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EMOTIONAL DYSREGULATION AND ATTACHMENT DIMENSIONS IN FEMALE PATIENTS WITH BULIMIA NERVOSA

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SUMMARY

Background: The aim of this study was to examine whether there is a difference in the dimensions of attachment and difference in emotional regulation between the group of female patients suffering from bulimia nervosa (BN) and the control group. We also wanted to examine whether emotional regulation has a mediating role in the relationship between dimensions of attachment and severity of BN symptoms.

Subjects and methods: The study included a total of 100 female participants from 15 to 25 years of age ($M=20.40$, $SD=3.26$). The clinical group consisted of 50 patients suffering from BN, and the control group consisted of 50 healthy female subjects.

Results: Female patients suffering from BN achieved higher scores in the dimensions of anxiety ($t_{98}=-5.12$, $p=0.00$) and avoidance ($t_{98}=-4.30$, $p=0.00$). Dimension of attachment related anxiety ($\beta=0.44$, $p=0.00$) proved to be a statistically significant predictor of BN symptoms. Subjects of the clinical group also achieved significantly higher ($t_{98}=7.41$, $p=0.00$) emotional dysregulation than participants of the control group. We also found that the mediation effect of emotional regulation on the association between anxiety and BN symptoms was statistically significant ($z'=4.43$, $p=0.00$).

Conclusions: Patients suffering from BN showed significantly higher levels of attachment related anxiety and avoidance as well as significantly higher level of difficulties in emotional regulation than healthy controls. Attachment anxiety proved to be a significant predictor of symptoms BN, suggesting that the attachment related anxiety is stronger correlate of BN symptoms than avoidance, and may represent a risk factor for more severe BN symptoms. It was also found that the relationship between attachment related anxiety and BN symptoms were mediated by emotional regulation.

Key words: bulimia nervosa - attachment anxiety - attachment avoidance - emotional regulation

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INTRODUCTION

There is a basic assumption in clinical psychology and psychiatry that the quality of close relationships has a significant impact on mental health problems (Zachrisson & Skårderud 2010). According to this assumption, attachment theory (Bowlby 1980) has become one of the most important theoretical frameworks for the understanding of general, as well as eating psychopathology. Through attachment relations human infants receive a sense of security from the primary caregiver, and repeated interactions with a caregiver become encoded in the implicit memory system, hence they develop into internal working models of attachment (Amini et al. 1996). Internal working models become the basis for consistent ways in which children and adults interact with the world, experience themselves and others, and regulate affect. These functions, especially affect regulation have implications on eating disorder psychopathology (Tasca & Balfour 2014).

Originally, attachment was conceptualized in categorical terms of three categories: secure, anxious and avoidant (Hazan & Shaver 1987), with avoidant later being divided into two categories (Bartholomew &

Horowitz 1991). Recent evidence suggests that attachment is most accurately measured by dimensions rather than by categories (Fraley et al. 2000). Brennan et al. (1998) suggested that there are two fundamental dimensions with respect to adult attachment patterns; attachment related anxiety and attachment related avoidance. Attachment anxiety may develop when attachment figures are inconsistent or unpredictable. In an attempt to maintain an engagement with inconsistent caregivers, these children hyperactivate their attachment systems. This involves excitatory pathways that intensify negative emotional responses by keeping them active in working memory resulting in an up regulation of emotion (Shaver & Mikulincer 2002). Attachment avoidance may develop when individuals perceive their primary attachment figure as rejecting or unavailable. In response, these individuals deactivate their attachment systems and defensively devalue their need for relationships. Thus, affective experiences are cut off from working memory, and this is accompanied by a down-regulation of emotion (Shaver & Mikulincer 2002).

