



ORIGINAL ARTICLE

Risk of disordered eating in emerging adulthood: media, body and weight-related correlates among Hungarian female university students

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Key words

Disordered eating • Sociocultural attitudes toward appearance • Body satisfaction • Eating disorders in family • Sporting • Hungary

Summary

Background. University years often are accompanied by dramatic lifestyle changes resulting in an elevated risk of disordered eating among females. We examined the associations of disordered eating with body image, weight and media-related variables.

Methods. Hungarian female university students ($n = 261$, mean age = 22.0 years; $SD = 2.2$ years) were the study participants using online data collection. The Eating Attitude Test-26 (EAT-26) was used to assess levels of and risk for disordered eating.

Results. Twenty-four percent of the sample displayed disordered eating: students with family's eating disorders ($OR = 4.73 [1.34-16.67]$, $p < 0.05$), body satisfaction ($OR = 0.23 [0.07-0.70]$, $p < 0.01$), engagement in sporting ($OR = 4.46 [1.77-11.27]$, $p < 0.01$) and past slimming ($OR = 5.63 [2.07-15.27]$, $p < 0.001$)

were particularly at risk. Multiple linear regression indicated that dieting was associated with a higher score among sporting students ($\beta = 0.18$, $p < 0.001$) and internalization of media messages ($\beta = 0.18$, $p < 0.001$). BMI was a predictor of dieting ($\beta = 0.15$, $p < 0.01$) and oral control ($\beta = -0.34$, $p < 0.001$); social media addiction for bulimia ($\beta = 0.17$, $p < 0.01$).

Conclusions. Our paper highlights the role of body dissatisfaction, sporting and slimming tendencies, sociocultural attitudes toward appearance, and family's eating pathology in understanding female university students' disordered eating. There is a limited role that social media plays in part, due to possible age-related experiences and skills related to coping with a variety of social pressures.

Introduction

Emerging adulthood [1] is that period during the life course when youth leave their childhood home and gain more freedom in making behavioral decisions. However, exploration of new behaviors has not always been positive in terms of health maintenance. University years often mean dramatic lifestyle changes which may result in an elevated risk of disordered eating, particularly among women [2]. The prevalence of diagnosed eating disorders among college students varies between 8-17% [3]. The occurrence of the risk of disordered eating can be much higher: 30.7 percent among Eastern European female students [4] and 20.1% among Hungarian students [5], with an increasing tendency among young women in their twenties [6]. Although disordered eating is common among young women, help-seeking is still remarkably low [7]. With regards to prevention, detecting the risk of disordered eating seems useful [8]. As such, using self-report measures is a good tool for screening and studying correlates without pathologizing [9].

Among potential factors impacting eating habits, foremost are body and weight-related factors. Being overweight is a key factor among college students [10]; Eastern European university students with a higher BMI were at risk to experience eating disorders, primarily among younger females [4].

Another factor is body dissatisfaction which is also related to the internalization of Western body ideals [11]. Among obese college students, the desire to be thin is closely associated with body dissatisfaction and slimming in both sexes, and with exercise intensity among males [12]. Many young people use sport as a way of maintaining/losing weight [13]; sport and physical activity can constitute a major risk factor for the development of eating disorders for those for whom obtaining an ideal body shape is relevant [14].

The family's attitudes are also crucial in the development of body image and dietary habits, particularly for females [15]. Parents' eating disorders or obesity can also increase the risk of body and weight-related concerns [16-18]. Besides family, pressure from and internalization of media messages can also contribute to dieting and disordered eating. Perceived sociocultural pressure often acts as a mediator in the relationship between internalization of the ideal body (both thin and athletic) and eating disorders [19]. Particularly, research finds that young girls are at the greatest risk for sociocultural exposure *vis a vis* mass media [20].

