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Preliminary report

Dissatisfaction with physical appearance and behaviors associated with eating disorders in adolescents

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Abstract

The paper analyses a survey conducted with 148 adolescent participants. The goal was to examine adolescent attitudes concerning their personal body image satisfaction, the prevalence of behaviours inherent to eating disorders, and their relationships with family and peers. Results were obtained using descriptive statistics, t-tests for independent samples, ANOVA and correlation analysis. The body image satisfaction was surveyed via a „Desired and current body type scale". The results indicate that 48.6% of girls desire a thinner body, 38.7% of them report complete satisfaction, while 12.6% expressed a desire to increase in weight. Girls are most dissatisfied with their abdominal area (31.5%), legs (28%), and thighs (20.7%). Boys report dissatisfaction with their chest area (35.1%), legs (21.6%) and abdominal area (18.9%). In total, 52.7% of participants report feeling overweight, with 65.5% reporting a strong desire to lose weight. Girls report significantly lower levels of body image satisfaction ($p<0.001$), higher levels of bulimia ($p<0.01$) and binge eating ($p<0.05$) than boys. Younger adolescents report significant levels of orthorexia-related behaviour ($p<0.05$). A low and negative correlation between the quality of relationships in the family and bulimia-related behaviour was found ($r=-0.18$, $p<0.05$). Body image dissatisfaction correlates strongly with both anorexia-related behaviour ($r=0.76$, $p<0.001$) and bulimia-related behaviour ($r=0.63$, $p<0.001$), and moderately with binge eating ($r=0.58$, $p<0.001$). The correlation between peer relationships and body image satisfaction, anorexia-, bulimia-, orthorexia-related behaviour and binge eating was not established.

Keywords: adolescents, family, peers, eating disorders, anorexia, bulimia, orthorexia

Introduction

Eating disorders have become an increasingly serious problem, and as such have been the topic of much scholarly work (Stice, Presnell and Spangler, 2002, Stice et al., 2008, 2009; Polivy et al., 2003; Ambrosi-Randić, 2004; Keel and Levitt, 2006; Smink, van Hoeken, Hoek, 2012; Smink et al., 2014). Further, the existing research reports on the increased prevalence of these atypical eating patterns (Preti et al., 2009; Swanson et al., 2011; Stice et al., 2009; Pokrajac-Bulian, Mohorić and Đurović, 2007; Zaborskis et al., 2008). Smink, van Hoeken, and Hoek's (2012) review of the relevant studies reveals that, in comparison with the previous decade, there has been greater prevalence of eating disorders among 15 to 19 year-old girls, though the lifelong prevalence has remained stable. The studies conducted thus far indicate that these disordered eating patterns and eating disorders are most common during adolescence, thus making adolescents the group that is at highest risk (Ambrosi-Randić, 2004; Smink, van Hoeken and Hoek, 2012).

Theoretical starting points

The period of adolescence is marked by an intense transition in all developmental areas. Significant changes in physical appearance are experienced, accompanied by social and emotional characteristics that the adolescent is meant to include into the existing self-image and thus adjust to the new reality of one's appearance (Archibald, Graber, Brooks-Gunn, 2003). At this point, a dissatisfaction with one's body may appear, which in turn leads to negative attitudes towards eating, concern about one's weight or dieting, and finally to eating disorders (Beumont, 2002; Pokrajac-Bulian, Mohorić and Đurović, 2007). The most common eating disorders are anorexia nervosa, bulimia nervosa, binge eating disorder (Martin and Golden, 2014), and a currently prominent disorder, orthorexia nervosa (Varga et al., 2013). Anorexia nervosa is a disorder in which a person strives to be thin, which results in a serious loss of weight (Ambrosi-Randić, 2004). Anorexia may be diagnosed if the following criteria are found in a patient: limitation of caloric intake in relation to caloric requirements (this leads to a significantly low body weight, compared to expectation with regard to age, sex, developmental stage, and physical health), intense fear of increase in body weight or persistent actions that make weight gain more difficult, disorders in the way one perceives one's weight and body shape, and an excessive influence of body weight on one's self-perception (American Psychiatric Association, 2014). Two types of this disorder may be discerned: *restrictive,* whereby a person's weight loss is caused by a decreased intake of food, and *overeating-purging,* which is characterized by the individual's overeating and subsequent purging behaviors, such as self-induced vomiting or the abuse of laxatives or diuretics (Bryant-Waugh, 2007). Bulimia nervosa is a disorder characterized by the individual's consumption of a large amount of food in a short period of time, accompanied by a prominent loss of control, and followed by purging or non-purging compensatory behaviors (Munjas Samarin, 2011). The criteria for setting the bulimia nervosa diagnosis are as follows: repeated episodes of overeating (characterized by an intake of food significantly larger than what most persons would eat, and a feeling of loss of control over intake of food in a certain period of time), repeated inappropriate compensatory behaviors with the aim of preventing weight gain (self-induced vomiting, diuretic abuse), the appearance of overeating and inappropriate compensatory behaviors at least once a week over a period of three months, with one's self-assessment overly depending on body weight and shape, and the disordered behaviors also appearing outside the episodes of anorexia nervosa (American Psychiatric Association, 2014). There is differentiation of two types of bulimia: *purging*, whereby one resorts to self-induced vomiting or use of laxatives and diuretics, and the *non-purging* type, which is characterized by other inappropriate behaviors, such as fasting or excessive exercise (Pinhas et al., 2007).

