Prevalence and Correlates of Eating Disorders in Greek-Cypriot Adolescents and Young Adults

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Abstract

The present study aimed to explore the prevalence rates of eating disorders among Greek-Cypriot adolescents and young adults and examine the role of the following variables in relation to eating disorder risk: gender, age, dieting, exercise and present-ideal weight discrepancy. One thousand and eighty-one middle, high school and university students responded to self-reported measures assessing eating disorders, weight-related concerns and behaviors. Prevalence estimates were 26% for high eating disorder risk and 14.98% for subthreshold eating disorders symptoms while 12% of participants met criteria of an eating disorder diagnosis. Multivariate logistic regression confirmed well-established predictors for eating disorder risk including present to ideal weight discrepancy which had a differential effect on risk in adolescents (i.e., 6-10 kg) and young adults (11+kg). This is the first study to provide prevalence rates of the entire eating pathology spectrum among Greek-Cypriot youth. Results are discussed in terms of their implications in the development of age-specific screening tools and prevention programs.

Keywords: eating disorder risk, prevalence, correlates, adolescence, young adulthood

Based on the revised Diagnostic and Statistical Manual for Mental Disorders-5 (DSM-5), three of the diagnoses specified under the heading "Feeding and Eating Disorders" are Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Binge Eating disorder (BED) (American Psychiatric Association, 2013). Eating disorders, as specified above, have potentially serious physical and psychological consequences making them a major public health hazard in youth (Berg, Frazier, & Sherr, 2009; Campbell & Peebles, 2014; Marzilli, Cerniglia, & Cimino, 2018; Şanlier, Yabanci, & Alyakut, 2008). The current study aims to examine eating disorders prevalence rates and correlated risk factors in a Mediterranean country, Cyprus.

Socio-cultural factors seem to play a significant role in the development of eating disorders. In particular, cultures of abundance that place a great emphasis on appearance and idealize slimness provide the context for body image issues and disordered eating to emerge (Polivy & Herman, 2002). Cyprus is of great interest in the literature concerning body image issues. The need for light or body-exposing clothing due to the year-long warm weather and the socio-economic changes in the Cypriot society with an emphasis on wealth, appearance and image may contribute to higher rates of eating disorder risk (see also Argyrides & Kkeli, 2015; Argyrides & Sivitanides, 2017; Karekla, Anderson, Symeou, & Kapsou, 2007).

Eating disorder high risk refers to individuals who present with body shape/weight disturbance and weight loss behaviors but do not currently meet the criteria for having an eating disorder diagnosis. Furthermore, individuals at high eating disorder risk differ from patients with subthreshold eating disorders in terms of symptom severity (e.g., frequency of caloric restrictions; Dancyger & Garfinkel, 1995; Fairburn & Beglin 1990; Hammerle, Huss, Ernst, & Bürger, 2016). Despite the lower intensity of eating pathology among individuals at high risk for developing an eating disorder compared to individuals who already meet criteria for an eating disorder, they nevertheless present significant mental and health risks, such as low self-esteem and social adjustment problems (Crow, Stewart Agras, Halmi, Mitchell, & Kraemer, 2002; Fairburn et al., 2007; Field et al., 2012; Jacobi, Abascal, & Taylor, 2004a; Schmidt et al., 2008) as well as strong associations with other psychiatric disorders and suicidality (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011).

The lifetime prevalence of AN based on the DSM-5 criteria is 1.7%, of BN 0.8% and of BED 2.3% (Smink, van Hoeken, Oldehinkel, & Hoek, 2014). In regards to the sub-threshold eating disorders, a cross-sectional survey conducted in six European countries with adults 18 years and older found rates of 0.72% for sub-threshold BED and 2.15% for any other binge eating (Preti et al., 2009). Based on another national school-based survey, prevalence rates among German students were 0.8% for subthreshold AN, 0.3% for subthreshold BN and 0.2% for subthreshold BED (Hammerle et al., 2016). In the US, a nationwide survey revealed high prevalence estimates of 0.8% for sub-threshold AN and 2.5% for sub-threshold BED in adolescents aged 13-18 years (Swanson et al., 2011).

