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ORIGINAL ARTICLE

Psychotropic medications in adult and adolescent eating disorders: clinical practice versus evidence-based recommendations

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Abstract
Aim The current study examined the frequency of psychotropic prescriptions in a clinical sample of eating disorder (ED) patients confirming earlier research indicating their use is very common but inconsistent with evidence-based recommendations.
Methods The sample consisted of 501 ED patients admitted to an adult partial hospitalization or adolescent residential program. Patients were divided into two diagnostic groups: anorexia nervosa (AN = 287) and bulimia nervosa (BN = 214), as well as two age groups: adults (age ≥18; $N = 318$) and adolescents (age <18; $N = 183$).
Results Forty-one different psychotropic medications (891 prescriptions in all) were prescribed for 429 patients. Overall, 85.6 % of the total sample reported using one or more psychotropic medications. Of 429 patients using any medications, 46.9 % were on two or more, 25.3 % on three or more, and 11.0 % four or more. Antidepressants were most commonly prescribed (89.5 % of those on medication) with no significant differences in usage patterns based on diagnosis. However, there was greater medication use among adults (89.6 %) compared to adolescents (78.7 %). Results indicate psychotropic medication prescription is more widespread in a clinical sample than in an earlier report screening for osteoporosis in AN women.
Discussion Treatment recommendations suggest medication should not be the primary treatment for EDs and empirical evidence demonstrates their ineffectiveness in AN. Nevertheless, there were no differences in frequency found between diagnostic groups, confirming little relationship between evidence-based recommendations and actual clinical use for those referred to a specialized ED treatment facility. This study adds new evidence regarding age-based comparisons of psychotropic prescription frequency in clinical EDs and comparison between AN and BN which has not been examined in earlier studies.

Keywords Eating disorders · Anorexia nervosa · Bulimia nervosa · SSRI · Atypical antipsychotic · Mood stabilizer · Anxiolytic · Stimulant · Psychotropic medications

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> "Let food be thy medicine, thy medicine shall be thy food." -Hippocrates.
> "The person who takes medicine must recover twice; once from the disease, and once from the medicine." -Sir William Osler.

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Introduction

Twenty-five years ago, George et al. [1] described a 25-year retrospective chart review of medication use in 96 anorexia nervosa (AN) patients over three time periods (1958–1962; 1968–1972; 1978–1982). They found a significant increase in the use of antidepressants (4–58 %) and antipsychotics (from 0 to 19 %) from the first to the last time-period. This trend has continued to increase dramatically in recent years. Fazeli et al. [2] recently reported that

psychotropic medication use for AN increased over two time periods surveyed (Group I: 1997–2002 and Group II: 2003–2009) despite the lack of data demonstrating effectiveness. Their sample consisted of women recruited from referrals from local eating disorder (ED) providers and online advertising for bone density screening. A complete medical history was obtained, including current medication use at the time of screening. A significantly higher percentage of participants in the later time-period (58 %) reported current use of psychotropic medication compared to the earlier time-period (49.5 %). Moreover, participants taking two or more medications between the time periods increased by 22.2 % and nearly twice as many participants in Group II were taking two or more medications compared to Group I (19.5 versus 9.9 %, respectively). Overall, 48.4 % of study participants were taking antidepressants and there were no significant differences over the two time periods in the use frequency of this drug class. Antipsychotics were the next most common medication prescribed (13 %), with the vast majority being atypical antipsychotics (97.1 %). The rate of antipsychotic prescriptions doubled in the time between Group I (8.9 %) and Group II (18.5 %).

The increased popularity of psychotropic medication in recent years indicated by Fazeli et al. [2] may underestimate medication use among patients presenting for treatment. In a retrospective chart review of 60 ED patients seeking either inpatient or outpatient treatment, Gable and Dopheide [3] reported a high use of psychotropic medication. Their sample included 31 AN, 28 BN and one eating disorder not otherwise specified (EDNOS) patients. They found that 58 patients (96.7 %) were prescribed psychotropic medication at some time during their admission and 58.3 % of the sample was receiving two or more drugs. The most commonly prescribed class of medications was SSRIs (86.7 %) followed by antipsychotics (38.3 %). The researchers found no differences in the prescribing pattern between diagnoses; however, their conclusion is limited by the heterogeneous sample consisting of outpatients, inpatients, adults, and adolescents across diagnostic groups with some cells too small for adequate statistical comparison.

