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Partial syndromes in eating disorders: A prevalence study on a sample of Italian adolescents

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ABSTRACT. OBJECTIVE: *Exploring the spectrum of eating disorders (ED) and its socio-demographic correlates in a population of adolescents.* **METHOD:** *The sample included 788 adolescent students (384 females and 404 males, 12-14 years old) from Verona, Northern Italy. A two-stage sampling procedure was adopted. Eating Disorder Inventory-2 (EDI-2), Body Image Satisfaction Questionnaire (BISQ) and a socio-demographic questionnaire were applied to the sample in the first stage. The sample was then partitioned in two strata, "below-cutoff" and "above-cutoff", using the threshold DT≥14 for the Drive for Thinness (DT) subscale. A second sample of 59+58 subjects was selected from the two strata. The structural interview of the second stage consisted of the Structured Clinical Interview for DSM-IV Axis I Disorders and the Symptom Checklist of EDI-2.* **RESULTS:** *Partial syndromes of ED were diagnosed in 9.4% of the interviewed sample with a sex ratio F/M=6. The following factors resulted to be related to partial syndrome of ED: dieting to be thin, body mass index, mother's occupation and being a menstruating girl.* **CONCLUSION:** *This study represents one of the few prevalence and association studies about ED in young Italian adolescents. It evidences that partial syndromes of ED, in particular the partial syndrome of binge eating disorder, are the most frequent syndromes in early adolescence. Some social and parental factors resulted to be significantly related to these syndromes.*

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INTRODUCTION

Usually the onset of eating disorders (ED) is around age 14-15, although ED cases are diagnosed more frequently in late adolescence and in early adulthood. Some ED cases have an early onset that precedes pubertal timing and menarche (1). Prepubertal bulimia nervosa (BN) and anorexia nervosa (AN) are rather rare but, frequently, have a severe psychopathologic frame (2, 3). Binge eating does occur in children; it is characterized by loss of control over eating and by moderate dieting behaviour. Eating in the absence of hunger, eating to modulate strong or negative affects and eating in secret may be connected with binge eating in children and adolescents (4).

ED prevalence studies on male adolescents are few, although more studies are being carried out in clinical situations. AN, BN and binge eating disorder (BED) symptomatology is similar in males and females (5, 6). Males and females show a similar low self-esteem and body dissatisfaction but males are mainly concerned about body muscular shape (7). BED symptomatic characteristics in males and females are the same but males have, more frequently an Axis I diagnosis and a diagnosis of substance dependence (8).

Body dissatisfaction is rather diffused among early adolescents and results to be a risk factor for the onset of eating pathology (9, 10). Body self-consciousness and body ideals seem to be important precursors of "pathological" diets for adolescent girls ending pubertal development. Both preadolescent and adolescent girls endorse the slender body ideal proposed by society, but the situation becomes particularly critical for those girls who are experiencing a growing gap between their actual body and the ideal shape (11).

Several studies (12-14) have found different levels of severity on ED symptomatology. In order to study these types of ED without giving up advantages offered by DSM-IV, concepts of partial syndromes of ED (PSED) and of sub-clinical or atypical

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ED have been introduced. Studies designed to explore the validity of the distinction between partial and full syndromes of ED have found higher presence of comorbid psychiatric disorders in the full syndromes (15, 16) but the same concerns about body weight/shape, and a low self-esteem (17, 18).

Two-stage prevalence and association studies on ED with adolescent samples are rather few in Italy. Rathner et al. (19) in a study conducted in a small rural town with a sample of 11-20 years old school girls identified 1.3% of AN cases, 1.3% of sub-clinical AN cases; no case of BN and 0.9% of sub-clinical BN. The authors did not found ED or sub-clinical ED cases in 15 years old or younger subjects. Santonastaso et al. (20) found a prevalence of 0% for AN, of 0.5% for BN and of 3.7% for ED not otherwise specified, in a sample of 16-year-old schoolgirls. Cotrufo et al. (21) in a study with a female students sample of 13-19 years of age found 0.2% AN, 2.3% BN, 3.9% PSED, 10.7% sub-clinical ED. Favaro et al. (22) in a prevalence study with a female population of 18-25 years of age found 2% of AN cases, 4.6% of BN cases, 0.6% of BED cases and 4.7% of atypical ED.

