Title:

Psychiatric comorbidity and maternal distress among adolescent eating disorder patients: A comparison with substance use disorder patients.

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Abstract

High rates of comorbidity are found among eating disorder (ED) patients, which may negatively affect treatment outcome and prognosis. However, there is a shortage of studies in Spain using clinician administered interviews to assess rates of comorbidity among these patients, particularly in adolescents. This study aimed to evaluate Axis I psychiatric diagnoses in adolescent patients with an ED and to compare them with patients with a distinct disorder with adolescent onset, substance use disorder (SUD) patients. Considering that maternal psychological distress is another factor involved in ED prognosis, a secondary aim was to examine the relationship between patient´s psychological variables and maternal distress (depression and anxiety). The cross-sectional study included 50 ED patients, 48 SUD patients, and their mothers. More than half of the patients received a diagnosis for a comorbid disorder. Internalizing problems were more common among EDs and externalizing disorders were the most common comorbidities among SUDs, similar to findings from other countries. Maternal distress was associated with higher levels of depression and symptom severity in patients. No differences in distress were found between mothers of patients with a comorbid diagnosis and those without. Elevated anxiety or depression in mothers did not increase the likelihood of patients having a particular primary diagnosis. In short, while both ED and SUD patients presented high rates of comorbidity, the types of comorbid diagnoses were specific to each group. Assessing for the presence of comorbid disorders and targeting maternal psychological distress may guide treatment interventions and improve patient prognosis.

Keywords: eating disorders; substance use disorders; comorbidity; caregivers; diagnostic interview; adolescents

1. Introduction

Eating disorders (EDs) are chronic mental illnesses, with a typical onset during adolescence or early adulthood (American Psychiatric Association, 2013), and significantly elevated mortality rates, particularly in the case of Anorexia Nervosa (AN) (Arcelus, Mitchell, Wales, & Nielsen, 2011). Another group of chronic, life threatening mental illnesses with a similar age of onset are substance use disorders (SUDs) (Oyefeso, Ghodse, Clancy, Corkery, & Goldfinch, 1999; Smink, van Hoeken, & Hoek, 2012). Both present a long recovery process (American Academy of Pediatrics, 2011) and high risk of poor prognosis (American Academy of Pediatrics, 2011; Steinhausen, 2002). Furthermore, they share a multifactorial etiology, involving a combination of genetic, biological and personality vulnerabilities that interact with environmental factors (Davis & Claridge, 1998; Emmelkamp & Vedel, 2012; Fairburn & Harrison, 2003; Klump, Bulik, Kaye, Treasure, & Tyson, 2009).

Both EDs and SUDs present high rates of comorbidity, with 40 to 98% of AN patients in particular (Blinder, Cumella, & Sanathara, 2006; Bühren et al., 2014; Salbach-Andrae et al., 2008), and 40 to 90% of SUD patients (Armstrong & Costello, 2002; Chan, Dennis, & Funk, 2008; Langenbach et al., 2010; Shrier, Harris, Kurland, & Knight, 2003) reporting a comorbid Axis I diagnosis. The most frequent comorbid diagnoses among ED patients are mood disorders, followed by anxiety disorders and obsessive-compulsive disorder (OCD) (Blinder et al., 2006; Bühren et al., 2014; Jordan et al., 2008; Salbach-Andrae et al., 2008). In SUD patients, conduct disorder (CD) and oppositional defiant disorder (ODD) are the most frequent comorbid diagnoses, although a strong association has been found with depression (Armstrong & Costello, 2002; Chan et al., 2008; Couwenbergh et al., 2006), a weaker one with anxiety (Armstrong & Costello, 2002; Chan et al., 2008), and an ascending trend of comorbidity rates have been found with attention-deficit/hyperactivity disorder (ADHD) as well (Couwenbergh et al., 2006).

