PREDICTORS OF EATING DISORDER RISK IN ANOREXIA NERVOSA ADOLESCENTS

Maja Batista[1], Lana Žigić Antić[1], Orjena Žaja[1], Trpimir Jakovina[2] and Ivan Begovac[2,3]

[1]Department of Pediatrics, Sestre milosrdnice University Hospital Centre, Zagreb, Croatia;
[2]Department of Psychological Medicine, Zagreb University Hospital Centre, Zagreb, Croatia;
[3]School of Medicine, University of Zagreb, Zagreb, Croatia

SUMMARY – The purpose of the present study was to examine the association among the risk of eating disorder (ED), psychological adjustment, empathy, attachment style and thin-ideal internalization among adolescents with anorexia nervosa (AN), as compared to a healthy control (HC) group. The Questionnaire of General Data, the Eating Disorders Inventory-3 (EDI-3), the Questionnaire of Sociocultural Attitudes Towards Appearance-3 (SATAQ-3), the Experiences in Close Relationships-Revised (ECR-R) and the Basic Empathy Scale (BES) were administered to 35 female adolescents with AN and 35 HC adolescents. Eating disorder risk was found to be highest in AN females with higher levels of general psychological maladjustment (GPMC), followed by HC females with higher thin-ideal internalization. In the AN group, attachment style and thin-ideal internalization in combination with GPMC were not indicated as significant predictors of eating disorder risk. Study data provide support to conceptualizations of EDs that emphasize the role of general psychological maladjustment in the development of EDs.

Key words: *Anorexia nervosa; Adolescent; Emotional adjustment; Feeding and eating disorders; Empathy; Surveys and questionnaires; Croatia*

Introduction

For centuries, there has been great interest in the relation of eating and body weight with emotional and physiological health. Eating disorders (EDs) are related to eating habits and behavior, and have been characterized for developed Western countries[1]. Anorexia nervosa (AN) is one of the main EDs. According to DSM-V classification[2], AN could be defined as a disorder that mainly occurs in adolescents and young adults, mostly female, characterized by persistent and successful weight loss. AN is characterized by permanently restricted calorie intake, which leads to a significant reduction in body weight, in the context of the minimum expected weight for age, sex, developmental stage and physical health. Moreover, there is intense fear of gaining weight or becoming fat, despite the significantly low weight, distorted perceptions of their weight or body shape, undue influence of body shape and weight on self, or continuing lack of recognizing the seriousness of the current low body weight. The average age at the onset of anorexia is 17 years, with a prevalence of 0.5%-1% in young adult women.

Recent theories have characterized ED as a disorder of multifactorial nature. In order to understand ED, it is necessary to take into account the environmental, social, psychological, biological, and cultural factors. The popularity of TV, movies, and magazines leads to very successful propagation of the ideals of beauty[3]. Wertheim *et al.*[4] report that girls having diet is associated with social factors, such as feeling worried, verbal comments given by others, to achieve thinness they believe will appeal to the others, or because their friends are on a diet. Some family and twin studies

Correspondence to: *Maja Batista, MSc Clin Psychol*, Department of Pediatrics, Sestre milosrdnice University Hospital Centre, Vinogradska c. 29, HR-10000 Zagreb, Croatia

E-mail: crnkovic_maja1@yahoo.com

show a strong genetic component in AN[5], which is mostly activated in puberty[6,7], and interacts with the environmental component[8]. Current studies suggest a major role of hormones in increased heritability of ED in puberty, and of the first menstruation at an early age as a risk factor for the development of ED[9,10]. AN usually occurs in early puberty, although we are witnessing a shift towards younger age groups[11]. Puberty itself is a risk factor for the development of ED, which is considered as an inappropriate response to pubertal events. Pubertal girls are daily imbued with uncertainty about the appearance of their body, comparing it with peer body, and negative perceptions of their body image are very likely decisive for turning to diet, making the risk of developing ED higher[12]. Suddenly changed shape and dimensions of the body have psychological effects, which are reflected primarily as a negative perception of the body and negative self-evaluation. The views are formed in early adolescence in relation to the body, and diet can ultimately favor development of clinical ED[13]. If we look closer to psychological factors, EDs are connected with higher depressiveness, lower self-esteem, higher body dissatisfaction, perfectionism, and other psychiatric disorders[1,14,15]. As can be seen, a full range of risk factors are associated with the development of AN.