In regards to eating disorder high risk, results from a 14-year-old teenagers' cohort in the UK show that 40% of girls and 12% of boys were dieting while 11.4% of girls and 4.7% of boys had increased weight and shape concerns (Micali et al., 2015). In a random sample of US college students, 13.5% of female and 3.6% of males presented with higher risk for developing an eating disorder (Eisenberg, Nicklett, Roeder, & Kirz, 2011). Among Australian high school students, 11.5% of girls and 2.3% of boys were on extreme dietary restriction while 24.2% of girls and 4.9% of boys reported over-evaluation of their body weight and shape (Mond et al., 2014). Prevalence estimates show considerable variation between studies and this is attributed to a number of factors including the population group sampled (clinical vs. community), the assessment tools (structured interviews vs. self-report), and the diagnostic classification system used (DSM-4 vs. DSM-5). However, despite the variations in the prevalence estimates, there is substantial evidence that sub-clinical eating disorders are increasing in prevalence while the age of onset seems to be decreasing (Davison, Markey, & Birch, 2003; Nagl et al., 2016; Rohde, Stice, & Marti, 2015).

Demographic and psychological correlates

Several studies point to well-established demographic and individual factors that are consistently linked with eating disorders onset (see Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004b, and Stice, Gau, Rohde, & Shaw, 2017, for a review). One of the most important contributing factors to the development of eating disorders is gender. Despite that eating disorders are characterized as gender-specific disorders with disordered eating patterns and attitudes being three times higher in females than in males (American Psychiatric Association, 2013), recent evidence suggests that there is a substantial minority of males presenting with eating disorders' symptoms as well (Campbell & Peebles, 2014).

Adolescence is considered as a critical period for the development of eating disorders, especially among females (Southgate, Tchanturia, & Treasure, 2005). Even though eating disorders emerge during late adolescence and early adulthood, significant risks, such as body dissatisfaction, are evident much earlier (i.e., from the age of nine years among females) and are associated with DSM-5 eating disorders onset (Parkinson et al., 2012; Rohde, Stice, & Marti, 2015). Early adulthood is considered as another window of vulnerability for eating disorders' development especially among females who are overweight or obese (Lipson & Sonneville, 2017). The transition to adulthood that for most individuals in western countries is associated with significant life changes and challenges (e.g., college entry, attending academic responsibilities and adapting to the social pressures of campus life) may trigger eating disorders' symptoms (Delinsky & Wilson, 2008; Taylor et al., 2006) which are also evident among graduate students (Berg et al., 2009; Delinsky & Wilson, 2008).

One of the most robust factors contributing to the development of eating disorders is body dissatisfaction that is defined as the discrepancy between one's actual body size/shape to one's ideal body size/shape (Cash & Deagle, 1997; Neighbors & Sobal, 2007). Based on the dual pathway model, body dissatisfaction predicts dieting and increases negative affect, which may lead to the onset of binge eating and bulimic symptomatology (Stice, 2001). Body dissatisfaction may not have direct effects on eating pathology but it fosters significant risks that can lead to the development of full-blown eating disorders (Stice, 2016).

Compulsive exercise in the context of weight and shape concerns also plays a key role in the development of eating pathology and it is often an overlooked correlate of eating disorders. Participation in sports among females is associated with more eating disorders symptoms (Holm-Denoma, Scaringi, Gordon, Van Orden, & Joiner, 2009) while compulsive exercise is often used as a weight loss behavior and as an affect regulation strategy among individuals with eating disorders diagnosis or at risk for eating disorders (see Meyer, Taranis, Goodwin & Haycraft, 2011, for a review). Over-exercising as a way of counteracting the effects of eating, as an attempt to lose weight or as a way to distract from negative emotions, can lead to eating disorders especially if it is the main and probably the only focus of individuals on the expense of other important areas of their life such as school, work, relations, etc.

