

Factors associated with treatment attrition in anorexia nervosa: a systematic review

G Abdelbaky^{1*}, P Hay^{2,3*}, S Touyz⁴

Abstract

Introduction

The reasons for attrition in the therapy of anorexia nervosa are not fully understood. This systematic review provides a summary of trials focusing on factors associated with attrition; it was aimed to compare and contrast findings between different treatment settings.

Materials and methods

Data were extracted from published reports sourced from online searches (till February 2013) of the following databases: SCOPUS, PubMed and PsycINFO. The search included French and English language papers, and the following search terms were used: 'anorexia nervosa' and 'attrition/drop-out/premature termination of treatment/outcome'.

Results

Four hundred and twenty-one papers were identified; 34 met the inclusion criteria, four were excluded as they were reviews and three investigated outcome and not attrition. Two papers of the 27 included were qualitative studies. Factors mostly studied were the subtype of anorexia nervosa ($n = 8$), the personality characteristics or disorder ($n = 11$) and eating psychopathology ($n = 10$). Six studies could not find an association with

attrition for demographic or other clinical characteristics. The factors associated with attrition in most studies were the subtype of anorexia nervosa, where the purging type was associated with a higher attrition rate than the restrictive type ($n = 7$ studies), and more frequent personality features and other psychiatric comorbidities. The majority of trials were conducted with adults and inpatient samples.

Conclusion

More studies with regard to attrition in younger people and outpatient settings, and a more consistent and standardised assessment of attrition in anorexia nervosa research, are needed. Addressing the use of purging behaviours and psychological comorbidities in anorexia nervosa is likely to enhance treatment retention, but further research is required in this regard.

Introduction

Anorexia nervosa (AN) is defined in the current American Psychiatric Association and other international diagnostic schemes as an eating disorder characterised by dietary restriction leading to low body weight, with psychological and/or behavioural resistance to gaining weight, and overvaluation of shape and weight. There are two subtypes of AN, restricting (AN-R) and binge eating/purging (AN-P)¹. AN is a common disorder with a lifetime prevalence of around half to 1% in the general population, this percentage being higher in women (up to 3.5%)². The predominant treatment modality is a psychological therapy, but the evidence available is limited; attrition is often high and motivation poor³.

The high rate of drop-out in AN poses a serious obstacle to successful treatment and is likely to promote poorer outcomes and subsequent chronicity with an increased severity in the course of illness as well as personal and community burden³. The most recent systematic review of attrition studies that we identified included a review of outpatient trials³. This review reported 19 studies with attrition rates of 4.8% for family therapy to 100% for dietary advice, but most attrition rates ranged between 20% and 40%. Seven studies were of individual psychotherapy for adults with AN. The review focused on effects of attrition on outcomes and not on factors that may predict attrition. This review highlighted the inconsistency in results, variations in the definition of drop-out and the proposed new definitions for the types of attrition, e.g., clinical withdrawal versus patient-initiated withdrawal as well as the timing of attrition, e.g., after assessment or at time points during and up to the end of treatment. Prior to this review³, Fassino et al.⁴ conducted a systematic review of the factors associated with attrition in eating disorders including AN and inpatient and outpatient treatments. They found that AN-P type was the most consistent predictor of attrition. In two inpatient studies and one outpatient study, borderline traits predicted attrition. No other consistent predictors of attrition specific to AN psychotherapy were found in more than one trial. In addition, other reviews have not included non-English language reports and have not discussed the differences or similarities in attrition predictors between inpatient and outpatient

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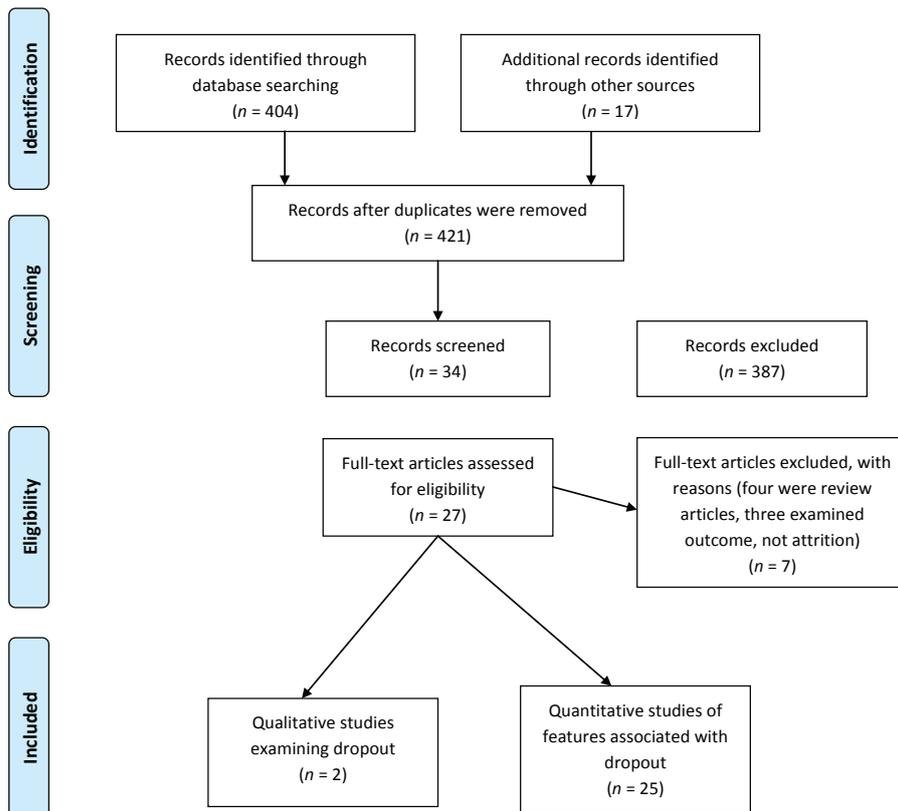


Figure 1: Flow chart of study selection.

treatment settings. Our aims were therefore to conduct a systematic review including studies since the Fassino et al.⁴ review of factors associated with attrition in AN psychological therapy and discuss results across treatment settings, inpatient and outpatient, and across age groups. Our focus was on studies where a psychological therapy was employed as this is the core to all treatment approaches in AN.