Generally, bulimia nervosa (BN) has been associated with a high degree of Cluster B personality disorders (Cassin & von Ranson 2005, Godt 2008) and associated

manifestations of hyperactivation of attachment systems and poor emotion regulation, such as high impulsivity, affective instability, and disinhibition (Keel et al. 2007, Grilo 2002). Studies in young adults with BN have already demonstrated that higher attachment anxiety was significantly related to greater BN symptom severity (Cash & Annis 2004, Illing et al. 2010). Research also demonstrated that individuals with BN display greater emotion dysregulation than controls (Harrison et al. 2010, Svaldi et al. 2012), and that higher levels of emotion dysregulation in BN are associated with greater levels of eating disorder psychopathology (Lavender et al. 2014, Svaldi et al. 2012). Similar results were also found in males suffering from BN (Fernández-Aranda et al. 2004, Serneck et al. 2015). Tasca et al. (2009) found that the association between attachment anxiety and ED symptoms was mediated by hyperactive affect regulation.

The purpose of this study was to examine whether there is a difference in the dimensions of attachment and difference in emotional regulation between the group of female patients suffering from BN and the control group. We also wanted to examine whether emotional regulation has a mediating role in the relationship between dimensions of attachment and severity of BN symptoms. It was hypothesized that the group of female patients suffering from BN will demonstrate higher attachment anxiety and attachment avoidance, as well as higher emotional dysregulation. It was also hypothesized that the association between attachment dimensions and BN symptoms was mediated by affect dysregulation.

SUBJECTS AND METHODS

Subjects

The study included a total of 100 female participants from 15 to 25 years of age ($M=20.40$, $SD=3.26$). The clinical group consisted of 50 patients suffering from BN, treated at University Hospital Center Zagreb, where in the symptoms do not last longer than 12 months. The control group consisted of 50 subjects that were matched with participants of clinical groups to the essential characteristics. The subjects were recruited into control group from School for Nurses Mlinarska, XVIII. Gymnasium Zagreb, and the Health Center Zagreb - West. Participants whose score was greater than or equal 2. on the SCOFF questionnaire were not included into control group.

Measures

SCOFF is questionnaire for screening participants with symptoms of anorexia nervosa and bulimia nervosa (Botella et al. 2013). It consists of five questions related to eating on which respondents answer "yes" or "no." Two or more "yes" suggests the existence of eating disorders. The sensitivity of the questionnaire for the existence of the BN confidence interval 92.6%-100.0% (Morgan et al. 1999).

Body Mass Index (BMI) was calculated from self-reports of height and weight. Self-reports of height and weight have been shown to be highly correlated with actual measures (Coates et al. 1978, Stunkard & Albaum 1981).

Eating disorder inventory-2 (EDI-2) was developed by Garner (1991) to measure the behaviors and attitudes related to anorexia nervosa and bulimia nervosa. It comprises 91 items, and three subscales measuring eating behavior and specific mental pathology (drive for thinness, bulimia, and body dissatisfaction), and eight subscales assessing general psychopathology (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fear, asceticism, impulse regulation, and social insecurity). Responses are scored on a 6-point Likert scale and recoded into a 4-point scale, with a "0" assigned to the three least symptomatic responses and a "3" assigned the most symptomatic responses. The Cronbach α reliability index for the recorded 11 subscales were as follows: drive for thinness 0.95; bulimia 0.92; body dissatisfaction 0.93; ineffectiveness 0.90; perfectionism 0.80; interpersonal distrust 0.80; interoceptive awareness 0.92; maturity fears 0.86; asceticism 0.68; impulse regulation 0.82; and social insecurity 0.71. The *EDI-2* bulimia subscale was used as a measure of BN symptoms.

The Experiences in Close Relationships-Revised (ECR-R) (Fraley et al. 2000) questionnaire is a revised version of Experiences in Close Relationships (ECR) (Brennan et al. 1998) questionnaire. The questionnaire contains 36 items rated on a 7-point Likert-type scale where 1 = strongly disagree and 7 = strongly agree. The items are distributed in two subscales; attachment-related anxiety (i.e., the extent to which people are insecure vs. secure about the availability and responsiveness of close person) and attachment-related avoidance (i.e., the extent to which people are uncomfortable being close to others vs. secure depending on others). More research confirms the improvement of metric characteristics of the ECR-R in relation to the ECR (Esbjörn et al. 2015), and the stability of the two-factor structure (Sibley & Liu 2004). Cronbach α reliability coefficient obtained in this study for anxiety subscale was 0.90 and for avoidance subscale was 0.92.