While there is empirical evidence that antidepressants are moderately effective in BN [4], this is in stark contrast to the overwhelming evidence that they are not effective in AN, even in those with comorbid depression. Summarizing the evidence on pharmacotherapy for AN, Bulik et al. [5] conclude that "no pharmacological intervention for anorexia nervosa has a significant impact on weight gain or the psychological features of AN" (p. 317). Crow et al. [6] came to the same conclusion, indicating "at present, there is no convincing evidence of efficacy for any drug treatment for AN in either the acute or chronic phase of the illness…" (p. 1). This caution is echoed by Reinblatt et al. [7] who state "no medication induces weight gain or reduced body image concerns sufficiently in the underweight phase of AN nor has been shown to prevent relapse in weight restored patients enough to support recommending its use in children" (p. 185).

Even in the absence of overall effectiveness, the argument for use of antidepressants in EDs has also rested on the assumption that they may be effective for those with comorbid conditions such as depression and anxiety. However, studies have shown that antidepressants are not more effective in AN patients with comorbid depression [8, 9] than those who do not have comorbid mood conditions. It has been repeatedly noted that depressive symptoms are a typical consequence of the starved state and often resolve with weight gain [2, 7, 10, 11].

The apparent increase in medication use in AN despite data indicating it is ineffective is troubling in light of the breadth and weight of the evidence that has been published on the subject. There appears to be little relationship between evidence-based practice guidelines for pharmacotherapy and clinical practice as it is conducted in the community. This troubling "research–practice gap" has recently been described as pervasive in the eating disorder field [12].

While the evidence for the efficacy, safety and acceptability of psychotropic medications in adults with EDs is marginal at best, there is even less evidence to support using these medications with children and adolescents. In a retrospective review of 308 child and adolescent cases seen in eating disorder specialist services, Gowers et al. [13] found that 27 % of the sample was prescribed psychotropic medications either before assessment or while in treatment (12 % before assessment and 24 % in treatment). No drugs were prescribed in those below the age of 12. In this child and adolescent sample, the proportion receiving psychotropic medications was considerably lower than the adult samples described earlier, but the amount of medication is still a concern given the lack of evidence for safety and efficacy of medications in younger patients.

Finally, added to concerns about the overall effectiveness of psychotropic medications in eating disorders, are the potential side effects and complications of these medications, particularly for those who are compromised by low body weight and/or metabolic instability. Although routinely prescribed for many psychiatric conditions due to purported safety, side effects of SSRIs can include cardiac arrhythmias, prolonged QTc interval, stroke, orthostatic hypotension, bone loss, insomnia, headaches, nausea, and sudden death [14].

The main aim of the current study is to determine the frequency of psychotropic use in clinical practice and ascertain the degree to which it conforms to well-

established evidence-based recommendations for both AN and BN. The practice guidelines for adolescents are more cautious than for adults [7]; therefore, a second objective of the current study is to compare prescription practices for adolescents and adults.

Method

Subjects

A retrospective chart review of admission medication was conducted on 738 consecutive first admissions to an adult partial hospitalization program and an adolescent residential program at a private treatment facility specializing in the treatment of EDs. All admissions were between October 2005 and December 2014. Forty-one male patients (15 adults and 26 adolescents) admitted during this time frame were excluded because their number was insufficient to conduct meaningful gender-based comparisons. All diagnoses were made according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [15] by a licensed clinician and reviewed by research staff to ensure that the clinical diagnoses were consistent with the diagnostic criteria. Since the main purpose of this study was to compare the two main diagnostic groups of AN and BN, patients were excluded if they met criteria for binge eating disorder ($n = 36$), other specified feeding or eating disorder ($n = 88$) and unspecified feeding or eating disorder ($n = 3$). Finally, 69 participants were excluded because their medical charts did not include adequately detailed information on admission medication. The final sample consisted of 501 participants divided into AN ($n = 287$) and BN ($n = 214$). Of the AN group, almost 60 % were classified as the restrictor type ($n = 163$) and more than 40 % were the binge eating/purging type ($n = 124$). Patients were between 9 and 62 years old and were divided into two groups: 318 adults ($\geq$18 years old) and 183 adolescents (<18 years old) for analyses. The retrospective chart review was approved by the Clinic Institutional Review Board and it was determined to comply with the Health Insurance Portability and Accountability Act guidelines. Patient names and identifiers were removed prior to conducting all analyses.