Binge eating is characterized by intake of an inordinately large amount of food over a short period of time, accompanied by a feeling of loss of control (Pokrajac-Bulian et al., 2009). The episodes of binge eating are characterized by three or more of the following: fast or inordinate food intake, eating until one feels full, eating a large amount of food without feeling hungry, eating alone because of feeling of shame, sense of disgust of oneself after eating, substantial discomfort due to overeating, appearance of overeating episodes at least once a week over a period of three months, and the lack of connection to the inappropriate compensatory behaviors, or with anorexia and bulimia (American Psychiatric Association, 2014). *Orthorexia* is a disorder that has not yet been defined by a set of accepted diagnostic criteria, and is apparently characterized by excessive concern

with healthy eating, and limiting one's food intake to healthy and organic products (Varga et al., 2013). Persons with orthorexia are not only overly concerned about consuming healthy food, but also the preparation of food in particular ways, and compete avoidance of those food groups that are thought of as unhealthy, along with detailed planning of every meal and the way it is prepared (Brytek-Matera, 2012).

The research on eating disorder prevalence indicates that anorexia affects 0.5 to 1.7%, and bulimia 0.5 to 3% (Bulik et al., 2006; Preti et al., 2009; Smink et al., 2014), while the prevalence of binge eating disorder is between 1 and 2.3% (Swanson et al., 2011; Smink et al., 2014; Preti et al., 2009). If not all of the diagnostic criteria for particular eating disorders were applied, the prevalence would be much higher, with 12-20% of adolescents exhibiting some forms of disordered eating patterns (Swanson et al., 2011; Stice et al., 2009; Zaborskis et al., 2008). The research conducted in Croatia has mostly tackled parts of these criteria and the risk factors in their etiology (Pokrajac-Bulian, Mohorić and Đurović, 2007; Zaborskis et al., 2008, Livazović and Ručević, 2012). The study on body self-image and body weight control conducted in Lithuania, Croatia, and the US, on a sample of 2946 Croatian adolescents, aged 13 to 15, found that 27.5% of them think of themselves as too fat, while 12% of adolescent girls are implementing a diet or another way to lower their weight (Zaborskis et al, 2008). Pokrajac-Bulian, Mohorić and Đurović (2007) found that 7.7% of adolescent girls and 0.5% of boys display signs of disordered eating, while 5.1% of adolescent girls report on overeating with the feeling of loss of control, and 1.3% have a need to throw up after eating.

Johnson, Tobin and Steinbert (1989, in Brookings and Wilson, 1994), postulated a model of risk factors for the development of eating disorders which includes biological irregularities, developmental problems, family surroundings, characteristics of the personality, and sociocultural influences. Polivy et al. (2003) divided the risk factors for the development of eating disorders based on the Bronfenbrenner ecological theory into individual factors (biological and psychological), and familial and sociocultural factors. Similar is stated by Ambrosi-Randić (2004), who categorizes the factors as biological, psychological, and social, with climate in the family listed as a social factor, rather than a category of its own. Biological factors include age (i.e., early adolescence) and sex (female) (Ambrosi-Randić, 2004; Bulik et al., 2006; Smink, van Hoeken and Hoek, 2012), as well as genetic predisposition (Polivy et al., 2003). Psychological factors are the most numerous, and the most common among them are a lack of satisfaction with one's body (Ambrosi-Randić, 2004; Polivy et al., 2003; Haines et al., 2010; Reiter and Davis, 2014) and low self-esteem (Polivy et al., 2003; Stice, Presnell and Spangler, 2002). Social risk factors include the internalization of thinness and the pressure to be thin which is experienced in a variety of contexts (Grogan, 1999; Stice, 2002; Pokrajac-Bulian, Stubbs and Ambrosi-Randić, 2004), exposure to media (Stice, 2002), and a bad relationship with one's parents (Croll et al., 2002, Neumark-Sztainer, Butler and Palti, 1995; Neumark-Sztainer et al., 2007). Good quality of peer relationships is a significant factors in disordered eating (Croll et al., 2002; Livazović and Ručević, 2012), though some of the research notes the protective function that these relationships can have (Gerner and Wilson, 2005; Stice, Presnell and Spangler, 2002).

Methods

Research aims, topic and hypotheses

The aim of this paper is to test the frequency of behaviors related to eating disorders among adolescents, with regard to sociodemographic characteristics, relationships with parents and peers, and attitudes concerning physical appearance. The independent variables in the study are the sociodemographic characteristics of the respondents. The dependent variables include the behaviors related to eating disorders, the respondents' attitudes that are characteristic of particular behaviors related to eating disorders, the relationship of the adolescents with their families and peers, and their attitudes concerning their physical appearance.

The following hypotheses have been put forward:

H1: Statistically significant differences in the respondents' frequency of behaviors related to eating disorders, and with regard to sociodemographic characteristics, are expected.

H2: Statistically significant differences in attitudes regarding one's own physical appearance are expected across the sexes.

H3: Behaviors related to eating disorders are expected to be more prevalent among the respondents who are also less satisfied with their own appearance.

H4: Significant correlation is expected between the quality of relationships that the adolescent has with family and peers, and behaviors related to eating disorders.

Respondents

The study was conducted on a sample of 148 students, aged between 15 and 18, with 111 female (75%) and 37 male (25%). The respondents are students in three classroom groups in the first and fourth-year of high school, respectively. The high school in question is in Osijek, Croatia. Most of the respondents (86.5%) live in a family with both parents.

Procedures employed

The survey was fielded in the first semester of the 2015/2016 school year. After an official announcement of the survey, the classrooms and the time of fielding the survey were agreed upon with the school pedagogue and psychologist. At the beginning of the school year, the parents were asked for consent and for their signature on the consent form for the child's participation in the survey. Prior to filling in the questionnaire, the students were informed of the purpose of the study, and were given instructions. Their participation was voluntary and anonymous. The survey was conducted in groups, at the beginning or the end of their homeroom class. The data acquired were processed in SPSS, and both descriptive and inferential statistical techniques were applied. Correlation analysis, ANOVA, and t-test for independent samples were used in the analysis.