The 'new' forms of media, such as the Internet, and particularly social networking sites can have a great impact on forming our body image and eating concerns through social comparison [21, 22]. Among Asian undergraduate students the risk of disordered eating

attitudes was found to be associated with pathological Internet use [23]. However, the link between eating disorders and the Internet or social media addiction has not been fully developed [24]. Research reports that females are at risk for the pressure of sociocultural norms of the media at every age, especially younger girls [20]. Moreover, a recent study reported that younger persons (around 13 years) were the most prone to internalize social media messages on disordered eating [25].

Despite a growing number of studies on the risk of disordered eating among university students, additional research is needed to map a broader context of the contributing factors to this negative health outcome. Therefore, the main goals of our study include: (1) to detect the prevalence of the risk of disordered eating; (2) to examine bivariate associations of what factors contribute to disordered eating behaviors; (3) to examine the role of body, weight and media-related variables in disordered eating habits; and finally, (4) using logistic regression, to examine the risk or protective odds among a set of independent variables used to determine disordered eating behavior.

Methods

PARTICIPANTS AND PROCEDURE

Survey participants were recruited via an online questionnaire between April and June 2021. The public link was shared on websites and special Internet communication platforms (e.g., Facebook, Instagram, and others). Participation was voluntary and confidential, and participant's informed consent was obtained. The study plan was approved by the Institutional Review Board of the Doctoral School of Education, University of Szeged, Hungary (No. 6/2021), in accordance with the Helsinki Declaration. The convenience sample that was obtained, consisted of Hungarian university students ($n = 313$; ages 18-30; 83.4% females). Due to the gender disparity, we decided to analyze only women's responses ($n = 262$; mean age = 22.0 years; $SD = 2.2$ years).

MEASUREMENT

The validated, Hungarian version [26] of the Eating Attitude Test-26 (EAT-26) was used to assess levels and risk of disordered eating habits [27]. Besides a summary score (EAT_sum) of the 26 items (with one inverse item), three factors were detected: dieting (EAT_dieting; e.g., "Avoid foods with sugar in them"), bulimia (EAT_bulimia; e.g., "Vomit after I have eaten"), and oral control (EAT_oral control; e.g., "Display self-control around food"). A six-point scale with responses ranging from 'never' to 'always' was used (a score of 3, 2, and 1 was given for 'always', 'usually' and 'often', respectively, and 0 for 'sometimes', 'rarely' and 'never'). The total scores could range between 0-78. The cut-off score ≥ 20 held the meaning of being 'at risk'. Internal consistency for the scale was 0.84 with the current sample of women. Among body and weight-related variables, the following were included: Body Mass Index (BMI = weight in

kilograms divided by height in meters squared), body satisfaction (no = 1, yes = 2), current sporting (no = 1, yes = 2), ever slimming (no = 1, yes = 2), eating disorder/obesity in the family (no = 1, yes = 2). Besides, the Hungarian validated [28] of the Body Appreciation Scale - 2 (BAS-2) comprised of 10 items rated on a 5-point Likert-type scale (1 = never... 5 = always [29]. This scale measures respondents' acceptance and favorable opinions of, and respect for their bodies (e.g., "Despite its imperfections, I still like my body"). Higher scores reflect higher levels of body appreciation. The Cronbach's alpha coefficient in our sample (α) was 0.94. The Hungarian, validated version [30] of the Sociocultural Attitudes Towards Appearance Scale (SATAQ) is a 30-item measure used to assess internalization of sociocultural appearance standards [31]. The scale contains items on the endorsement and acceptance of unrealistic ideal images and athletic body idea, importance of various forms of media for obtaining information, and perceived pressure to achieve the media body ideal. Here summary scores were applied where higher scores indicated higher societal and media impact on the body image of the individual. Cronbach's alpha coefficient in our sample was 0.93.

Finally, the Hungarian validated form [32] of the 6-item Bergen Social Media Addiction Scale (BSMAS) [33] was used to assess problematic social media use over the past 12 months (e.g., "You spend a lot of time thinking about social media or planning how to use it"). Participants responded on a 5-point scale (never to always). The Cronbach's alpha coefficient was 0.79 in our sample.