Materials and methods

The following inclusion criteria were employed: studies (i) of attrition in AN, or mixed eating disorder diagnostic types where results on AN were reported, (ii) of all age groups, (iii) of psychological therapies, (iii) in either an inpatient or outpatient setting, (iv) written in the French, English or Arabic languages and (v) of original reports published in full. Studies were identified with a systematic online search of SCOPUS, PubMed and PsycINFO data-

bases up to the date of 11 February 2013 using the search terms: 'anorexia nervosa' and 'attrition', or 'drop-out', or 'premature termination of treatment' or 'outcome'. In addition, a manual search was performed from the references sections of the identified studies. There were no specific exclusion criteria, and qualitative as well quantitative studies were evaluated.

Data extraction and identification of studies were done by the first author and consensus ratings made with the second author. Data extraction included sample and inclusion criteria, definition of attrition, context and type of study, outcome measure, treatment used and predictors of drop-out.

Results

Description of studies

A flowchart of the identification of studies is depicted in Figure 1. Four hundred and twenty-one papers were initially identified in the computerised search; of these,

27⁵⁻³¹ were included and seven were excluded. The seven excluded studies were four reviews and three studies that looked at outcomes and not attrition. The 27 studies are summarised in Tables 1–3. Sample sizes in quantitative studies ranged from eight to 320. Two of the 27 studies were qualitative studies^{30,31}. Sixteen¹⁻⁵ of the 27 studies were conducted in an inpatient setting, eight²²⁻²⁹ were conducted in an outpatient setting and one was done in both settings¹. Twelve studies^{5,6,7,8,9,11,12,19,20,21,24,27} were of AN patients solely, and 13^{9,12,13,14,15,16,17,22,24,25,26,28,29} were of mixed samples of bulimia nervosa (BN) or other eating disorders. Two^{22,27} were of adolescent or young adult patient samples. In inpatient trials, attrition mostly referred to patients self-discharging prior to completion of treatment or reaching a goal body mass index (kg/m²; BMI) or weight. In outpatient studies, attrition mostly referred to not completing planned numbers of treatment sessions and usually was divided into leaving at early or late stages of therapy. Two trials^{17,29} examined failing to attend for follow-up and two were mixed^{22,27}.

Predictors of attrition – inpatient studies

Six^{6,7,8,11,12,19} of the inpatient studies examined the subtype of AN and five^{6,7,8,12,19} reported that the purging subtype consistently predicted attrition; one study did not find it predictive¹¹. Personality was also commonly studied. In seven studies^{10,11,14,15,16,19,20} that looked at different aspects of personality character and/or disorder, it was found that having a borderline or antisocial personality organisation was associated with attrition^{15,19}. In separate studies, the following features were found to predict attrition: an antisocial attitude¹⁵, emotional instability¹⁵, lack of ego mastery¹⁵, social and emotional alienation¹⁵, high levels of aggression¹⁰, extraversion and low level of inhibitedness¹⁰, high self-transcendence²⁰, lower scores on the Temperament

Table 1 Features of inpatient studies investigating factors associated with attrition in anorexia nervosa participants.

Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Vandereycken and Pierloot, 1983 ⁵	One hundred and forty-five AN (Feighner criteria) female patients, mean age 20.5 years 12 excluded (insufficient information) Attrition groups defined by temporal stages	50% Most, 50.4% late (A) Early dropout: patient leaving Rx within one week after admission (B) Later dropout: 2–15 weeks (C) Late dropout: 16–52 weeks (includes outpatient phase), was planned	Inpatient Consecutive series of hospitalised patients	First phase, (8–15 weeks) focused on weight restoration and normalisation of eating behaviour Then behaviour therapy (operant paradigm) was employed Second phase was an inpatient/outpatient group psychotherapy programme	Age at admission, duration of illness, educational level, social class and treatment method
Kahn and Pike, 2001 ⁶	Eighty-one AN patients Exclusion criteria of current alcohol or drug dependence and/or ever had bipolar illness or psychotic disorder 37% AN-R 63% AN-P	33.3% Patient pursued discharge prior to reaching their target weight of 90% of IBW and maintaining it for ≥2 weeks Early dropout: ≤80% IBW Late dropout: ≥81% IBW.	Inpatient Naturalistic study	Multidisciplinary approach, including medical management, individual, family and group psychotherapy, and nutritional rehabilitation	AN purging subtype and length of stay were modestly predictive No significant differences in clinical characteristics or eating disorder pathology
Surgenor et al., 2003 ⁷	One hundred and sixty-six AN patients, voluntary status, three male. 91 had AN-P 75 had AN-R	20.2% 65% AN-P, 26% AN-R If self-discharged against medical advice or were 'away without leave'	Inpatient Cohort study	Five inpatient specialist eating disorder programs in Sydney and Christchurch (NZ)	Lower BMI on admission, diagnosis of AN-P subtype and actively restricting fluid
Woodside et al., 2004 ⁸	Seventy-four AN participants, all female 30 AN-R 44 AN-P Mean BMI 15.9 Mean age 28.4	51% 65% AN-P, 26% AN-R Dropout, defined as premature termination of treatment before achieving a BMI of 20	Consecutive inpatient admissions	Intensive group Rx focused primarily on normalisation of eating and restoration of body weight Mixture of nutritional rehabilitation, psychosocial therapy and medical treatment	AN-P, lower restraint scores, more intense maturity fears and with concerns