Measurement instruments

The survey questionnaire used in this study consisted of 40 questions, divided into 5 sections. The first six-question section concerned sociodemographic information (1 *Sex: a) M b) F; Age: a) 16, b)17, c)18, d)19; 2 Overall grade at the end of the previous school year: a) fail, b) satisfactory, c) good, d) very good, e) excellent; 3 Parents' education: mother - a) no qualification, b) primary school, c) high school, d) higher education (less than B.A.), e) high education (B.A., M.A., PhD.) and Parents' education: father- a) no qualification, b) primary school, c) high school, d) higher education (less than B.A.), e) high education (B.A., M.A., PhD.); 5 How many brothers or sisters do you have: brothers - a) 0, b) 1, c) 2-3, d) more than 3 (how many?); sisters: a) 0, b) 1, c) 2-3, d) more than 3 (how many?).*

The second part of the questionnaire contained images of the male and female bodies, from the skinniest, to the fattest. The respondents were asked to select those images that best matched their current and desired appearance. They were also asked to use the selected image of current appearance to mark those body parts that they were least satisfied with (face, shoulders, arms, chest, abdomen, hips and rear, legs).

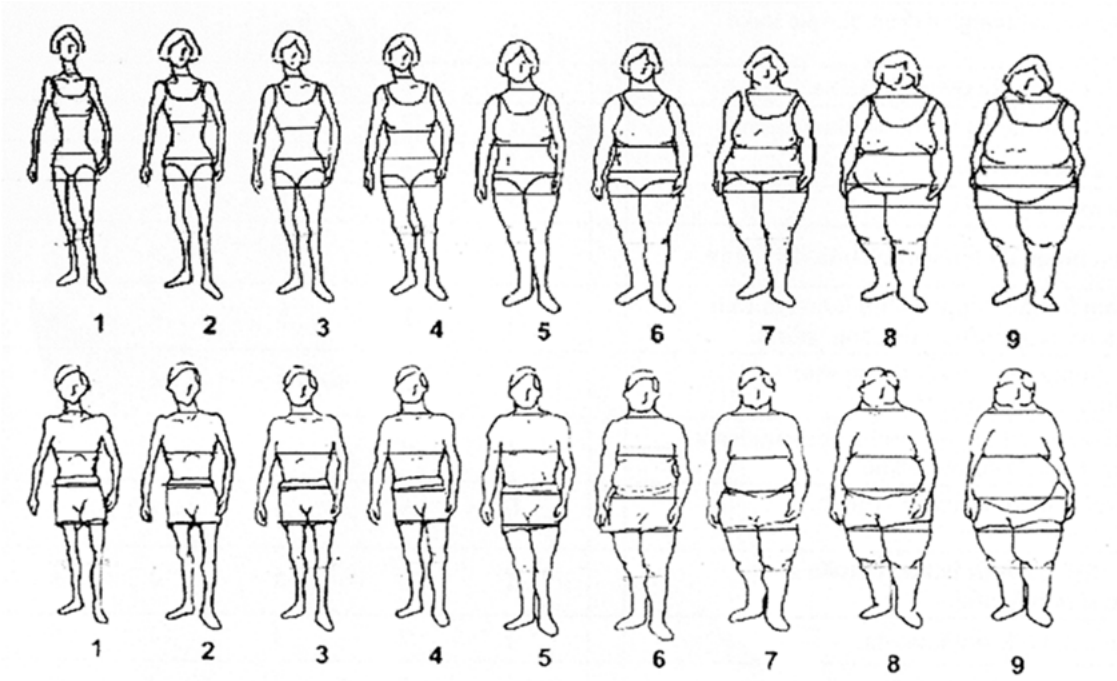

Image 1. The images of male and female bodies (adjusted from Stunkard, Sorensen, and Schlusinger, 1983)

The third part of the questionnaire contained seven items that concerned relationships with family (*1: Life in my family is generally pleasant; 2: My family members get along well; 3: I talk to my mother about my problems; 4: My family is a source of help and support; 5: I talk to my father about my problems; 6: Other families get along better than mine; 7: I feel accepted in my family)*. The fourth section of the questionnaire contained items concerning relationships with peers (1*: I get along well with my friends; 2: My friends treat me well; 3: I talk to my friends about my problems;*

4: I feel trust towards my peers; 5: I like to spend time with my peers.). The five-part Likert scale was used for all of these items (*1- never; 2- rarely; 3- sometimes; 4- often; 5- always*).

The last part of the questionnaire referred to the behaviors related to eating disorders and the attitudes concerning one's own physical appearance, containing a total of 20 claims on 5-point Likert scales. The claims related to dissatisfaction with one's body, along with their level of intercorrelation with the scale (α=.826) , are as follows: *1) I am dissatisfied with my body; 2) I feel overweight; 3) I feel a strong desire to be thinner; 4) I am on a diet*. The claims that described the behaviors related to anorexia (α=.732) are the following: *1) I avoid eating when I am hungry; 2) I consciously limit the amount of food I consume so that I may affect my appearance and body weight; 3) I am afraid of becoming fat or increasing my body weight; 4) I work out excessively so that I may lose weight*.

The statements concerning behaviors related to bulimia, with a lower intercorrelation analysis of the scale (α=.645) were: *1) I think about trying to throw up after a meal so that I may lose weight; 2) I intentionally throw up food so that I may prevent becoming overweight; 3) I intentionally use diuretics or laxatives to prevent weight gain; 4) I eat moderately in front of others, but "stuff" myself with large amounts of food when I am alone; 5) I feel guilt during meals because of the effect they will have on my weight*.

