to exhibit such characteristics as an increased, inappropriate for their BMI, level of drive for thinness; body dissatisfaction; bulimic thoughts; a low level of interoceptive awareness; a high level of maturity fears and increased perfectionism; a strong sense of ineffectiveness as well as profound interpersonal distrust and difficulties in establishing and maintaining relationships with other people.

According to clinical interpretation of the data obtained in the sample of clinical subjects, the mean values describing the aforementioned characteristics are considered to be extremely high, high, or increased, which points to an inappropriate (inadequate for maintaining health) level of all of the emotional and cognitive characteristics examined in this group of study subjects. None of the scores received by the clinical participants in the scales describing the examined predictor variables were found to lie within the first quartile. However, the scores obtained in the group of females comprising the control sample were discovered to lie in the first quartile or within the lower limit of the second quartile, which proved that the levels of the variables investigated in the study were either normal or slightly increased (especially in case of such characteristics as interoceptive awareness deficits and bulimic tendencies).

Analysis of the data gathered as a result of this research demonstrated that the females comprising the clinical sample, who exhibited medically diagnosed symptoms of bulimia or anorexia nervosa (either a restrictive or binge eating/purging type) displayed inappropriate levels of all emotional and cognitive characteristics, which were measured using the EDI inventory. Statistically significant differences were observed between the clinical and control subjects in terms of the variables investigated in the study.

The essential part of the research process was aimed at confirming statistically significant differences between the females suffering from anorexia or bulimia nervosa and the participants exhibiting no symptoms of the aforementioned eating disorders, as well as creating a profile of cognitive and emotional characteristics exhibited by the individuals comprising the clinical sample. In the second stage of the study the present author focused on identifying the psychological (emotional and cognitive) characteristics which are most likely to predict the development of im-

Table 3. Psychological predictors of impulsive behaviours exhibited by females suffering from bulimia or anorexia nervosa. Results of logistic regression analysis of the research data collected in a clinical sample (N=60)

Dependent variable: Impulsive behaviours in bulimia and anorexia nervosa Loss: Maximum likelihood estimation, Mean Standard Error, scaled to 1 Final loss 14.586 Chi sq. (6) = 149.51 p= 0.001							
Estimate	0.983	-0.422	-0.028	0.416	-0.297	-0.119	0.752
Standard Error	4.102	0.196	0.063	0.183	0.159	0.185	0.238
t (205)	0.239	-2.156	-0.438	2.280	-1.863	-0.645	3.153
p- level	0.810	0.032	0.661	0.024	0.064	0.519	0.002
-95%CL	-7.130	-0.810	-0.154	0.055	-0.613	-0.486	0.280
+95%CL	9.097	-0.035	0.0984	0.777	0.018	0.246	1.223
Wald's Chi-square	0.057	4.651	0.192	5.180	3.473	0.416	9.944
p- level	0.810	0.031	0.660	0.023	0.062	0.518	0.002
Odds ratio (unit ch)	2.672	0.655	0.972	1.520	0.742	0.887	2.120

pulsive and restrictive behaviours in anorexia and bulimia nervosa.

Logistic regression was used to investigate the impact of psychological predictors on a dichotomous variable (i.e. restrictive behaviours in a restrictive type of anorexia nervosa, and impulsive reactions characteristic of bulimia nervosa and bulimia-type anorexia nervosa). Logistic regression is a statistical method employed for analyzing a dataset in which there are one or more independent variables that determine an outcome. The outcome is measured with a dichotomous or binary-valued dependent variable (it can take on only two possible values). The values of the dependent variable denote the presence or absence of the predicted event. The method allows to estimate the probability of an event occurring. A logistic regression model allowed to establish a relationship between a particular type of eating and body-related behaviours and a group of predictor variables.

The p-value calculated for a chi-square test was discovered to reach a significant level, which pointed to statistical significance of a logistic regression model. This allowed to establish which of the emotional and cognitive characteristics investigated in the study were significantly predictive of impulsive (bulimic) or restrictive behaviours displayed by the clinical subjects. The results of logistic regression analysis are displayed in Tables 3 and 4.

The p-values for a chi-square test presented in table 3 demonstrate that the model of logistic regression is statistically significant. It is apparent from the figures that the model reveals a cluster of significant characteristics, which predict the development of impulsive behaviours in the individuals diagnosed with bulimia nervosa.

An examination of the p-values for the independent variables (i.e. cognitive and emotional characteristics), which were included in the final model of logistic regression, demonstrates that interoceptive awareness and bulimic thoughts (obsessive preoccupation with food, overeating and provoking a variety of impulsive behaviours) prove to be the most significant predictors of impulsive behaviours in patients diagnosed with bulimia or anorexia nervosa. This can be confirmed by the odds ratios, calculated for the particular predictor variables. A tendency towards bulimia turned out to be the most significant determinant of impulsive behaviours (odds ratio=2.120), whereas low interoceptive awareness was discovered to be the second most important factor contributing to the development of the aforementioned tendencies (odds ratio= 1.520).