Table 1 Continued					
Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Tasca et al., 2004 ⁹	125, 50.4% (63) AN (AN-R 32, AN-P 31) 39.2% BN, 10.4% EDNOS 1 male Mean age 22.7 Mean BMI 18.9 Those at suicide risk, substance dependence or psychotic symptoms, were referred to the appropriate inpatient treatment	55% non-completers Treatment completion was defined as participation in the program for a minimum of 12 weeks and attaining a weight restoration to a minimum of BMI of 20	Randomised trial Partial hospitalisation program	Nutritional rehabilitation, psychological intervention (individual, group, art, interpersonal Rx)	High avoidant attachment for those with AN-R, but not for AN-P, high anxious attachment for those with AN-P, but not for those with AN-R
Franzen et al., 2004 ¹⁰	One-hundred and thirty three AN patients 92.5% women Mean age 24.8	36.8% AN did not complete the four-month day programme No recovery criteria identified	Four-month day hospital program Four phases: outpatient motivation phase (one month), day hospital phase (four months), outpatient (4–12 months) and self-help phase (six months) Cohort study	Multidisciplinary approach (CBT, psycho-education, interpersonal intervention, family therapy, group support) Key aspect was the promotion of patient motivation, encouraging autonomy	AN-R type lowest levels of attrition Higher levels of aggression and extraversion and lower levels of inhibition in non-completers No demographic characteristics associated non-completion
Zeeck et al., 2005 ¹¹	Seventy-seven female AN voluntary patients. 43% AN-P 57% AN-R Mean age 25.5 (7.8) Mean BMI 15 (1.6)	32% attrition defined as any unilateral (team or patient) decision for premature termination of Rx before the planned regular discharge date and target weight of BMI 18–19	Inpatient Consecutively admitted patients with a diagnosis of AN, treated between 1/1990 and 1/2003	Multi model treatment setting, combining CBT and psychodynamic component	Lower attrition in patients who reported fewer general psychological symptoms, were hospitalised before and had a comorbid depression Higher attrition (trend) with higher levels of maturity fears AN subtype, age, duration of illness, comorbid personality disorder or previous drop outs were not predictive
Carter et al., 2006 ¹²	Seventy-eight (42%) medically stable AN patients aged >16 years Of the 186 patients, 41.4% BN and 16.6% EDNOS 93% female Mean age 26.5	36% prematurely terminated Rx and before achieving a BMI of 20 They included discharge due to lack of progress or repeated violation of program norms	Consecutive admissions to an inpatient unit 2000–2005.	Intensive group Rx that was primarily directed at the normalisation of eating and the restoration of body weight	History of CSA was not predictive, however, AN-P type cases with a history of CSA were significantly more likely to terminate treatment prematurely

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Table 1 Continued

Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Masson et al., 2007 ¹³	One hundred and forty-five patients, 12 males; 66 (45.5%) AN, 17 (11.7%) BN, 62 (42.8%) EDNOS Age range (13–50) Mean for all 26.5 Mean BMI 14.59 (AN) Voluntary status. Failed less intensive treatment or not manageable in an outpatient setting. Active substance abuse, schizophrenia and other psychotic disorders were not included	37.5% attrition if there was a documented (i) unilateral patient decision to leave without the recommendation or approval of the clinical team (DO 22.1%) or (ii) continued non-compliance with Rx contract or failure to engage with the programme, or the treatment team asked the patient to take their discharge from the programme (AD 15.5%)	Retrospective chart reviews of consecutive admissions to an inpatient Eating Disorder program Jan 2003–Dec 2004	Cognitive behavioural approach incorporating psychodynamic and psych educational treatment options (art, family, body-image, body-esteem group, horticulture and recreational Rx, with nutritional education)	Psychiatric diagnosis comorbidity, the only factor associated with AD No factors were predictive of DO
Dalle Grave et al., 2008 ¹⁴	AN or EDNOS 75 women 69 AN, 6 EDNOS	23.4% , 35% for AN; all unilaterally decided to interrupt the voluntary Rx	In patient Consecutive admissions to the eating disorder inpatient unit between Nov 2003 and 2005	New trans-diagnostic cognitive behaviour theory of ED, adapted for an inpatient setting, (20 weeks) Multidisciplinary approach by a non-eclectic team of physicians' psychologists, dieticians and nurses	Lower level of education, a higher prevalence of separation or divorce in the family and lower persistence scale No demographic or clinical characteristics such as previous treatment, duration of disorder, or weight history
Nozaki et al., 2007 ¹⁵	One hundred and sixty-two patients, 32 AN, randomly selected from a total cohort of 465 comprising three equally sized groups: (i) those who remained in active Rx at 12-month follow-up, $n = 54$, (21 inpatient, 16 outpatient, 17 both), mean age 24.8, BMI 20.5; (ii) those who had completed treatment, $n = 54$ (27 outpatient, 27 both), mean age 25.5, BMI 22.1; (iii) Drop-outs, $n = 54$ (45 outpatient, 9 both), mean age 23.4, BMI 20.4	Twenty-four drop-outs (32%) Any unilateral decision to discontinue treatment without completing the full schedule of treatment Early phase: first two weeks Middle: after the third week but before reaching the target weight Late phase: after reaching target weight	Consecutive admission to the inpatient unit (general ward) 2000– 2003	Behaviour protocol governing privileges during hospitalisation, a modification of the intensive, multimodal inpatient treatment for AN including CBT, group therapy, family involvement and physician review	Social and emotional alienation, a lack of ego-mastery, emotional instability, and an 'antisocial' attitude For those who self-discharged, there was increased likelihood of family dysfunction No demographic or clinical characteristics such as type of eating disorder, duration, age or BMI