A recent study highlighted the need for additional research on comorbidity rates among adolescents ED patients, particularly those with AN, as the majority of research to date has involved adult samples despite the fact that ED onset typically takes place during adolescence (Bühren et al., 2014). Psychiatric comorbidity appears to be associated with worse long term prognosis for both SUD (Grella, Hser, Joshi, & Rounds-Bryant, 2001) and ED (Herpertz-Dahlmann et al., 2001). While information regarding rates of comorbidity and common comorbid diagnoses may aid mental health professionals working with these patients, in Spain in particular, very few studies have assessed rates of psychiatric comorbidity in either patient sample (Couwenbergh et al., 2006; Godart, Flament, Perdereau, & Jeammet, 2002; Godart et al., 2007). Furthermore, the use of diagnostic interviews to assess prevalence rates of EDs is relatively recent in Spain (Peláez Fernández, Raich Escursell, & Labrador Encinas, 2010) in spite of the fact that semi-structured diagnostic interviews have long been considered the ¨gold-standard¨ for assessing the presence of psychiatric disorders as they are more reliable than other forms of assessment (Jewell, Handwerk, Almquist, & Lucas, 2004; Peterson, Ranson, & Hodgins, 2014).

Research on both EDs and SUDs have seen a shift in recent years, taking into consideration not only the patient, but the family as well (Anastasiadou, Medina-Pradas, Sepulveda, & Treasure, 2014; Templeton, Velleman, & Russell, 2010), revealing that family members report increased levels of stress and strain (Orford, Velleman, Copello, Templeton, & Ibanga, 2010; Treasure et al., 2001). Within the field of ED research, this distress is one component of the interpersonal maintenance model of AN (Treasure & Schmidt, 2013), which provides a theoretical framework for understanding the relationship between patient and family variables. This model posits that the high levels of distress reported by family members may be risk factors preceding illness onset, as well as maintenance factors which influence prognosis (Anastasiadou, Cuellar-Flores, Sepulveda, Parks, & Graell, 2016;

Treasure et al., 2008). To date, studies assessing the distress experienced by ED family members have not used exclusively adolescent samples and most do not include a comparison group, which makes it difficult to know if the relationship between patient and family variables are unique to ED or are generalizable to family members of patients with other chronic mental illnesses (Anastasiadou et al., 2014). There is reason to believe that the latter may be true considering that the broader literature on child and adolescent psychopathology suggests that there is an association between mother's mental health and their children's behavioral problems and emotional functioning (Goodman et al., 2011).

The primary objective of this study was to use semi-structured diagnostic interviews to assess rates of psychiatric Axis I comorbidities in treatment-seeking adolescent ED and SUD patients and to compare these two groups on the type and frequency of psychiatric diagnoses, and other sociodemographic variables. A secondary objective was to assess the relationship between patients´ psychological variables and mothers´ levels of distress.

In regards to our hypotheses, we predicted that the rates of comorbidity and types of comorbidity for both groups would be similar to those found in prior studies carried out in other Western countries with treatment seeking adolescents (i.e. more internalizing problems in the ED group and more externalizing problems in the SUD group). We also expected to find an association between mother and patient variables in both groups, independent of the patient´s primary diagnosis.

2. Method

2.1 Participants

Forty-nine females and 1 male (Mean age = 14.8; SD = 1.8, Range: 12-18) diagnosed with an ED were compared with 8 females and 40 males (Mean age = 18.2; SD = 2.2, Range: 13-23) diagnosed with a SUD. The patients' mothers were also enrolled in this study.

2.2 Procedure

A cross-sectional study with a descriptive and comparative design was carried out. The inclusion criteria for patients were: 1) 12 to 23 years old; 2a) for the ED group: presence of an ED according to DSM-IV-TR diagnostic criteria, 2b) for the SUD group: presence of a SUD according to DSM-IV-TR diagnostic criteria, 3) living with at least one parent. Patients were excluded if they had a diagnosis of psychosis, a learning disability, a neurologic disease or a disease affecting metabolic regulation (i.e. diabetes, hyperthyroidism) or comorbid ED and SUD. Data were collected from October 2011 to July 2014. The research was reviewed and approved by an institutional review board (R-009/10), all participation was voluntary and participants provided informed consent.