As can be seen from Table 3, the BMI index values are negative. Hence, it is possible to predict that the development of impulsive behaviours in bulimia nervosa or bulimia type anorexia nervosa is closely associated with a decrease in body mass index. According to clinical interpretation, the likelihood of impulsive behaviours grows as body mass index BMI decreases (which is *equivalent* to *losing weight*). This suggests that the consequent gradual body emaciation, coupled with an impaired ability to recognize and respond to body sensations such as hunger or satiety, appears extremely likely to trigger impulsive behaviours in individuals diagnosed with the aforementioned types of eating disorders.

The research data indicate that, when compared to impulsive tendencies, restrictive behaviours such as regular excessive exercising, which often leads to a state of body emaciation and is detrimental to health, as well as restrictive dieting that involves fasting and using appetite reducing substances, are more likely to be predicted by low interoceptive awareness. Analysis of the most significant estimates of odds ratios revealed that the factors which are most likely to contribute to the development of impulsive behaviours include such psychological characteristics as a tendency towards bulimia (which proves to be the most significant predictor of impulsive behaviours), interoceptive awareness deficits, body dissatisfaction and body mass index (BMI). Among the most significant predictors of restrictive behaviours there are such variables as interoceptive awareness deficits, perfectionism, body dissatisfaction and body mass index BMI.

Positive low values for interoceptive awareness, and considerably high values describing a tendency towards bulimia confirm the thesis that an increase in the aforementioned predictor variables significantly contributes to the development of impulsive behaviours in bulimia, which include self-induced vomiting, using laxatives and other impulsive body-related behaviours. A point estimate of the odds ratio seems to play a significant role in the logistic regression anal-

ysis of the research data since it is indicative of the correlation between the probability of the occurrence of the particular outcome and the predictor variable. In other words, it demonstrates how a one-unit change in the independent variable affects the predicted odds. In the present study, the odds ratio estimate indicates how the likelihood of impulsive behaviours exhibited by the study subjects grows if the predictor variable increases by one unit. As a result of the logistic regression analysis, the following correlations have been observed between the probability of occurrence of impulsive behaviours in bulimia and certain predictor variables:

- for every one-unit decrease in body mass index, the predicted value of impulsive behaviours increases 0.655 times,
- for every one-unit increase in interoceptive awareness deficits, the predicted value of impulsive behaviours increases 1.52 times,
- or every one-unit increase in a tendency towards bulimia (referred to as obsessive preoccupation with food, and overeating, frequently followed by recurring episodes of binge eating and purging), the predicted value of impulsive behaviours increases 2.120 times (i.e. 212%).

A tendency toward bulimia emerged as a very significant predictor of impulsive behaviours in bulimia nervosa.

Apart from identifying psychological predictors of impulsive behaviours in bulimia nervosa, the study also aimed at specifying emotional and cognitive characteristics which predict the increased likelihood of restrictive behaviours in anorexia nervosa. The results of logistic regression analysis concerning this stage of the study are shown in Table 4.

Table 4. Psychological predictors of restrictive behaviours exhibited by females suffering from a restrictive type of anorexia nervosa. Results of the logistic regression analysis of the data collected in a clinical sample (N=30).

Dependent variable: Restrictive behaviours in anorexia nervosa (a restrictive type) Loss: Maximum likelihood estimation, Mean Standard Error, scaled to 1 Final loss 15.790 Chi Sq.(5) =140.42 p=0.001						
	Const.B0	BMI	Body dissatisfaction	Interoceptive awareness	Drive for thinness	Perfectionism
Estimate	-3.143	-2.049	-1.323	1.735	2.469	4.616
Standard Error.	1.251	0.766	0.670	0.863	1.928	1.716
t (205)	-2.510	-2.675	-1.973	2.008	1.280	2.690
p-level	0.013	0.008	0.050	0.046	0.202	0.008
-95%CL	-5.620	-3.565	-2.649	0.026	-1.345	1.221
+95%CL	-0.666	-0.534	0.002	3.444	6.285	8.011
Wald's Chi-square	6.304	7.158	3.896	4.034	1.639	7.234
p-level	0.012	0.007	0.048	0.044	0.200	0.007
Odds ratio (unit ch)	0.043	0.128	0.266	5.671	11.821	101.100

The p-values for a chi-square test presented in Table 4 demonstrate that the model of logistic regression is statistically significant. It is apparent from the figures that the model points to selected cognitive and emotional characteristics, which significantly predict the development of restrictive behaviours in individuals diagnosed with anorexia nervosa.