Most of the above-mentioned factors have received strong empirical support (Stice, 2002; Stice et al., 2017) mainly from studies conducted in Western countries. There are, however, indications that cultural factors have differential effects on the expression of eating disorders (Jackson, Keel, & Ho Lee, 2006; Pike, Hoek, & Dunne, 2014). The aim of the present study was to examine the effects of these factors in Greek-Cypriot youth residing in Cyprus.

Current State of the Art in Cyprus

In Cyprus, a significant increase in the number of people treated for severe eating disorders, and more precisely a doubling of cases between 1992 and 2002, was registered in the records of the Child and Adolescent Psychiatric Ward at Makarios Hospital (the main child governmental hospital in the country; Hadjigeorgiou, Tornaritis, Savva, Solea, & Kafatos, 2012). This alarming increase led to the first epidemiological study in 2003 by Hadjigeorgiou and his colleagues. In a sample of 1900 adolescents aged 10 to 18 years, 18.8% of males and 34.4% of females were identified as high risk for eating disorders based on their self-reported body weight/shape concerns and disordered eating behaviors. In a replication of the study in 2010, the results showed an increasing trend with females at risk reaching 35.9%. In addition, a significant increase in the maladaptive

thoughts and behaviors associated with binge eating and self-induced vomiting was found in 30.6% of the sample (Hadjigeorgiou et al., 2012). High prevalence rates were found in another study conducted in a public high school in the capital of Cyprus in 2011, with 29.6% of middle school students being on a diet and 13.4% found to be at high risk for eating disorders (Koushiou et al., 2012).

Similar prevalence rates were found among university students (Karekla et al., 2007). In a study by Katsounari (2009), 28.6% of Cypriot female university students presented with disordered eating attitudes and behaviors based on the Eating Attitudes Test-26 while Argyrides (2013) confirmed the same significant problems in 21.43% of a female university sample. Cypriot females reported high preoccupation with their weight (Katsounari & Zeeni, 2012) while they appeared to be more prone to sociocultural influences and thus in higher risk for developing an eating disorder (Zeeni, Gharibeh, & Katsounari, 2013). In addition, internalization of the thin ideal and weight-related anxiety significantly predicted disordered eating attitudes among Cypriot female university students (Argyrides & Kkeli, 2015). These data are disconcerting from a public health perspective and point to the need for close monitoring of prevalence rates of eating pathology among Cypriot youth.

Monitoring of prevalence rates and significant correlates is not yet well-established on a national level. There are a number of potential reasons for this. The first reason is that the first public center for the Prevention and Treatment of Eating Disorders in children and adolescents was only recently established in 2012, under the Mental Health Services of the Cyprus Ministry of Health. Secondly, there is no local specialized center for the treatment of eating disorders in adults who are currently being referred to centers/hospitals abroad if intensive or inpatient care is needed. This lack of expertise and specialized services for the prevention and treatment of eating disorders in Cyprus has a significant impact on the increasing numbers of incidents with a long-term course (due to delayed identification, limited options for treatment, etc.) on a local level.

This is the first study that aimed to examine the prevalence rates of the whole eating pathology spectrum, including high risk, sub-threshold and full symptom syndrome in a randomly selected sample of Greek-Cypriot middle and high school students as well as university students and further explore the effects of well-established factors, such as gender, age, dieting, exercise, body dissatisfaction, in the prediction of eating disorder risk. This is among the few studies that aimed to operationalize body dissatisfaction in terms of present-ideal weight discrepancy and measure its effect on eating disorder risk. We hypothesized that the prevalence of eating disorders' symptoms would be higher among females, as in previous studies (Eisenberg et al., 2011). We did not have specific hypothesis regarding differences by age since age of both groups (middle/high schools and university students) is considered as critical for the development of eating disorders (Soet & Sevig, 2006; Southgate, Tchanturia, & Treasure, 2005). Based on previous studies (see Stice, 2016), we expected that gender, dieting and body dissatisfaction would have a higher impact in eating disorder risk, followed by age, and exercise.