Measures

All patients completed a detailed online assessment prior to admission, which included demographic and symptom data, height, current weight, highest weight ever, lowest adult weight, sex, age, frequency of bingeing and vomiting, and laxative and diuretic use to control weight and treatment history. Height and body weight were measured on the first day of admission and BMI was calculated. Self-report measures including the EAT-26 [16] were administered. All demographic and clinical data were verified by a clinician at the time of admission.

Medication history

Medication use was determined from a self-report questionnaire completed online prior to admission as well as a clinical interview by a registered nurse and/or psychiatrist at the time of admission. Current psychotropic medication and the dosage were tabulated in an electronic medical record or a paper chart and the information was entered into the patient research file. Medications were subdivided into the following categories: antidepressants, antipsychotics/atypical antipsychotics, mood stabilizers, anxiolytics/sleep, and stimulants.

Statistical methods

Statistical analyses were conducted using the IBM SPSS 20 statistical software. Comparisons for statistical significance were made for clinical and drug data using Chi-square analyses and for non-parametric variables using a one-way ANOVA with subsequent planned two-sided t tests. The Fisher's exact test was used to compare between-group differences in the proportions of medications used with a p value of <0.05 considered to be statistically significant. Clinical measures are reported as means with standard deviations and percentages.

Results

Patient characteristics

Demographic and clinical features of 501 study patients are presented in Table 1. There was no statistical difference between AN and BN on age or duration of illness; however, there were significant differences on body weight, BMI, weekly bingeing, and weekly vomiting as expected since these variables form the base diagnostic classification. The mean BMI for the AN group was 16.5 and 75 % of these patients had a BMI of $\leq$17.5. There were no significant differences between diagnostic groups or age groups on pre-treatment EAT-26 scores. Adult patients had a significantly longer duration of illness, higher weekly binge eating, self-induced vomiting, and higher pre-treatment body weight and BMI compared to the adolescent group.

Table 1 Demographic and clinical features of 501 anorexia and bulimia nervosa first admissions to PHP or residential treatment

	Anorexia nervosa ($n = 287$)		Bulimia nervosa ($n = 214$)		t test*		Adults ($n = 318$)		Adolescents ($n = 183$)		t test**	
	Mean	SD	Mean	SD	t	$P<$	Mean	SD	Mean	SD	t	$P<$
Age (years)	23.2	10.4	22.1	7.0	1.32	0.19	26.8	9.1	15.6	1.7	16.43	0.001
Duration Ill (years)	7.8	9.2	7.9	6.7	0.10	0.92	10.6	9.1	3.0	2.4	11.08	0.001
Weight (pounds)	97.1	13.7	137.3	29.8	20.16	0.001	118.7	32.3	106.6	22.6	4.49	0.001
BMI	16.5	1.6	23.0	4.8	21.46	0.001	19.9	5.1	18.2	3.4	4.00	0.001
Binge/week	3.4	9.7	10.8	12.7	7.43	0.001	7.4	11.6	5.1	11.6	2.11	0.05
Vomit/week	5.00	10.4	17.4	20.9	8.69	0.001	11.8	17.6	7.7	15.3	2.64	0.05
EAT score ($n = 481$)	40.4	18.5	41.8	15.2	0.93	0.36	41.8	16.4	39.7	18.4	1.28	0.20

* Comparison between anorexia nervosa and bulimia nervosa using two-tailed t test

** Comparison between adults and adolescents using two-tailed t test

Table 2 Psychotropic medications in a sample of 501 adolescent and adult first admissions by diagnosis