The aims of this study were to explore the prevalence of the ED spectrum in a representative sample of 12-14 years old students from the city of Verona, and to analyze the associations between ED and a set of socio-demographic variables.

MATERIALS AND METHODS

A two-stage prevalence study was conducted: a first "screening" stage involved the distribution of a self-administered questionnaire to the entire sample. Subsequently, a "diagnostic" stage was carried out by expert psychiatrists and psychologists who interviewed all the "above-cutoff" subjects and a randomly selected subgroup of "below-cutoff" subjects. The study lasted five months, from February to June 2004. The target population was composed of boys and girls living in Verona (a city of about 256,100 inhabitants in North Eastern Italy) with an age range of 12-14 years. The study sample included students of the second and third-year classes belonging both to public and to private junior high schools of Verona. There were 5,172 students registered in the second and third-year classes of the Verona junior high schools; 10.9% of these attended private junior high schools (Administrative Service Centre of Verona: CSA, 2003). The sample was chosen using a cluster sample selection, firstly identifying the schools and, afterwards, the classrooms. In order to choose the schools we adopted the criteria of a fair distribution between the districts. Eight out of ten selected public junior high schools decided to participate in the study while two refused. All of the three selected private junior high schools are in the sample. Four classes per school were selected at random. An informed consent paper was sent to the students' parents of the selected classes by the schools. Some parents declined participation in the study; some students did not return the informed consent paper to their teachers and therefore were automatically excluded; a few students were absent at the time of the questionnaire administration. The overall number of students not participating to the study was 62 (7.3%). The effective sample, in the first stage of the study, was of 788 subjects, 384 females (48.7%) and 404 (51.3%) males, corresponding to 15% of the second and third-year class student population of the Verona junior high schools.

In the first stage the EDI-2, Eating Disorder Inventory-2 (23) has been used for screening. Besides being a validated questionnaire, EDI-2 is useful for obtaining profiles that include the psychological dimensions related to ED (24, 25). The Drive for Thinness (DT) subscale was used as screening reference (9, 26). As suggested by the Italian manual of EDI-2, a cut-off value DT ≥14 was adopted to detect at-risk subjects. BISQ, Body Image Satisfaction Questionnaire (27), was used to assess the level of body satisfaction. BISQ, which contains 26 items, is qualified both for females and males and is easily intelligible by adolescents. A socio-demographic questionnaire was used to obtain some demographic information about sex, age, nationality, family composition, parents' studies and parents' occupations. All of the three questionnaires were administered during a standard period by trained psychiatrists and psychologists, so that the administration was as uniform as possible and, in case, the students could receive explanations if unable to understand some items.

In the second stage of the study, diagnostic interviews were conducted on the whole set of "above-cutoff" subjects. In addition, interviews were held also on a random subgroup of "below-cutoff" subjects, matched by sex with the "above-cutoff" units. The section of the Structured Clinical Interview for DSM-IV Axis I Disorders concerning eating disorders was used (28). The Symptom Checklist associated with EDI-2 was also included in the structured interview for its specific questions on dieting, binge-eating, compensatory strategies and the

TABLE 1
Distribution of diagnosis in "below-cutoff" and "above-cutoff" groups and total distribution in male (M) and female (F) interviewed subjects: number of units in each group (n), estimated prevalence (%) and standard error (se).

	"Below-cutoff" group		"Above-cutoff" group		Total distribution								
					M			F			Total		
	M	F	M	F	n	%	se	n	%	se	n	%	se
PSAN	0	0	0	1	0	0.0	0.0	1	0.2	0.2	1	0.1	0.1
PSBN	0	1	1	2	1	0.7	0.7	3	2.3	2.0	4	2.0	1.6
BED	1	0	0	4	1	8.4	8.1	4	0.6	0.3	5	2.1	1.6
PSBED	0	4	1	6	1	0.7	0.7	10	8.7	3.8	11	7.2	3.1
Case	1	5	2	13	3	9.8	8.1	18	11.7	4.2	21	11.4	3.7
Not case	10	43	9	31	19	90.2	8.1	74	88.3	4.2	93	88.6	3.7
Unknown	0	0	1	2	1	-	-	2	-	-	3	-	-
Total	11	48	12	46	23	-	-	94	-	-	117	-	-

regularity of the menstrual cycle. Furthermore, the interview contained four questions with a "yes" or "no" answer:

Is there anybody in your family who has any problem with food?