The behaviors and attitudes related to binge eating were described by the following statements (α=.655): *1) I eat a overly large amount of food in a short period of time; 2) I feel disgust and depression after a meal due to the amount of food I have eaten; 3) I feel that I am losing control over the amount of food I am eating*. The claims that were referring to behaviors related to orthorexia (α=.706) were the following: *1) I check the calories and nutritional value of food; 2) I only eat healthy food; 3) I follow strict rules when it comes to eating (i.e., caloric intake, types of food, mealtimes); 4) I think about food and its caloric values*.

Results

The *dissatisfaction with one's body* was tested using the image above, as the difference in the assessment of current and desired physical appearance. The results, disaggregated by sex, are presented in Table 1.

Table 1. The difference between the desired and current physical appearance, as indicated on the image used in the survey, disaggregated by sex

		The respondents' desired physical appearance			Σ
		Sex thinner than current	Equal to current	More weight than current	
M	N	6	20	11	37
	%	16.2	54.1	29.7	100
F	N	54	43	14	111
	%	48.6	38.7	12.6	100
	∑ %	60 40.6	63 42.6	25 17	148 100

Majority of the girls (48.6%) chose a thinner image as their desired one, while 38.7% stated that their desired physical appearance is equal to the current one, while the least common preference was for a body that is more fat. Most of the boys (54.1%) stated that their desired physical appearance was the same as the current one, followed by those that preferred a body that was more fat than their own (29.7%), while the smallest group was those who would prefer a thinner appearance (16.2%).

Table 2. The difference between the desired and current physical appearance, as indicated on the image used in the survey, disaggregated by age

		The respondents' desired physical appearance			Σ
		Thinner than current	Equal to current	More weight than current	
Younger	**N**	28	25	13	66
	%	42.4	37.9	19.7	100
Older	**N**	32	38	12	82
	%	39	46.3	14.6	100
	Σ %	60 40.6	63 42.6	25 17	148 100

The difference between the desired and current physical appearance, as indicated on the image used in the survey, and disaggregated by age, is shown in Table 2. The respondents were sorted into one of the two groups, the younger ones (aged 15 or 16) and older ones (17 or 18). More of the younger adolescents chose physical appearance that is thinner than their assessed current appearance (42.3%), followed by those whose preference was equal to the assessed current appearance (37.9%). Among the older adolescents, however, the most common preference was for physical appearance equal to their current one (46.3%), followed by a preference for a thinner appearance (39%).

Table 3. Descriptive statistics concerning choice of body parts that the respondents are least satisfied with

		Body parts the respondents are least satisfied with							Σ
		Sex face	Shoulders	Arms	Chest	Abdomen	Hips and rear	Legs	
M	**N**	0	6	1	13	7	2	8	36
	%	0.0	16.2	2.7	35.1	18.9	5.4	21.6	100
F	**N**	3	1	6	14	35	23	29	111
	%	2.7	0.9	5.4	12.6	31.5	20.7	26.1	100

The analysis of the images that the respondents marked with body parts they were not satisfied with is presented in Table 3. The girls most often marked their abdomen (31.5%), legs (28%), and hips and rear (20.7%). Among the boys, the body part they were least satisfied was the chest (35.1%), legs (21.6%), and abdomen (18.9%).

Table 4. Descriptive analysis of the "Dissatisfaction with one's body" variable

			%				
Dissatisfaction with one's body	**Sex**	**N**	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
I am dissatisfied with my body	**M**	37	18,9	56,8	16,2	5,4	2,7
	F	111	5.4	32.4	39.6	13.5	9

I feel overweight	M	37	73.0	21.6	5.4	0	0
	F	111	38.7	26.1	18.9	9.9	6.3
I have a strong desire to be thinner	M	37	62.2	29.7	5.4	2.7	0
	F	111	25.2	22.5	2.7	14.4	9.9
I am on a diet	M	37	78.4	18.9	0	0	2.7
	F	111	52.3	25.2	18	3.6	0.9

Table 4 shows the frequencies of responses to the claims that describe dissatisfaction with one's body. Just 5.4% of girls stated that they never feel dissatisfied with their bodies, while 22.5% stated that they often or always feel that way. One may note the differences between girls and boys on the "I feel overweight" claim, with 16.2% of girls responding with "often" or "always", while none of the boys gave those responses. The finding that 47.6% of adolescent girls are on diets of varying intensity is concerning.

Table 5. Descriptive analysis of the variables related to anorexia, bulimia, binge eating, and orthorexia

Behaviors related to eating disorders	Sex	N	%				
			Never	Rarely	Sometimes	Often	Always
I avoid eating when I am hungry	M	37	83.8	13.5	2.7	0	0
	F	111	50.5	29.7	17.1	2.7	0
I consciously limit the amount of food I consume so that I may affect my appearance and body weight	M	37	67.6	21.6	10.8	0	0
	F	111	39.6	25.2	21.6	8.1	5.4
I am afraid of becoming fat or increasing my body weight	M	37	75.7	13.5	5.4	5.4	0
	F	111	27.0	23.4	27.9	12.6	9.0
I work out excessively so that I may lose weight	M	37	73.0	18.9	2.7	0	5.4
	F	111	63.1	24.3	11.7	0	0.9
I think about trying to throw up after a meal so that I may lose weight	M	37	100	0	0	0	0
	F	111	90.1	5.4	3.6	0	0.9
I intentionally throw up food so that I may prevent becoming overweight	M	37	100	0	0	0	0
	F	111	93.7	3.6	1.8	0.9	0
I intentionally use diuretics or laxatives to prevent weight gain	M	37	100	0	0	0	0
	F	111	95.5	2.7	1.8	0	0
I eat moderately in front of others, but "stuff" myself with large amounts of food when I am alone	M	37	62.2	32.4	2.7	2.7	0
	F	111	67.6	13.5	9.9	5.4	3.6
I feel guilt during meals because of the effect they will have on my weight.	M	37	89.2	5.4	5.4	0	0
	F	111	62.2	20.7	8.1	7.2	1.8
I eat a overly large amount of food in a short period of time	M	37	21.6	35.1	29.7	5.4	8.1
	F	111	16.2	32.4	36.0	11.7	3.6
I feel disgust and depression after a meal due to the amount of food I have eaten	M	37	91.9	8.1	0	0	0
	F	111	70.3	16.2	9.0	4.5	0
I feel that I am losing control over the amount of food I am eating.	M	37	64.9	24.3	5.4	0	5.4
	F	111	50.5	18.9	20.7	5.4	4.5
I check the calories and nutritional value of food	M	37	89.2	2.7	5.4	0	2.7
	F	111	84.7	8.1	4.5	1.8	0.9
I only eat healthy food	M	37	16.2	21.6	37.8	21.6	2.7
	F	111	8.1	25.2	52.3	13.5	0.9
I follow strict rules when it comes to eating (i.e., caloric intake, types of food, mealtimes)	M	37	78.4	8.1	10.8	2.7	0
	F	111	76.6	9.9	8.1	1.8	3.6
I think about food and its caloric values	M	37	70.3	13.5	8.1	2.7	5.4
	F	111	72.1	13.5	9.9	3.6	0.9

