



BRIEF REPORT

Long-term outcome in males with anorexia nervosa: A prospective, sex-matched study

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Abstract

Objective: The objective of this study is to report on the 5.5-years outcome of anorexia nervosa (AN) in male adolescent inpatients and compare it to the outcome of female adolescent inpatients with AN.

Method: Diagnostic eating disorder outcome was assessed by the Structured Inventory of Anorexic and Bulimic Syndromes (DSM-IV) in 20 males and 20 females matched for AN diagnosis, age at treatment, and length of follow-up. For documentation, follow-up scores of the Eating Disorder Inventory and the Brief Symptom Inventory are reported.

Results: Diagnostic outcome did not differ between sexes. Four male and six female participants had AN at follow-up. One male and four females had crossed to bulimia nervosa, and five males and three females to eating disorder not otherwise specified. Remission was found in 10 males and 7 females. Effect sizes were mostly small. At follow-up females had higher scores than males with large effect sizes for drive for thinness (Cohen's $d = 0.86$) and body dissatisfaction ($d = 1.07$).

Discussion: Few significant sex differences were found. Additional research involving larger samples of males and a broader range of assessed outcomes (e.g., drive for muscularity) in both sexes is urgently needed.

KEYWORDS

adolescents, anorexia nervosa, eating disorder, females, long-term, males, outcome, structured inventory of anorexic and bulimic syndromes

1 | INTRODUCTION

Anorexia nervosa (AN) is a severe illness with a typical onset in childhood or early adolescence. Because of the young age of the affected individual, caregivers show great alarm concerning the future health of their loved one. This is also an issue of public interest as AN is associated with a range of medical complications, psychosocial impairments and increased health care spending (Whiteford & Weissman, 2017). In follow-up studies, as in our study,

no treatment adapted to the special needs of males is apparent and it is unclear whether the female-dominated treatment in the long run is effective in both sexes. From cross-sectional studies on adults it seems that the clinical presentation of male and female patients with eating disorders (ED) is more similar than different (Bramon-Bosch, Troop, & Treasure, 2000; Crisp, & Collaborators, 2006). Knowledge on the longer-term course of early onset AN, however, is scarce (Herpertz-Dahlmann & Dahmen, 2019) and still more scarce in males.

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Considering the criticism of Bardone-Cone et al. (2010) that most definitions of remission ignore psychological symptoms of ED, ED diagnoses seem to be the most suitable outcome measure. Ten years after inpatient treatment for AN in adolescence all seven males of one cohort had no ED diagnosis (AN, bulimia nervosa [BN], ED not otherwise specified [EDNOS]) and were considered as recovered (Herpertz-Dahlmann et al., 2001). In an additional inpatient cohort, of the three male patients included in 5–10 years follow-up of AN, one had EDNOS and two were without an ED diagnosis at follow-up (Herpertz-Dahlmann et al., 2018). In another sample of 10 male inpatients with a mean age at treatment for AN of 17.7 (1.7) years, one male patient had a diagnosis of AN and two had a diagnosis of another ED at 12-year follow-up (Deter, Köpp, Zipfel, & Herzog, 1998).

With the dearth of knowledge on the outcome of AN in males, additional data are urgently needed. The large sample of males with AN reported by Strobel, Quadflieg, Naab, Voderholzer, and Fichter (2019) offered an opportunity to reanalyze a subsample of males and a comparison sample of females who were below age 18 at the time of treatment for AN. This male adolescent sample is larger than the combined male adolescent samples from previous studies on diagnostic outcome, and thus can contribute essential data on the long-term outcome of AN. We present data on the 5-year follow-up of male adolescent inpatients treated for AN, and female inpatient controls with AN of the same age at treatment. The aim of the study was to explore differences in long-term outcome between male and female adolescents with AN after treatment with cognitive-behavioral therapy (CBT). Additionally, descriptive data of questionnaire scores reflecting psychological features are provided. Because so little is known on this topic, we did not formulate hypotheses and will report descriptive data only.

2 | METHOD

2.1 | Participants

The study methods are reported in detail in Strobel et al. (2019). In short, between 1987 and 2016, 27 males below age 18 and meeting the inclusion criteria of the larger study were treated for AN in a specialized ED subunit of the Schoen Clinic Roseneck in Prien, Germany. This facility treats patients from all parts of Germany and neighboring countries. In the German health system inpatient treatment for ED is readily accessible and is covered by most health insurances and available at relatively low cost. Of course, treatment was adapted to new developments over the long recruitment period, but the inpatient treatment was based throughout on multimodal CBT. It included one or two weekly individual sessions (50 min per session) and manualized group sessions (general group, sports and art therapy, social competence and relapse prevention training, and classes in a therapy kitchen [Schlegl, Quadflieg, Löwe, Cuntz, & Voderholzer, 2014]).