An examination of the p-values for the independent variables, which were included in the final model of logistic regression, demonstrates that such variables as body mass index (BMI), body dissatisfaction, a low level of interoceptive awareness, and perfectionism prove to be the most significant predictors of restrictive behaviours in patients diagnosed with anorexia nervosa. As can be seen from table 4, the BMI index values as well as those of body dissatisfaction are negative. On the basis of the data it is possible to predict that a decrease in the aforementioned independent variables is followed by an

increase in the probability of occurrence of restrictive behaviours in a sample of females suffering from a restrictive type of anorexia nervosa. In other words, a decrease in body mass index (BMI), which is equivalent to weight loss; coupled with the consequent increase in the level of body satisfaction; leads to an increased risk of developing restrictive behaviours. Such characteristics as interoceptive awareness deficits, and a high level of perfectionism, accompanied by body satisfaction, seem to be significantly predictive of restrictive behaviours in anorexia nervosa. This is confirmed by the research data, which indicate that a decrease in body dissatisfaction (and consequently, an increased level of satisfaction with gradual loss of weight) exhibited by the females diagnosed with a restrictive type of anorexia nervosa is likely to correlate with a high level of perfectionism as well as poor ability to control hunger and satiety, and to recognize and respond to emotional states and body sensations.

Analysis of the odds ratio estimates displayed in Table 4 reveals that:

(1) for every one-unit decrease in body mass index (BMI), the predicted value of restrictive behaviours increases;
(2) every one-unit decrease in body dissatisfaction, the predicted value of restrictive behaviours increases 0.266 times. The research data demonstrate that the slimmer the anorectic patient is, the higher body satisfaction the individual displays. It is fairly common that patients diagnosed with a restrictive type of anorexia nervosa tend to ignore their distorted body image. The odds ratio estimates obtained as a result of this research indicate that an increased level of satisfaction with body weight loss effects gradual body emaciation, which is believed to be a common symptom of a restrictive type of anorexia nervosa;
(3) for every one-unit increase in interoceptive awareness deficits, the predicted value of restrictive behaviours increases 5.67 times. The research data indicate that lower ability to recognize and respond to body sensations such as hunger or satiety predicts a higher risk of restrictive behaviours;
(4) for every one-unit increase in perfectionism, the predicted value of restrictive behaviours increases 100 times.

Taking into consideration the research data concerning the levels of the most significant characteristics of psychological functioning exhibited by the subjects diagnosed_with a restrictive type of anorexia nervosa, it can be concluded that such factors as interoceptive awareness and perfectionism, coupled with a low body mass index value and satisfaction with emaciated body, significantly contribute to the development of restrictive behaviours in patients diagnosed with a restrictive type of anorexia nervosa.

DISCUSSION

Analysis of the data obtained as a result of the current research revealed that three of the psychological characteristics describing individuals diagnosed with anorexia or bulimia nervosa, investigated in the present study, seem to be most likely to predict impulsive and restrictive behaviours in the aforementioned group of patients. They include body dissatisfaction, interoceptive awareness deficits as well as a tendency towards bulimia.

It was found that interoceptive awareness deficits significantly contribute to an increase in the likelihood of impulsive and restrictive behaviours in anorexia and bulimia nervosa. However, low interoceptive awareness emerged as a characteristic which has greater predictive power in the development of restrictive behaviours in anorexia nervosa (OR=4.034) than in the process of stimulating impulsive behaviours (OR=1.520).

A number of studies described in worldwide literature have found that there is a significant correlation between interoceptive awareness and the way that individuals suffering from eating disorders experience their bodies [1-5, 7, 9].

Logistic regression analysis of the data obtained as a result of this research revealed different psychological predictors for the two types of eating and body-related behaviours examined in the study. It was discovered that the development of impulsive behaviours is significantly determined by a tendency towards bulimia, referred to as obsessive bulimic thoughts, i.e. in-

tense preoccupation with food thoughts and focusing on compensatory behaviours (e.g. self-induced vomiting). The findings of the worldwide research addressing the issue of psychological functioning of individuals exhibiting symptoms of anorexia or bulimia nervosa highlight the predictive role of cognitive schemas, characterized by bulimic thoughts and behaviours, in the development of the aforementioned eating disorders [4, 35, 44].

It was found out that restrictive behaviours are significantly predicted by two variables: perfectionism and body dissatisfaction.