Psychotropic medication	Total sample ($n = 501$)		Anorexia nervosa ($n = 287$)		Bulimia nervosa ($n = 214$)		*$p<$	Adults ($n = 318$)		Adolescents ($n = 183$)		*$p<$
	N	%	N	%	N	%		N	%	N	%	
Any psychotropic	429	85.6	240	83.6	189	88.3	0.16	285	89.6	144	78.7	0.001
Two or more meds	235	46.9	132	46.0	103	48.1	0.65	179	56.3	56	30.6	0.001
Three or more meds	127	25.3	67	23.4	60	27.9	0.25	104	32.7	23	12.6	0.001
Four or more meds	55	11.0	29	10.1	26	12.1	0.47	46	14.5	9	4.9	0.001
Only those on medication	429		239		189			285		144		
Antidepressant	384	89.5	211	87.9	173	91.5	0.27	253	88.8	131	91.0	0.62
Antipsychotic	101	23.5	58	24.2	43	22.8	0.82	64	22.5	37	25.7	0.48
Mood stabilizer	96	22.4	50	20.8	46	24.3	0.42	82	28.8	14	9.7	0.001
Anxiolytic/sleep	136	31.7	86	35.8	50	26.6	0.05	113	39.6	23	16.0	0.001
Stimulant	39	9.1	14	5.8	25	13.2	0.02	28	9.8	11	7.6	0.60

* Fisher's exact test (two sided)

Types of psychotropic medication used

Of the total study sample of adult and adolescent first admissions surveyed in the current study, 429 (85.6 %) were prescribed one or more of 41 different medications and as indicated in Table 2, almost half of the patients (46.9 %) were receiving two or more medications leading to a total of 891 prescriptions for the entire sample. The mean number of psychotropic medications prescribed for those receiving medication was 2.1 (SD = 1.28). As shown in Table 2, there were no significant differences between diagnostic groups in the proportion of patients receiving two or more (46.9 %), three or more (25.3 %) and four or more (11.0 %) different medications.

Antidepressants were the most commonly prescribed class of medications with 384 (76.6 %) of the total sample on antidepressants. As shown in Table 2, antidepressants were prescribed for 89.5 % of those receiving at least one medication; SSRIs were the most common representing 79 % of the antidepressants prescribed. Fluoxetine was the most commonly prescribed SSRI (40 %). Antipsychotics were prescribed for 23.5 % of those receiving psychotropic medications and most were atypical. Mood stabilizers were prescribed for 22.4 % of those receiving medications. Anxiolytic/sleep medications were prescribed for 31.7 % (75 % of these were benzodiazepines). Stimulants represented 9.1 % of the total psychotropic medications prescribed. Although medications were categorized according to their class, it is recognized that some medications are prescribed off-label for indications outside of the typical target for the medication class (e.g., the antidepressant trazodone prescribed at a low dosage for sleep).

Types of psychotropic medications used by diagnosis

Table 2 shows that overall there was no significant difference in the proportions of AN (83.6 %) and BN (88.3 %) patients who reported using psychotropic medications. Similarly, there was no significant difference between the AN and BN diagnostic groups in the proportions of patients taking two or more, three or more, or four or more medications. Comparing diagnostic groups on class of medications used indicated that there were no significant differences between diagnostic groups in the use of antidepressants, antipsychotics, or mood stabilizers; however, anxiolytic/sleep medications were reportedly used significantly more often by AN (35.8 %) compared to BN (26.6 %) patients ($p < 0.05$) and stimulants were used more often by BN (13.2 %) compared to AN (5.8 %) patients ($p < 0.02$). Antidepressants were reportedly used by 384 patients or 89.5 % of the subgroup receiving medication and of these, 105 patients or 21.5 % were on two or more antidepressants. Although there was not a significant difference between the proportion of AN and BN patients prescribed antidepressants, a greater proportion of BN patients were on fluoxetine versus AN (34.4 vs. 23.8 %, $p < 0.02$, respectively). Based on the findings that higher dosages of fluoxetine are more effective in BN [4], we examined the dosage of the drug for the 122 patients receiving it and found a greater mean daily dosage for BN (37.9 mg) compared to AN (30.6 mg) ($p < 0.05$). Of the patients on fluoxetine, there was a trend for a greater proportion of BN patients receiving 60 mg or more daily (BN = 29.2 % vs. AN = 15.8 %, $p < 0.09$) and 40 mg or more daily (BN = 56.9 % vs. AN = 42.1 %, $p < 0.08$).