Method

Participants

A total of 1081 students aged 13 to 32 years (M = 16.79, SD = 2.95) participated in the study. Of those, 741 were middle and high school students while the rest (N = 340) were university students. The vast majority of the sample (90%) was Greek-Cypriot while the rest declared other ethnicities (Turkish-Cypriot, Armenian, Mar-

onite, Greek or Other). Middle and high school students (with average age: M = 15.12, SD = 1.34) were recruited from twenty-five public schools in the Republic of Cyprus with 55% coming from middle schools. Sixty-three percent of the middle and high school students were female. Regarding the university students (with average age: M = 20.68, SD = 1.76), 90% were female. Thirty-seven percent were on the final year of their undergraduate studies, 21% on their third year, 23% on their second year, 15% on their first year and one percent were graduate students. Participants were classified based on their self-reported measures on height and weight following the World Health Organization guidelines on Body Mass Index (BMI; calculated as weight in kilograms divided by height in meters squared). Participants were classified as follows: 24% of the participants were underweight (BMI less than 18.5 kg/m^2), 64% fell within the normal range (18.5 kg/m^2 and 25 kg/m^2), 10% were overweight (BMI between 26 kg/m^2 and 30 kg/m^2) while the rest (two percent) had a BMI above 30 kg/m^2 and fell within the Obese category.

Measures

Measures not already available in Greek were translated following a standard front and back translation by doctoral students fluent in both languages. The questionnaires were administered in a separate pilot sample that was used for validation purposes and all the ones used in this study were found to have adequate psychometric properties.

The Demographic/Historical Data Questionnaire

This questionnaire was compiled by the authors to obtain demographic and personal information including participants' medical history, eating and exercise habits and weight status and goals (current, highest, lowest, ideal, and disappointing weight).

The Eating Disorder Diagnostic Scale

The Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000) is a 22 item self-report measure answered on a 0-6 Likert scale, assessing the presence of eating disorders. Answers provide a composite score for eating disorders, a possible diagnosis for Anorexia Nervosa, Bulimia Nervosa and Binge Eating Disorder and the corresponding sub-threshold syndromes based on Diagnostic and Statistical Manual for Mental Disorders-IV criteria. The scale is a psychometrically sound measure that is able to differentiate between clinical eating disordered patients and controls (Krabbenborg et al., 2012) and thus, it was included in the present study to identify individuals that meet eating disorders threshold criteria (but do not necessarily warrant a diagnosis) and sub-threshold syndromes. The scale has shown high test-retest reliability (r = .87) and internal consistency (M_α = .89) in previous studies (Stice, Telch, & Rizvi, 2000) and adequate reliability in the present study for both middle-high school (α = .67) and university students (α = .66).

The Weight Concern Scale

The Weight Concern Scale (Killen et al., 1994) is a 5-item questionnaire assessing fear of weight gain, worry about weight and body shape, importance placed on weight, diet history, and perceived fatness. This questionnaire has been associated with eating disorder onset in female adolescents over a 4-year period (Killen et al., 1996). Scoring instructions as proposed by the authors (Killen et al., 1994) were followed. A score of greater than 52 is indicative of high risk for developing eating disorders. Adequate psychometric properties with alphas > .7 have been reported in previous studies (Killen et al., 1994; Killen et al., 1996). For the present study, satis-

factory internal consistency in both university (α = .75) and high and middle school students (α = .80) were found.

Procedure

Middle and High Schools

Twenty-five public middle and high schools were recruited from the government-controlled area of Cyprus and more specifically, from the districts of Nicosia (12 schools), Limassol (five schools), Larnaka (five schools), Paphos (one school) and the unoccupied part of Famagusta (two schools). The schools were recruited via the Health Promotion Network of the Ministry of Education and Culture and all the necessary approvals were obtained in advance from the Cyprus Bioethics Committee. Informed consent was obtained from the participants as well as from their parents/guardians. Questionnaires were completed during class time and supervised by the project's researchers in collaboration with teachers. Parents were informed about the results only in the case that their child was at risk or was found to meet the criteria for an eating disorder diagnosis. In the latter case, parents were encouraged to seek further assessment and possibly treatment for their child.