ED patients and their mothers were randomly recruited from consecutive admissions to inpatient and outpatient services at the Eating Disorders Unit of the Child and Adolescent Psychiatric Department of the Niño Jesus University Hospital, Madrid, Spain. A total of 53 patients were approached for the study, one female and one male patient with comorbid SUD were not approached. Two of the patients who were approached declined participation due to distrust regarding confidentiality of their personal information. Then, three of the authors (D.A., M.P. & M.G.) carried out semi-structured clinical interviews and one patient was excluded because she presented psychotic symptoms.

 SUD patients and their mothers were randomly recruited from the adolescent outpatient clinic of "Programa Soporte" (Support Program), which is part of Proyecto Hombre, an association based in Madrid which provides treatment to adolescents and young adults with substance abuse and dependence related problems, as well as their families. Forty-eight of the 55 families who were invited to participate provided informed consent and underwent the semi-structured clinical interview carried out by D.A. Seven families declined participation due to lack of time and/or distrust regarding the confidentiality of their personal information. Two adolescents (one female and one male) had comorbid ED and were not

approached. All SUD patients that were interviewed met the selection criteria and were included in the study. Following the interview, patients and their mothers completed a set of self-report instruments detailed below.

2.3 Instruments

2.3.1 Patients and Mothers

Demographic and clinical characteristics were collected using a clinical interview designed for the specific purposes of the study. Mothers provided their age, education level, marital status, employment situation and history of psychiatric illness. Age, gender and illness duration was collected from all patients. The researcher conducting the interview measured the weight and height of the patient in order to calculate BMI.

The *Schedule for Affective Disorders and Schizophrenia for School-Age Children* (K-SADS-PL) (Kaufman et al., 1997) is a semi-structured diagnostic interview capable of generating 32 DSM-IV Axis I child psychiatric diagnoses. It consists of an introductory interview, diagnostic interview and supplementary diagnostic interview questions, which are administered when deemed relevant. The interview was carried out in the presence of the patient and responses were confirmed with mothers if the interviewer had doubts. The interview has been validated for use in Spain (De la Peña et al., 2002; Ulloa et al., 2006) and a pilot study proposed the extension of the K-SADS to young adults aged 18-25 years, although results have not yet been published (National Institute of Mental Health, 2016). For the current study we only considered current episodes of mental disorders.

2.3.2 ED patients

The *Eating Attitudes Test* (EAT-26) (Garner, Olmsted, Bohr, & Garfinkel, 1982) is a 26-item questionnaire with a six-point Likert-type scale (range 0–5) used to assess disordered eating behaviors. Scores of 20 or more indicate ED pathology although these scores alone cannot yield a specific ED diagnosis. The questionnaire is highly reliable and valid (Garner et

al., 1982) and its Spanish version has demonstrated satisfactory psychometric properties (Castro, Toro, Salamero, & Guimera, 1991).

2.3.3 SUD patients

The *Drug Abuse Screening Test* (DAST-20) (Skinner & Goldberg, 1986) consists of 20 items scored on a two-point Likert scale (1 = *yes*, 0 = *no*). It measures problematic drug use and associated consequences and a total score of six or above suggests possible drug abuse (Skinner & Goldberg, 1986). The questionnaire has shown good internal consistency (Saltstone, Halliwell, & Hayslip, 1994; Skinner, 1982) with Cronbach's alpha of .84 and .78 for men and women, respectively. The instrument has been validated in Spain in an adult population (Pérez Gálvez, García Fernández, de Vicente Manzanaro, Oliveras Valenzuela, & Lahoz Lafuente, 2010) and is considered valid and reliable.