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Table 1 Continued					
Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Bjorck et al., 2008 ¹⁶	Two hundred and sixty-eight female patients, 29.1% AN-R, 20.1% AN-P 50.8% BN Mean age : AN 23.2, BN 22.8 Mean BMI : AN 15.7, BN 23 Divided into responders and non-responders (n = 116, 57%)	33% documented termination of Rx by the patient prior to completion of the treatment plan at six-month or 12-month follow-up	Inpatient and outpatient setting Longitudinal and naturalistic design	Wide variety of treatment: inpatient, day-patient, outpatient, personalised program of individual, family, group and art Rx, and medication	Initial presentation with lower negative self-image, lower self-blame and fewer psychological problems significantly predicted attrition
Neeren et al., 2010 ¹⁷	One hundred and seventy-four female patients 39.1% AN-R, 13.8% AN-P, 32.2% BN and 14.9% EDNOS Mean age, 21years Mean BMI 14.7	Those who did not complete a one-month follow-up assessment	Private residential treatment facility Observational study	Not specified	There were no significant differences between the AN responders and non-responders at intake or in treatment improvement In BN, lower restraint, weight concern, eating concerns, body dissatisfaction, drive for thinness and depressive symptoms were associated with attrition
Vandereycken and Vansteenkiste, 2009 ¹⁸	Six hundred and one AN female patients Exclusion criteria were involuntary admission, inability to read French and to complete forms and questionnaire 320 AN-R, mean age 25.9, mean BMI 13.9 281 AN-P, mean age 27, mean BMI 15.1	21.4% drop out, 5.8% early drop out Defined as no negotiated termination of treatment, unilaterally decided by either staff or the patient Early drop out within the first month, later within 2–3 months.	Inpatient Quasi-experimental design, comparing ED patient treated in the new strategies compared with a comparable sample of those treated in the old strategies	Old strategies applied the routine inpatient multidisciplinary approach, whereas new strategies focused on the patient's willingness to get inpatient help, going through different stages in therapy, starting with psycho-education, ending with weight restoration and behaviour changes	The provision of a choice at the beginning of treatment significantly reduced drop-out during the first weeks of inpatient treatment No differences between both strategies on later drop-out and weight change (AN) during inpatient treatment, were found

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Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Huas et al., 2011 ¹⁹	Sixty-four AN female patients, 28 AN-R, 36 AN-P Aged ≥18 years, mean 24.9 BMI 13.3 for AN-R and 14.6 for AN-B	53.3%, 50% AN-R, 56.2% AN-P Patient or team decision for a premature termination of planned inpatient treatment Early dropout: left during the first week Late drop out: occurred after contract was signed	Consecutive admission to inpatient unit Recovery criteria was BMI >19	Multidisciplinary approach, three phases of treatment, first two phases focused on weight gain and the third phase on weight stabilisation	Having one or more children, low desired BMI and low minimum BMI, higher scores on the SCL-90 paranoid ideation scale, not attaining high school Early drop out had more impulsive behaviours including self-harm
Pham-Scottet et al., 2012 ²⁰	AN, BMI <17.5, voluntary status Age above 18 years 135 patients recruited 109 met inclusion criteria 90 agreed to participate Mean age 28.3 Mean BMI 14	29.7% Any discharge before treatment termination (planned day of discharge was recorded in the therapeutic contract) whether by patient or staff	Consecutive series of patients admitted to a specialised ED unit	Multidisciplinary, specialist care, personalised therapeutic contract with clearly defined objectives about weight, behaviours, medical Rx, regular family sessions, individual and group Rx	Drop out patients were significantly more likely to have a personality disorder than the completers Self-transcendence scores were higher for completers than non-completers
Sly et al., 2013 ²¹	AN, all BMI <17.5 96.7% female Mean age 27.3 Mean BMI 14.16	57.8% Premature termination of treatment or those who don't complete treatment	Successive new inpatient admissions at each of the four research sites Naturalistic, prospective cohort study	Four UK specialist inpatient treatment centres	First impressions of therapeutic alliance were significantly lower for non-completers Premature termination associated with lower discharge BMI, and poorer weight gain

AD, active discharge by clinician; AN, anorexia nervosa; BMI, body mass index (kg/m²); BN, bulimia nervosa; CBT, cognitive-behavioural therapy; CSA, child sex abuse; DO, discharge against advice; ED, eating disorder; EDNOS, eating disorder not unless otherwise specified, unless otherwise specified DSM-IV diagnostic criteria were used; IBW, ideal body weight; P, binge eating/purging type; R, restricting type; Rx, therapy or treatment.

and Character Inventory (TCI) persistence scale¹⁴ and higher score on the 90-item psychiatric Symptom Checklist (SCL-90) paranoid scale¹⁹.

