Factors Affecting Self-Image in Patients with a Diagnosis of Eating Disorders on the Basis of a Cluster Analysis

Maciej Wojciech Pilecki[1,*], Kinga Sałapa[2] and Barbara Józefik[3]

[1]*Department of Child and Adolescent Psychiatry, Jagiellonian University Medical College, ul. Kopernika 21a, 31-501 Krakow, Poland*

[2]*Department of Bioinformatics and Telemedicine, Jagiellonian University Medical College, ul. Św. Łazarza 16, 31-530 Krakow, Poland*

[3]*Laboratory of Psychology and Systemic Psychotherapy, Department of Child and Adolescent Psychiatry, Jagiellonian University Medical College, ul. Kopernika 21a, 31-501 Krakow, Poland*

Abstract: The aim of this study was to assess the relationship between self-image in eating disorders and age, duration and severity of the disorder, comorbidity, depressiveness and self-evaluation of eating problems. The results of the Offer self-image questionnaire for adolescents (QSIA) were compared in four groups: anorexia nervosa restrictive subtype (ANR, n: 47), anorexia nervosa binge/purge subtype (ANBP, n: 16), bulimia nervosa (BUL, n: 34) and eating disorders NOS (EDNOS, n: 19). The control group was age matched female pupils (NOR, n = 76). The Kruskal-Wallis test revealed significant differences between the age of patients from the ANR (16.34, SD 1.58) and BUL (17.56, SD 0.96) groups (p = .008). The self-image of schoolgirls from the NOR group was on most scales significantly better than the self-image of girls from clinical groups. On four scales differences between the (better) self-image in the ANR group and that in the BUL group were observed. Next, a cluster analysis using a generalised k-means algorithm with v-fold cross validation of QSIA questionnaire results was conducted in the group of clinical eating disorders (ANR, ANBP, and BUL). Three clusters were obtained. The first was characterized by very good self-image (above the average for the general population), the second by poor self-image and the third by negative self-image. Severity of depressiveness measured using the Beck Depression Inventory turned out to be the only factor which differentiated the clusters of self-image in eating disorders.

Keywords: Anorexia, bulimia**,** QSIA, DATA MINING, cluster analysis.

CONTEXT OF THE STUDY

An appropriate and adequate self-image integrates the perception of one's own self and the world. It also has an stabilizing significance for actions and interactions [1]. Self-image in eating disorders is important for four reasons. Firstly, self-image disorders (especially body dissatisfaction) may be regarded as one of the risk factors in the development of eating disorders [2-5], whereas, secondly, self-esteem may be taken as a protective factor [6]. Thirdly, self-image distortions (disturbed perception of body shape or weight, undue influence of body shape or weight on self-evaluation) are important symptoms and diagnostic criteria of anorexia and bulimia nervosa [7]. Fourthly, self-image may be a prognostic indicator in eating disorders [8-11]. The main issue in self-image studies of eating disorders is the credibility of the results. It is not just a question of whether a test investigates what it is supposed to. What is also important is how reliable results obtained from individual respondents are [12]. Among the eating disorders, there are several specific phenomena which may significantly affect the results of self-evaluation tests. One of the most important is denial of the presence of eating disorders symptoms. This constitutes a problem in both the diagnosis and the treatment, especially in anorexia nervosa. It may also accompany other aspects of self-evaluation, which go beyond simple clinical symptoms [13]. This phenomenon, though important, is rarely studied. Depressive symptoms accompany symptoms of eating disorders, especially bulimia nervosa. Their intensity may therefore affect all the results of self-evaluation questionnaires which may be impacted by the severity of depression [14-16]. Another important issue is the relationship between self-evaluation and the severity of eating disorders. In anorexia nervosa two opposing tendencies may be expected in this regard. On the one hand, intensification of the symptoms may lead to increased negative self-evaluation. On the other hand, emotional gratification related to progressing emaciation may exacerbate an unrealistic self-image [17]. Another important issue concerns the relation between self-image and age at the onset of the disorder, and the duration of the disorder. The age of the study subjects may have a significant impact on all the variables which are associated with the process of maturing, such as sexual attitudes, autonomy, the

*Address correspondence to this author at the Department of Child and Adolescent Psychiatry, Jagiellonian University Medical College, ul. Kopernika 21a, 31-501 Krakow, Poland; Tel: +48124248740; Fax: +48124248744;
E-mail: maciej.pilecki@uj.edu.pl

E-ISSN: 1929-6029/13

significance of the body, and self-esteem in self-evaluation [18-21].

Taking a clinical diagnosis of eating disorders as a starting point without taking into account the above facts may mean that methodologically correct statistical analyses could lead to erroneous clinical conclusions concerning not just self-image but all self-assessment tests. This raises the question of the possibility of scientific procedures and statistical analyses which reduce the magnitude of this difficulty.