Attachment regulates the conduct of closeness between the child and the parents, and a unique, evolutionary based motivational mechanism, the primary function of which is to provide protection and emotional security[16]. Different forms of early attachment can be considered as strategies designed to solve adaptive problems related to different kinds of environment in which individuals grew up, i.e. our ancestors[17]. Uncertain adherence is associated with the development of anorexia, however, it is not certain that an identifiable group of insecure attachment styles plays a role in developing disorders[18,19].

Although there has been a growing number of experimental studies on the risk factors for eating pathology and empathy, this literature has not been critically reviewed or synthesized. According to Schipper and Petermann[20], based on interrelations between emotion processes and social information processing and recent neuroscientific findings showing that empathy deficits might not only result in difficulties labeling others' emotions but one's own emotions too, they suggest that empathy deficits might serve as a potential trigger of emotion dysregulation. Considering the presented information, we assume that a healthy amount of empathy builds the foundation of an effective emotion regulation. Empathy could be defined as the ability of recognizing other's feelings, the cause of these feelings, and to be able to participate in the emotional experience of an individual without becoming part of it[21]. There are two dimensions of empathy, cognitive and affective empathy. Cognitive empathy implies understanding the others' feelings[22], whereas affective empathy defines empathy as an observer's emotional response to the affective state of another person[23]. Individuals with AN have impaired cognitive empathy, even the understanding of others' emotions[24], while personal distress could be a persistent feature of AN that leads to poor emotional awareness and regulation[25]. For instance, AN has modified emotional facial expression, shows less facial expression, and reports less positive but not less negative emotions than the healthy control (HC) group[26]. Moreover, Davies *et al.*[27] found that individuals with AN showed less positive expression, with less negative expression in response to showing a sad clip. These factors could affect effective emotional regulation and social relations[28]. Some studies found no differences between AN and HC individuals in their self-reported empathy and systemizing, with AN higher scores on the autism-spectrum quotient related to HC[29].

In adolescents and young adult women, differences in the mental image of the body and the cultural ideal are related with body dissatisfaction, tendency to overestimate the size of the body, depressed mood and bulimic behavior[1]. Thin-ideal internalization predicted ED attitudes indirectly *via* body dissatisfaction, dietary restraint, and depression. It also predicted ED attitudes directly[30]. Stice[31] showed that thin-ideal internalization as the ideal of beauty and perceived pressure to thinness (by family, friends, partners and media) predicted and increased body dissatisfaction in girls aged 14-17 years. Body dissatisfaction is a significant predictor of the frequency of dieting and negative emotionality. The media are probably the most powerful transmitters of social and cultural ideals of appearance and therefore play an important role in the development of ED[1]. Early adolescence girls that accepted articles and advertisements as important sources of information on the implementation of diet and maintaining a perfect body were more dissatisfied with their

appearance. Comparison with slender and famous women from the media reinforces negative emotions concerning their weight and body shape, especially if their body image is negative[32].

However, to the authors' best knowledge, there are no studies examining the association among the risk factors for ED, psychological adjustment, empathy, attachment style and thin-ideal internalization, particularly in clinical samples. Therefore, the purpose of the present study was to examine psychological adjustment, empathy, attachment style and thin-ideal internalization in female adolescents with AN in comparison to the HC group. Both patient specific psychological constructs and sociocultural attitudes, as well as psychological adjustment profile were described in the study. The primary hypotheses of the study were that adolescents with AN would show 1) a statistically significant higher general psychological maladjustment than the HC group; and 2) a statistically significant impairment in empathy, attachment style and thin-ideal internalization than the HC group.

In addition, the goal of the study was to investigate the role of general psychological maladjustment, empathy, attachment style and thin-ideal internalization for the eating disorder risk (EDR). We hypothesized that general psychological maladjustment, insecure or avoidant attachment, thin-ideal internalization, and lower or higher levels of empathy would lead to higher EDR. In this research, we were interested in the predictors of developing EDR in both females with anorexia and HC group.