Difficulties in Emotion Regulation Scale (DERS) was developed by Gratz & Roemer (2004) to assess emotion dysregulation. The measure comprises 36-items and provides a total score and six subscale scores: nonacceptance (nonacceptance of emotional states), strategies (limited access to adaptive emotion regulation skills), goals (difficulty with goal-directed behavior in the context of emotional distress), impulse (difficulty controlling behaviors when upset), clarity (lack of emotional clarity), and awareness (lack of emotional awareness). Items are rated on 5-point Likert-type scale and are summed such that higher scores indicate greater emotion dysregulation. The measure has demonstrated good validity and reliability in past research (Gratz &

Roemer 2004), including in studies with ED samples (e.g., Harrison et al. 2010, Racine & Wildes 2013). The Cronbach α reliability index for the recorded 6 subscales were as follows: nonacceptance 0.90, goals 0.89, impulse 0.87, awareness 0.78, strategies 0.91, clarity 0.86, and for DERS total score 0.88. The DERS total score was used as a measure of emotion regulation deficit.

Statistical analysis

To compare sociodemographical data among two groups we used Chi-square test or Fisher's exact test with Freeman-Halton extension for categorical data and t-test for continuous data. To evaluate the correlations between the variables we used Pearson correlation coefficient. To determine the relationship between the interval predictor and criterion variables were used multiple regression analysis. In order to test the existence of mediation influence were conducted hierarchical regression analysis and then testing the significance of a mediation effect with Sobel test. Statistical data processing is done using the software STATISTICA 12.7, and was used the level of significance of 5% ($p < 0.05$) and 1% ($p < 0.01$).

RESULTS

Comparison of sociodemographic characteristics

Table 1 shows comparisons of sociodemographic characteristics of patients with BN and healthy controls (HC) and their families. Most of the participants within each of the groups (28%) are employed, 26% of respondents

attend gymnasium, 24% attend university, 12% attend tertiary vocational school, and the lowest percentage of participants within each of the groups are enrolled in some type of secondary vocational school (10%).

According to Fisher's exact test we found a statistically significant association ($p=0.01$) between membership to clinical or control group and the amount of monthly family disposable income, with greater representation of families with below-average income in clinical group, and greater representation of families with average and above-average disposable income in the control group. The result of Fisher's exact test also indicates a statistically significant association between group membership and the level of education of mothers ($p=0.00$), as well as statistically significant association between group membership and education levels of the father ($p=0.00$) with greater representation of parents with primary, secondary and higher education in clinical group and greater representation of parents with a university degree in the control group. T-test did not register statistically significant difference in BMI ($t_{96}=0.06$, $p=0.95$) between the participants of clinical groups ($M=20.88$, $SD=3.49$) and participants of the control group ($M=20.92$, $SD=3.50$).

Attachment dimensions

Table 2 shows the differences between clinical and control group on the dimensions of attachment related anxiety and attachment related avoidance on ECR-R. We find a statistically significant difference between group results in the dimensions of anxiety ($t_{98}=-5.12$, $p=0.00$) and avoidance ($t_{98}=-4.30$, $p=0.00$), wherein the subjects

Table 1. Comparisons of sociodemographic characteristics and BMI of patients with BN and HC and their families

	BN (n=50) n (%)	HC (n=50) n (%)	p
Current educational and employment status			
Secondary vocational school	5 (10)	5 (10)	
Gymnasium	13 (26)	13 (26)	
Tertiary vocational school	6 (12)	6 (12)	
University	12 (24)	12 (24)	
Employed	14 (28)	14 (28)	
Household income			0.01
Below average	14 (28)	3 (6)	
Average	31 (62)	38 (76)	
Above average	5 (10)	8 (16)	
Mother's education level			0.00
Primary school	3 (6)	0 (0)	
High school	30 (60)	22 (44)	
Tertiary vocational school	12 (24)	6 (12)	
University	5 (10)	22 (44)	
Father's education level			0.00
Primary school	2 (4)	0 (0)	
High school	32 (64)	28 (56)	
Tertiary vocational school	8 (16)	2 (4)	
University	8 (16)	20 (40)	
BMI	M=20.88 (SD=3.49)	M=20.92 (SD=3.50)	0.95

BN – Bulimia nervosa patients; HC – Healthy controls; BMI – Body mass index; Significance values are from Chi-square test or Fisher's exact test with Freeman-Halton extension for categorical data and t-test for continuous data

of the clinical group achieved higher scores on both attachment dimensions. We also found statistically significant positive correlations between attachment related anxiety and BN symptoms ($r=0.48$, $p<0.01$), as well as between attachment related avoidance and BN symptoms ($r=0.39$, $p<0.01$) (Table 3).