DATA ANALYSIS

SPSS for MS Windows Release 22.0 was used to analyze the data, with a maximum significance level set at 0.05. The analysis started with an examination of the descriptive statistics for the dependent and independent variables. For appropriateness of our data to correlation and regression analyses, we carefully test normality of the variables using statistical tests and/or visual inspection: Skewness, Kurtosis, Kolmogorov-Smirnov Test. When the requirements are not met, we "transform" the data to make it "normal", namely, our normalizing transformation uses a logarithmic transformation. After that, the data meet the criteria of the normal distribution, they are suitable for parametric analyses. Bivariate relationships between the (sub)scales of disordered eating habits and other study variables were examined using Pearson correlation coefficients. The primary focus of the analyses was two-fold. First, detecting the associations between dependent variables (body image, weight and media-related) and the independent variable (EAT score) using multiple linear regression analysis. Next, binary logistic regression analyses (simple and multiple) were used to examine correlates of EAT risk by calculating odds ratios (OR). An odds ratio > 1.0 indicates that there is a positive association between the factors of interest to the baseline odds, while a value < 1.0 indicates the opposite.

Results

Descriptive statistics for the sample are presented in Table I. Nearly one-fourth (24.1%) of the students had EAT-26 scores ≥ 20 . Eating disorder in the family was reported by 6.9% and obesity by 65.9%. More than 80% of respondents said they were satisfied with their body, 64.8% reported participating in some sporting and 54.8% reported slimming behavior.

Correlations among study variables are presented in Table II. The summary EAT score was positively correlated with social media addiction, sociocultural attitudes toward appearance, familial factors, and (ever) slimming and BMI, while negatively associated with body appreciation and satisfaction. The strongest positive correlation was with previous slimming ($r = 0.39$, $p < 0.001$) and the negative ones with body appreciation ($r = -0.40$, $p < 0.001$) and body satisfaction ($r = -0.38$, $p < 0.001$). The EAT_dieting subscale was similar except for social media addiction being nonsignificant and sporting as an additional correlate ($r = 0.19$, $p < 0.01$). The EAT_bulimia subscale was also similar with social media addiction being significant ($r = 0.25$, $p < 0.001$). In the case of EAT_oral control, only past slimming ($r = -0.14$, $p < 0.05$) and BMI ($r = -0.31$, $p < 0.001$) were significant correlates.

Multiple regression estimates are in Table III. In the case of EAT_sum, sociocultural attitudes towards appearance ($\beta = 0.14$, $p < 0.05$), obesity in the family ($\beta = 0.13$, $p < 0.05$), sporting ($\beta = 0.12$, $p < 0.05$) and past slimming ($\beta = 0.19$, $p < 0.01$) were positive, while body appreciation ($\beta = -0.19$, $p < 0.01$), body satisfaction ($\beta = -0.16$, $p < 0.05$) and age ($\beta = -0.10$, $p < 0.05$) were negative predictors. In terms of dieting (EAT_dieting), besides these predictors, BMI was a significant contributor ($\beta = 0.15$, $p < 0.01$) and age was nonsignificant. The following variables proved significant predictors of EAT_bulimia: social media addiction ($\beta = 0.17$, $p < 0.01$), obesity in the family ($\beta = 0.15$, $p < 0.01$), body satisfaction ($\beta = -0.24$, $p < 0.001$) and ever slimming ($\beta = 0.18$, $p < 0.01$). In addition with growing age, bulimia also showed a decreasing tendency ($\beta = -0.10$, $p < 0.05$). Finally, the only significant predictor of EAT_oral control was BMI with a negative association ($\beta = -0.34$, $p < 0.001$). The results in Table IV, using binary (simple) logistic regression, show that all variables are significant ($p < 0.05$) except for age.