For unknown reasons, four males did not return the questionnaire and three males were deceased at follow-up. For each male with follow-up ($N = 20$, 74%) we selected from a large sample (Fichter, Quadflieg, Crosby, & Koch, 2017; Fichter, Quadflieg, & Hedlund, 2006) one female treated for the same subtype of AN in

the same clinic. For each male, the female with the nearest age at admission and length of follow-up was selected.

Figure S1 shows the sample composition and patient flow. Length of follow-up was 5.46 (SD 4.49) years for males and 5.75 (4.33) years for females.

2.2 | Assessment instruments

Data collection for males and females was identical and comprised the following assessments.

(1) *Structured Inventory for Anorexic and Bulimic Disorders for DSM-IV and ICD-10 (SIAB)* expert interview version (SIAB-EX; Fichter & Quadflieg, 2001) and self-rating form (SIAB-S; Fichter & Quadflieg, 2000). These assessments were used to derive ED diagnoses (DSM-IV; American Psychiatric Association, 1994) at follow-up by a standardized algorithm. Both SIAB-EX and SIAB-S cover the same spectrum of ED symptoms in parallel items rated on a 0–4 severity scale. For diagnosis, items were dichotomized with codes 0 and 1 indicating no clinical ED symptom. Interrater reliability for SIAB-EX diagnoses was good (mean kappa of .81; Fichter & Quadflieg, 2001) and the diagnostic algorithm of the SIAB-S is also well validated (PPV .91, sensitivity .73, specificity .63; Fichter & Quadflieg, 2000).

EDNOS included four types as described in DSM-IV (page 550): (a) AN with normal range body mass index (BMI; upper limit 25); (b) BN with short duration or low frequency of symptoms; (c) Regular use of inappropriate compensatory behavior after consuming small amounts of food at normal weight; (d) Chewing and spitting out food. An additional EDNOS type which can only be met by females (all criteria for AN are met except that the individual has regular menses) is in the present study reported in the AN category to ensure comparability with males' diagnostic outcome categories. The admission diagnosis of AN was also derived from the algorithm of the SIAB-S.

(2) *Eating Disorder Inventory (EDI)*; Garner, Olmstedt, & Polivy, 1983). We used the early 64-item version at admission and follow-up, with items being transformed into a 0 to 3 format as recommended for clinical samples. For subscales and Cronbach's α at admission to inpatient treatment in the present adolescent sample see Table S1.

(3) *Brief Symptom Inventory (BSI)*; Derogatis & Melisaratos, 1983) assessed general psychopathology. For subscales and Cronbach's α at admission to inpatient treatment in the present adolescent sample, see Table S1.

Although α varied between sexes, there was no discernible pattern of one sex having systematically higher values than the other.

(4) Length of hospital stay, age at onset of ED, age at admission to treatment, the number of inpatient and outpatient pretreatments of any kind for ED, height and weight were taken from the hospital documentation. Height and weight at follow-up were self-reported by the patients.

2.3 | Procedure

Follow-up data were collected by a questionnaire sent by letter to the patients and once the completed questionnaire was received, a

clinical psychologist conducted the SIAB-EX by phone. The psychologist involved in collecting data from the males was trained in the SIAB-EX by videos until she exceeded the kappa of .81 mentioned above which was established by interviewers involved in earlier data collection of the female sample. A shortened version of the questionnaire, excluding some subscales of the EDI and BSI (but all subscales included the complete set of respective items), was provided to the eight males who were unwilling to answer the long version. All females completed the long questionnaire. Males completing the short questionnaire did not differ from males completing the long questionnaire in diagnostic outcome and all EDI and BSI subscales at follow-up. At admission, males completing the short follow-up questionnaire had a higher BMI and lower scores in EDI-Body dissatisfaction and BSI-Phobic anxiety.

2.4 | Statistical analyses

Statistical analyses were calculated using SPSS Statistics 25. Descriptive results are reported as means and standard deviations or frequencies and percentages. Since BMI varies with age and sex, raw BMI values were standardized into percentiles collected from the German general population (Hebebrand, Himmelmann, Hesecker, Schäfer, &

Remschmidt, 1996). Independent *t*-tests were computed for continuous variables, and sex differences in diagnostic outcome were assessed using χ^2 -tests. Our study is explorative and descriptive, therefore we focus on effect sizes rather than statistical significance.