Nineteen patients (10 AN and 9 BN; 18 adults and 1 adolescent) were prescribed bupropion despite its specific contraindication for those with EDs according to the APA practice guidelines for the treatment of patients with eating disorders [17]. The anxiolytic/sleep category was the second most commonly prescribed class of psychotropic medications with 31.7 % of the patients on psychotropic drugs receiving this class of medication and 84 % of the medications prescribed were benzodiazepines. A significantly greater proportion of AN patients received anxiolytic/sleep medication compared to BN patients (35.8 vs. 26.6 %, respectively, $p < 0.05$). The third most commonly prescribed medication was antipsychotics (almost all were atypical) and there was no significant difference in the proportions of these medications reportedly received by AN (24.2 %) and BN (22.8 %) patients. Mood stabilizers were the fourth most commonly prescribed medication (22.4 % of those reportedly prescribed medication) and there were no significant differences between diagnostic groups. Finally, 9.1 % of patients were prescribed stimulants and a significantly greater proportion of BN patients (13.2 %) received stimulants compared to AN patients (5.8 %) ($p < 0.02$).

Types of psychotropic medications used by age

Table 2 indicates that a significantly greater proportion of adult patients reported using prescription medications compared to the adolescent group and this finding was also evident when the threshold was two or more, three or more, and four or more medications. Also shown in Table 2, there were no significant differences between adult and adolescent groups in the proportion of patients using antidepressant, antipsychotic, or stimulant medications; however, a significantly greater percentage of adults reported use of mood stabilizers and anxiolytic/sleep medications compared to adolescents.

Discussion

Unique aspects of the current study were the ability to compare patterns of psychotropic medication use between large samples of AN and BN patients as well as the comparison between subgroups of adults and adolescents. The results confirm earlier research that the use of psychotropic medications is very common for ED patients. A total of 41 different psychotropic medications were prescribed for 429 patients (891 prescriptions in all) of 501 AN and BN patients who were first admissions to either an adult partial hospitalization or an adolescent residential program. Overall, 85.6 % of the total sample and 89.6 % of the adult patients reported being prescribed one or more psychotropic medications. The fact that this is higher than the 58.5 % found in the Fazeli et al. [2] sample of adult women with AN recruited in a screening study for osteoporosis between 2003 and 2009 suggests that drug use is more common in the current sample that sought treatment. Similarly, an earlier chart review of a small clinical sample confirms a higher frequency of prescription drug use in ED patients seeking treatment [3].

A significant proportion of the current sample was prescribed multiple psychotropic medications. Overall, 46.9 % reported using two or more, 25.3 % reported three or more, and 11 % reported four or more psychotropic medications. Of the 429 patients using any medications, more than half (54.8 %) were on more than one, 29.6 % were on three or more, and 12.8 % were on four or more psychotropic medications. Two AN patients and one BN patient were on seven medications at the time of assessment. The comparable rates for the AN sample recruited between 2003 and 2009 by Fazeli et al. [2] were 30 % for two or more and 19.5 % for three or more medications. Again, the higher medication usage rates in the current

study may be attributed to the fact that the earlier study respondents were drawn from an osteoporosis screening study rather than a clinical sample seeking treatment.

The results comparing diagnostic groups indicated similar and high proportions of AN and BN patients being prescribed at least one medication, two or more, and three or four or more medications. This widespread prescription of psychotropic medications in AN is troubling given the evidence-based consensus spanning more than 20 years indicating that they do not have a meaningful impact on weight gain, ED symptoms, or comorbid psychopathology in AN [5, 7, 18, 19]. Importantly, AN patients were receiving the same high frequency of psychotropic prescriptions despite the lack of empirical support, as compared to BN patients where there was some evidence for effectiveness [19, 4]. The magnitude of the disparity between the research literature and clinical practice highlighted in the current study is striking considering that 89.6 % of adults were prescribed at least one psychotropic medication (78.7 % of adolescents). More than half (56.3 %) of the adults were receiving two or more medications and 32.7 % were receiving three or more psychotropic medications (versus 30.6 and 12.6 % of adolescents, respectively). Furthermore, the widespread use of psychotropic medication with adolescent patients reported here and by Gowers et al. [13] is troubling in light of the lack of evidence-based guidelines for their use in younger patients [7, 10]. Whereas Gowers et al. [13] reported that no psychotropic medication was prescribed for patients under 12 years old, we found that two patients in our sample were on antidepressants.