The role of perfectionism in relation to body image and eating behaviours has been widely investigated. In the light of modern cognitive theories put forward by such researchers as Cash [5], as well as P. van den Berg, J. K. Thompson, K. Brandon, and M. Coovert [5], perfectionism is considered to be a potential risk factor for the development of body image dissatisfaction and restrictive bulimic behaviours.

Moreover, P. van den Berg, J. K. Thompson, K. Brandon, and M. Coovert [5] discovered that impulsive and restrictive eating behaviours exhibited by patients suffering from eating disturbances are determined by overall psychological functioning of the individuals. However, the researchers failed to make an attempt at specifying the particular psychological factors which are likely to predict the development of impulsive and restrictive behaviours in eating disorders. Hence, the major aim of the current study was to extend earlier work and create a profile of psychological characteristics exhibited by individuals diagnosed with eating disorders.

Taken together, these findings indicate that such psychological factors as low interoceptive awareness and a tendency towards bulimia contribute to the development of impulsive behaviours; whereas the variables including the body mass index BMI, body image dissatisfaction, low interoceptive awareness and perfectionism influence restrictive eating and body-related behaviours.

The research studies mentioned above have found that the risk factors for the onset of eating disorders include not only interoceptive awareness but also other psychological characteristics such as a tendency towards bulimia, body image dissatisfaction, drive for thinness, and the fear of gaining weight [7]. Perfectionism was discovered to contribute to the development of body image dissatisfaction, which in turn proved to trigger impulsive or restrictive eating and body-related behaviours. Therefore, the main aim of the present research was to evaluate a direct predictive impact of perfectionism on the aforementioned types of behaviours. However, the current findings were limited by a use of a cross-sectional study design, which did not allow to draw general conclusions from the research data. Another major finding to emerge from this study is that interoceptive awareness has been identified as a predictive factor for impulsive and restrictive behaviours in anorexia and bulimia nervosa. The contributory role of the aforementioned psychological characteristic in the development of eating disorders has been reported in the world literature [1, 7]. However, very little information was found in Polish references on empirical studies aimed at measuring the level of interoceptive awareness in individuals diagnosed with eating disorders [9]. It is interesting to mention that very few studies aimed at diagnosing psychological characteristics and body-related behaviours have been conducted in a large population, using the EDI inventory. Therefore, the present findings seem to add to a body of literature on this subject.

CONCLUSIONS

The clinical subjects suffering from anorexia or bulimia nervosa exhibited the following psychological characteristics: a high level of body dissatisfaction, an excessive drive for thinness; distinctive strong cognitive schemas characterized by an obsessive tendency towards preoccupation with food and compensatory behaviours; low interoceptive awareness; an increased (inadequate) level of maturity fears; an inadequate level of perfectionism; a sense of self-worthlessness, as well as interpersonal distrust and difficulties in establishing emotional bonds with other people. Moreover, the females displayed an increased tendency towards engaging in such self-destructive behaviours as restrictive dieting and excessive exercising, as well as compensatory behaviours. This proved the presence of re-

strictive and impulsive behaviours in the clinical participants of the study.

The cognitive and emotional characteristics describing a psychological profile of individuals suffering from bulimia or anorexia nervosa, which were presented above, can be arranged into two groups: factors which are predictive of impulsive behaviours in anorexia and bulimia nervosa, and variables that contribute to the development of restrictive behaviours in the aforementioned eating disorders.

Low interoceptive awareness was found to be a significant determinant of both types of body-related behaviours. Such variables as perfectionism and body dissatisfaction turned out to be the most significant predictors of restrictive behaviours. This configuration of psychological characteristics seems to be rather dangerous, since it is likely to trigger destructive eating and body-related behaviours which consequently lead to body emaciation.

It was discovered that the most significant predictors of impulsive behaviours displayed by individuals diagnosed with bulimia nervosa or bulimia type anorexia are enduring cognitive schemas, characterized by obsessive preoccupation with food and compulsory eating and body-related behaviours. It should be highlighted that low interoceptive awareness and perfectionism are considered to be enduring psychological characteristics. Therefore the process of treatment for the aforementioned patients should include a long-term, multi-dimensional psychotherapy.

An implication of this research is the possibility that a psychological diagnosis of emotional and cognitive characteristics displayed by females diagnosed with anorexia and bulimia nervosa is likely to facilitate the process of predicting the development of specific impulsive and restrictive behaviours characteristic of the particular eating disorders. Thus, it appears to be a tool that can be useful at the initial stage of treatment, which involves establishing appropriate psychological interventions aimed at eliminating impulsive and restrictive behaviours developed in individuals diagnosed with the aforementioned eating disorders. Hence a psychological diagnosis, aimed at distinguishing psychological characteristics of individuals suffering from anorexia or bulimia nervosa, should be part of treatment since it improves the effectiveness of therapy in this group of patients.

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