However, results were conflicting in the two studies which exam-

ined the presence or absence of a comorbid personality disorder^{11,20}. The two studies^{11,13} that examined other psychiatric disorder comorbidities (depression specified in one study¹¹) also had inconsistent results.

Eating disorder psychopathology was associated with attrition in six studies. Specific pathologies were examined which were predictive of attrition; these included dietary restriction⁷, lower restraint⁸, more

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intense maturity fears^{8,11}, higher weight concern⁸, having a less negative self-image¹⁶, presence of more bulimic features¹⁰ and having a low desired weight¹⁹. Two studies^{6,17} were unable to identify any statistically significant associations between eating disorder features and attrition.

One study looked at attachment style⁹. They found that AN-P patients with an anxious attachment were more likely to complete treatment, but AN-R patients who had an avoidant attachment were less likely to complete treatment. In this study, the authors commented that

attachment avoidance may thus be a contraindication for group-based, partial, hospital therapy of AN-P, but that attachment anxiety may facilitate remaining in treatment for those with ANP. Attrition was also associated with a high prevalence of parental separation or problem^{14,15},

Table 2 Features of outpatient studies investigating factors associated with attrition in anorexia nervosa participants.

Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Szmulker et al., 1985 ²²	Fifty-one AN or BN (Russell 1970, 1979 criteria) patients, 5 male young adults, mean age 22.8 years (8.0) 34 AN, 17 BN	27% Those who didn't take up the prescribed follow-up treatment, as well as those who dropped out after attending for some follow-up therapeutic sessions Premature termination of treatment against the therapist's advice within three months of commencing follow-up therapy	Consecutive admission to an ED inpatient unit, then random allocation to one of the two outpatient Rx groups	Patients randomly allocated to either family therapy or individual psychotherapy for up to a year	All but one of the factors which were examined for their association with the dropping out of treatment, was found not to differ significantly No patient variables were associated with attrition; the only identified factors were high parental 'emotional over-involvement' and 'critical comment' scores
Waller, 1997 ²³	Fifty female patients, eight AN-P, 42 BN P, mean age 21 to 22 years	7 (14%) failed to engage, (mean age 22, BMI 22.1), i.e. decided not to take up the treatment that was offered 15 (30%) dropped out (mean age 22.3, BMI 21.9), i.e. didn't complete the course of Rx, leaving either with or without consultation and at various stages in the Rx process	Outpatients recruited from a case series of referrals to an eating disorders clinic	Individual cognitive behaviour therapy	Both non-completing groups had high levels of borderline psychopathology and more severe perceived bulimic characteristics than the completers However, drop-outs and failure to engage differed in perceived family emotional involvement with the failures to engage having healthier functioning

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Table 2 Continued					
Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Halmi et al., 2005 ²⁴	One hundred and twenty-two AN patients, mean age 23.4–25.7, three sites, mean BMI 17.8	46% drop-out including 17% withdrawn Self-discharge of trial therapy before five weeks	Outpatient Randomized, prospective study	Intervention with CBT, fluoxetine hydrochloride or combination for one year	High self-esteem associated higher acceptance of Rx (51%)
Swan-Kremeier et al., 2005 ²⁵	One hundred and thirty-nine adult patients, 2.7% male, 2 sites, mean age at the 2 sites: 27.6, 26.5	BN 81.4%, EDNOS 73.4%, AN 52.9% Patient was considered a drop-out if termination was not indicated in the final documentation Mean age 27.6 for completers vs 26.5 for drop-out cases	Observational Case record study	Outpatient eating disorder program	Being employed, having BN or EDNOS vs AN were also associated with attrition, but were not significant Living closer to the Rx not associated attrition
Bandini et al., 2006 ²⁶	Sixty-seven patients with AN, BN or EDNOS, 3 male AN-R: 22, mean age 23.6, BMI 17.1 AN-P: 9, mean age 22.4, BMI 16.8 BN: 9, EDNOS: 24	AN-R 27.3%, AN-P 33.3% BN 25%, EDNOS 21% Patients' decision for a premature termination of treatment before the planned conclusion date Early drop: <6 weeks Intermediate: six weeks, but before the BMI≥18 Late drop-out: after stabilising body weight and/or 70% reduction of compensatory behaviours	Consecutive series of patients at eating disorder outpatient clinic	Multidisciplinary team (included dietician) approach and individual CBT for nine months	Attrition significantly higher in patients with AN-P vs others Significant association with attrition also of patient low cooperativeness, frequency of purging episodes, severity of restrictive eating, use of several weight control practices and psychiatric comorbidity.
Lock et al., 2006 ²⁷	Eighty-six AN, aged <18 years, 91% female, 19% AN-P, mean age 15.1 years	9% trial attrition and 11% Rx attrition i.e. attending <80% of the sessions (short-term <8 sessions, long-term <16 sessions)	Assessor blinded, outpatient, randomised, controlled trial	Family therapy, comparing short term family therapy (10 sessions and six-month treatment) with longer term therapy (20 sessions and 12-month treatment)	Comorbid psychiatric disorder; being randomised to longer treatment was associated with greater Rx attrition