Is there anybody in your family who is obese?

Is there anybody in your family who has any psychiatric problem?

In the last two years, have you lost anybody you were particularly close to?

The aim of these questions was to obtain a set of information about familiar context (29-33). During the interview weight and height were measured to calculate the body mass index (BMI). The interviews were held two months after the questionnaires' administration in available rooms inside the school buildings. The psychiatrists and psychologists diagnosing ED were blind: they did not know the scores obtained by the subjects at the screening stage. The diagnosis of eating disorder was made according to the DSM-IV-TR diagnostic criteria. Partial syndrome was considered when all of the DSM-IV-TR criteria except one were met (21).

Statistical analysis

Data were collected and analyzed by Stata 9.2 (StataCorp, College Station, Texas). The analysis of factors related to eating disturbance was conducted on the group of interviewed subjects. Because of the low number of subjects in some diagnostic categories, PSAN, PSBN, BED and PSBED cases were grouped into a single category and a dichotomous outcome variable (with "ED" and "No ED" categories) was constructed. To test the hypothesis of no association between outcome and (discrete and continuous) socio-demographic variables, Pearson's χ^2 test and Wilcoxon's ranksum test were applied. In addition, multiple logistic regression models were estimated and odds ratios (ORs), which give a measure of the strength and the sign of the association between outcome and the other variables, were reported in Table 2 (bivariate associations) and Table 3 (multivariate associations).

The estimates described above were calculated considering sampling weights and applying methods for sample surveys.

RESULTS

A total of 58 subjects (7.4% of the sample), 46 females and 12 males (F/M ratio=3.8), resulted to be "above-cutoff" (DT≥14) in the EDI-2 Drive for Thinness subscale. A set of 59 subjects was randomly selected from the "below-cutoff" group, with the same gender proportions of the "above-cutoff" subjects. At the time of the interview 3 over-threshold persons were not present and a total of 114 subjects were actually interviewed. Neither AN nor BN cases which fulfilled all of the DSM-IV-TR criteria were found. The following cases were diagnosed: 1 PSAN case (0.8% of the interviewed subjects), 4 PSBN cases (3.4%), 5 BED cases (4.2%) and 11 PSBED cases (9.4%). A total of 21 cases were found: 17.9% of the interviewed sample, 2.7% of the screening sample. The sex F/M ratio was 6. Diagnostic distribution by gender in the "below-cutoff" and "above-cutoff" groups is reported in Table 1.

TABLE 2

Bivariate association between socio-demographic variables and psychiatrist-diagnosed eating disorders according to DSM-IV criteria: number of subjects in each diagnostic group (n), estimated prevalence (%), adjusted odds ratio with 95% confidence interval (95% CI) and statistical significance (p-value).