The purpose of this study was to assess the relationship between self-image in eating disorders and such variables as age, duration of the disorder, the severity of clinical symptoms, comorbidity, severity of depressiveness and self-evaluation of eating problems severity. The starting point for this analysis was not the clinical diagnosis but self-image. Cluster analysis was applied in the study. This allowed the most similar cases to be grouped according to characteristics of self-image that are not influenced by diagnosis characteristics or other factors.

METHODOLOGY

In order to evaluate self-image, The Offer Self-Image Questionnaire for Adolescents [22] was applied in the present study. It define the adolescent self-image in 10 separate dimensions: Impulse Control, Emotional Tone, Body and Self-Image, Social Relationships, Vocational and Educational Goals, Sexual Attitudes, Family Attitudes, Mastery of External World, Psychopathology, Superior Adjustment. The author of the questionnaire selected a psychodynamic basis for understanding the concept of self-image and years of empirical observations as the starting points for devising the tool [23]. Wanda Badura-Madej *et al.* [24, 25] were the authors of the Polish version.

The present study applied the 26-question version of the Eating Attitude Test – the EAT 26 by D. Garner and P. Garfinkel - to investigate attitudes and behaviours towards eating of persons suffering from anorexia nervosa [26]. K. Włodarczyk-Bisaga was responsible for the Polish standardization of the tool. In the present study 19/20 points were assumed as a cut-off point. When selecting this cut-off point, the Polish version of the EAT-26 displayed a sensitivity of 100%, specificity of 53.6% and probability of disorder diagnosis of 18.6%. EAT26 scales used in the present study included Slimming (Slim), Excessive Concern (Conc), Social Pressure (Pres), Dietetic (Diet), and Bulimic (Vom). The internal validity of the scales was assessed using Chronbach's alpha. Satisfactory alpha values between 0.65 and 0.82 were found for the EAT scales [27, 28].

The Beck Depression Inventory – BDI [29] was used to measure depressiveness where the subject evaluation referred to the last month. The standardising procedure by Parnowski and Jernajczyk [30] who adapted the tool to Polish conditions, was used. In the quoted studies, the question about weight loss was excluded from calculations.

The analyses took into account BMI, the presence of bulimic symptoms defined by categories from the Polish version [31] of the Eating Disorder Examination Interview (EDE) [32] describing the quantity of the phenomena per month (episodes of binge eating and, vomiting) or only the presence of phenomena (starving, physical exercise and, laxatives). The analyses also applied data from a psychiatric examination which focused on additional psychiatric disorders.

THE STUDY GROUP

Data from patients with a diagnosis of eating disorders according to DSM IV were used in the statistical analyses underlying this publication. The patients were consulted for the first time at the Clinic of Child and Adolescent Psychiatry of the Jagiellonian University Hospital in Krakow between 2002-2004. The control group consisted of data from 76 age matched healthy girls from Krakow schools with no increased risk of eating disorders (results of Eating Attitudes Test lower than 20) (NOR).

The adolescent female patients were asked to take home and fill in questionnaires used in the course of the study and to post them or hand back during their next visit. In addition, a clinical interview was conducted to obtain clinical data on symptoms, demographics, development, family and social factors. Consultation at the clinic was based on a referral from psychiatrist, psychologist, recommendation from the school or self-referral. Mentally handicapped persons and, those brought up in institutions were not included in the study. No one refused to participate in the study.

STATISTICAL ANALYSES

Quantitative features were presented using the mean value and standard deviation. The Shapiro-Wilk test was used to check the conformity of these features with a normal distribution. Comparisons of mean values

of selected features in the groups were performed using parametric tests: t-test for two groups, and one-way analysis of variance for more than two groups if all assumptions were met. Otherwise, the data were analysed using non-parametric tests: the Mann-Whitney test or the Kruskal-Wallis test in the absence of normality or Welch's test in the absence of homogeneity of variance, respectively. In addition, post-hoc tests (the Scheffe test or the Bonferroni test) were conducted if the results of variance analysis were significant.

Qualitative features were presented by size and percentage. Relationships between two given qualitative features were investigated using the chi-square test. In the case of insufficient theoretical size (e_{ij}<5, where *i* and *j* represent the indices of row and column, respectively), Fisher's exact test was used. For significant results, multiple comparison analysis was additionally performed. In order to graphically represent the relationship between two qualitative data, correspondence analysis was used.