The findings in the current investigation indicated that antidepressants were the most commonly prescribed psychotropic medication, a finding that is consistent with earlier reports for AN alone [2, 3]. Overall, antidepressants were reportedly prescribed for 76.6 % of the current sample (89.5 % of those receiving medication), a proportion that was considerably higher than the 48.4 % described by Fazeli et al. [2] SSRIs were the most commonly prescribed antidepressant with fluoxetine being used most often. In the current study, there was not a statistically significant difference in the proportions of AN and BN patients receiving antidepressants (74 and 81 %, respectively) despite the overwhelming evidence that they are not effective in AN, even in those with comorbid depression [5]. However, of interest, BN patients received a significantly higher dosage of fluoxetine compared to AN, lending some support to the notion that practitioners were following the empirical evidence that higher dosages are more effective in BN [4]. Although not statistically significant, there was a trend toward a greater percentage of BN patients being on 60 mg or more and 40 mg or more daily compared to AN patients. Nevertheless, in light of the research showing that the 60 mg dosage is optimal for BN [4], it is concerning that more than 70 % of the BN patients in the current study were receiving an inadequate dosage of the medication. The widespread use of SSRIs in AN is particularly worrisome given the risk of their serious complications mentioned earlier. Although used less often, the risks of other antidepressants are worthy of mention; the current study found that a small number of patients were taking the tricyclic amitriptyline ($N = 19$) which is a concern given the cardiovascular complications on this medication [14], and bupropion ($N = 19$) in light of its explicit proscription for those with EDs [17].

Antipsychotic medications have been increasingly prescribed to improve weight gain as well as ameliorate ED and other psychiatric symptoms in AN [20]. The increasing reliance on antipsychotics is documented by Fazeli et al. [2] who reported greater use of atypical antipsychotic medications in EDs over the two time periods studied. However, their increased popularity in AN is not supported by three recent meta-analyses [20–22] that found little evidence for effectiveness in promoting weight gain or reducing psychological symptoms. Nevertheless, in the current study 20.2 % of the sample (23.5 % of those on medication) reported using antipsychotic medication (mostly atypical) and there were no significant differences in use of this class of medication based on diagnostic group or age groups (adult versus adolescent). As with antidepressants, if the published data on ineffectiveness is not sufficient to discourage the use of these medications, serious side effects mentioned earlier should be cause for concern, particularly with children. Fazeli et al. [2] conclude that "at the present time there is no conclusive evidence that atypical antipsychotics have any benefit in the treatment of anorexia nervosa" (p. 974). This conclusion is echoed by Lebow et al. [20] who caution that "it does not appear that atypical antipsychotics are clinically indicated in the treatment of AN (p. 338)."

Of interest, recent reports on psychotropic medications for eating disorders have largely overlooked the use of anxiolytic and sleep medications [2, 3]. Gowers et al. [13] reported that anxiolytics accounted for 11 % of the total number of prescriptions for their sample of children and adolescents with beneficial effects for about half of the cases. However, benzodiazepines should be prescribed with caution given their addiction potential in a population noted for the abuse of drugs and alcohol. In the current study, medications classified as anxiolytic/sleep were prescribed for 27 % of the patient sample (31.7 % of those on medication) and of these, 86.7 % were benzodiazepines. There were no significant differences in the proportion of the total class or the benzodiazepine subclass based on diagnosis. However, significantly fewer adolescents on medication received anxiolytic/sleep medications compared to adults (16.0 vs. 39.6 %, respectively).

Finally, 7.8 % of the total sample reported being prescribed stimulants (9.1 % of those on medication) and the proportion of BN patients (13.2 %) was significantly greater than AN patients (5.8 %) who were taking medication. There was no significant difference in the use of stimulants between adult and adolescent patients. Although there does seem to be an association between ADHD and eating disorders, the relationship appears to be complex [23]. Extreme caution should be exercised in prescribing a powerful appetite suppressant for AN patients.