Variable and categorization	No ED		ED		Odds ratio *	95% CI*	p-value
	n	%	n	%			
Total	93	88.6	21	11.4			
Gender							
Male	19	19.1	3	16.1	Ref.		
Female	74	80.9	18	83.9	1.2	0.2–9.1	0.839
Age							
12	12	19.7	1	1.1	Ref.		
13	51	49.8	11	50.6	17.8	1.8–178.0	0.015
≥14	30	30.5	9	48.3	27.9	2.7–287.9	0.006
School							
Public	68	76.8	15	67.8	Ref.		
Private	25	23.2	6	32.2	1.8	0.3–12.5	0.544
Nationality							
Italian	89	96.2	16	68.9	Ref.		
Foreign	4	3.8	5	31.1	12.4	1.1–145.6	0.045
Father studies							
Degree+ High School	39	35.1	10	42.6	Ref.		
Trade S.+Junior H.S.+Primary S.	52	64.9	10	57.4	0.6	0.1–2.4	0.450
Mother studies							
Degree+ High School	45	47.3	10	42.6	Ref.		
Trade S.+ Junior H.S.+ Primary S.	48	52.7	10	57.4	1.1	0.2–5.2	0.894
Father occupation							
Skilled worker +Clerk +Soldier	41	43.5	6	19.5	Ref.		
Unemployed +Pensioner	3	3.7	0	0.0	–	–	–
Unskilled worker	18	20.5	10	49.4	6.3	0.8–47.3	0.073
Manager+ Professional m.+Entrepreneur	29	32.0	5	31.1	3.5	0.4–32.6	0.269
Other	2	0.3	0	0.0	–	–	–
Mother occupation							
Skilled worker+ Clerk+ Soldier	42	43.6	5	18.4	Ref.		
Unemployed+ Pensioner +Housewife	22	24.4	7	33.3	5.7	1.3–25.6	0.023
Unskilled worker	24	24.7	9	48.3	13.6	3.6–51.7	<0.001
Manager+Professional w.+Entrepreneur	4	5.5	0	0.0	–	–	–
Other	1	1.8	0	0.0	–	–	–
Family composition							
Father+Mother	24	23.1	6	19.5	Ref.		
Father+Mother+Brother(s)	38	43.0	8	34.5	0.9	0.1–6.9	0.932
Father or Mother	14	15.1	4	17.2	1.3	0.1–15.9	0.838
Other	17	18.8	3	28.8	2.1	0.2–21.9	0.537
ED in family							
No	63	76.1	11	50.6	Ref.		
Yes	30	23.9	10	49.4	2.6	0.6–11.5	0.190
Obesity in family							
No	79	84.9	15	67.8	Ref.		
Yes	14	15.1	6	32.2	2.7	0.5–15.7	0.263
Psychiatric problems in family							
No	78	83.1	15	67.8	Ref.		
Yes	15	16.9	6	32.2	2.6	0.5–15.0	0.273
Bereavement in the last 2 years							
No	64	71.3	9	61.1	Ref.		
Yes	29	28.7	12	38.9	1.5	0.4–6.0	0.584
Doing sport to get thin							
No	78	89.7	15	67.8	Ref.		
Yes	15	10.3	6	32.2	5.4	0.9–33.6	0.071

TABLE 2
Bivariate association between socio-demographic variables and psychiatrist-diagnosed eating disorders according to DSM-IV criteria: number of subjects in each diagnostic group (n), estimated prevalence (%), adjusted odds ratio with 95% confidence interval (95% CI) and statistical significance (p-value).

Variable and categorization	No ED		ED		Odds ratio *	95% CI*	p-value
	n	%	n	%			
Dieting							
No	69	90.0	7	46.1	Ref.		
Yes	24	10.0	14	53.9	10.6	2.1–52.7	0.004
Use of medicine							
No	85	92.3	19	85.0	Ref.		
Yes	8	7.7	2	15.0	1.5	0.1–18.1	0.745
Menarche							
No	20	29.8	2	2.7	Ref.		
Yes	54	70.2	16	97.3	11.1	1.9–64.4	0.008
Age at menarche							
Mean ± se	11.8±0.1		11.4±0.4		0.5	0.1–1.9	0.328
BMI							
Mean ± se	19.5±0.3		22.5±1.4		1.4	1.1–1.7	0.001

*Odds ratio and 95% confidence intervals adjusted for sex and age. Ref. = reference class.

Table 2 shows the results of the analysis concerning the bivariate association between socio-demographic variables and psychiatrist-diagnosed eating disorders according to DSM-IV-TR. Age, nationality, mother's occupation, dieting, menarche and body mass index showed statistically significant p-values of the association test.

Table 3 reported the final multiple logistic model where only significantly associated variables were taken into account: dieting, BMI, menarche and mother's occupation. Interestingly, a significant interaction between dieting and (standardized) BMI emerged from the analysis: in presence of dieting the OR of BMI is 1.2 (95%CI= 0.2–5.8, p=0.816), otherwise OR=9.8 (95% CI= 3.6–26.1, p<0.001).

DISCUSSION

The originality of the present study is due to the uniformity of the sample, obtained by reducing the age range, and to the adoption of a two-stage sampling procedure, where interviewed individuals were selected with different proportions from "below-" and "above-cutoff" groups. Only two other studies adopting similar sampling designs were carried out in Italy: Rathner et al. (19) and Santonastaso et al. (26).