The study applied cluster analysis using a generalised k-means algorithm with v-fold cross validation. This exploratory data technique aims at sorting different objects into groups so that the degree of association between two objects is maximal if they belong to the same group, and minimal otherwise. We wanted to use an estimation of k obtained using v-fold cross validation rather than give k *a priori*. A cross validation algorithm is a typical data mining application. The general purpose of the v-fold cross validation algorithm is to divide the whole dataset into random v samples. A training sample is created by observations belonging to v-1 folds and a testing sample by the rest of the data. Cluster analysis was performed using a training sample, and then the results were applied to a testing sample to compute an index of predictive validity. These calculations were repeated v times. The results of v replications were averaged to yield a single measure of model stability [33, 34]. Input data into the cluster analysis came from the results of the Polish standardised version of the QSIA.

The statistical analyses were performed with SPSS Statistics v.21 (IBM, New York, USA) and STATISTICA v10 (StatSoft Inc., Tulsa, OK, USA). P-value of <0.05 was considered to be statistically significant.

RESULTS

The study consisted of 116 girls, including 47 with a diagnosis of restrictive anorexia nervosa (ANR), 16 with a diagnosis of binge/purge anorexia (ANBP), 34 with a diagnosis of bulimia (BUL), 19 with a diagnosis of eating disorders not otherwise specified (EDNOS). Seven patients with an EDNOS diagnosis had subclinical symptoms of restrictive anorexia nervosa, 6 had subclinical binge/purge anorexia, and 6 had subclinical bulimia. In 27.59% of the patients, the presence of one or more additional mental disorders was observed. Most frequently, symptoms of eating disorders were accompanied by depressive episodes. Anxiety disorders and suicide attempts were also reported.

The conducted comparative analyses are presented in Table **1**. The last column shows groups that are significantly different from each other in terms of the given factor.

Next, an analysis was conducted in which QSIA results were compared with the control group (Figure **1**, Table **2**). Figure **1** shows mean values of QSIA scales in each group of patients and in the schoolgirls group. Statistically significant differences were indicated for almost all QSIA scales, except for Sexual Attitudes and Superior Adjustment (Table **2**).

Next a patient grouping analysis was conducted using the generalised method of k-means with v-fold cross-validation. The study was conducted twice. In the first analysis the data of all 116 patients were used; in the second, patients from the EDNOS group were excluded (n = 97). Squared Euclidean distance was used in both analyses as a measure of distance. The analyses were conducted for different v = 10, 20, ..., 100. The vast majority of analyses showed 3 clusters. Based on the cost sequence graph, it may be concluded that in both conduced analysis (n = 116, n = 97), the benefit of increasing the number of clusters to 4 is relatively small (Figure **2**).

First of all, the results obtained in cluster analysis were compared to clinical diagnoses (DSM IV). Correspondence analysis was applied to better illustrate this association. A correspondence map (Figure **3**) shows the position of clusters and diagnoses in relation to each other on a two-dimensional graph. The left figure reflects calculations based on all four diagnoses (n=116) and the right one on the three groups without the EDNOS group (n=97). It shows that in an analysis of four groups, cluster 1 consists mainly of people from the EDNOS group and some patients from the ANR group, whereas cluster 2 consists, mainly of people from the ANR group, while cluster 3 -

Table 1: Comparison of Characteristics in Groups

		NOR	ANR	ANBP	BUL	EDNOS	p	post-hoc
	N	**76**	**47**	**16**	**34**	**19**		
age	mean SD	16.92 1.60	16.34 1.58	16.75 1.29	17.56 0.96	16.95 1.35	.020	ANR-BUL
disorder duration (in months)	mean SD		12.21 8.89	19.13 15.72	15.13 9.48	12.81 8.99	.192	---
BMI	mean SD		14.96 1.46	15.48 1.35	19.66 1.70	18.94 2.01	<.001	ANR-ANBP ANR-BUL ANBP-EDNOS ANBP-BUL
BDI	mean SD	9.75 8.38	17.50 10.66	28.86 15.31	28.21 10.80	25.89 15.94	<.001	NOR-ANR NOR-EDNOS NOR-BUL NOR-ANBP ANR-BUL
EAT26>19	N [%]	0 [0.0]	22 [48.9]	12 [80.0]	28 [82.4]	13 [68.4]	<.001	NOR-ANR NOR-ANBP NOR-BUL NOR-EDNOS ANR-ANBP ANR-BUL
EAT26	mean SD	4.91 4.03	23.87 15.67	37.40 18.54	37.26 18.22	34.21 20.18	<.001	NOR-ANR NOR-ANBP NOR-BUL NOR-EDNOS ANR-ANBP ANR-BUL
Slim	mean SD	1.75 2.23	7.40 6.25	14.87 7.31	15.06 7.35	12.95 9.09	<.001	NOR-ANR NOR-EDNOS NOR-BUL NOR-ANBP ANR-BUL
Conc	mean SD	0.27 0.72	3.67 3.09	5.40 3.81	6.53 4.06	5.79 4.05	<.001	NOR-ANR NOR-EDNOS NOR-BUL NOR-ANBP
Pres	mean SD	0.88 1.20	4.32 2.55	4.67 2.87	4.09 2.40	4.37 2.59	<.001	NOR-ANR NOR-EDNOS NOR-BUL NOR-ANBP
Diet	mean SD	0.43 0.96	4.75 3.89	6.73 4.96	5.74 4.75	5.74 4.75	<.001	NOR-ANR NOR-EDNOS NOR-BUL NOR-ANBP

(Table 1). Continued.