University

University students participated in the study in exchange for course credit. Participants completed the questionnaire packet in group format during course time. Written consent was obtained from each student who participated in the study. Participants who met criteria for an eating disorder based on their score on the Eating Disorder Diagnostic Scale were referred for further testing and treatment at the Center for the Prevention and Treatment of Eating Disorders.

Results

Eating Disorder Risk Prevalence and Relevant Parameters

Based on descriptive statistics, university students' mean score on the Weight Concern Scale (WCS) was 38.97 (SD = 23.96) and 32.71 (SD = 24.56) for middle/high school students. University students mean score on the Eating Disorders Diagnostic Scale (EDDS) was 30.15 (SD = 9.68) while middle/high school students mean score on the same scale was 29.21 (SD = 8.85). Chi-square analysis conducted to compare eating disorder risk between male and female students showed that the difference in the prevalence of eating disorders risk (based on the WCS; $\chi^2(1)$ = 47.29, p < .001) between the two sexes was significant. Higher scores were noted for females on the WCS in both age cohorts (middle/high school students: M = 38.66, SD = 25.22; university students: M = 40.64, SD = 23.67) in comparison to males (middle/high school students: M = 22.89, SD = 19.89; university students: M = 23.33, SD = 21.22). The mean score of adolescent female students on the EDDS was 30.70 (SD = 8.68) whereas for university female students was 30.64 (SD = 9.79). University male students had a mean score of 25.80 (SD = 7.50) while male middle/high school students' mean score was 26.81 (SD = 8.61). Chi-square analysis regarding the gender differences on the EDDS diagnostic categories was not performed due to the small distribution within some of the categories (fewer than 5 cases within the cells).

Table 1 presents the prevalence results on eating disorder risk and diagnosis (that is cases meeting eating disorders threshold criteria based on the EDDS but do not necessarily warrant an eating disorders diagnosis), including sub-threshold syndromes as well as between-group comparisons in all diagnostic categories mentioned

Table 1

Prevalence Rates of Eating Disorder Risk and Diagnosis Among Middle-High School and University Students

Variable	Middle and High School Students		University students		Total		Between-group comparisons
	N	%	*N*	%	*N*	%	
Weight Concern Scale							$\chi^2(1, N = 993) = 9.77, p = .002.$
High risk	141	21.40	102	30.50	275	26	
Low Risk	518	78.60	232	68.20	787	64	
Eating Disorder Diagnostic Scale							$\chi^2(6, N = 1081) = 17.76, p = .007.$
Anorexia Nervosa	40	5.40	31	9.11	71	6.55	
Bulimia Nervosa	22	3	25	7.35	47	4.33	
Binge Eating Disorder	8	1.10	4	1.18	12	1.11	
Subthreshold Anorexia Nervosa	65	8.77	32	9.41	97	8.97	
Subthreshold Bulimia Nervosa	46	6.21	16	4.71	62	5.73	
Subthreshold Binge Eating Disorder	2	0.26	1	0.29	3	0.28	

Note. The prevalence rates mentioned for the diagnostic categories of the Eating Disorders Diagnostic Scale refer to eating disorder symptoms meeting threshold criteria and do not necessarily warrant a diagnosis.

above. An overall 9.5% of the middle/high school students and 9.11% of the university students reported clinical symptoms pertaining to one of the three eating disorders diagnosis. Chi-square results show that there is a statistically significant association between academic level (middle/high school vs. university) and eating disorder high risk with more symptoms reported among university students as compared to the younger students.

Table 2

Eating Disorder Risk and Related Parameters Among Middle School, High School and University Students