Effect sizes are reported as Cohen's *d* or phi (ϕ ; diagnostic outcome). Small effects are indicated by $d = 0.2$ – 0.5 , and $\phi = .1$; medium effects by $d = 0.5$ – 0.8 , and $\phi = .3$; large effects by $d \geq 0.8$, and $\phi = .5$ (Cohen, 1988).

3 | RESULTS

Male drop-outs did not significantly differ from participating males regarding age, weight, age at onset, duration of ED, length of treatment, number of pretreatments, BSI, and EDI ratings. The only exception was a higher EDI-Ineffectiveness score in drop-outs.

Males and females did not differ on AN subtype ($N = 5$, 25% restricting type for each sex), age at admission, and length of follow-up, indicating a successful matching on these criteria. Males and females also did not differ on age at onset, duration of ED, number of previous in- and outpatient treatments, and admission BMI and BMI percentiles. However, males had a shorter duration of ED and a shorter period of inpatient treatment both with small effect sizes (Table 1).

TABLE 1 Characteristics at admission to index inpatient treatment in the follow-up sample

	Males ($N = 20$) Mean (SD)	Females ($N = 20$) Mean (SD)	<i>t</i> (<i>df</i>)	Statistics <i>p</i> -value	<i>d</i>
Age at admission (years)	16.39 (1.13)	16.58 (0.81)	0.63 (38)	.53	0.19
Follow-up (years)	5.46 (4.49)	5.75 (4.33)	0.21 (38)	.84	0.07
Age at onset (years)	14.66 (1.43)	14.12 (0.93) $N = 17$	1.33 (35)	.19	0.45
Duration of ED (years)	1.73 (1.36)	2.34 (0.96)	1.63 (38)	.11	0.52
Number of previous outpatient treatments	1.41 (1.37) $N = 17$	1.85 (2.01)	0.76 (35)	.45	0.26
Number of previous inpatient treatments	0.63 (0.68) $N = 19$	0.75 (0.91)	0.46 (37)	.65	0.18
Index inpatient treatment days	72.60 (28.36)	85.15 (28.15)	1.41 (38)	.17	0.44
Body mass index	15.00 (1.45)	14.77 (1.27)	0.53 (38)	.60	0.17
Body mass index percentiles	0.80 (1.28)	0.65 (1.09)	0.40 (38)	.69	0.13

Abbreviations: *d*, effect size Cohen's *d*; *df*, degree of freedom; ED, eating disorder.

TABLE 2 Eating disorder diagnostic outcome (DSM-IV) at follow-up in adolescent inpatients

	Males $N = 20$ <i>n</i> (%)	Females $N = 20$ <i>n</i> (%)	Statistics χ^2 <i>df</i> = 1	ϕ
Anorexia nervosa ^a	4 (20%)	6 (30%)	0.53 $p = .47$.12
Bulimia nervosa	1 (5%)	4 (20%)	(2.06) $p = .34$.23
Any eating disorder not otherwise specified ^b	5 (25%)	3 (15%)	(0.63) $p = .70$.13
None of the above eating disorder diagnoses (remission)	10 (50%)	7 (35%)	0.92 $p = .34$.15

Abbreviations: *df*, degree of freedom; χ^2 -values in parentheses denote Fisher exact test.

Notes: No binge-eating disorder was found in either group at follow-up. Overall χ^2 was 3.23 ($df = 3$; $p = .36$).

^aIncludes eating disorder not otherwise specified type 1 (= for females, all criteria for anorexia nervosa are met except that the individual has regular menses).

^bExcludes binge-eating disorder and eating disorder not otherwise specified type 1.

3.1 | Diagnostic outcome

Effect sizes for differences between males and females in remission rates and the frequency of ED diagnoses at follow-up were small with ϕ -coefficients varying between .12 and .23. Cross-over from AN to BN was more frequent in females, and the most frequent cross-over was to EDNOS (Table 2).

3.2 | Psychological features

Descriptive data for EDI and BSI scores at admission and follow-up are presented in Tables S2 and S3. At follow-up males had lower scores than females in Drive for Thinness and Body Dissatisfaction, both with large effect sizes. Other EDI subscales and BMI percentiles showed small effect sizes at follow-up. Effect sizes were also mostly small for the BSI subscales at follow-up. Females had higher perfectionism scores at follow-up with a medium effect size.