2.3.4. For both patients and their mothers

The *Hospital Anxiety and Depression Scale* (HADS) (Zigmond & Snaith, 1983), is designed to detect the presence and severity of anxiety and depression in both adults and adolescents (White, Leach, Sims, Atkinson, & Cottrell, 1999). It is comprised of 14 items, scored on a four-point Likert-type scale. While the factor structure has been debated, several studies exploring the psychometric properties of the Spanish version of the instrument have confirmed a two-factor structure (Terol-Cantero, Cabrera-Perona, & Martín-Aragón, 2015). The items are equally distributed in two subscales: anxiety (7 items) and depression (7 items). Scores of 11 or more on each subscale indicate probable anxiety or depression. The original version of the instrument obtained satisfactory reliability, with Cronbach's alpha of .86 for each subscale. The Spanish version has shown satisfactory internal consistency of .86 for the anxiety subscale and .87 for the depression subscale (Herrero et al., 2003).

2.4 Statistical analysis

Data were analyzed using SPSS 20.0 (SPSS, 2011) for Windows and the criterion for significance was set at p value of 0.05. Kolmogorov–Smirnov tests confirmed that the data followed a normal distribution and parametric tests were used. The patients' continuous sociodemographic and clinical data were compared using independent samples t-test. Patients' categorical sociodemographic and clinical variables and mothers' sociodemographic variables were described using contingency tables and compared using χ^2 test or Fisher exact test, as appropriate. When comorbidity with a specific DSM-IV Axis I disorder was absent in one of the two groups, no χ^2 test or Fisher exact test was performed. The relationship between the patients' scores on psychological measures and mothers' HADS scores was investigated using Pearson's correlation coefficient, separately for each group of patients. The relationship between mother's HADS scores and having a child with a comorbid disorder was explored using independent sample t-tests.

A series of logistic regression analyses were performed to identify which of the psychiatric comorbidities had a significant independent association with the likelihood that patients belonged to either the ED or SUD group. Mothers' anxiety and depression were also each entered into a model as possible predictor variables and were categorized using HADS suggested cut-off points: absence of or low levels of anxiety/depression (0 = HADS-Anxiety/HADS-Depression <11) and probable presence of anxiety/depression (1 = HADS-Anxiety/HADS-Depression ≥11). Axis I disorders were grouped into three main categories (unipolar mood disorders, anxiety disorders, ADHD). Disruptive behavior disorders (CD, ODD) were not included as a predictor variable due to the complete absence of this type of comorbidity in the ED group. All independent variables were categorical (0 = absence of psychiatric comorbidity; 1 = presence of psychiatric comorbidity).

3. Results

3.1 Demographic and clinical data

Detailed demographic and clinical data for the patients is provided in Table 1. In regards to the mother´s sociodemographic data, ED mothers had a mean age of 44.9 (SD = 4.6), the majority (52.1%) had completed higher education, 83.3% were married or living with their partner and 72.3% had a full- or part-time job. SUD mothers had a mean age of 49.6 (SD = 4.9), the majority (66%) had completed higher education, 78.7% were married or living with their partner and 78.7% had a full- or part-time job. All of the mothers were living with their son/daughter. Finally, 25% of the ED mothers and 21.3% of the SUD mothers reported having a psychiatric history (χ^2 (1) = 0.19, p = .667).

3.2 Psychiatric comorbidity

Table 2 shows the DSM-IV Axis I comorbidities in the ED and SUD groups. A total of 66% of the ED patients and 68.8% of the SUD patients received a diagnosis of a comorbid disorder. The most common diagnosis among the ED group was major depressive disorder (66%), which was significantly higher than in the SUD group (χ^2 = 7.20, p = .007). Anxiety disorders were present in 32% of ED patients and in 4.2% of SUD, with no statistically significant differences between groups. Similarly, both groups reported the same rates of simple phobia, but the type of phobia differed, with 1 case of nychtophobia in the ED group and 1 case of claustrophobia in the SUD group. Externalizing disorders (ADHD, CD and ODD) were the most common comorbidities among the SUD group (73%). ADHD was the only one of these disorders seen in the ED group (6%), and its prevalence was significantly lower than in the SUD group (χ^2 = 11.71; p = .001). All ED patients with a comorbid diagnosis were female. In the SUD group, 7 females presented a comorbid diagnosis of either depression (n = 4), ADHD (n = 1), CD (n = 1) or ODD (n = 1).