Finally, in multiple regression (Tab. V), sociocultural attitudes toward appearance (OR = 1.02 [1.01-1.04], $p < 0.05$), eating disorder in the family (OR = 4.73 [1.34-16.67], $p < 0.05$), sporting (OR = 4.46 [1.77-11.27],

Tab. I. Descriptive statistics for study variables (n = 261).

Variables	Cronbach alpha	Min.	Max.	Mean (SD)	%
Social media addiction	0.79	6	27	12.95 (4.77)	
Sociocultural attitudes toward appearance	0.93	30	148	79.33 (23.83)	
Eating disorder in family					6.9%
Obesity in family					65.9%
Body appreciation	0.94	12	50	35.47 (8.25)	
Body satisfaction					86.2%
Sporting					64.8%
Slimming (ever)					54.8%
BMI		15.06	39.19	22.21 (4.32)	
EAT_sum	0.84	0	66	13.59 (10.32)	
EAT_dieting	0.86	0	38	6.97 (6.50)	
EAT_bulimia	0.74	0	15	2.06 (2.99)	
EAT_oral control	0.60	0	18	3.55 (3.25)	
EAT_risk					24.1%

Tab. II. Correlation analysis between disordered eating habits and other study variables.

	EAT_sum	EAT_dieting	EAT_bulimia	EAT_oral control
Social media addiction	0.16*	0.03	0.25***	0.04
Sociocultural attitudes toward appearance	0.33***	0.34***	0.32***	-0.01
Eating disorder in family	0.07	0.06	0.11	0.10
Obesity in family	0.22***	0.27***	0.24***	0.01
Body appreciation	-0.40***	-0.44***	-0.39***	0.08
Body satisfaction	-0.38***	-0.40***	-0.43***	0.06
Sporting	0.11	0.19**	-0.05	0.02
Slimming (ever)	0.39***	0.49***	0.38***	-0.14*
BMI	0.24***	0.41***	0.23***	0.31***
Age	-0.08	-0.04	-0.07	-0.11*

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Tab. III. Multiple linear regression estimates for EAT summary score and subscales.

B/SE/ β	Eat_sum	Eat_dieting	Eat_bulimia	Eat_oral control
Media-related variables				
Social media addiction	0.01/0.01/0.06	-0.01/0.01/-0.07	0.03/0.01/0.17**	0.01/0.01/0.03
Sociocultural attitudes toward appearance	0.01/0.01/0.14*	0.01/0.01/0.18***	0.01/0.01/0.09	0.01/0.01/0.01
Family-related variables				
Eating disorder in family	0.07/0.16/0.02	0.07/0.18/0.02	0.22/0.17/0.07	0.21/0.18/0.07
Obesity in family	0.21/0.09/0.13*	0.21/0.10/0.10*	0.26/0.10/0.15**	0.17/0.10/0.11
Body-related variables				
Body appreciation	-0.02/0.01/-0.19**	-0.03/0.01/-0.23***	-0.01/0.01/-0.11	0.01/0.01/0.04
Body satisfaction	-0.37/0.14/-0.16*	-0.30/0.16/-0.11*	-0.58/0.15/-0.24***	-0.19/0.15/-0.09
Sporting (ever)	0.20/0.09/0.12*	0.35/0.10/0.18***	-0.04/0.09/-0.02	0.07/0.09/0.05
Slimming (ever)	0.30/0.10/0.19**	0.46/0.11/0.24***	0.31/0.10/0.18**	-0.06/0.10/-0.04
BMI	0.01/0.01/0.01	0.03/0.01/0.15**	0.01/0.01/0.01	-0.06/0.01/-0.34***
Age	-0.04/0.02/-0.10*	-0.03/0.02/-0.06	-0.04/0.02/-0.10*	-0.03/0.02/-0.10
Constant	2.81***	0.96	1.25	2.92***
R2	0.32	0.46	0.33	0.13
F value	11.86***	20.76***	12.48***	3.79***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. B: Unstandardized regression coefficient, SE: Standard Error, β : standardized regression coefficients. VIF (Variance Inflation Factor) < 2.0 in each case.