4 | DISCUSSION

The present study adds substantially to the knowledge on the long-term diagnostic outcome of AN in adolescent males. We collected an important sample of males and compared them to females treated for AN in the same hospital and followed-up using the same assessments. Long-term diagnostic outcome did not differ between males and females. Small effect sizes point at little difference between sexes regarding the course of AN. Because of the small number of studies and low sample sizes, no firm conclusions on the effectiveness of treatments in males with AN can be made. However, some adaptations for male-specific needs may be necessary to improve outcome in male patients (Kinnaird, Norton, Pimblett, Stewart, & Tchanturia, 2019).

Males and females had a similar age at admission, age at ED onset and duration of illness. This is contrary to the later onset and shorter duration of illness in a comparison of adult male and female patients with mixed ED diagnoses (Bramon-Bosch et al., 2000), and probably is partially explained by our matching procedure.

Remission after 5.5 years was more frequent in males than females (50% vs. 35%) but effect sizes were small and point at no meaningful difference between sexes. Three studies, all from Germany, reported outcome in very small numbers of adolescent inpatients with AN, preventing firm conclusions from the comparison with our sample. One study reported two recovered males out of three participating in 5–10 years follow-up after CBT inpatient treatment, the third male having an EDNOS (Herpertz-Dahlmann et al., 2018). In longer follow-ups of inpatients, all seven males were recovered 10 years after inpatient CBT treatment (Herpertz-Dahlmann et al., 2001), and out of 10 males in a mixed adolescent/adult sample treated in a department of internal medicine, seven were recovered at 12-year follow-up (Deter et al., 1998).

At follow-up, the EDI-scales Drive for Thinness and Body Dissatisfaction were lower in males than in females. This is consistent with findings from another follow-up study in adolescent males with AN

which reported lower scores in a similar scale (EDE weight and shape concerns) 1 year after treatment (Strober et al., 2006). Remarkably, in our female patients, body dissatisfaction was nearly identically high at admission and follow-up, while males showed a distinct decrease over time, although they started with a similar high score at admission.

Concerning general psychopathology, small effect sizes indicated little difference between males and females at follow-up. Our BSI scores at 5.5-year follow-up were similar to the scores reported for females at 8-year follow-up (Nilsson & Hägglöf, 2005).

There are several limitations of this study: (a) Our sample included only inpatients from one hospital and we do not know if these results are valid for other hospitals or for individuals seeking outpatient or no treatment. (b) The female sample was from an earlier study and consequently males could have been treated later regarding calendar years. Table S4 provides the distribution of admission years which, however, was not different between sexes ($\chi^2(16) = 26.00, p > .05$). (c) Outcome was assessed at one cross-section and we do not know the course of the ED from treatment to follow-up. (d) We used primarily female-centered ED assessments and diagnostic criteria. To compare males and females, however, we had to use the same state-of-the-art assessments for both sexes. This excluded symptoms like drive for muscularity which seem to be more prevalent in males (Murray et al., 2017). For an extensive coverage of this topic see Strobel et al. (2019). (e) Due to the limited number of cases we were not able to search for predictors of outcome. (f) We cannot exclude the possibility that the mode of follow-up interviews (by telephone) resulted in a loss of information. However, several studies provided evidence on the reliability of diagnostic telephone interviews (Fichter & Quadflieg, 2004; Reich & Earls, 1990). (g) ED diagnoses at admission were derived from self-ratings, and at follow-up from clinical experts and patients' self-ratings. Other studies used also self-ratings for ED diagnostics (Crow et al., 2009). However, we applied the published standardized diagnostic algorithms for the SIAB-EX and SIAB-S for all ED diagnoses in this study to reduce bias. For more discussion on this topic, see Fichter et al. (2017) and Quadflieg and Fichter (2019). (h) Our sample was larger than other samples of males with AN, but still may be too small to show possible differences between sexes. Strengths of this study include: (a) a homogeneous sample of male adolescent inpatients with an ample follow-up period; (b) a comparison sample of females of the same age and with the same length of follow-up; and (c) a standardized procedure for establishing ED diagnoses.

5 | CONCLUSION

AN may be more common in females in terms of numbers affected, but not in terms of impact on health. Males affected with AN seem to have a course of illness similar to females. However, research in much larger male samples is required to provide firm evidence on the role of sex in the treatment and outcome of ED. Further research should also address the relevance of drive for thinness and drive for muscularity for males as well as for females. While there are some indications of drive for muscularity being a predominantly male phenomenon, this hypothesis has not firm evidence yet. Assessments for both drive for

thinness and drive for muscularity exist, and what we need are improved definitions of EDs covering the main symptoms as presented by males and by females.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data available from the authors on qualified request.

ETHICS STATEMENT

The study was reviewed and approved by the Ethics Committee of the Bavarian Medical Association and participants provided informed consent at the beginning of data collection.

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SUPPORTING INFORMATION

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