The frequencies of responses to the statements describing behaviors related to particular eating disorders, disaggregated by sex, are presented in Table 5. The results concerning the fear of gaining weight are interesting to note: this is something that is felt by 73% of girls, in different temporal intensities, but most of the boys (75%) indicated that they never feel such a fear. One may note the differences in resorting to various compensatory behaviors that have the aim of reducing one's body weight. While boys report that they never resort to such behaviors, the girls report on throwing up after meals (6.3%) and using diuretics and laxatives (4.5%). When it comes to behaviors related to orthorexia, no significant differences in the responses between girls and boys are noted.

Table 6. Differences in dissatisfaction with one's body and the manifestation of behaviors related to anorexia, bulimia, binge eating, and orthorexia, disaggregated by sex

Variable		N	Mean	SD	t
Dissatisfaction with one's body	M	37	6,27	2,05	-5,05***
	F	111	9,44	3,62	
Behaviors related to anorexia	M	37	5,49	1,91	-4,44***
	F	111	7,91	3,13	
Behaviors related to bulimia	M	37	5,62	0,92	-2,66**
	F	111	6,62	2,22	
Behaviors related to binge eating	M	37	5,08	1,77	-2,07*
	F	111	5,96	2,39	
Behaviors related to orthorexia	M	37	6,95	2,54	0,02
	F	111	6,94	2,58	

The *t-test for independent samples* was used to test the differences across sexes on the variables that concern dissatisfaction with one's body, behaviors related to anorexia, behaviors related to bulimia, behaviors related to binge eating, and behaviors related to orthorexia (Table 6). Statistically significant differences across the sexes were found for the variables concerning dissatisfaction with one's body ($t=-5.05$, $p<0.001$), behaviors related to anorexia ($t=-4.44$, $p<0.001$), behaviors related to bulimia ($t=-2.66$, $p<0.01$), and behaviors related to binge eating ($t=-2.07$, $p<0.05$), with girls reporting these behaviors to a greater extent than boys.

Table 7. Differences in the dissatisfaction with one's body and the manifestation of behaviors related to anorexia, bulimia, binge eating, and orthorexia, disaggregated by age

Variable		N	mean	SD	t
Dissatisfaction with one's body	younger	66	8.50	3.51	-0.45
	older	82	8.76	3.63	
Behaviors related to anorexia	younger	66	7.45	3.02	0.54
	older	82	7.18	3.09	
Behaviors related to bulimia	younger	66	6.48	1.92	0.61
	older	82	6.28	2.10	
Behaviors related to binge eating	younger	66	5.80	2.22	0.29
	older	82	5.70	2.33	
Behaviors related to orthorexia	younger	66	7.5	2.96	2.5*
	older	82	6.4	2.1	

p<0.05*; p<0.01**; p<0.001***

Prior to conducting the t-test for independent samples across the age groups, the age variable was dichotomously coded, dividing the respondents into the younger and older group, as above.

A statistically significant difference (t=2.5, p<0.05) was only found on the variable of behaviors related to orthorexia among younger adolescents (M=2.96), who have to a greater extent reported on behaviors and feelings related to orthorexia (M=2.1).

Table 8. Correlation analysis of the quality of relationships in the family and behaviors related to anorexia, bulimia, binge eating, and orthorexia

Variable		Behaviors related to anorexia	Behaviors related to bulimia	Behaviors related to binge eating	Behaviors related to orthorexia
Relationships in the family	r	-0.08	-0.18*	-0.16	-0.02
	N	148	148	148	148

p<0.05*; p<0.01**; p<0.001***

The relationship between the variables of "quality of relationships in the family" and "quality of relationships with peers" with the dissatisfaction with one's body and behaviors related to eating disorders was tested using correlation analysis. No significant correlations were found between quality of peer relationships and dissatisfaction with physical appearance, and behaviors related to anorexia, bulimia, binge eating, and orthorexia. The analysis of the relationship between quality of relationships in the family and the behaviors related to eating disorders yielded a low negative correlation (r=-0.18, p<0.05). No significant correlation with the quality of relationships in the family was found for the remaining eating disorder-related behaviors and dissatisfaction with one's body (Table 8).

Table 9. Correlation analysis of dissatisfaction with one's body and behaviors related to eating disorders

Variable		Behaviors related to anorexia	Behaviors related to bulimia	Behaviors related to binge eating	Behaviors related to orthorexia
Dissatisfaction with one's body	r	0.76***	0.63***	0.58***	0.11
	N	148	148	148	148

p<0.05*; p<0.01**; p<0.001***

It is interesting to note that the testing of the correlation between dissatisfaction with one's body with the behaviors related to eating disorders yielded positive and significant results for all eating disorder-related behaviors apart from those associated with orthorexia. Dissatisfaction with one's body is highly and positively correlated with behaviors that are indicative of anorexia (r=0.76, p<0.001), bulimia (r=0.63, p<0.001), and moderately positively correlated with behaviors related to binge eating (r=0.58, p<0.001). The results are presented in Table 9.