		NOR	ANR	ANBP	BUL	EDNOS	p	post-hoc
	N	**76**	**47**	**16**	**34**	**19**		
Vom	mean SD	0.00 0.00	0.31 1.04	2.27 2.19	3.00 2.09	1.63 1.92	<.001	NOR-EDNOS NOR-BUL NOR-ANBP ANR-EDNOS ANR-ANBP ANR-BUL
binging episodes	mean SD			32.69 44.16	44.80 38.09	14.56 25.26	.004	BUL-EDNOS
vomiting	mean SD			50.62 44.59	61.32 49.57	19.11 40.75	.001	ANBP-EDNOS BUL-EDNOS
laxatives	N [%]		2 [4.7]	4 [28.6]	10 [41.7]	4 [22.2]	<.001	ANR-BUL
exercise	N [%]		10 [23.3]	6 [42.9]	4 [17.4]	10 [55.6]	026	BUL-EDNOS
fasting	N [%]		39 [90.7]	12 [85.7]	11 [45.8]	13 [72.2]	.001	ANR-BUL
other diagnosis	N [%]		9 [19.1]	4 [25.0]	12 [35.3]	7 [36.8]	<.001	NOR-ANR NOR-ANBP NOR-BUL NOR-EDNOS ANR-BUL

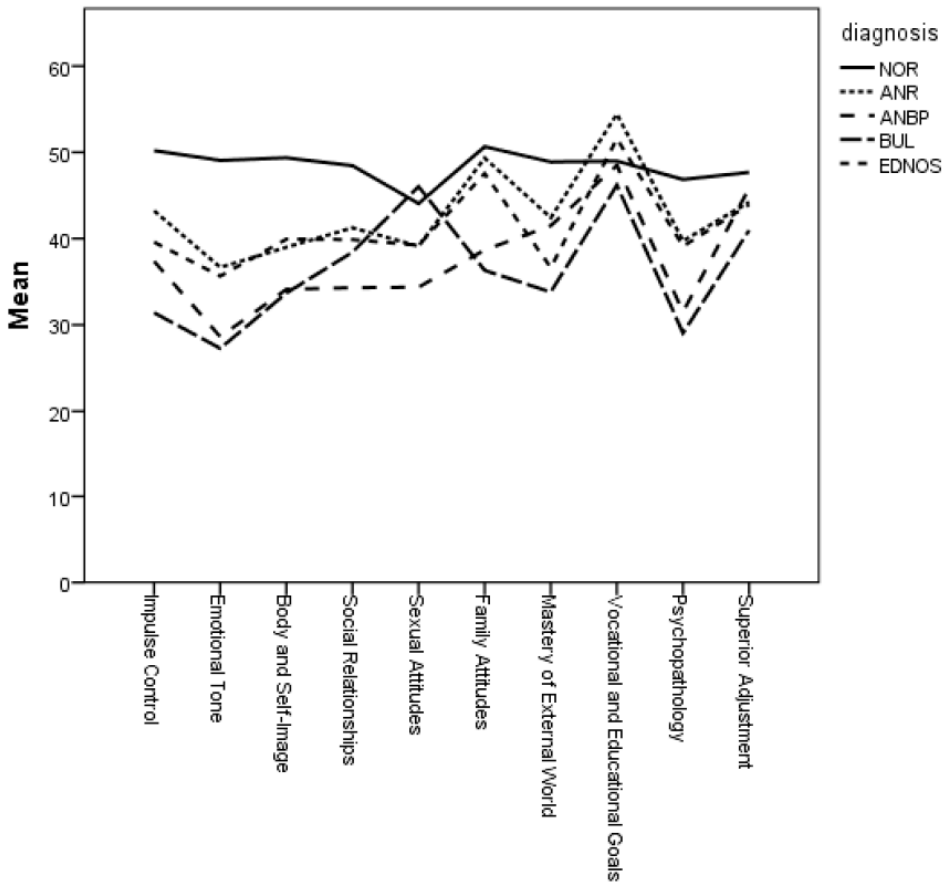

Figure 1: Comparison of average results of scales for NOR and ED diagnoses.