3.3 Mothers' distress and patients' variables

In both groups, significant correlations were found between mother´s HADS scores (anxiety and depression subscales) and nearly all patient psychological variables (Table 3).

The exception was patient´s anxiety scores, which were not significantly associated with mothers' HADS scores. Mothers of children with a comorbid disorder and those with only a primary diagnosis of ED or SUD did not differ in their HADS anxiety (t (91) = -.41, p = .686) or depression scores (t (91) = -.85, p = .396).

3.4 Prediction of patient group based on mothers' HADS scores and Axis I comorbidities

Table 4 presents results of the two logistic regressions with ED as a reference category. The first model was carried out to ascertain the effects of mothers' depression and the presence of one of the three most prevalent Axis I comorbidities (mood disorders, anxiety disorders, and ADHD) on the likelihood that patients belonged to the ED or SUD group. The logistic regression model was statistically significant, χ^2 (4) = 25.36, p < .001. It explained 34% (Nagelkerke R^2) of the variance in the ED group and correctly classified 71.3% of cases. Anxiety disorders were 6.1 times more likely and mood disorders were 2.9 times more likely to co-occur with an ED. However, ADHD was associated with a reduction in the likelihood of belonging to the ED group (5 times less likely). When SUD was used as a reference category, as expected, ADHD was 6.4 times more likely to co-occur with SUD, and mood and anxiety disorders were associated with a reduction in the likelihood of belonging to the SUD group (2.9 and 6.2 times, respectively). Similarly, when mothers' anxiety was entered in a new logistic regression model to replace mothers' depression, the model proved to be statistically significant, (χ^2 (4) = 25.18, p < .001. It explained 32% (Nagelkerke R^2) of the variance and correctly classified 67.7% of the cases. Mother's anxiety and depression were not significant predictors in the models.

4. Discussion

This study revealed that comorbid psychiatric disorders were present in over half of the patients (66% for the ED group and 68.8% for the SUD group). Despite the fact that EDs

and SUDs share a complex interaction of genetic, biological and personality vulnerabilities, environmental and familial factors (Baker Dennis & Brewerton, 2014), findings suggest that the type of psychiatric comorbidities may be specific to each illness. The most frequent clinical manifestations for the ED group were internalizing disorders (i.e. mood and anxiety disorders) whereas for the SUD group externalizing disorders (i.e. ADHD, CD and ODD) were most common, which was further supported by results of the logistic regression. These findings are similar to those found in prior studies employing standardized diagnostic interviews to assess rates of Axis I disorders among treatment seeking adolescent patients with ED (Bühren et al., 2014; Salbach-Andrae et al., 2008) and SUD (Chan et al., 2008), as well as Spanish adolescent community samples in Spain with ED (Rojo et al., 2003). The one exception was the complete absence of OCD among the ED group, which is contrary to findings from prior studies (Swinbourne & Touyz, 2007). One possible explanation is that patients with OCD could have been seen in other units of the psychiatric department. According to Toro and Vilardell (1987), in AN patients with comorbid OCD, symptoms of AN can remit following successful treatment for OCD.

A discussion of these findings also requires consideration of the differences in gender composition between the two groups. The primarily male SUD group and primarily female ED group raise the question of whether these comorbidities are not specific to the patient group, but rather a result of gender. Externalizing disorders tend to be more frequent in male adolescents males, while internalizing disorders are more frequent in females (Scaramella, Conger, & Simons, 1999). While we cannot definitively conclude whether it is the primary diagnosis or the gender that is associated with the particular comorbid diagnoses, these results do confirm that the gender composition and Axis I comorbidities of each patient group were similar to those found in previous studies employing adolescent treatment seeking ED and SUD samples from other countries (Couwenbergh et al., 2006; Herpertz-Dahlmann et al.,

2001; Schmidt et al., 2008). Therefore, these findings may be generalizable to treatment settings both inside and outside of Spain. Results point to the importance of assessing for comorbid symptoms in treatment seeking ED and SUD patients, and are suggestive of the most common comorbid diagnoses which clinicians may encounter, which may help to guide and improve treatment interventions (Askey, 2007; Milos, Spindler, Buddeberg, & Crameri, 2003).