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Study	Sample and inclusion criteria	Attrition rate and definition	Type of study and context	Treatment	Predictors of attrition
Stein et al., 2011 ²⁸	Sixty-nine females, four AN, 45 BN, 18 EDNOS-BN, two EDNOS-AN, age 18–35 AN, BN based on the DSM-IV	45% overall attrition, four were randomised but did not start Rx, 27 (39%) were Rx attrition (one withdrawn), post Rx 45%, 30 didn't compete a one-month follow-up and 31 didn't complete a six-month follow-up	Outpatient, randomised, controlled trial	IIP designed to alter the non-weight related self-cognitions as the means to promote recovery and health versus SP	No baseline differences between groups in Rx attrition 68% completed IIP vs 50% SP Post Rx attrition higher in IIP group and older aged participants Attrition was highest during treatment phase but no significant predictors were found During the follow-up phase, a greater increase in inter-relatedness was associated with increased late drop-out
Rodriguez-Cano et al., 2012 ²⁹	One hundred and ninety-six were recruited, 151 completed the whole assessment; 31 (20.5%) AN-R, 13 (8.6%) AN-P, 45 (29.8%) BN-P, 10 (6.6%) BNNP, 52 (34.4%) EDNOS. Mean age 22.9 for drop-out vs 23 for completers Mean BMI 21.8 vs 24.7 for drop-outs; 32.45% drop-outs	32.45% Drop-out: those who failed to return were reassessed at the two-year follow-up One hundred and twenty-one patients continued in treatment at the two-year follow-up	Outpatient Observational, prospective cohort study	Psycho-education (six sessions), cognitive group therapy (two sessions), family work (four sessions), motivational therapy (12 sessions), nursing input to aid nutrition (20 sessions), pharmacological Rx for comorbid mood disorder	Scores on pre-contemplation at the beginning were predictors for drop out at the two-year follow-up Character variables such as responsibility, integrity and self acceptance were protective factors at the pre-contemplation stage-of-change

AN, anorexia nervosa; BMI, body mass index (kg/m²); BN, bulimia nervosa; CBT, cognitive-behavioural therapy; ED, eating disorder; EDNOS, eating disorder not unless otherwise specified, unless otherwise specified DSM-IV diagnostic criteria were used; IIP, identity intervention program; P, binge eating/purging type; R, restricting type; Rx, therapy or treatment; SP, supportive psychotherapy.

a lower level of education^{14,19}, low BMI⁷ and poor therapeutic alliance²¹.

Outpatient studies

There were few studies that examined the same/similar predictors. Like inpatient studies, Bandini et al.²⁶ found that attrition was

significantly higher in patients with AN-P than AN-R, in those with use of other compensatory behaviours and in those with other psychiatric comorbidity. Waller²³ also found that 'bulimic' and borderline features were associated with attrition, but this was a study which included a

majority of BN patients. Lock et al.²⁷ also reported comorbid psychiatric disorder; they also reported that being randomised to longer treatment predicted greater drop-out in an adolescent population. One study²⁹ examined the stage-of-change and found that being pre-contemplative

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Table 3 Qualitative studies of attrition in anorexia nervosa participants.

Study	Sample and inclusion criteria	Definition of attrition	Therapy, methods	Findings
Nordbo et al., 2012 ³⁰	Thirty-six female AN patients receiving Rx within the past two years at four clinical institutions in Norway. Twenty-three outpatient, 11 inpatient, aged 18–39, mean 26.5	All but two patients were still receiving Rx at the time of interview	Twenty-three were receiving outpatient Rx and 11 were receiving inpatient Rx Interviews were tape recorded, transcribed and analysed using QSR-NVivo7 (QRS International, Melbourne, Australia) software	Seven core obstacles were found to interfere with the informants' 'wish to recover' as follows: perception of being judged by others, feelings of hopelessness, despair or depression, denial of illness, not wanting to eat or gain weight and not perceiving benefits of change
Eivors et al., 2003 ³¹	Twenty-eight AN patients in partial or full remission, eight participants Five narrative accounts and seven interviews accomplished Have dropped out of therapeutic contact within two years of the start of the research (September 96–98)	Approximately 50% had dropped out Regular treatment relationship which ends by the patient's unilateral decision	Psychotherapeutic approach (CBT, personal construct and psychodynamic approach) Social constructionist revision, grounded theory Semi structured interviews	Highlighted central theme of control and needing to stay in control as well as the treatment milieu and experience in contributing to attrition

AN, anorexia nervosa; BMI, body mass index (kg/m²); CBT, cognitive-behavioural therapy; Rx, therapy or treatment.

predicted a two-year attrition and that personality features such as self-acceptance were protective factors at the pre-contemplation stage. Two studies in younger samples^{22,23} examined parental expressed emotions and found over involvement and critical comments to be associated with attrition.

Qualitative studies

Both qualitative studies were conducted in adults. The first looked at the role of reluctance to recover in drop-out of treatment³⁰. Seven core obstacles were described that had interfered with the informants' wish to recover. These were: perception of being judged by others, feeling 'stuck' or hopeless, feeling depressed, not acknowledging AN, not wishing to recover through eating or gaining weight and not appreciating the benefit of recovery versus having AN. The second study explored the expe-

rience of eight women who dropped out of treatment³¹. In this study, the perceived loss of 'control' in conditions created by the therapeutic milieu appeared to prompt dropping out of treatment.

Discussion

The present review found a small number of consistently investigated predictors of treatment attrition. In two or more studies, AN-P, personality, some eating disorder features and psychiatric co-morbidity were consistently associated with attrition. Most findings, in particular the increased attrition in AN-P, were also consistent across treatment settings. Severity and type of eating disorder psychopathology such as having a low desired weight, bulimic symptoms and more severely restrictive eating, were also associated with attrition in either inpatient or outpa-

tient treatment settings. In three of the four (two outpatient) studies investigating psychiatric disorder, such comorbidity was found to be a predictor of drop-outs.