Table 2: Comparison of Average QSIA Scale Values in Each Group

		NOR	ANR	ANBP	BUL	EDNOS	p	post-hoc
Impulse Control	mean SD	50.27 12.65	44.22 16.56	37.38 15.22	32.26 17.81	40.21 20.32	<.001	NOR-BUL ANR-BUL
Emotional Tone	mean SD	48.84 14.38	38.29 15.39	28.63 12.99	28.35 13.89	33.37 21.87	<.001	NOR-ANR NOR-ANBP NOR-BUL NOR-EDNOS
Body and Self-Image	mean SD	49.54 14.23	39.34 12.60	34.13 12.67	33.97 10.75	39.89 17.84	<.001	NOR-ANR NOR-ANBP NOR-BUL
Social Relationships	mean SD	48.83 16.32	42.40 18.41	34.31 14.30	38.82 16.81	40.53 21.53	.007	NOR-ANBP
Sexual Attitudes	mean SD	44.36 17.34	38.23 18.03	34.38 12.42	46.21 20.14	38.44 21.58	.086	---
Family Attitudes	mean SD	50.96 13.45	50.67 12.66	38.69 12.51	37.50 14.26	45.63 17.24	<.001	NOR-ANBP NOR-BUL ANR-BUL
Mastery of External World	mean SD	49.07 14.66	43.16 15.24	41.50 13.22	34.45 14.90	36.63 22.33	<.001	NOR-BUL
Vocational and Educational Goals	mean SD	49.23 14.48	54.82 13.48	48.50 10.49	45.85 12.63	51.74 14.31	.042	ANR-BUL
Psychopathology	mean SD	46.86 15.03	41.18 14.90	31.50 17.00	29.06 16.18	37.89 23.36	<.001	NOR-ANBP NOR-BUL ANR-BUL
Superior Adjustment	mean SD	48.07 15.56	46.64 15.59	45.88 11.03	40.48 16.08	44.63 14.39	.233	---

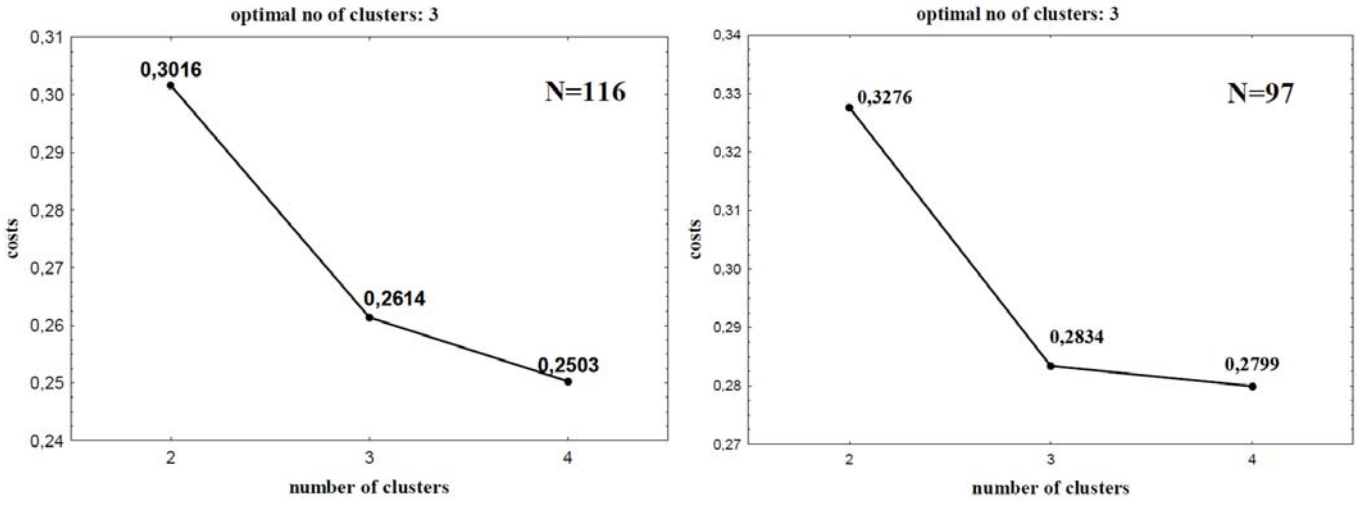

Figure 2: Graphs of cost sequence.

of patients from the ANBP and BUL group. In the analysis which excluded EDNOS, the remaining cases were classified virtually identically.