In order to test contribution of attachment dimensions to the explanation of variance in BN symptoms, while controlling the effect of socio-demographic variables we used hierarchical multiple regression - method enter. In the first block we entered family income, mother's education level and father's education level, as predictors. Regression model proved not to be statistically significant ($F=0.48$, $p=0.69$) and it explained a total of 1.5% variance of BN symptoms (Table 4). With the addition of attachment anxiety and attachment avoidance in the second block considerable predictive power was added to the model, increasing the amount of BN symptoms variability accounted for up to 26.7%, and the model proved to be statistically significant ($F=6.77$, $p=0.00$). Significance of the regression

coefficients in multiple regression model indicates that the dimension of attachment related anxiety ($\beta=0.44$, $p=0.00$) represents a statistically significant predictor of BN symptoms, while attachment related avoidance ($\beta=0.11$, $p=0.35$) does not contribute significantly to the explanation of variance in BN symptoms.

Emotional regulation

Comparison of the DERS results is presented in Table 2. As expected, participants of the clinical group achieved significantly higher scores than participants of the control group on all scales of the DERS, as well as the DERS total score: nonacceptance ($t_{98}=4.23$, $p=0.00$), goals ($t_{98}=3.79$, $p=0.00$), impulse ($t_{98}=6.62$, $p=0.00$), awareness ($t_{98}=3.47$, $p=0.00$), strategies ($t_{98}=7.75$, $p=0.00$), clarity ($t_{98}=7.08$, $p=0.00$), DERS total ($t_{98}=7.41$, $p=0.00$). The DERS total score, as a measure of emotion regulation deficit, was found to be statistically significantly positively correlated with BN symptoms ($r=0.64$, $p<0.01$).

Table 2. Comparisons of ECR-R and DERS scores of patients with BN and healthy controls

	BN (n=50)		HC (n=50)		t	t-test df	p
	M	SD	M	SD			
ECR-R							
Anxiety	4.56	1.20	3.21	1.41	-5.12	98	0.00
Avoidance	3.59	1.39	2.41	1.33	-4.30	98	0.00
DERS							
Nonaccept	18.60	7.14	13.22	5.44	4.23	98	0.00
Goals	18.20	5.22	14.30	5.05	3.79	98	0.00
Impulse	19.92	6.29	12.60	4.63	6.62	98	0.00
Awareness	18.68	5.16	15.52	3.85	3.47	98	0.00
Strategies	29.16	7.88	17.62	6.96	7.75	98	0.00
Clarity	16.52	5.01	10.10	3.98	7.08	98	0.00
DERS Total	121.08	27.59	83.36	23.06	7.41	98	0.00

BN – Bulimia nervosa patients; HC – Healthy controls

Table 3. Correlations among variables anxiety, avoidance, emotional regulation and BN symptoms

	Anxiety	Avoidance	Emotional regulation	BN symptoms
Anxiety	1	0.63*	0.64*	0.48*
Avoidance		1	0.45*	0.39*
Emotional regulation			1	0.64*
BN symptoms				1

BN – Bulimia nervosa; N=100; * $p<0.01$

Table 4. Summary of hierarchical regression analysis for attachment related variables predicting BN symptoms with controlling of sociodemographic variables

Step	Variables	B	β	t	p	Regression model			
						R	R ²	F	p
1.	Household income	-0.92	-0.07	-0.63	0.52	0.12	0.1	0.48	0.69
	Mother's education level	-0.89	-0.11	-0.91	0.36				
	Father's education level	0.85	0.10	0.85	0.39				
	Household income	0.88	0.06	0.66	0.51				
2.	Mother's education level	-0.84	-0.10	-0.97	0.33	0.51	0.26	6.77	0.00
	Father's education level	0.61	0.79	0.70	0.48				
	Anxiety	2.13	0.44	3.58	0.00				
	Avoidance	0.52	0.11	0.92	0.35				