In addition, in almost all studies, the presence of a personality disorder or other personality characteristics associated with a personality disorder, were also associated with higher attrition. The results support other findings that eating disorder patients with more complex psychopathology may require additional treatment to address interpersonal deficits or mood intolerance as in the trans-diagnostic therapy of Fairburn³². However, there were inconsistencies; such as, in one study, lower self esteem²⁴ predicted attrition and in one study, higher self-esteem predicted attrition¹⁶. Thus, attrition need not imply poorer pre-treatment function.

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Four of the inpatient and two of the outpatient studies found no association between demographic features and attrition, and in one study, there was lower attrition with poorer geographic accessibility. Duration of illness and previous treatment were also inconsistently predictive of attrition. These findings support the importance of not rationing care provision on the basis that those from a particular age or other demographic group, or with longer illness duration or a history of previous care may be less (or more) likely to leave treatment prematurely.

There were insufficient studies of adolescents in previous literature for comparative analyses with inpatient or older patient groups. One study examined parental expressed emotions²² and the other looked at predictors of drop-out and remission in family therapy for adolescent AN in a randomised clinical trial²⁷. Higher expression of emotions was identified as a predictor for drop-out in the adult²² as well as in the adolescent sample²². Psychiatric comorbidity was identified as a predictor of drop-out in the adolescent study as well as in two of the three adult studies.

Attrition rates in the present review ranged from around 20% to almost 60%, but most attrition rates were around 30%. This negates the view that patients with AN have necessarily high attrition^{24,33} despite the known low levels of motivation. However, there was only one quantitative study that examined the stage-of-change²⁹ and one that reported results on 'cooperativeness'²⁶. Themes emergent in the two qualitative studies^{30,31} support the need to address the perceived benefits of AN to the patient and its likely contribution to patients leaving treatment early.

The review's strengths were in the systematic search and appraisal of studies and the consensus between two authors on the data extracted. Limitations include the reporting

of findings in studies of mixed diagnostic groups where data on AN alone could not be elicited, and that no authors were approached for data and there was no 'grey' literature search.

Critical appraisal of the validity of relevant articles

Articles identified in the present review focussed largely on treatment attrition in inpatient programs. A major gap identified was the need for more research on adolescent samples and the relationship of stage-of-change to attrition. Studies should also comprehensively assess a range of factors that may be associated with attrition and employ multivariate designs to investigate the relative strength of prediction. Quantitative studies have focused on factors in the participants; however, research is needed on factors in the treatment milieu and health care providers. As in prior reviews, disparate definitions of attrition are problematic, and studies should examine trial as well as treatment attrition and the temporal stage of attrition as factors may vary.

Conclusion

Overall, attrition is not necessarily 'high' in AN patients, amounting to usually around one third of patients. Clinicians should not prejudge the likelihood of attrition, even in patients with long standing illness. However, the use of purging behaviours is an important indicator of the increased rate of attrition. Leaving treatment early may also have as much, if not more, to do with therapeutic engagement than with the age of the patient, duration and severity of illness or prior failed therapy. Such engagement rests on factors in the clinic, the clinicians, as well as the readiness for change in the patient.

Clinical applicability

In clinical practice addressing psychiatric comorbidity, in particular mood disorder and borderline personality

traits, is important to reduce drop-out and/or the need to terminate treatment early. This may include the adjunctive use of psychotropic medications as well as specific psychological therapies such as dialectical behaviour therapy and interpersonal psychotherapy.

Abbreviations list

AN, anorexia nervosa; AN-P, anorexia nervosa purging type; AN-R, anorexia nervosa restrictive type; BMI, body mass index; BN, bulimia nervosa.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA: American Psychiatric Publishing Inc.; 2013.
2. Hudson J, Hiripi E, Pope HG Jr, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biol Psychiatry*. 2007 Feb;61(3):348–58.
3. De Jong H, Broadbent H, Schmidt U. A systematic review of dropout from treatment in outpatients with anorexia nervosa. *Int J Eat Disord*. 2012 Jul;45(5):635–47.
4. Fassino S, Piero A, Tomba E, Abbate-Daga G. Factors associated with dropout from treatment for eating disorder: a comprehensive literature review. *BMC Psychiatry*. 2009 Oct;9:67.
5. Vandereycken W, Pierloot R. Drop-out during in-patient treatment of anorexia nervosa: a clinical study of 133 patients. *Br J Med Psychol*. 1983 Jun;56 (Pt 2):145–56.
6. Kahn C, Pike M. In search of predictors of dropout from inpatient treatment for anorexia nervosa. *Int J Eat Disord*. 2001 Nov;30(3):237–44.
7. Surgenor LJ, Maguire S, Beumont PJV. Drop-out from inpatient treatment for anorexia nervosa: can risk factors be identified at point of admission? *Eur Eat Disorders Rev*. 2004 Mar–Apr;12(2):94–100.
8. Woodside DB, Carter JC, Blackmore E. Predictors of premature termination of inpatient treatment for anorexia nervosa. *Am J Psychiatry*. 2004 Dec;161(12):2277–81.
9. Tasca GA, Taylor D, Ritchie K, Balfour L. Attachment predicts treatment completion in an eating disorders partial hospital program among women with