Materials and Methods

Recruitment

A total of 70 female participants, equally distributed between the AN group (N=35) and HC group (N=35) were included in the study. Diagnosis was established by medical doctors (psychiatrists). Recruitment of patients took place at two participating centers. One centre was a specialized pediatric hospital unit for inpatients and outpatients with an ED: Gastroenterology Unit, Department of Pediatrics, Sestre milosrdnice University Hospital Centre, Zagreb, Croatia and Department of Psychological Medicine, Zagreb University Hospital Centre, Zagreb, Croatia. Recruitment of patients was carried out from January 2014 to January 2015.

Patients were diagnosed by a psychiatrist using the Diagnostic and Statistical Manual of Mental Disorders (DSM), 4th edition[33]. Subsequently, the patients were re-diagnosed in accordance with the DSM, 5th edition[2]. A total of 35 patients met the DSM-5 diagnostic criteria for AN. The study included only inpatient adolescent females with AN, with no other psychiatric disorders as comorbidity. All participants had suffered from anorexia for at least one year before setting the diagnosis. Inclusion criteria were age 11-19 years, with body mass index percentile for age <5% and body mass index (BMI) <18.5 at the time of hospital admission. In order to avoid the impact of malnutrition on the research results, all patients were administered questionnaires after one-month stay in the inpatient unit. Therefore, in some patients BMI percentile for age was greater than 5% and BMI was higher than 18.5 at the time of completing the questionnaire (Table 1). A gastroenterologist estimated medical stability of all participants in the experimental group according to the guidelines set by the Society for Adolescent Medicine[34], and directed by the Workgroup for Classification of Eating Disorders in Children and Adolescents[35]. Excluded were inpatients that were, according to the gastroenterologist examination, severely malnourished and in deep somatic mortal danger, or patients with severe bradycardia, hypotension, hypothermia, and orthostatic changes in heart rate or blood pressure.

The HC female group (N=35) was recruited from elementary and secondary schools in Zagreb (both vocational and humanistic). Females of the relevant age range were invited to participate. Patients and HCs were matched 1:1 by age, type of school (i.e. within one grade), and matched at the group level for the socio-demographic background.

Ethical aspects and procedure

Participation was voluntary; patients and their parents were informed that nonparticipation would not affect their treatment. Written and verbal information about the study was provided before recruitment. A written informed consent was obtained from the holder of custody, and it was a guarantee of data anonymity and confidentiality. The study design was cross-sectional, in one period of data import. The study was conducted by a clinical psychologist, PhD student who was with the participants throughout the time of fill-

Table 1. Demographic data of the sample (N=70)

	M (SD)		TR		N	N
	AN	HC	AN	HC	AN	HC
Age (years)	15.17 (1.52)	15.14 (1.44)	12.0-18.0	13.0-18.0	35	35
Body mass index	16.00 (2.82)	20.05 (2.23)	10.9-23.1	15.4-25.7	35	35
Percentile	12.06 (19.01)	45.28 (21.59)	0.0-71.8	87.5-45.28	35	35
Z-score	-2.55 (2.35)	-0.16 (.68)	-9.71-0.58	-2.12-1.15	35	35
Lowest weight ever in adolescence	41.27 (7.17)		29.0-57.0		35	35
Deliberately lost kilograms ever	14.21 (6.78)		5.0-30.0		35	35
	Frequency		%		n	n
	AN	HC	AN	HC	AN	HC
Education level:						
elementary school	11	10	31.4	29.4		
high school	7	7	20	20.6	35	34
technical school	17	17	48.6	48.6		
Financial status:						
low	-	1		2.9		
below average	5	2	14.3	5.9		
average	25	26	71.4	76.5	35	34
above average	5	3	14.3	8.8		
high	-	2		5.9		

M = mean; SD = standard deviation; TR = total range; AN = anorexia nervosa; HC = health control; N = number of participants

ing out the questionnaires. The study was approved by the local Research Ethics Committee of the participating hospitals and schools, and by the Research Ethics Committee of the School of Medicine, University of Zagreb, as the research was part of a doctoral study.

To achieve high reliability, joint personnel training and supervision were provided continuously during the study period. Highly trained staff managed all assessment tools. Somatic assessment was conducted by one medical doctor. Ongoing rating and supervision were provided by one PhD student psychologist.