Discussion

The conducted study tested the frequency of behaviors related to various eating disorders with regard to sociodemographic characteristics, as well as their correlation with the relationships with family and peers, and attitudes towards one's own physical appearance. A statistically significant difference across the sexes was found in the frequency of most of these behaviors. Girls were reporting the presence of behaviors related to anorexia (p<0.001), bulimia (p<0.01), and related binge eating (p<-.05) to a greater extent than boys. Greater incidence of these eating disorders among women is also found in other research (Pokrajac-Bulian, Mohorić and Đurović, 2007; Preti

et al., 2009; Micali et al., 2013; Smink et al., 2014). Unlike the studies by Donini et al. (2004) and Fidan et al. (2010), which found a greater prevalence of orthorexia among males, this study found no statistically significant differences in the occurrence of orthorexia across the sexes. Even though the clear reasons why women are more affected by anorexia, bulimia, and binge eating disorders are not yet knowns, the explanation may be found in the social pressure to be thin in the developed countries, a pressured that is predominantly directed at women (Grogam 1999). As early adolescent girls are facing numerous changes, among others the increase in the amount of fat deposits, their physical appearance is at that time often growing more distant from the socially idealized female body (Polivy et al., 2003). Adolescent girls thus engage in dieting, avoidance of meals, and other disordered eating habits in order to achieve a thin body, which is considered synonymous with beauty (Smint et al., 2014, Stice et al., 2009). A statistically significant difference across the two adolescent age groups ($p<0.05$) was only found with the frequency of behaviors related to orthorexia. The younger adolescents, i.e. those who are 15 or 16 years old, were found to be more likely to engage in orthorexia-related behaviors. The lowering of incidence of orthorexia with the increase in age was also confirmed in Fidan et al. (2010). In contrast, Donini et al. (2004) found that the prevalence of orthorexia increased with the increase in age. These different results suggest that there is still a dearth of research into orthorexia, as it is a relatively recently identified eating disorder. It is interesting to note that our study did not find differences by age in the behaviors related to anorexia, bulimia, and binge eating, unlike the study by Pokrajac-Bulian, Mohorić and Đurović (2007), who found a greater incidence of eating disorder symptoms among the younger adolescents. However, these differences in age also failed to appear in the study by Ambrosi-Randić (2001). These results can be explained by the fact that the peak time for the development of eating disorders is that between 15 and 19 years of age (Bulik et al.).

The study found a significant difference in the attitudes concerning one's own physical appearance with regard to sex, with girls expressing a greater dissatisfaction with their physical appearance ($p<0.001$). The results show that 22.5% of adolescent girls are often or always feeling dissatisfied with their own bodies, which is in line with the conclusions by Pokrajac-Bulian, Mohorić and Đurović (2007) who note that about 20% of adolescent girls and 7% of adolescent boys are dissatisfied with their physical appearance. A greater extent of dissatisfaction with one's physical appearance among women is also found in other studies (Ata, Ludden and Lally, 2007; Zaborskis et al., 2008). Our study indicated a significant difference between girls and boys when it comes to dissatisfaction with their bodies, as measured by the images in the survey ($p<0.01$). The girls are less satisfied with their bodies than boys are, with most of them (48.6%) thus selecting the figure that is thinner than the one they think represents their current appearance. Most of boys, however, chose the figure that was the same as what their assessment of current appearance was. When the boys chose a figure different from the one they assessed as their current one, however, they tended to choose the larger ones. The second most common option among girls was to choose the figure they currently had as the preferred one. These results are in line with the studies by Demarest and Allen (2000), Ata, Ludden and Lally (2007), and Pokrajac-Bulian, Mohorić and Đurović (2007) which also used images to assess the respondents' satisfaction with their bodies, and found that the differences between assessment of current appearance and the desired body were greater among adolescent girls.

In order to better understand this trend in dissatisfaction with one's own body among boys and girls, the results related to the dissatisfaction with the particular body parts ought to be analyzed. In this study, the girls most often listed their abdomen, followed by legs and hips and rear, as parts of the body they are least satisfied with. Among boys, these were their chest, followed by abdomen and legs. These results are in line with the study by Levine and Smolak (2002), who explain these findings with the fact that these are body parts that grow and extend in puberty, and where fat deposits build up, driving adolescent girls away from the society's ideal female physique. As the appearance favored for men is mesomorphic, including broad shoulders and a narrow waist, rather than a thin appearance (Polivy et al., 2003), the adolescent boys most often report dissatisfaction with their upper body, i.e. chest and abdomen. The developmental changes of puberty bring adolescent boys closer to the societal ideal of the male body, making it understandable that they would be more satisfied with their physical appearance. Study of eating disorders often includes tests of satisfaction with one's body, as it presents a significant risk factor for the disordered eating habits and development of eating disorders (Ambrosi-Randić, 2004). Expectedly, the results of this study show that those adolescents who are more dissatisfied with their bodies are also those that exhibit the behaviors and feelings related to anorexia, bulimia, and binge eating ($p<0.001$). Similar was found by Haines et al. (2010), whose study of protective and risk factors in eating disorders and obesity found that dissatisfaction and concern about one's appearance are significantly correlated with eating disorders. The correlation of dissatisfaction with one's body and dieting is confirmed by Phares, Steinberg and Thompson (2004), Wiseman et al. (2004), but also Pokrajac-Bulian, Stubbs and Ambrosi-Randić (2004), who researched the eating habits in adolescence among high-school pupils in Croatia, and found that there is a significant correlation between general dissatisfaction with one's body and disordered eating habits.