In further analyses, clusters obtained from the analysis of the three groups were used (without EDNOS). All the clusters differed significantly from one

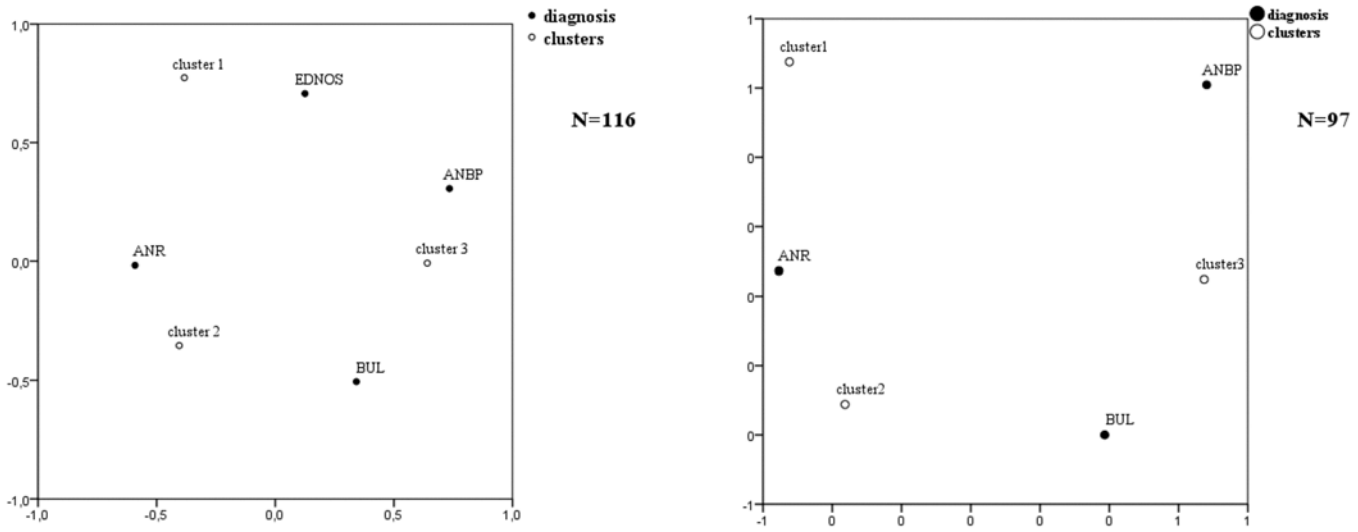

Figure 3: Plot of clusters and diagnosis profiles.

another in the context of the QSIA results. On the family attitudes scale, these differences were only between clusters 2 and 3, and on the vocational and educational goals, between clusters 1 and 3. The mean values of individual QSIA scales in particular clusters are shown on the graph (Figure **4**). It is shown that the first cluster is represented by patients with averages above 54 points on all QSIA scales, the second one by girls with average values between 35 and 52 points, and the last cluster focuses girls with the lowest QSIA results (mean between 18 and 45 points). It should be highlighted that very high results were observed for vocational and educational goals in the second and third cluster.

In view of the differences between diagnoses in the context of BMI, and the nature of the symptoms, an analysis was conducted of differences between clusters in relation to individual diagnoses. The

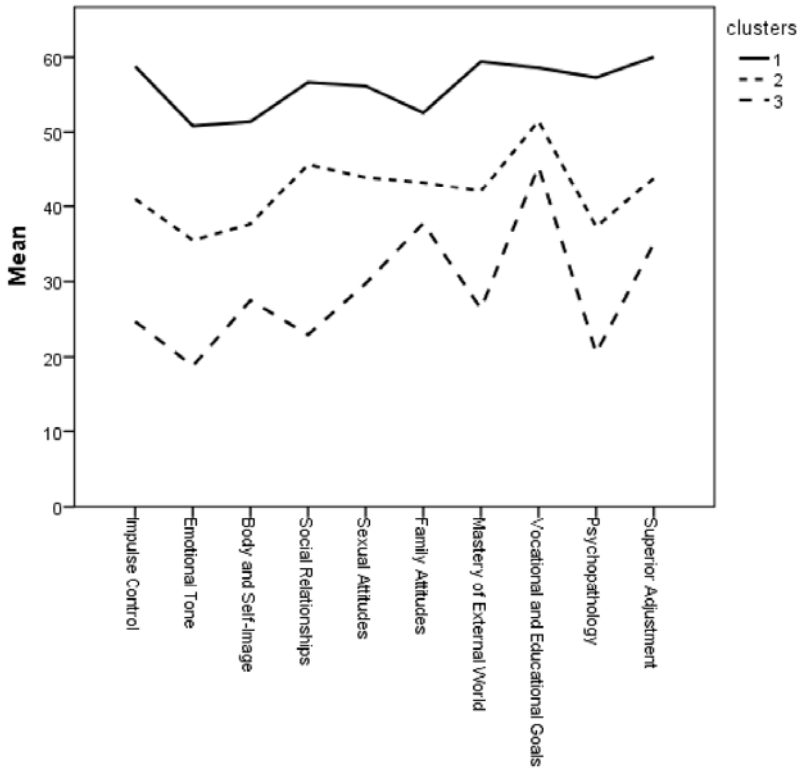

Figure 4: Mean values of individual QSIA scales in separate clusters: 3 groups.

analysis was conducted for clinical groups in the following sets: anorectic patients (ANR + ANBP) (Table **3**) and, bulimic patients (ANBP + BUL) (Table **4**). The analysis excluded patients from the EDNOS group.