Tab. IV. Simple (binary) logistic regression estimates for EAT risk.

Predictors	Simple logistic regression	
	OR (95% CI)	SE
Media-related variables		
Social media addiction	1.06 (1.01-1.13)*	0.03
Sociocultural attitudes toward appearance	1.03 (1.02-1.05)***	0.01
Family-related variables		
Eating disorder in family	3.50 (1.32-9.25)*	0.50
Obesity in family	3.07 (1.51-6.25)**	0.36
Body-related variables		
Body appreciation	0.90 (0.87-0.94)***	0.02
Body satisfaction	0.09 (0.04-0.20)***	0.40
Sporting	2.04 (1.07-3.89)*	0.33
Slimming (ever)	12.37 (5.10-30.03)***	0.45
BMI	1.11 (1.04-1.18)**	0.03
Age	0.93 (0.81-1.06)	0.07

OR: Odds Ratio; 95% CI: 95% Confidence Intervals; SE: Standard Error. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

$p < 0.01$) and past slimming (OR = 5.63 [2.07–15.27], $p < 0.001$) are related to higher odds of disordered eating, while body satisfaction is related to lower odds of disordered eating (OR = 0.23 [0.07–0.70], $p < 0.01$).

Discussion

This study explores the associations between disordered eating and a set of body, weight and media-related variables among a sample of Hungarian female university students. We chose a sample of young women since female gender was typically associated with higher odds of disordered eating [4, 10]. Age was slightly related to decreased occurrence of bulimia but it did not elevate significantly the risk of disordered eating. Findings indicate 24.1 percent of risk of disordered eating which was lower than previous Eastern European studies [4] but higher than a previous Hungarian study (20.1%) [5]. While some of the correlates (particularly

sociodemographics) were already detected, our study added a variety of factors to get a more complex picture. Previous studies revealed (social) media playing important role in dieting, forming body image and weight concerns through social comparison and internalization of the ideal body type [19, 20, 22]. Our findings support the role of sociocultural attitudes toward appearance in eating disorders. It was related to higher levels of disordered eating, particularly in students' dieting behavior. While a previous study reported that younger girls were more at risk [20], older females, such as university students, remained a susceptible group. However, social media played a limited role similar to a previous study [24]; the only relevant association was with bulimia. Thus, young adults seemed less susceptible to social media messages perhaps because they learned how to cope with them. As it seemed, dieting or oral control were not influenced by social media activities in contrast with bulimia and general risk of eating disorders [6]. Interestingly, sociocultural attitudes were

Tab. V. Multiple (binary) logistic regression estimates for EAT risk.

Predictors	Multiple logistic regression	
	OR (95% CI)	SE
Media-related variables		
Social media addiction	1.03 (0.94-1.11)	0.04
Sociocultural attitudes toward appearance	1.02 (1.01-1.04)*	0.01
Family-related variables		
Eating disorder in family	4.73 (1.34-16.67)*	0.64
Obesity in family	2.25 (0.89-5.70)	0.47
Body-related variables		
Body appreciation	0.95 (0.90—1.00)	0.03
Body satisfaction	0.23 (0.07-0.70)**	0.57
Sporting	4.46 (1.77-11.27)**	0.47
Slimming (ever)	5.63 (2.07-15.27)***	0.51
BMI	0.99 (0.91-1.09)	0.05
Age	0.85 (0.71-1.00)	0.09
c^2		98.77***
df		10
Nagelkerke R^2		0.47

OR: Odds Ratio; 95% CI: 95% Confidence Intervals, SE = Standard Error. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

not significant correlates of bulimia. These findings suggest that the interactive nature of social media and posts/comments from friends may play a more decisive role than information and pressure from mass media. In dieting behavior, the situation is the reverse: internalizing messages on the ideal body from well-known people who are popular on TV or magazines.