Instruments

All participants in the AN group filled out the following test battery:

Questionnaire of General and Health Information – apposite questionnaire designed for this research that examines general and health information about participants (age, level of education, socioeconomic status of the family, parental marital status, family history of eating disorders, family history of other psychiatric illness, family structure, and data that include physical state: menstrual status, duration of disease prior to

testing, etc.). Clinical psychologist also filled out this questionnaire to ensure the reliability of data. Clinical psychologist completed the questionnaire obtaining information from medical records, as well as from participant parents.

Eating Disorder Inventory-3 (EDI-3)

The EDI-3 is a 91-item self-report questionnaire of psychological traits clinically relevant in individuals with an ED. Participants respond on a 6-point Likert scale ('Always' through 'Never'). It consists of 12 subscales: Drive for Thinness (DT), Bulimia (B), Body Dissatisfaction (BD), Low Self-Esteem (LSE), Personal Alienation (PA), Interpersonal Insecurity (II), Interpersonal Alienation (IA), Interceptive Deficits (ID), Emotional Dysregulation (ED), Perfectionism (P), Asceticism (A) and Maturity Fears (MF). The sum of the subscales comprises 6 composites: Eating Disorder Risk (EDRC), Ineffectiveness (IC), Interpersonal Problems (IPC), Affective Problems (APC), Overcontrol (OC), and General Psychological Maladjustment Composite (GPMC). In the present study, Cronbach's α for GPMC score was 0.96 and

for EDRC score 0.95, which is good internal reliability.

Experience in Close Relationship-Revised (ECR-R)

The ECR-R assesses attachment anxiety (e.g., strong need for care and attention from attachment figures combined with uncertainty about the willingness or capability of attachment figures to respond to him/her in an appropriate fashion)[36] and avoidance dimension (e.g., discomfort with intimacy and need for independence, even in close relationships)[36]. It is a 36-item questionnaire where participants are asked to rate statements based on how they generally feel in emotionally close family relationship[37]. The seven categories range from 'strongly disagree' to 'strongly agree'. Fraley *et al.*[38] have presented considerable evidence that the four-category model of attachment is best characterized by the two-dimensional system. Secure adolescents are low in both attachment anxiety and attachment avoidance. Preoccupied adolescents are high in attachment anxiety and low in attachment avoidance. Dismissive adolescents are high in attachment avoidance and low in attachment anxiety. Fearful adolescents are high on both dimensions. Internal consistency for the ECR-R total score was excellent in the current study (Cronbach's α=0.96).

Basic Empathy Scale (BES)

The BES was originally developed by Jolliffe and Farrington[39]. The BES has 20 items, nine of which measure cognitive empathy and 11 measure affective empathy on a five-point Likert type scale (1=strongly disagree to 5=strongly agree). Before analyses, seven of the items were reverse coded. Therefore, higher scores indicated a higher level of empathy. Jolliffe and Farrington[39] found a two-factor solution: affective ('My friend's emotions don't affect me much') and cognitive empathy ('I can understand my friend's happiness when she/he does well at something'), and Cronbach's alpha coefficients were 0.85 for the affective component and 0.79 for the cognitive component. Internal consistency for the ECR-R total score was very good in the current study (Cronbach's α=0.83).

Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3)

The SATAQ-3 is a 30-item scale measuring the multidimensional impact of socio-cultural influences on body image along four dimensions (Information, Pressure, Internalization-General, and Internalization-Athlete). The four factors are internally reliable, with Cronbach's alpha coefficients generally exceeding 0.80[40]. Items were rated on a 5-point Likert-type scale (1=definitely disagree to 5=definitely agree), and subscale scores were computed by taking the mean of items associated with each factor. Correlational, structural equation modeling and prospective studies of the SATAQ-3 have shown consistent and significant associations with measures of body image disturbance and eating pathology[41]. In the present study, Cronbach's α for total score was 0.95.

Assessment of healthy control subjects

The HC group subjects were screened for indication of psychiatric disorder during recruitment using the Strengths and Difficulties Questionnaire[42].