It appears that the BDI results differ significantly both within the anorectic and within the bulimic group. In both groups, the lower BDI results are associated with higher self-image results. The average value for the Slimming scale (focusing on body shape and mass with accompanying fear of weight gain or the desire to lose weight) in cluster 2 is significantly lower than in cluster 3 in the anorectic patients, whereas within the bulimic patients there are no significant differences for Slimming results. However, in the second group, three other EAT26 scales have a p-value below the significance level, i.e. Excessive Concern (excessive focusing on food with accompanying feeling of losing control); Social Pressure (feeling the concern of others linked to body weight); Dietetic (remaining on a diet and awareness of dietetic principles), as do the overall EAT26 results. It is demonstrated that there are significant differences between average values in the first and the third cluster for all of these scales and for the EAT26, while for the first two scales there are significant differences only between the first and the second cluster (Table **4**).

Table 3: Descriptive Characteristics of Selected Features in Clusters in ANR + ANBP Group

		Cluster1	Cluster2	Cluster3	p	post-hoc
Age	mean SD	16.69 1.38	16.42 1.45	16.53 1.65	.897	---
disorder duration	mean SD	8.60 6.40	15.00 9.99	15.95 15.37	.123	---
BMI	mean SD	15.56 1.29	15.10 1.37	14.82 1.46	.343	---
BECK	mean SD	11.00 8.25	18.67 11.37	30.67 8.04	<.001	CL1-CL3 CL2-CL3
EAT26	mean SD	25.54 19.05	25.62 15.15	34.56 17.13	.180	---
Slim	mean SD	8.92 8.52	7.73 5.72	13.18 7.07	.039	CL2-CL3
Conc	mean SD	3.54 3.07	3.81 3.05	5.56 3.63	.150	---
Pres	mean SD	4.00 2.92	4.44 2.55	5.11 2.27	.758	---
Diet	mean SD	5.54 4.67	5.19 3.69	5.94 4.76	.919	---
Vom	mean SD	0.62 1.66	0.58 1.40	1.39 1.98	.206	---
binging episodes	mean SD	16 47.18	1.96 6.87	12.94 25.89	.125	---
vomiting	mean SD	17.00 47.15	8.75 25.76	16.35 28.08	.286	---
laxatives	N [%]	0 [0.0]	3 [12.5]	3 [16.7]	.550	---
exercise	N [%]	2 [20.0]	6 [25.0]	8 [44.4]	.287	---
fasting	N [%]	10 [100]	22 [91.7]	14 [77.8]	.169	---
other diagnosis	N [%]	2 [15.4]	3 [11.5]	8 [42.1]	.053	---

Table 4: Descriptive Characteristics of Selected Features in Clusters in ANBP + BUL Group

		Cluster1	Cluster2	Cluster3	p	post-hoc
age	mean SD	17.00 1.00	17.29 1.16	17.29 1.16	.822	---
disorder duration	mean SD	18.20 8.84	15.23 8.69	18.11 15.73	.626	---
BMI	mean SD	17.70 2.58	18.80 2.33	18.05 2.75	.546	---
BECK	mean SD	13.71 11.73	28.13 10.91	32.61 10.17	.001	CL1-CL2 CL1-CL31
EAT26	mean SD	23.29 16.38	37.41 14.88	43.13 18.50	.015	CL1-CL3
Slim	mean SD	10.14 8.45	14.59 6.34	17.35 6.63	.055	---
Conc	mean SD	2.86 3.81	6.29 3.39	7.26 4.025	.011	CL1-CL2 CL1-CL3
Pres	mean SD	2.14 1.95	4.82 2.16	4.74 2.65	.035	CL1-CL2 CL1-CL3
Diet	mean SD	2.86 3.81	6.18 4.57	7.39 4.78	.021	CL1-CL3
Vom	mean SD	2.57 2.76	2.65 1.84	2.96 2.29	.761	---
binging episodes	mean SD	60.20 59.37	31.00 25.81	46.67 42.27	.512	---
vomiting	mean SD	73.00 56.30	55.15 43.78	58.22 50.68	.844	---
laxatives	N [%]	0 [0.0]	5 [38.5]	8 [42.1]	.204	---
exercise	N [%]	1 [20.0]	1 [7.7]	8 [42.1]	.073	---
fasting	N [%]	4 [80.0]	7 [53.8]	12 [63.2]	.649	---
other diagnosis	N [%]	1 [14.3]	5 [29.4]	9 [37.5]	.534	---

There are no statistically significant differences between mean values in clusters for the rest of the characteristics taken into account in this paper, both in the anorectic and in the bulimic group (Tables **3** and **4**).