Results of the current study show that the majority of AN patients were prescribed medication in the absence of solid data for efficacy extend earlier findings of psychotropic medication in eating disorders, highlighting the disparity between research and clinical practice in the treatment of EDs. Lilienfeld et al. [12] review the overwhelming evidence for a research–practice gap in the mental health field in general, and how resistance to evidence-based treatment extends to eating disorders treatment. They quote a study by von Ranson and Robinson [24] that found that only 39 % of ED specialists listed research as guiding their treatment selection compared to "clinical experience" (60 %) and compatibility with their theoretical orientation (39 %). This contrasts with only 3 % of family physicians who expressed resistance to using clinical practice guidelines [25].

Another explanation for the popularity of prescribing antidepressants for AN in clinical practice may relate to a more general selective reporting of positive findings for these medications in the psychiatric literature. Turner et al. [26] reported on 74 food and drug administration (FDA) registered studies of 12 antidepressants and found that only one of the 37 studies viewed by the FDA as having positive findings was not published. In contrast, the majority of studies viewed as having negative or questionable results were either not published or published in a way that erroneously cast them in a positive light. It was concluded that it was not possible to determine whether "the bias observed resulted from a failure to submit manuscripts on the part of authors and sponsors, from decisions by journal editors and reviewers not to publish, or both" (p. 252) [26]. The selective reporting of psychotropic drug effectiveness could be one factor leading doctors to make inappropriate prescribing decisions. Owing to the relatively small number of drug efficacy studies in the eating disorder field, it is unlikely that unpublished data create a meaningful bias; however, prescribing practices that continue despite consistently negative published findings for AN is worrisome.

It is important to note that the results in the current study were from a treatment facility located in the Midwestern USA and may reflect a regional prescribing pattern that may not be generalizable to other regions or countries. Another limitation of the current study is that the reported results do not offer any insight into factors that may be responsible for the decision-making process for prescribing medications. For example, it is possible that prescribing psychotropic medication is related to comorbid diagnoses of depression, anxiety or personality disorders, or that medication was given due to ED chronicity, symptom severity, or the failure of psychological treatments. The current study did not evaluate drug prescription based on possible comorbid diagnoses. With regard to comorbidity, it has been noted that causal direction between mood, personality, anxiety, and EDs is far from certain, but it is known that weight suppression may cause these changes in some instances [27]. While future evaluations of psychotropic prescription in EDs may parse out clinical overlap with other significant co-occurring disorders, the current sample presented with frequent psychotropic prescription regardless of the specific ED diagnosis. Even though medications have not been shown to selectively benefit certain ED patient subgroups (i.e., AN), the rationale for their application may be based on reasonable clinical speculation. It is also possible that prescribers were a part of the referral process for a condition in which they were not certain of the diagnosis or clinical severity before presentation at our specialized ED clinic. If this were the case, it highlights considerable need for practitioner education on recognition of ED signs, severity, and guidelines for referral to specialized care. This possibility also underscores the need for well-controlled prospective studies examining specific psychological targets of drug interventions in EDs as it is possible that concurrent conditions and symptoms with a clinically severe ED population are treated with pharmacotherapy.

In sum, the current study confirms that the prescription of psychotropic medication for those with eating disorders is widespread in clinical practice and is discrepant with published evidence-based guidelines. We found no significant differences in the application of medications based on diagnosis despite practice guidelines showing differential effectiveness for AN and BN. Compared with adult patients, fewer adolescent patients were prescribed psychotropic medication before referral to partial hospitalization or residential treatment. Nevertheless, the majority of adolescent patients were prescribed at least one medication and more than thirty percent were on two or more medications. It is possible that patients presenting with a primary ED diagnosis are being treated for other conditions or symptoms that are unknown or off-label, and our study highlights the need for symptom target tracking of psychotropic prescriptions in future clinical ED studies. However, in the meantime, research is needed to see if clinicians' prescribing practices can be shaped to be more consistent with research evidence on effectiveness.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest. The authors wish to thank John Garner for assistance with database management.

Ethical standards Use of the data conformed to HIPAA standards for use of de-identified, archival data. Patients were informed that clinical information collected may be used to evaluate the effectiveness of their treatment program, and consents for this purpose were obtained upon admission.

Informed consent Informed consent was obtained from all individual participants included in the study.

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