Furthermore, these findings provide a foundation upon which to address future research questions regarding treatment seeking adolescent patients with ED or SUD. Previous research demonstrates that many individuals with these disorders have never received treatment (Bijl & Ravelli, 2000; Compton, Thomas, Stinson, & Grant, 2007), and future studies could explore the possibility of unmet care needs among Spanish adolescents with ED or SUD. A recent survey carried out in Spain showed that 14.4 to 47.6% of adolescents, depending on their age, presented risky alcohol consumption, with greater rates among females than males (Health Social Services and Equality Ministry, 2016). However, only a small percentage of our SUD sample (12.5%) presented a diagnosis of alcohol abuse and only 16.7% were female. Future studies could investigate the role of gender, cultural norms regarding drugs and alcohol, and the presence of externalizing disorders (and their associated interpersonal, familial and legal consequences) in seeking treatment for SUD in Spain. The role of gender in seeking or receiving ED treatment for adolescent males could also be explored. While research on body dissatisfaction and EDs in males has advanced in recent years (Raevuori, Keski-Rahkonen, & Hoek, 2014), they continue to be seen as a "women's illness." This may lead males to delay seeking treatment (Räisänen & Hunt, 2014), to present EDs in ways that require less intensive treatment, or professionals themselves may fail to recognize ED symptoms in males (Greenberg & Schoen, 2008).

It is common for both EDs and substance abuse to begin during adolescence, a developmental stage in which individuals are particularly vulnerable to developing addictive behaviors (Barbarich-Marsteller, Foltin, & Walsh, 2011). Adolescents are exposed to a number of pressures, such as acceptance by their peers, experimentation with "adult" behaviors, and overwhelming feelings of distress and painful self-awareness. While all adolescents may experience these pressures to a greater or lesser degree, seen from the perspective of the developmental psychopathology principle of multifinality (Cicchetti & Rogosch, 1996), not all of them will present the same outcome (e.g. type of psychopathology). While these groups of patients differed in terms of the manifestation of their symptoms (both the primary and comorbid diagnoses), they may be representations of underlying levels of distress intolerance (Daughters et al., 2009).

In terms of the second aim of the study, our hypotheses were partially supported. Anxiety and depression in both groups of mothers were associated with patients' levels of depression and symptom severity, but not with patients´anxiety. This is similar to recent cross-sectional studies exploring the relationship between parental and adolescent psychopathology in which maternal mental health has been shown to be associated with both internalizing and externalizing disorders (Ranøyen, Klöckner, Wallander, & Jozefiak, 2015; Van Loon, Van de Ven, Van Doesum, Witteman, & Hosman, 2014). According to the interpersonal maintenance model of AN (Treasure & Schmidt, 2013), these correlations may be indicative of the vicious cycle of maintenance in which parental psychological distress may increase in the face of ED symptoms, thereby leading to unhelpful responses to the illness, which then serve to worsen the prognosis (Treasure & Schmidt, 2013). While initial empirical support suggests that parental distress leads to worse distress and symptoms in ED patients (Goddard et al., 2013), future longitudinal studies would allow us to elucidate if maternal distress serves as a risk or maintenance factor for ED, as well as SUD and the

common comorbid mental illnesses identified in this study (Anastasiadou et al., 2016). A recent meta-analysis found that interventions targeted specifically at those caring for someone with an ED are effective at reducing caregiver distress (Hibbs, Rhind, Leppanen, & Treasure, 2015). Future studies could explore the effectiveness of similar interventions in SUD parents and caregivers.