Interestingly, our study found that the presence of behaviors related to orthorexia was not correlated with dissatisfaction with one's body. As noted by Varga et al. (2013), the disorder of orthorexia is primarily directed at consuming healthy food and maintaining health, rather than weight loss, leading to the expectation that it would not correlate with the fear of gaining weight or dissatisfaction with one's body. In opposition to the hypothesis that was put forward, no significant correlation of quality of relationships in the family and behaviors and feelings related to anorexia, binge eating and orthorexia was found. Additionally, no correlation was found between dissatisfaction with one's body and relationships in the family. Though low, negative correlation ($p<0.05$) was found between relationships in the family and behaviors related to bulimia. One of the possible explanations is that the period of adolescence shifts the relevance of relationships, making the quality of relationship with peers and the extent of their acceptance more important than relationships with the parents (Granic, Dishion and Hollenstein, 2003). While peers are more influential in everyday matters such as choice of clothing, music, or choice of friends, parents tend to have more influence on core life values and plans (Berk, 2008). A possible explanation for these results is provided by Dalle Grave (2015), who notes that the most common position nowadays is that most problems in the families of persons with eating disorders have actually arisen as a consequence rather than the cause of the disorder. Thus, the problems in the functioning of the family may appear only after the eating disorder has developed in the child, and the parents have begun to exercise overly protective behaviors with regard to external pressures, or have acted in a way that prevents the child's process of achieving autonomy, or in a way that is hostile or overly

critical (Dalle Grave, 2015). Interestingly, even though a series of research indicates that there is a significant correlation between the adolescents' relationship with their peers and eating disorders, this study found no such correlations, which should also be ascribed to the limited sample size and research design. While Stice, Presnell, and Spangler (2002) note that better relationships with peers and a feeling of acceptance by peers reduce the need to conform to the ideals of thinness, Croll et al. (2002) state that the prevalence of eating disorders is greater among those girls that find their relationships with peers to be supportive. This may mean that the adolescents conform to the norm of thinness in order to be accepted in these peer group, or that their peers are more supportive of those who they notice as having disordered eating habits (Croll et al., 2002). Even though the supportive relationship with peers is a source of support for the adolescents, when it is characterized by a concern about one's physical appearance and conversations about ways of achieving what is considered desirable physical appearance, the adolescents show greater dissatisfaction with their bodies and disordered eating habits (Ata, Ludden, and Lally, 2007). These findings indicate that eating disorders are very complex and that their etiology is not completely clear, with multi-factor models considered the most advanced in this regard (Pokrajac-Bulian, Ambrosi-Randić, Kukić, 2008).

Conclusion

The aim of this study was to test the frequency of behaviors and attitudes related to eating disorders among adolescents, with regard to their sociodemographic characteristics and their correlations with the quality of relationships in the family, relationships with peers, and the respondents' own attitudes concerning their physical appearance. A statistically significant difference was found between the sexes in the frequency with which behaviors and feelings related to anorexia, bulimia, and binge eating are found among the respondents, with girls more commonly affected. A significant difference between the sexes was found in the attitudes towards one's own physical appearance, with girls more frequently expressing dissatisfaction with their appearance and a desire to achieve a thinner body than they currently have. With regard to age, a significant difference was found for the feelings and behaviors related to orthorexia, which was more frequently reported on by the younger adolescents. Further, a significant correlation was found between dissatisfaction with one's physical appearance and behaviors related to anorexia, bulimia, and binge eating. Such behaviors were more present among those adolescents that were dissatisfied with their physical appearance.

The correlation analysis found no connection between the behaviors related to the eating disorders and the adolescents' relationships with peers. Only bulimia-related feelings and disorders were found to be significantly correlated with the relationships within the family, with a low and negative coefficient. As this study also researched the perceived support, communication, and a feeling of trust towards the family and peers, it would be useful if future research would test the other dimensions of relationships with family and peers, which may be related to dissatisfaction with one's body and behaviors related to eating disorders. These other dimensions may include a pressure to be thin, negative verbal comments related to physical appearance and eating habits.

Despite the limited research design and a relatively modest survey sample, the results concerning the perception of one's own body suggest that preventive action should urgently be

undertaken, and that there is a need for a change in culture and norms concerning the desirable and acceptable appearance, which should be reflected in targeted preventive publicity campaigns, and in the educational practice in schools and the home. Given that this study found no statistically significant differences with regard to age in most of the considered variables, it is necessary to study the dissatisfaction with one's body and disordered eating habits among the younger pupils, so that a better insight might be had into the sensitive period of internalizing the social ideals of physical appearance and the initiation of eating disorders.