Most of the ED cases diagnosed in the present study are partial syndromes. Only 4.7% of them are 12-year-old and 52.4% are 13-year-old subjects. The low number of males resulting at risk on the screening questionnaire (F/M ratio=4.2) and the few diagnosed cases (F/M ratio=6.0) confirm a low prevalence of ED for males. BED and PSBED appear to be the most diffused syndromes and rather early eating disturbances. This supports the results obtained by Marcus et al. (4) and Spurrell et al. (34). A rather frequent situation emerged from the interviews with students: in the afternoon, many adolescents are often alone at home and fill themselves with food to calm their sense of inadequacy and to vent the tensions accumulated at school.

TABLE 3
Multiple logistic model for psychiatrist-diagnosed eating disorders: adjusted odds ratio with 95% confidence interval (95% CI) and statistical significance (p-value).

Variable and categorization	Odds ratio	95% CI	p-value
Menarche			
Male or non menstruating girl	Ref.		
Menstruating girl	5.1	1.1 – 23.9	0.037
Mother occupation			
Skilled worker + Clerk + Soldier + Manager+Profess. worker+Entrepreneur	Ref.		
Unemployed+ Pensioner +Housewife	4.5	0.7–27.2	0.103
Unskilled worker	5.4	1.1–24.9	0.033
Dieting			
No	Ref.		
Yes	11.7	1.5–90.3	0.019
BMI			
(standardized)	8.4	3.7–19.4	<0.001
Interaction term			
Dieting x BMI	0.1	0.0–0.8	0.023

Some variables considered in this study resulted to be significantly associated to partial syndromes of ED. "Dieting to be thin" shows a strong association with partial syndromes of ED. This confirms the results obtained by other studies (19, 26, 35). We have seen that in some cases the diet is supported by a family member or by a dietician while, in other cases, dieting is a personal choice of the adolescent who simply eliminates the assumption of some kinds of food. In all cases, dieting seems to engage mechanisms of food intake and weight-shape control. Self-efficacy and self-control feelings following the decision to go on a diet probably become resources at which to draw repeatedly and tenaciously. Body mass index is another variable strongly associated to PSED. During puberty weight and shape changes resulted to be associated with trying to lose weight by adopting diets and making exercises (19, 34). Stice et al. (10) evidenced that BMI is an important predictor of body dissatisfaction onset. A statistically significant interaction between dieting and body mass index was found: BMI was significantly associated with PSED only when dieting is absent. Mother's occupation was significantly associated to diagnosed cases: having a mother with an unskilled rather than skilled occupation (housewife, barwoman, dust-woman rather than clerk, nurse or other skilled worker) increase the odds about 5 times. On the contrary, father's occupation did not show a significant association with PSED. In general these data seem to suggest the importance of the quality of the maternal presence for the offspring wellbeing. Menarche occurrence results significantly associated with PSED while age at menarche does not. Studies on peripubertal adolescent females have found similar results (10, 36).

Some limitations can be identified in this study. First, the limited number of diagnosed cases (ascribable to the low prevalence of ED in the population and to the limited sample size of the study) did not allow to study the associations between socio-demographic variables and the single specific diagnostic categories. The decision to adopt a sample composed both of females (high risk subjects) and males (low risk subjects) further reduced the possibility to detect ED cases. In order to reach a sufficient statistical power, the spectrum of ED was therefore collapsed into a single binary variable. Second, because of the observational design, the present study was unable to determine risk factors of ED. A case-control study would be the appropriate design for investigating cause-effect relationships for a rare event like ED.

In addition, in our study we observed that a remarkable number of subjects found problems in understanding the text, probably because of the way questions are formulated and for the presence of "obscure" technical terms. To this regard, we suggest caution when using EDI-2 with young adolescents. Six partial syndromes of ED (28.5% of the total cases) were found in the "below-cutoff" group. We may suppose that this result is attributable to the above mentioned difficulties inherent to EDI-2. Anyway, logistic regression and ROC analyses (not reported in this paper) evidenced that EDI-2 subscales have a fairly good accuracy in predicting eating disorders, but BISQ scores show a significantly higher diagnostic capacity. This may be explained considering the greater clarity in the formulation of BISQ items and/or the crucial importance of body self-esteem for ED aetiology.

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