Variable	Middle and High School Students (*n* = 673)		University students (*n* = 278)	
	Low Risk	High Risk	Low Risk	High risk
Gender				
Female	293 (43.53%)	117 (17.38%)	182 (65.47%)	65 (23.38%)
Male	225 (33.43%)	24 (3.57%)	30 (10.79%)	1 (0.36%)
On a diet				
Yes	61 (9.06%)	107 (15.90%)	28 (10.07%)	45 (16.19%)
No	455 (67.61%)	33 (4.90%)	184 (66.19%)	20 (7.19%)
Discrepancy[a]				
1-5 kg	194 (28.83%)	42 (6.24%)	79 (28.42%)	21 (7.55%)
6-10 kg	65 (9.66%)	33 (4.90%)	29 (10.43%)	17 (6.11%)
11+ kg	47 (6.98%)	50 (7.42%)	18 (6.47%)	19 (6.83%)
Exercise				
1-2 times per week	105 (15.60%)	37 (5.50%)	49 (17.62%)	15 (5.40%)
3-4 times per week	204 (30.31%)	50 (7.43%)	48 (17.26%)	23 (8.27%)
5-7 times per week	115 (17.10%)	30 (4.46%)	16 (5.75%)	4 (1.43%)
7+ times per week	50 (7.43%)	5 (0.74%)	1 (0.36%)	0

[a]Between present and ideal weight.

Table 2 presents the results on eating disorder risk and related factors such as engaging in diet, exercise, and discrepancy between present and ideal weight. Results are presented separately for middle-high school students and university students.

Predictors of Eating Disorder Risk

Two multivariate logistic regressions with forward entry were conducted to determine potential eating disorder risk predictors separately for middle-high school students and university students. The dichotomous variable high/low eating disorder risk was used as the dependent variable while the following were entered as the independent variables: gender, age, dieting, exercise, exercise duration, discrepancy between present and ideal weight. School (middle and high school) was tested as an independent variable only in the adolescent sample. Participants with a potential eating disorder diagnosis, based on their EDDS score, were excluded from the analyses. These logistic regression results are presented in Table 3.

Table 3

Logistic Regression for Middle-High School and University Students

	Middle and High School Students				University Students			
		95% CI for Odds Ratio				95% CI for Odds Ratio		
Variable	B (SE)	Lower	Odds Ratio	Upper	B (SE)	Lower	Odds Ratio	Upper
Gender	1.18* (0.34)	1.68	12.23	6.34	-3.01* (1.39)	0	0.05	0.75
Age	-2.55 (2.81)	0	0.82	19.29	-2.41(3.66)	0	0.09	116.47
School (Middle school/High School)	-2.34 (0.52)	0.29	0.79	2.17	/	/	/	/
Diet	-3.09* (0.31)	0.02	0.05	0.08	-3.25* (0.65)	0.01	0.04	0.14
Exercise	-0.71 (1.24)	0.04	0.49	5.53	2.58* (1.14)	1.41	13.18	123.57
Exercise (duration)	-0.01 (0.01)	0.98	0.99	1	-0.01 (0.07)	0.78	0.78	1.05
Present-Ideal Weight Difference								
1-5 kg	0.19 (0.42)	0.53	1.22	2.79	-0.13 (0.80)	0.18	0.88	4.22
6-10 kg	-0.98* (0.47)	1.15	0.38	0.94	-0.17 (0.91)	0.14	0.84	4.98
11+ kg	-1.35* (0.45)	0.11	0.26	0.63	-1.80* (0.94)	0.03	0.16	1.04
Constant	-39.57 (42.91)		0		-48.37 (76.60)		0	

Note. For Middle and High School Students: R^2 = 3.68 (Hosmer & Lemeshow, 2000), .34 (Cox & Snell, 1989), .53 (Nagelkerke, 1991). Model χ^2(11, *N* = 570) = 236.21, *p* < .001. For University Students: R^2 = 0.62 (Hosmer & Lemeshow, 2000), .37 (Cox & Snell, 1989), .53 (Nagelkerke, 1991). Model χ^2(10, *N* = 139) = 65.98, *p* < .001.
**p* < .01.

Middle and High School Students

The logistic regression model was statistically significant, χ^2(11, *N* = 570) = 236.21, *p* < .001. The model explained 53% of the variance (Nagelkerke R^2) in high eating disorder risk and correctly classified 88% of the participants. Gender, dieting, and a discrepancy of six kilos and above between present and ideal body weight significantly contributed in the prediction of the outcome risk for eating disorders. Females were significantly more likely, Exp(B) = 3.27, *p* < .001) to present high risk for eating disorders as compared to males. Participants who reported dieting had a higher possibility by 95% to present high risk for eating disorders, Exp(B) = .05, *p* < .001). In addition, the risk for eating disorders was 62% higher for students reporting that they want to lose 6-10 kg to achieve their ideal weight, Exp(B) = .38, *p* = .04, while the risk percentage increased to 74% for those who wished to lose 11 or more kilos, Exp(B) = .26, *p* < .003.