The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioral screening questionnaire for individuals aged 4-17 years. It exists in several versions to meet the needs of researchers, clinicians and educationalists. The SDQ is a 25-item scale divided into 5 subscales: Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Relationship Problem, Prosocial Behavior, and Total Score. Findings support the use of the SDQ as a genuinely dimensional measure of the child mental health[43]. Furthermore, an identical test battery was administered as in the experimental (AN) group.

Statistical analyses

Pearson's correlation analysis was performed to investigate the relationship between ED risk composite and psychological variables. In addition, t-test was used to investigate differences between independent samples. Hierarchical multiple regression analyses were performed to identify predictors of EDRC. If data did not fulfill the requirement of normality, the non-parametric equivalent Wilcoxon Mann-Whitney test was performed. Effect sizes were calculated, taking into account the dependence structure of data by adjusting for correlation within matched pairs[44]. The level of statistical significance was set at $p<0.05$. The Statistical Package for the Social Sciences, version 19.0 (SPSS Inc., Chicago, IL, USA) was used on all data analyses.

Results

Sociodemographic and somatic characteristics

As shown in Table 1, the mean age in the AN group was 15.1 years (SD=1.5), range 12-18 years. The patients in the study cohort were seriously ill, with the mean BMI 16 (SD=2.8) and BMI percentile for age 12.0 (SD=19.0). The range for BMI was 10.9-23.1, and for BMI percentile for age 0-71.8 with z-score -2.55. In order to avoid the impact of malnutrition, patients filled out a battery of questionnaires after one-month stay in inpatient unit, having gained weight during that time. The lowest weight recorded in adolescence was 41.2 kg (SD=7.1), range 29-57 kg. Deliberately lost weight amounted to 14.2 kg (SD=6.7), range 5-30 kg.

Thirty-two patients had AN restricting type, whereas three patients had AN binge-eating/purging type. Four patients had a family history of ED. The mean duration of disease measured by self-reported duration of changes in eating behavior was 1 year, range 0.6-more than 2 years. In the experimental (AN) group, almost 65% of subjects had amenorrhea and in 70% of them, this was their first inpatient hospital stay. Their parents were mostly married, but in 20% of patients their parents were divorced or in the process of getting divorce. In the HC group, 82% of parents were married. About 97% of subjects had no history of ED in family, while almost 3% of girls were malnourished.

Difference between AN and HC groups regarding psychosocial measures

To determine whether there was a difference between AN and HC groups in psychological maladjustment t-test was employed. AN females were found to have significantly higher GPMC scores as compared with HC group (t=5.03, p=0.00) (Table 2). As expected, a statistically significant difference was confirmed between the AN and HC groups regarding all specific psychological composites measured in EDI-3: Ineffectiveness (t=4.80, p=0.00), Interpersonal Problems (t=3.09, p=0.00), Affective Problems (t=4.18, p=0.00) and Overcontrol (t=4.64, p=0.00), with higher scores in adolescent females with anorexia. If considered more closely, AN females compared to HC group had significantly increased scores in all Eating Disorder Risk and Psychological scales on EDI-3 except for Maturity Fears and Bulimia scales, then in Drive for Thinness (t=5.51, p=0.00), Body Dissatisfaction

Table 2. T-test results in anorexia nervosa (AN) and healthy control (HC) groups

	Group	N	M	SD	T	df	p
GPMC	AN	35	436.37	70.33	5.03	68	0.00
	HC	35	371.83	28.51			
SATAQ	AN	35	81.49	28.96	1.29	68	0.20
	HC	35	73.83	20.07			
BES	AN	35	76.94	9.66	-1.27	68	0.21
	HC	35	79.80	9.17			
ECR-R	AN	34	110.50	46.70	2.33	67	0.02
	HC	35	88.46	30.54			
IC	AN	35	90.63	20.14	4.80	68	0.00
	HC	35	73.31	7.12			
IPC	AN	35	98.14	18.99	3.09	68	0.00
	HC	35	85.60	14.66			
APC	AN	35	97.11	21.28	4.18	68	0.00
	HC	35	80.83	8.85			
OC	AN	35	93.37	16.47	4.64	68	0.00
	HC	35	78.31	9.85			