Our results showed that past slimming was also associated with an elevated risk of disordered eating among sporting students [13, 14] where internalization of thin or athletic body types formed by the media may play a role. This finding suggests that students tend to use not only sport but also disordered eating habits to get a similar figure. Sporting students and those reporting previous slimming tendencies were more likely, while students being satisfied with their bodies were less likely to engage in disordered eating.

The role of familial factors was previously noted [16-18]. In our study, obesity in the family was related not only to the summary scores of disordered eating but also to dieting and bulimia. Familial obesity can force students to prevent their own overweight by dieting or even bulimic behavior. A previous study also revealed the importance of control strategies which are also related to gender [34], although in our study, oral control was not related to familial factors, only with BMI. In terms of the overall risk of disordered eating, however, familial eating disorders proved a predictor: these were less frequent than familial obesity but if present they played a role in elevating the likelihood of young women's disordered eating. More research is needed to clarify the background of these findings; perhaps individual psychological factors can play a role.

Weight and body-related factors were the strongest correlates, similar to previous studies [10-12], particularly body satisfaction as a protective factor and body appreciation against dieting. In addition, dieting significantly moderated the relationship between body

dissatisfaction and disordered eating in a previous study [35]. On the other hand, BMI played a limited (if any) role in multiple regression analysis (only in oral control and dieting) suggesting that (subjective) body image is more important than the more objective weight status.

Overall, five factors increased considerably the odds of disordered eating: 1) body satisfaction (negatively); 2) eating disorder in the family; 3) sporting; 4) previous slimming behavior; and 5) sociocultural attitudes toward appearance. Namely, being less satisfied with one's body, having an elevated susceptibility to mass media messages, the negative example of eating disorders in the family, and engaging in certain activities such as sporting and/or previous slimming behavior, made students more susceptible.

Study limitations

While the cross-sectional design, self-reported and online data collection (using a convenience sample) are limitations, using a broader and more inclusive number of correlates in the analysis is clearly a strength. Our paper highlights the role of body satisfaction, sporting, and previous slimming behavior, pressure from and information of the mass media and family's eating pathology/obesity in female students' disordered eating, while the limited role of social media possibly can be attributed to their age-related experiences and skills on how to cope with it. However, information about the ideal body from the media seems ideal for sporting students which can elevate their risk of disordered eating. Future research should also concentrate on other psychological variables and disordered eating such as binge eating, and the link between social media use and bulimia.

Conclusions

Females usually have higher odds of disordered eating, and it is especially increasing among young women in their twenties. While we know more about its contributors in adolescent girls, less information is available about female university students. Among a few previous studies, most of them concentrated on sociodemographic associations and psychological correlates. However, except for one study in Hungary, we have not yet explored background variables of young women's disordered eating so far. This is the first study to detect associations between disordered eating and a set of body, weight and media-related variables among a sample of Hungarian female university students. These results can trigger future studies on this issue at international level as well including more similar variables.

We concluded that a relatively high level of risk of disordered eating was detected in our sample of female university students which was lower than previous Eastern European studies but higher than a previous Hungarian study. We identified several risk factors, such as eating disorders/obesity in the family, previous slimming behavior, or internalization of sociocultural attitudes towards appearance, while body satisfaction served as protection. Sporting students are also at risk of disordered eating, while BMI and social media addiction played a limited role in this age group.

Acknowledgment

Not applicable.

Ethical approval

The study protocol was approved by the Institutional Review Board of the Doctoral School of Education, University of Szeged, Hungary (No. 6/2021), in accordance with the Helsinki Declaration.

Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

BFP, HK and AG designed the study. BFP conducted literature review. HK and AG were responsible for data collection and editing the questionnaire. BFP supervised the whole research project and wrote the first draft. KMF participated in the analysis and interpretation of data and finalized the manuscript. All authors contributed to and have approved the final manuscript.

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