University Students

The logistic regression model was statistically significant, $\chi^2(10, N = 139) = 65.98$, $p < .001$, explaining 56% of the variance (Nagelkerke R^2). The model correctly identified 88% of the university students. Four variables significantly predicted eating disorders risk. Women had significantly higher odds for eating disorders risk, Exp(B) = .05, p = .03. Also, the risk for eating disorders was 96% higher in participants that engaged in dieting, Exp(B) = .04, p < .001, and 83% higher in students who reported that they want to lose 11 kg or more to achieve their ideal weight, Exp(B) = .16, p = .05. Participants who engage in exercise were less likely to develop an eating disorder, Exp(B) = 13.18, p = .02.

Discussion

The current study is the first to provide rates on the whole eating disorder spectrum including prevalence rates for eating disorders sub-threshold syndromes among Greek-Cypriot youth.

The rates of eating disorders diagnosis as derived based on the Eating Disorders Diagnostic Scale (EDDS) indicate that 9.50% of middle-high and 17.64% of university students respectively meet the threshold criteria of an eating disorder. These rates are greater than the rates presented in the Diagnostic and Statistical Manual for Mental Disorders-5 and result from clinical interviews. They are however, similar with studies using dimensional measures yielding eating disorders prevalence rates ranging between 14 to 22% in community youth samples (Swanson et al., 2011) and between 8 to 17% among University students (Eisenberg et al., 2011) in the US, classifying eating disorders as one of the most frequent group of disorders encountered in these populations. It is important to note that Anorexia Nervosa (AN) rates in our sample (among both middle-high school and university students) are higher than expected based on the literature. Reporting AN threshold criteria (such as fasting, and excessive exercise) might be more socially acceptable among students than reporting compensatory behaviors often encountered in cases with Bulimia Nervosa (BN) such as self-induced vomiting, misuse of laxatives, and diuretics (Goss & Gilbert, 2002). This might explain the higher prevalence rates of cases meeting AN threshold criteria in our sample as compared to the prevalence rates reported for adolescents and young adults in other European countries (e.g., Nagl et al., 2016). These rates need to be re-examined in future epidemiological studies as cultural factors may also be associated (e.g., greater emphasis on thinness in Cyprus needs to be further explored).

Prevalence rates of sub-threshold eating disorders syndromes were higher in our middle-high school students' sample (15.24%) as compared to sub-threshold prevalence estimates in US as well as European adolescent populations (Hammerle et al., 2016; Swanson et al., 2011). Prevalence rates of subthreshold syndromes were similar in both age cohorts in our study suggesting that eating pathology may begin in adolescence and maintained as the person moves from adolescence to adulthood (Stice, Marti, Shaw, & Jaconis, 2009). Overall, more pronounced prevalence rates of subthreshold eating disorders were found in our study as compared to other studies using measures targeting direct symptom criteria such as objective measures of Body Mass Index (BMI) and structured interviews in the form of self-report questionnaires (e.g., Hammerle et al., 2016).

Among middle and high school students, the prevalence of positive screens for high eating disorder risk was 21.40%. This rate is slightly lower in comparison to two epidemiological studies conducted in Cyprus in 2003 and 2010 (Hadjigeorgiou et al., 2012). Based on the first epidemiological study in 2003, the percentage of ado-

lescents at risk for eating disorders was 27% and it slightly increased in the second epidemiological study in 2010 with more females presenting disordered attitudes and behaviors (female percentage increased from 34.4% in 2003 to 35.9% in 2010). This discrepancy between the present study and the two previous epidemiological studies may be attributed to the differences in the screening questionnaires used to identify adolescents at risk. The present study used the Weight Concern Scale (WCS), a brief 5-item questionnaire to identify general concerns and attitudes in relation to eating pathology while the epidemiological studies mentioned above used a more extensive tool such as the Eating Attitudes Test-26 that measures both disordered eating attitudes and behaviors (Jacobi et al., 2004a).