N=100; B – unstandardized regression coefficient; β – standardized regression coefficient
R – coefficient of multiple correlation; R² – coefficient of multiple determination

Table 5. Hierarchical regression analysis for testing mediation effect of emotional regulation on the relationship between anxiety and BN symptoms

Step	Variable	β	t	p	R	Regression model		
						R ²	F	p
1.	Anxiety*	0.48	5.47	0.00	0.48	0.23	29.95	0.00
2.	Anxiety **	0.64	8.37	0.00	0.64	0.41	70.13	0.00
3.	Anxiety *	0.11	1.11	2.66	0.65	0.42	36.09	0.00
	Emotion regulation	0.57	5.70	0.00				

N=100; BN – Bulimia nervosa; * Dependent variable: BN symptoms; ** Dependent variable: Emotion regulation

Emotional regulation as a potential mediator in the relationship between attachment anxiety and BN symptoms

The nature of the relationship between the variables we tried to explain with the mediation relationship. In order to examine the impact of mediation effect of emotion regulation we used a four step approach proposed by Baron & Kenny (1986) in which several regression analyses were conducted. The results are shown in Table 5. In the first step attachment anxiety has been introduced as a predictor variable into the equation with the severity of BN symptoms as a criterion. Unique contribution of anxiety in explaining the variance of BN symptoms proved to be statistically significant ($\beta=0.48$, $t=5.47$, $p=0.00$), and it explained 23% of the variance. In the second step anxiety has been introduced as a predictor and emotion regulation as a criterion. The contribution of anxiety in explaining the variance of emotional regulation also showed to be statistically significant ($\beta=0.64$, $t=8.37$, $p=0.00$) with 41% of variance explained. In the third step, we introduced anxiety and emotional regulation as predictors and severity of BN symptoms as a criterion. After introduction of the emotion regulation contribution of anxiety in explaining the variance of BN symptoms became statistically insignificant ($\beta=0.11$, $t=1.11$, $p=2.66$), whereas contribution of emotion regulation remained statistically significant ($\beta=0.57$, $t=5.70$, $p=0.00$), which supports full mediation. Sobel test indicates that the mediation effect of emotional regulation on the association between anxiety and BN symptoms was statistically significant ($z'=4.43$, $p=0.00$). All conditions for mediation are met and the mediation role of emotional regulation between anxiety and severity of BN was confirmed.

DISCUSSION

Of the observed socio-demographic characteristics we recorded that participants suffering from BN come from families with below-average income and (tend to) have parents with lower education level. According to research conducted by Goeree et al. (2011) the poorest girls exhibit a 32% increase of symptoms of BN (relative to the mean of the EDI bulimia subscale) when compared to middle class girls, and a 40% increase when compared to wealthier peers. These findings stand in stark contrast to the popular conceptions about eating disorders. National Longitudinal Study of Adolescent

Health (Harris et al. 2009) suggests girls in a high income households with highly educated parents are almost twice as likely to be diagnosed with an eating disorders relative to an average girl, indicating that the popular conception is consistent only with who is diagnosed with an eating disorder, suggesting dramatic differences in diagnosis across income classes. Results have the implications that greater outreach for BN should be made to individuals from low income families (Goeree et al. 2011). Our results also suggest that there is no statistically significant difference in BMI between the participants of clinical and control group which is in line with expectations, as it is known that patients suffering from BN are usually not markedly thin, and can be average or above-average weight. For that very reason their disease often goes unnoticed, unlike patients suffering from anorexia nervosa. According to Hudson et al. (2007) 65.3% of patients suffering from BN have body weight within the average, with a BMI between 18.5 and 29.9, while only 3.5% have lower body weight with a BMI of less than 18.5.