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Appendix

Questionnaire

Dear students,

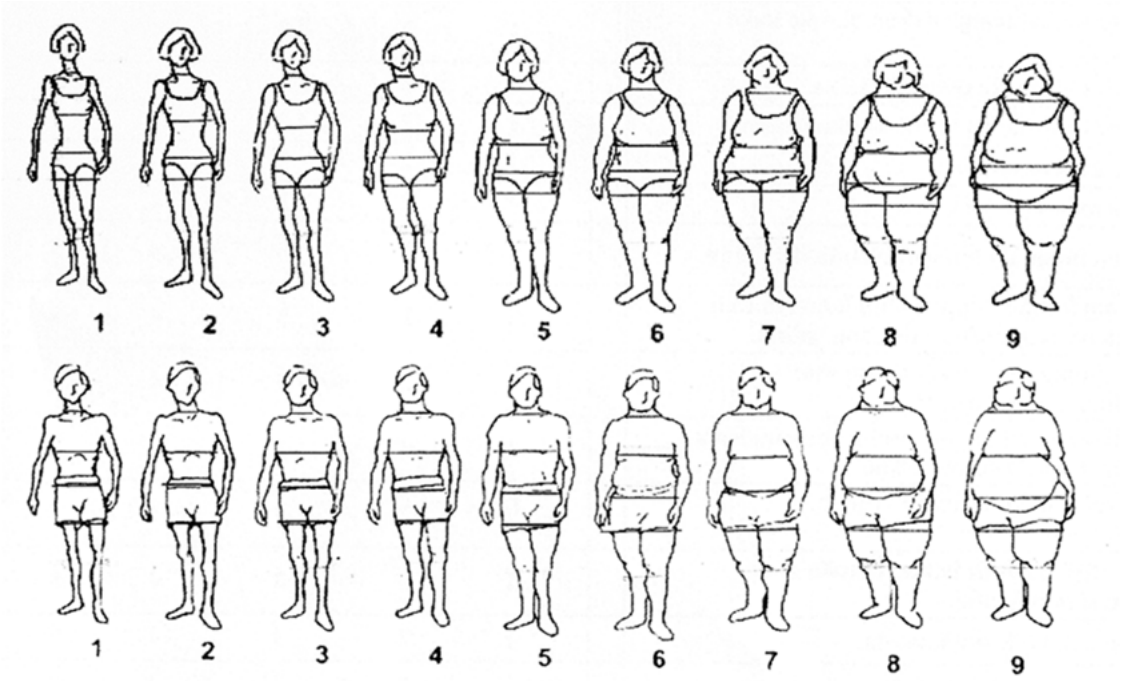
We kindly ask that you fill in the questionnaire and thus take part in a study concerning the attitudes to food and eating habits among adolescents. Please provide honest and complete responses to all questions. This questionnaire is anonymous and will only be used for the aims of this study.

Thank you for your participation!

1.Please answer the questions below by circling one of the offered choices or filling in the blanks.

1. Age (circle)	
a) 15	
b) 16	
c) 17	
d) 18	
2. Sex (circle)	
a) M	
b) F	
3. Overall grade for the last schools year (circle)	
a) fail	
b) satisfactory	
c) good	
d) very good	
e) excellent	
4. Parents' education (circle)	
Father	**Mother**
a) no qualifications	a) no qualifications
b) primary school	b) primary school
c) high school	c) high school
d) higher education (less than BA)	d) higher education (less than BA)
e) high education (BA, MA, PhD)	e) high education (BA, MA, PhD)
5. Which family members do you live with? (circle or fill in)	
a) mother and father	
b) mother	
c) father	
d) someone else (who?) _____	
6. How many brothers or sisters do you have? (circle or fill in)	
Brothers	**Sisters**
a) 0	a) 0
b) 1	b) 1
c) 2-3	c) 2-3
d) more than 3 (how many?) _____	d) more than 3 (how many?) _____

2. Look at the images below and circle the number of the picture you think best fits your current physical appearance. On that image, note (colour in) the body part that you are least satisfied with.



3. Which one of the pictures best fits the physical appearance that you would prefer to have.

Circle: **1** **2** **3** **4** **5** **6** **7** **8** **9**

4. To what extent are the following claims true when it comes to your family?

What are the relationships like in your family?	**1 never**	**2 rarely**	**3 sometimes**	**4 often**	**5 always**
1. Life in my family is generally pleasant.	1	2	3	4	5
2. My family members get along well.	1	2	3	4	5
3. I talk to my mother about my problems.	1	2	3	4	5
4. My family is a source of help and support.	1	2	3	4	5
5. I talk to my father about my problems.	1	2	3	4	5
6. Other families get along better than mine.	1	2	3	4	5
7. I feel accepted in my family.	1	2	3	4	5

5. To what extent are the following claims true when it comes to your relationships with your peers?

What are your relationships with peers like?	**1 never**	**2 rarely**	**3 sometimes**	**4 often**	**5 always**
1. I get along well with my friends.	1	2	3	4	5
2. I talk to my friends about my problems	1	2	3	4	5
3. My friends treat me well	1	2	3	4	5
4. I feel trust towards my peers.	1	2	3	4	5
5. I like to spend time with my peers.	1	2	3	4	5

6. How often do you experience the feelings and behaviors described below?

	1 never	**2 rarely**	**3 sometimes**	**4 often**	**5 always**
1. I am dissatisfied with my body.	1	2	3	4	5
2. I avoid eating when I am hungry.	1	2	3	4	5
3. I am on a diet.	1	2	3	4	5
4. I intentionally use diuretics or laxatives to prevent weight gain.	1	2	3	4	5
5. I eat a overly large amount of food in a short period of time.	1	2	3	4	5
6. I feel overweight.	1	2	3	4	5
7. I think about trying to throw up after a meal so that I may lose weight.	1	2	3	4	5
8. I am afraid of becoming fat or increasing my body weight.	1	2	3	4	5
9. I feel that I am losing control over the amount of food I am eating.	1	2	3	4	5
10. I only eat healthy food.	1	2	3	4	5
11. I feel a strong desire to be thinner.	1	2	3	4	5
12. I intentionally throw up food so that I may prevent becoming overweight.	1	2	3	4	5
13. I consciously limit the amount of food I consume so that I may affect my appearance and body weight.	1	2	3	4	5
14. I eat moderately in front of others, but "stuff" myself with large amounts of food when I am alone	1	2	3	4	5
15. I feel guilt during meals because of the effect they will have on my weight.	1	2	3	4	5
16. I check the calories and nutritional value of food.	1	2	3	4	5
17. I feel disgust and depression after a meal due to the amount of food I have eaten.	1	2	3	4	5
18. I work out excessively so that I may lose weight.	1	2	3	4	5
19. I think about food and its caloric values.	1	2	3	4	5
20. I follow strict rules when it comes to eating (i.e., caloric intake, types of food, mealtimes).	1	2	3	4	5