In addition to those already noted, certain study limitations must be considered. First, the cross-sectional design does not permit us to draw causal relationships between the primary psychiatric disorders and their comorbidities. Longitudinal studies would allow us to discover if adolescents with higher rates of internalizing behaviors are more likely to engage in ED-related behaviors than to experiment with drugs, and if those with externalizing behaviors are more inclined to do the opposite. Furthermore, it would allow researchers to observe the development and trajectory of EDs and their associated comorbidities. Future studies may also benefit from recruiting larger samples in order to assess for differences in comorbidity or maternal mental health between patients in early, middle and late adolescence.

Another limitation involves the differences between the two patient groups in terms of gender, age and illness duration. While this was expected given the specific characteristics of each condition (Brady & Randall, 1999; Currin, Schmidt, Treasure, & Jick, 2005; R. C. Kessler et al., 2005; R. D. Kessler et al., 2007), it remains relevant to note that these differences may have had an indirect effect, which could not be examined due to the design of the present study. The strict exclusion criteria established for this study added a further limitation. The decision to exclude patients with comorbid SUD and ED prohibited us from detecting the frequency of the co-occurrence of ED and SUD, which is a finding that has been reported in previous studies (Couwenbergh et al., 2006; Salbach-Andrae et al., 2008).

The findings of the present study, which employed a semi-structured diagnostic interview, reveal a high frequency of psychiatric comorbidities in adolescent patients seeking treatment for their ED or SUD in Spain. Furthermore, the most common comorbid mental illnesses were distinct in each group. While these groups differed in terms of certain demographic and clinical variables, their representativeness increases the generalizability of the findings. Clinicians must take care to not only treat the symptomatology associated with the patient´s primary diagnosis, but also assess for the highly likely occurrence of comorbid symptomatology, as psychiatric comorbidy is associated with worse prognosis in both patient groups (Grella et al., 2001; Herpertz-Dahlmann et al., 2001). In recent years, both SUD and ED treatment and research have seen a shift from seeing parents as part of the problem to part of the solution (Orford et al., 2010; Treasure, Schmidt, & Macdonald, 2009). The current findings suggest that maternal distress may be an appropriate treatment target in interventions directed at parents and caregivers.

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Table 1

Sociodemographic and clinical data of young participants

	ED group N = 50	SUD group N = 48	All N = 98	t-test or χ^2 test
	Mean (SD)			
Age (years)	14.78 (1.79)	18.19 (2.17)	16.45 (2.61)	$t = -8.5$, $p < .001$
Illness duration (months from detection)	15.22 (11.79)	33.96 (21.01)	24.40 (19.31)	$t = -5.47$, $p < .001$
Treatment duration (weeks)	19.73 (39.91)	27.32 (26.63)	23.45 (34.10)	$t = -1.09$, $p = .278$
Body Mass Index (kg/m^2)	18.14 (1.82)	21.34 (2.12)	19.39 (2.50)	$t = -7.29$, $p < .001$
	N (%)			
Sex				
Female	49 (98.0%)	8 (16.7%)	57 (58.2%)	$\chi^2 = 66.58$, $p < .001$
Male	1 (2.0%)	40 (83.3%)	41 (41.8%)	
Diagnosis				
Anorexia Nervosa Restrictive type	39 (78.0%)	0	39 (39.8%)	
Bulimia Nervosa Non Purging type	3 (6.0%)	0	3 (3.1%)	
Eating Disorder Not Otherwise Specified (Restrictive type)	8 (16.0%)	0	8 (8.2%)	
Alcohol Abuse	0	6 (12.5%)	6 (6.1%)	
Substance (Cannabis) Abuse	0	47 (97.9%)	47 (48%)	
Substance (Cannabis) Dependence	0	30 (62.5%)	30 (30.1%)	