N = total number of cases; M = mean; SD = standard deviation; T = t-test value; df = degree of freedom; p = level of significance; GPMC = global psychological maladjustment; SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire; BES = Basic Empathy Scale; ECR-R = Experience in Close Relationship-Revised; IC = ineffectiveness; IPC = interpersonal problems; APC = affective problems; OC = overcontrol

(t=5.23, p=0.00), and in almost all psychological scales (Low Self-Esteem (t=4.53, p=0.00), Personal Alienation (t=4.64, p=0.00), Interpersonal Insecurity (t=2.64, p=0.01), Interpersonal Alienation (t=3.04, p=0.00), Interoceptive Deficits (t=4.65, p=0.00), Emotional Dysregulation (t=2.92, p=0.00), Perfectionism (t=3.03, p=0.00) and Asceticism (t=4.58, p=0.00). No difference between the AN and HC groups was recorded in Maturity Fears and Bulimia scales.

A highly significant between-group difference was found in the Experience in Close Relationships (ECR-R) (t=2.33, p=0.02), with higher scores in AN group. However, there was no between-group difference regarding empathy (BES) and thin-ideal internalization (SATAQ) (Table 2).

Relationship between Eating Disorder Risk Composite (EDRC) and psychosocial measures

Exploration of relationships between the Eating Disorder Risk Composite (EDRC) and psychosocial variables revealed that EDRC was related to the GPMC (r=0.65, p<0.01), thin-ideal internalization (SATAQ) (r=0.39, p<0.05) and Experience in Close Relationships (ECR-R) (r=0.47, p<0.01) in AN group. Similar results were recorded for relationships between EDRC and psychosocial variables in HC group: EDRC was related to the GPMC (r=0.44, p<0.01), SATAQ (r=0.59, p<0.01) and ECR-R (r=0.43, p<0.01). However, empathy (BES) was not related to EDRC in either group (Table 3), so it was excluded from further analysis.

In order to establish predictors of the risk of eating disorders (EDRC), hierarchical multiple regression was performed, with EDRC as a dependent variable (Table 4). According to literature and correlation analysis, the GPMC as a psychological variable was controlled in the first step. In the second step, the ECR-R as a psychosocial measure was entered. Finally, in the third step, the SATAQ as a social measure for thin-ideal internalization was entered. To ensure the validity of the results in hierarchical analysis, we alternated the order of inputting the variables in the analysis, but each time we received identical results. Identical steps were performed separately for the AN and HC groups. The final model explained 43% of variance of the risk of ED in the AN group, followed by explanation of 50% of variance in the HC group.

Table 3. Correlations between EDRC and psychological variables (AN above diagonal, HC below diagonal)

	GPMC	BES	SATAQ	ECR-R	EDRC
GPMC	-	0.09	0.57**	0.69**	0.65**
BES	-0.21	-	-0.09	0.24**	0.24
SATAQ	0.17	-0.11	-	0.56**	0.39*
ECR-R	0.47**	-0.27	0.19	-	0.47**
EDRC	0.44**	-0.07	0.59**	0.43**	-

*p<0.05; **p<0.01; AN = anorexia nervosa group; HC = healthy control group; GPMC = Global Psychological Maladjustment Composite; SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire; BES = Basic Empathy Scale; ECR-R = Experience in Close Relationship-Revised; EDRC = Eating Disorder Risk Composite

Table 4. Hierarchical regression analysis showing predictors of eating disorder risk

	AN		HC	
Predictor	ΔR^2	β	ΔR^2	β
Step 1	0.43**		0.19**	
GPMC		0.65**		0.44**
Step 2	0.00		0.07	
GPMC		0.62**		0.30
ECR-R		0.04		0.29
Step 3	0.00		0.24**	
GPMC		0.61**		0.25
ECR-R		0.04		0.22
SATAQ		0.03		0.50**
Total R²	0.43**		0.50**	

*p<0.05; **p<0.01; AN = anorexia nervosa group; HC = healthy control group; GPMC = Global Psychological Maladjustment Composite; SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire; ECR-R = Experience in Close Relationship-Revised; EDRC = Eating Disorder Risk Composite; ΔR^2 = the adjusted coefficient of determination; β = standardized beta coefficient

The ECR-R and SATAQ did not contribute significantly to the explanation of variance in AN group, whereas the GPMC and ECR-R did not contribute significantly to the explanation of variance in HC group.