The percentage of at risk university students in our sample was 30.50% that is similar to the results of another study reporting that 29.50% of US university students (*N* = 2,822) screened positive for eating disorders with symptoms that persisted even at a 2-year follow up (Eisenberg, Nicklett, Roeder, & Kirz, 2011). Our findings are also comparable to the prevalence rates of female university students reporting distorted perceptions of weight in Mediterranean countries, such as in Greece and Italy as well as female students reporting attempts to lose weight from Portugal and Spain (Wardle, Haase, & Steptoe, 2006).

Current results confirm gender differences, as expected based on previous studies (e.g., Swanson et al., 2011), with female participants presenting with overall more eating disorders symptoms than their male counterparts. In addition, rates of eating disorder high risk were higher among university students as compared to middle/high school students. This finding is consistent with recently reported data suggesting that body dissatisfaction, one of the most robust predictors of eating disorders, increases from middle school to young adulthood (even after controlling for age-standardized BMI) thus accounting for the higher eating disorders prevalence rates among older youth (Rohde, Stice, & Marti, 2015).

Our study corroborated the role of well-established risk factors (Stice, Marti, & Durant, 2011). As expected based on our hypotheses, gender, dieting and present to ideal weight discrepancy were significantly present in both adolescents and university students at high risk for eating disorders. These results are in line with previous research showing that individuals with higher present to ideal weight discrepancy are more prone to thin ideal internalization and present with more eating disordered symptomatology (Argyrides & Sivitanides, 2017; Gluck & Geliebter, 2002; Neighbors & Sobal, 2007). In the present study, the discrepancy between present and ideal weight was found to differently contribute in the prediction of risk among adolescents and young adults. More specifically, a stricter criterion in terms of desired weight loss was related to eating disorder risk among middle and high school students that is equal or exceeds six kilograms. For the university students, this criterion was raised to 11 kilograms. These findings are crucial since there are no specific guidelines as to what consists a problematic weight loss goal and how this contributes in the development of eating disorders in at risk populations such as adolescents and young adults. These results are interpreted though with caution since they are based on self-reported measures of weight. Objective BMI measurements would allow more meaningful and accurate interpretation of present to ideal weight discrepancy in our sample.

Another important finding of the present study is that exercise was found to have a protective role since university students engaging in exercise were less likely to develop an eating disorder. These results are in line with previous empirical evidence suggesting that healthy exercise is associated with better psychological outcomes (such as increased positive affect) among university students (Thome & Espelage, 2004). In addition, previous

research suggests that psychological well-being can have a protective role against eating disorder risk in the absence of compulsive exercise in the same population (Cook, Hausenblas, Tuccitto, & Giacobbi, 2011).

An important limitation of our study is that we relied on self-report questionnaires to assess eating disorders symptoms and did not corroborate the eating disorders diagnosis with a clinical interview. Additional measures such as structured interviews or parents' questionnaires are important to determine eating disorders diagnosis prevalence rates in future studies. In addition, the results of the present study referring to university students should be interpreted with caution since the majority of our university sample comprised of female students. Male students should be equally represented in similar future studies.

Despite these limitations, the present study provides important and novel information regarding the prevalence rates of the eating pathology spectrum, including high risk, sub-threshold and full symptom syndrome among Greek-Cypriot adolescents and young adults. Previous epidemiological studies in Cyprus did not include rates on the whole eating disorder spectrum, and thus they may have underestimated the actual magnitude of the eating pathology in the Greek-Cypriot population. More interestingly, this is the first study to examine the factors associated with increased eating disorder risk among two different age cohorts, namely adolescence and early adulthood in the Greek-Cypriot population. These factors can provide guidance for the development of age-specific screening tests and prevention practices delivered in schools and campuses.

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Competing Interests

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