Patients suffering from BN showed higher attachment related anxiety and avoidance. The findings are consistent with the hypothesis according to which we expected a higher level of anxiety and avoidance in women with BN, suggesting that patients with BN experience close relations through constant vigilance, a sense of fear and worries of possible rejection and abandonment (anxiety), and the discomfort associated with closeness (avoidance), which is defined as fearful avoidant attachment style (Bartholomew & Horowitz 1991). This style indicates a sense of unworthiness combined with an expectation that others will be negatively disposed. By avoiding close involvement with others, this style enables people to protect themselves against anticipated rejection by others. In contrast to BN patients healthy participants reported low anxiety and low avoidance indicative of secure attachment. Our findings are consistent with the findings of research conducted by Evans & Wertheim (2005).

Even though both attachment related anxiety and attachment related avoidance were significantly associated with BN symptoms, in multivariate model only attachment anxiety proved to be a significant predictor of symptoms BN, suggesting that the attachment related anxiety is stronger correlate of BN symptoms and plays a more important role in prediction of BN symptoms than avoidance, and furthermore it may represent a risk factor for more severe BN symptoms. Based on the

literature on personality and eating disorders, Tasca & Balfour (2014) speculate that individuals who binge and purge (i.e. who have BN) may show greater attachment anxiety associated with affect dysregulation, whereas those who engage in dietary restriction (i.e. who have AN) may show greater avoidance characterized by down-playing of affect. Attachment anxiety is also indicated by a hypervigilant, anxious attention seeking focus on attachment figures and relationships, failure to detach from psychological pain, and hyperactivation of negative thoughts and emotions (Shaver & Mikulincer 2002). Studies in young adults with BN have already demonstrated that higher attachment anxiety was significantly related to greater BN symptom severity and poorer treatment outcome (Cash & Annis 2004, Illing et al. 2010). In the analysis we also controlled sociodemographic variables, whose influence was statistically insignificant.

At the DERS total score, which was used as a measure of emotion regulation deficit, as expected, patients with BN achieved significantly higher scores compared to healthy subjects in the control group. In addition to the DERS total score, as most deficient aspects of emotional regulation stands out the lack of emotional clarity (clarity), limited access to adaptive emotion regulation skills (strategies) and difficulty controlling behaviors when upset (impulse). The results are similar to findings Lavender et al. (2014), which in addition to the above aspects also single out nonacceptance of emotional states (nonacceptance). Overall emotional regulation difficulties (DERS total score) also represent a statistically significant predictor of BN symptoms. The obtained results are consistent with the findings of previous studies suggesting that patients suffering from eating disorders, including BN, reported a higher level of emotional regulation difficulty (Harrison et al. 2010, Svaldi et al. 2012), as well as consistent with theoretical models to which the emotional regulation difficulties contribute to psychopathology of eating disorders, and acting as inappropriate strategies to manage their own emotions (Wildes et al. 2010, Haynos & Fruzzetti 2011, Wonderlich et al. 2014).

Furthermore, the nature of the relationship between attachment related anxiety, emotional regulation and BN symptoms we tried to explain with the mediation relationship. With conducted hierarchical regression analyses we proved that the relationship between attachment related anxiety and BN symptoms were mediated by emotional regulation. Our findings support the role of insecure attachment organisation in manifestation of BN symptoms, wherein a significant role is played by emotional regulation. Based on our results and the literature (e.g. Tasca & Balfour 2014, Cassin & Ranson 2005, Hickman 1998) it is plausible to conclude that early attachment relations are seen to be crucial in the acquisition of skills of emotion regulation, in a way that attachment related anxiety may contribute to development of emotion regulation deficits, which in turn may result in expression of BN symptoms.

CONCLUSIONS

It was found that patients suffering from BN showed significantly higher levels of attachment related anxiety and avoidance than control group subjects. In multivariate model only attachment anxiety proved to be a significant predictor of symptoms BN, suggesting that the attachment related anxiety is stronger correlate of BN symptoms and plays a more important role in prediction of BN symptoms than avoidance, and furthermore it may represent a risk factor for more severe BN symptoms. Patients suffering from BN also showed significantly higher level of difficulties in emotional regulation than healthy controls. It was also found that the relationship between attachment related anxiety and BN symptoms were mediated by emotional regulation.

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