Table 2

Comorbid DSM-IV Axis I diagnoses (K-SADS) for each patient group

	ED group N = 50	SUD group N = 48	All patients N = 98	χ^2-test or Fisher Exact test
Any Axis I diagnosis	**33 (66.0%)**	**33 (68.8%)**	**66 (67.3)**	$\chi^2 = 0.84$, $p = .772$
Major depressive disorder	28 (56.0%)	14 (29.2%)	42 (42.9%)	$\chi^2 = 7.20$, $p = .007$
Dysthymic disorder	1 (2.0%)	0	1 (1.0%)	
Panic disorder without agoraphobia	7 (14.0%)	0	7 (7.1%)	
Panic disorder with agoraphobia	1 (2.0%)	0	1 (1.0%)	
Simple phobia	1 (2.0%)	1 (2.1%)	2 (2.0%)	
Social phobia	2 (4.0%)	0	2 (2.0%)	
Generalized anxiety disorder	2 (4.0%)	1 (2.1%)	3 (3.1%)	$p = .999$
Separation anxiety disorder	3 (6.0%)	0	3 (3.1%)	
Obsessive-compulsive disorder	0	0	0	
Attention-deficit/hyperactivity disorder	3 (6.0%)	16 (33.3%)	19 (19.4%)	$\chi^2 = 11.71$, $p = .001$
Conduct disorder	0	9 (18.8%)	9 (9.2%)	
Oppositional defiant disorder	0	10 (20.8%)	10 (10.2%)	
Self-harm/Suicidal ideation	20 (40.0%)	14 (29.8%)	34 (34.7%)	$\chi^2 = 1.27$, $p = .260$
Self-harm/Suicidal intention	7 (14.0%)	4 (8.3%)	11 (11.2%)	$\chi^2 = 0.79$, $p = .374$
Self-harm/Suicide attempts	8 (16.0%)	8 (16.7%)	16 (16.3%)	$\chi^2 = 0.01$, $p = .929$

Table 3

Pearson correlations between mothers' HADS scores and patients' scores on psychological measures

Measures	1	2	3	4
EDs (N=48)				
(1) HADS-Depression/child				
(2) HADS-Anxiety/child	.75***			
(3) EAT-26/child	.62***	.66***		
(4) HADS-Depression/mothers	.30*	.20	.38**	
(5) HADS-Anxiety/mothers	.29*	.27	.49***	.73***
SUDs (N=38)				
(1) HADS-Depression/child				
(2) HADS-Anxiety/child	.67***			
(3) DAST-20/child	.48**	.55***		
(4) HADS-Depression/mothers	.52***	.26	.34*	
(5) HADS-Anxiety/mothers	.46**	.19	.31*	.75***

Note. HADS-Depression/child=Hospital Anxiety and Depression Scale-Depression subscale for group of adolescents listed in heading (ED or SUD); HADS-Anxiety/child= Hospital Anxiety and Depression Scale-Anxiety subscale/child; EAT-26/child=Eating Attitudes Test for group of adolescents listed; HADS-Depression/mothers=Hospital Anxiety and Depression Scale-Depression subscale/group of mothers; HADS-Anxiety/mothers=Hospital Anxiety and Depression Scale-Anxiety subscale/group of mothers; DAST-20/child=Drug Abuse Screening Test for SUD patients.

* p<.05; ** p<.01; ***p<.001

Table 4

Logistic regressions predicting child's primary diagnosis (ED used as reference category)

Predictors	OR	95% CI	Overall test of effect				
			B	S.E.	Wald χ^2	df	*p*-value
Model 1							
Mothers' HADS-Depression	2.3	0.5-10.8	0.84	0.78	1.2	1	.282
Axis I comorbidities							
Mood disorders	2.9	1.1-8.0	1.07	0.51	4.3	1	.037
Anxiety disorders	6.1	1.1-33.4	1.80	0.87	4.3	1	.039
Attention-deficit/hyperactivity disorder	0.2	0.04-0.7	-1.85	0.73	6.5	1	.011
Model 2							
Mothers' HADS-Anxiety	1.8	0.7-4.8	0.59	0.49	1.4	1	.230
Axis I comorbidities							
Mood disorders	2.5	1.0-6.5	0.93	0.48	3.7	1	.054
Anxiety disorders	7.9	1.4-43.7	2.07	0.87	5.6	1	.018
Attention-deficit/hyperactivity disorder	0.2	0.04-0.7	-1.74	0.70	6.1	1	.013

Note. **CI = Confidence interval for odds ratio** *(OR)*