Significant predictors of eating disorder risk was GPMC (β=0.61, p<0.01) in AN group and SATAQ (β=0.50, p<0.01) in HC group. Eating disorder risk was found to be highest in more general psychological maladjusted females with AN, followed by HC females with higher thin-ideal internalization.

Discussion

One aim of the study was to describe the general psychological adjustment profile in patients with AN. This was carried out through comparison with the psychological adjustment profile of the HC group. It was expected that patients with AN would have higher GPMC and its composites than the HC group. Significant between-group difference in GPMC was found. AN females showed a significantly higher levels of GPMC and its specific psychological composites.

The results suggested that adolescents with AN as compared to HC group had a higher rate of psychological maladjustment, i.e. more interpersonal and affective problems; they appeared to pursuit perfection through self-denial and suffering, and had low self-evaluation and sense of emotional emptiness. In more detail, they had lower self-esteem, wanted to be thinner, were more dissatisfied with their body, were insecure in interpersonal relationships, and had higher emotional dysregulation, asceticism and perfectionism than the HC group. There was no difference between the AN and HC groups regarding Maturity Fears and Bulimia. These findings are consistent with the results of several other studies. According to the literature, EDs are marked with psychosocial impairment and comorbid psychopathology[45,46]. The self-esteem of a female before puberty and in adolescence is an important factor in their predisposition for the development of ED[47]. Low self-esteem is also associated with ED and with eating attitudes in non-clinical student groups[48], as well as with anorectic behavior[49]. Halmi *et al.*[50] report on the presence of depression during lifespan in 68% of anorexic females, whereas in control population, the incidence was 21%. Body concerns and diet attempts in adolescents are risk factors for the later development of EDs[51,52] and always are, at the subclinical level, linked to depression, low self-esteem and anxiety[53].

The results indicated a highly significant difference between the groups in the ECR-R, demonstrating higher levels of avoidance and anxiety in AN group. Also, significant relationship was found between EDRC and ECR-R in both AN and HC groups. Similar findings were also found in many other studies[54-56], indicating a significant correlation between anorexia and rejected or preoccupied attachment style.

According to the literature, empathy deficits in terms of low empathic abilities might trigger emotion dysregulation; also too high amount of empathy is a potential trigger of emotion dysregulation. However, in our study the difference was not found between AN and HC group regarding empathy (BES). In addition, there was no significant correlation between EDRC and empathy in AN and HC groups. Similar findings found Harrison *et al.*[57], where they stated that there was a small difference between the ED and HC groups for the emotion recognition task (small-medium effect), particularly in the restricting AN group.

Beside ECR-R, significant relationship was found between EDRC and SATAQ, and between EDRC and GPMC in both groups. However, in AN group, significant predictor was only GPMC. On the other hand, in HC group, proven significant predictor of EDRC is only SATAQ. Interestingly, in our study SATAQ was not as significant predictor in AN group, but only in the HC group. These results are partly in line with our expectations. According to literature, and to the socio-cultural theories that explain the risk of developing ED, SATAQ is a significant predictor for the development of ED. Numerous studies conducted in the last twenty years documented the rise of social desirability of slim female figures[3,58,59]. Research based on the effect of the media indicates that higher exposure to media leads to thinness associated with more pronounced symptoms of ED[60,61]. One measure of risk that has received a great deal of attention is internalization of the thin ideal[62]. Recent work in the preventive area has demonstrated that internalization may be a causal risk factor for the onset of eating and shape-related disturbances[63] and a significant predictor of treatment success among adolescent girls and women with AN[64]. Importantly, it is possible to modify such internalization and changes in this risk factor appear to be related to changes in levels of body dissatisfaction[65]. Data reported by Garner *et al.*[66] suggest that both pressures to be slim and achievement expectations are risk factors in the development of AN. Thin-ideal internalization is a causal risk factor for body dissatisfaction, dieting, negative affect, and bulimic pathology, as well as a maintenance factor for bulimic pathology[67,68]. However, these conclusions should be interpreted with caution because most of the studies were from one research group, mostly on non-clinical samples and on bulimia groups, rather than on anorexia sample. It is important to stress that these studies cannot explain why only some adolescents

who are exposed to cultural messages become concerned about the body and slimming diet. It seems that in our healthy sample the best predictor for the risk of eating disorders is SATAQ, while in the AN group a significant predictor is only GPMC.