- anorexia nervosa. *J Pers Assess.* 2004 Dec;83(3):201–12.
10. Franzen U, Backmund H, Gerlinghoff M. Day treatment group programme for eating disorders: reasons for drop-out. *Eur Eat Disorders Rev.* 2004 May-Jun;12(3):153–8.
11. Zeeck A, Hartmann A, Buchholz C, Herzog T. Dropouts from in-patient treatment of anorexia nervosa. *Acta Psychiatr Scand.* 2005 Jan;111(1):29–37.
12. Carter JC, Bewell C, Blackmore E, Woodside DB. The impact of childhood sexual abuse in anorexia nervosa. *Child Abuse Negl.* 2006 Mar;30(3):257–69.
13. Masson PC, Perlman CM, Ross SA, Gates AL. Premature termination of treatment in an inpatient eating disorder programme. *Eur Eat Disord Rev.* 2007 Jul;15(4):275–82.
14. Dalle Grave R, Calugi S, Brambilla F, Marchesini G. Personality dimensions and treatment drop-outs among eating disorder patients treated with cognitive behaviour therapy. *Psychiatry Res.* 2008 Apr;158(3):381–8.
15. Nozaki T, Motoyama S, Arimura T, Morita C, Koreeda-Arimura C, Kawai K, et al. Psychopathological features of anorectic patients who dropped out of inpatient treatment as assessed by the Minnesota Multiphasic Personality Inventory. *BioPsychoSocial Med.* 2007;1:15.
16. Bjorck C, Bjork T, Clinton D, Sohlberg S, Norring C. Self-image and treatment drop-out in eating disorders. *Psychol Psychother.* 2008 Mar;81(Pt 1):95–104.
17. Neeren AM, Butryn ML, Lowe MR, O'Planick AP, Bunnell DW, Ice SM. Does attrition during follow-up bias outcome in studies of eating disorders. *Eat Behav.* 2010 Jan;11(1):40–4.
18. Vandereycken W, Vansteenkiste M. Let eating disorder patients decide: providing choice may reduce early drop-out from inpatient treatment. *Eur Eat Disord Rev.* 2009 May;17(3):177–83.
19. Huas C, Godart N, Foulon C, Pham-Scottez A, Divac S, Fedorowicz V, et al. Predictors of drop out from inpatient treatment for anorexia nervosa: data from a large French sample. *Psychiatry Res.* 2011 Feb;185(3):421–6.
20. Pham-Scottez A, Huas C, Perez-Diaz F, Nordon C, Divac S, Dardennes R. Why do people with eating disorders drop out from inpatient treatment?: the role of personality factors. *J Nerv Ment Dis.* 2012 Sep;200(9):807–13.
21. Sly R, Morgan JF, Mountford VA, Lacey JH. Predicting premature termination of hospitalised treatment for anorexia nervosa: the roles of therapeutic alliance, motivation, and behaviour change. *Eat Behav.* 2013 Apr;14(2):119–23.
22. Szmukler GI, Eisler I, Russell GF, Dare C. Anorexia nervosa, parental 'expressed emotion' and dropping out of treatment. *Br J Psychiatry.* 1985 Sep;147:265–71.
23. Waller G. Drop-out and failure to engage in individual outpatient cognitive behaviour therapy for bulimic disorders. *Int J Eat Disord.* 1997 Jul;22(1):35–41.
24. Halmi KA, Agras WS, Crow S, Mitchell J, Wilson GT, Bryson SW, et al. Predictors of treatment acceptance and completion in anorexia nervosa: implications for future study designs. *Arch Gen Psychiatry.* 2005 Jul;62(7): 776–81.
25. Swan-Kremeier LA, Mitchell JE, Twardowski T, Lancaster K, Crosby RD. Travel distance and attrition in outpatient eating disorders treatment. *Int J Eat Disord.* 2005 Dec;38(4):367–70.
26. Bandini S, Antonelli G, Moretti P, Pampanelli S, Quartesan R, Perriello G. Factors affecting dropout in outpatient eating disorder treatment. *Eat Weight Disord.* 2006 Dec;11(4):179–84.
27. Lock J, Couturier J, Bryson S, Agras S. Predictors of dropout and remission in family therapy for adolescent anorexia nervosa in a randomized clinical trial. *Int J Eat Disord.* 2006 Dec;39(8):639–47.
28. Stein KF, Wing J, Lewis A, Raghunathan T. An eating disorder randomized clinical trial and attrition: profiles and determinants of dropout. *Int J Eat Disord.* 2011 May;44(4):356–68.
29. Rodriguez-Cano T, Beato-Fernandez L, Moreno LJ, Vaz L, Francisco J. Influence of attitude towards change and self-directedness on dropout in eating disorders: a 2-year follow-up study. *Eur Eat Disord Rev.* 2012 May;20(3):e123–8.
30. Nordbo RH, Espeset EM, Gulliksen KS, Skarderud F, Geller J, Holte A. Reluctance to recover in anorexia nervosa. *Eur Eat Disord Rev.* 2012 Jan;20(1):60–7.
31. Eivors A, Button E, Warner S, Turner K. Understanding the experience of drop-out from treatment for anorexia nervosa. *Eur Eat Disord Rev.* 2003 Mar-Apr; 11(2):90–107.
32. Fairburn CG. *Trans-diagnostic cognitive behaviour therapy for eating disorders.* New York: Guilford Press; 2010.
33. Agras WS, Robinson AH. What treatment research is needed for anorexia nervosa? . In: Grilo CM, Mitchell JE, editors. *The treatment of eating disorders: A Clinical Handbook.* New York: The Guilford Press; 2010.p538.