DISCUSSION

Cluster 1 in the first cluster analysis taking into account 4 groups of eating disorders largely consisted of girls from the EDNOS group. The subjects displayed subclinical symptoms of eating disorders, nevertheless requiring treatment in the judgment of a clinician. It may be assumed that this was the healthiest group, not only with a subclinical picture, but also with self-image close to the norm. In this group, the occurrence of other mental disorders was the lowest. In view of the above, and because of its heterogeneity, this group was excluded from further analysis. However, cluster analysis excluding this group proved to be practically identical. The obtained analysis results excluding the EDNOS group confirm earlier research which indicated a relationship which depressive symptoms have in the multidimensional evaluation of self-image [14-16]. Bulimic symptoms in anorexia turned out to be insignificant. Negative self-image in eating disorders may be an expression of the same mechanism of distortion, which is the essence of the cognitive symptoms of depression. The differences in the

severity of depression may considerably impact the diversity of clinical symptoms in the context of self-image.

In the absence of differences in the severity of objectively reported symptoms, the observed differences between clusters according to the overall EAT26 and its scales results indicates similarities between the self-evaluation of the presence of symptoms and self-image. The denial of symptoms extends in this respect to a wider area associated not only with the denial of the presence of symptoms but also other aspects of self-evaluation going beyond mere clinical symptoms. Confirmation of this finding would require additional statistical analyses. EAT26 is not a diagnostic tool. However, it has high compatibility with DSM-IV eating disorders diagnostic criteria [35].

Overall, our results are not incompatible with the function of self-image. It is not simply a description of features, but also an outcome of a number of defence mechanisms [36]. The main limitation of this study is the small number of study subjects. Size might have significantly affected the obtained results. Attention should also be paid to the large dispersion of results in each group. This usually translates into a lack of conformity of the empirical distribution with the normal distribution and the need to use non-parametric tests, which are characterized by a lower power than parametric tests. In the case of small size and high dispersion of data the researcher is faced with a dilemma: to remove outliers to increase the possibility of using parametric tests, thus reducing the sample size even more, or to use non-parametric tests, which, on the one hand, are resistant to the occurrence of such points, but on the other hand, have weaker test power.

The results raise questions about the usefulness of diagnostic criteria of eating disorders used in the modern psychiatric classifications. In the literature, studies which examine the whole group of eating disorders are becoming increasingly less common. The results of the presented analyses confirm the fact that anorexia and bulimia nervosa differ and that there are significant differences between restrictive anorexia nervosa subtype and binge/purge anorexia subtype [37]. This research also supports the view concerning the importance of not only clearly defined clinical symptoms but also dimensions which take into account phenomena associated with clinical symptoms such as severity of depressiveness or self-evaluation of the presence of symptoms. Despite the modification of the diagnostic criteria in DSM–V, the adopted solutions can-not be regarded as definitive and they raise doubts among clinicians who are still looking for alternatives [38-40].

The main limitation of this study is the small number of study subjects. Size might have significantly affected the obtained results. Attention should also be paid to the large dispersion of results in each group. This usually translates into a lack of conformity of the empirical distribution with the normal distribution and the need to use non-parametric tests, which are characterized by a lower power than parametric tests. In the case of small size and high dispersion of data the researcher is faced with a dilemma: to remove outliers to increase the possibility of using parametric tests, thus reducing the sample size even more, or to use non-parametric tests, which, on the one hand, are resistant to the occurrence of such points, but in the other hand, have weaker test power.

CONCLUSIONS

The factor which most affects the self-image of patients with eating disorders is depressiveness measured using the Beck Depression Inventory. There is also a similarity between subjective perception of severity of clinical symptoms measured using the EAT26 and patients' self-image.

ACKNOWLEDGEMENT

Scientific grant from the State Committee for Scientific Research (Grant number: 6 POSE 09021), scientific grant from the Jagiellonian University, Medical College (Grant number 501/NKL/269/L). Consent of the Bioethics Commission the Jagiellonian University No: KBET/26/B/2001.

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Received on 01-10-2013 Accepted on 31-10-2013 Published on 11-11-2013

http://dx.doi.org/10.6000/1929-6029.2013.02.04.3