Based on these results it can be concluded that the role of psychological maladjustment should not be ignored when it comes to risk of developing ED in adolescence, as the role of sociocultural attitudes about body image in the healthy population should not be neglected, especially in creating prevention programs for ED.

Finally, it is useful to mention some limitations of the study. It should be noted that all the conclusions of this study were in only correlation nature, and do not reflect the causal relationships among the analyzed phenomena. Therefore, the future research should focus on other research approaches, such as cross-sequential draft with the longitudinal component, which would provide more valid information about the direction of impact. Furthermore, the study was conducted on a convenient sample and, as such, must to some extent limits the possibility of generalization of the results to the entire population of adolescents with AN. This study provides a unique contribution to the etiological factors of ED. The results of this study can be useful guidelines for further research in this area. The data provide support for conceptualizations of EDs that emphasize the role of general psychological maladjustment in the development and maintenance of EDs. Further research will concentrate on exploring whether these findings are state or trait features of EDs.

Conclusion

Clinicians and researchers are unanimous in concluding that in adolescent females with ED they may perceive a specific form of emotional instability. These data confirm that females with AN exhibit different psychological profile than HCs. They are more psychologically maladjusted females with more interpersonal and affective problems, they pursuit the perfection through self-denial and suffering, and they have lower self-evaluation and the sense of emotional emptiness compared to HC group. It seems that there are no differences between healthy females and females with anorexia regarding empathy, and no association was found between the risk of developing eating disor-

der and empathy. The risk of developing eating disorders significantly correlated with thin-ideal internalization, attachment style and global psychological maladjustment. Eating disorder risk was found to be highest in more general psychological maladjusted females with AN, followed by HC females with higher thin-ideal internalization. Attachment style and thin-ideal internalization were not proved as significant predictors, in combination with global psychological maladjustment in the AN female adolescent group.

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Sažetak

PREDIKTORI RIZIKA ZA RAZVOJ POREMEĆAJA JEDENJA U ADOLESCENTICA S ANOREKSIJOM NERVOZOM

M. Batista, L. Žigić Antić, O. Žaja, T. Jakovina i I. Begovac

Cilj ovoga istraživanja bio je ispitati povezanost između rizika za razvoj poremećaja u jedenju (ED), psihološke prilagodbe, empatije, privrženosti i internalizacije mršavosti među adolescentima s anoreksijom nervozom (AN) u odnosu na zdravu kontrolnu skupinu (HC). Upitnik općih podataka, Upitnik o poremećaju jedenja-3 (EDI-3), Upitnik sociokulturnih stavova prema izgledu-3 (SATAQ-3), Revidirani upitnik o iskustvima u bliskim odnosima (ECR-R) i Upitnik o empatiji (BES) ispunilo je 35 adolescentica s dijagnosticiranim poremećajem u jedenju (anoreksija nervoza) i 35 zdravih adolescentica koje su činile kontrolnu skupinu. Rizik za razvoj poremećaja u jedenju se pronašao najvećim u adolescentica s anoreksijom nervozom koje su imale značajne teškoće u općoj psihološkoj prilagodbi, zatim u zdravih adolescentica kod kojih se potvrdila značajna internalizacija ideala mršavosti. U djevojaka s utvrđenom dijagnozom anoreksije nervoze, stil privrženosti i internalizacija ideala mršavosti se nisu pokazali značajnim prediktorom, u kombinaciji s faktorom opće psihološke neprilagodbe, za rizik za razvoj poremećaja u jedenju. Rezultati podupiru konstrukt poremećaja u jedenju koji naglašava ulogu opće psihološke prilagodbe u razvoju poremećaja u jedenju.

Ključne riječi: *Anoreksija, nervoza; Adolescent; Psihološka prilagodba; Poremećaji hranjenja; Empatija; Ankete i upitnici; Hrvatska*