

Dropout from Inpatient Treatment for Anorexia Nervosa: Critical Review of the Literature

Jenny Wallier, MS¹⁻⁵
 Sarah Vibert, MS¹⁻⁴
 Sylvie Berthoz, PhD¹⁻⁴
 Caroline Huas, MD^{1-4,6}
 Tamara Hubert, MS^{1,2,7}
 Nathalie Godart, MD, PhD^{1-4*}

ABSTRACT

Objective: High dropout rates from inpatient treatment for Anorexia Nervosa (AN) pose a serious obstacle to successful treatment. Because dropping out of inpatient treatment may have a negative impact on outcome, it is important to understand why dropout occurs so that treatment can be targeted toward keeping patients in care. We therefore conducted a critical literature review of studies on dropout from inpatient treatment for AN.

Method: Searches of Medline and PsycINFO revealed nine articles on this subject. Two were excluded because they did not differentiate AN from other eating disorders in analyses.

Results: Results were scarce and conflicting, with methodological issues complicating comparisons. Weight on admission, AN subtype, eating disorder symptoms, greater psychiatric difficulty in general, and the absence of depression were related to dropout in multivariate analyses.

Discussion: Authors should use a common definition of dropout and continue research on the identified predictors as well as potential predictors such as impulsivity and family factors. © 2009 by Wiley Periodicals, Inc.

Keywords: dropout; anorexia; inpatient; literature review

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Introduction

Anorexia Nervosa (AN) is a serious psychiatric disorder characterized by an inability to maintain a healthy body weight.¹ Hospitalization is necessary for many people with AN, particularly for those with the most severe cases of this disorder.¹ However, there remains a paucity of research regarding inpatient treatment for this disorder.^{2,3} Some research has suggested that patients who are hospitalized may have not only less favorable overall outcome, but also higher mortality rates.^{4,5} This is

particularly true for patients who are discharged with low body weights (i.e., patients who do not complete treatment).^{6,7}

This finding is noteworthy in light of the frequency with which patients leave hospital before care is complete: reported dropout rates for patients with AN from specialized inpatient eating disorder programs range from 20.2⁸ to 49.6%.⁹ High dropout rates pose a serious obstacle to successful treatment. Patients who drop out of inpatient care have an increased risk of relapse within the first year, endorse more eating disorder symptoms at follow-up⁷ and have a more chronic and severe course of illness.⁶ Because dropping out of inpatient treatment may have a very negative impact on outcome, it is important to understand the reasons for dropout so that treatment can be targeted toward keeping such patients in care.

A few studies have considered factors leading to dropout.⁸⁻¹⁶ Although one paper has reviewed factors leading patients with AN to drop out of all kinds of treatment,¹⁷ we were not able to uncover any systematic review considering the factors leading patients with AN to drop out of inpatient care.

Consequently, the purpose of this article is to conduct a critical literature review of studies on dropout from inpatient treatment for AN. In the first part of this article, we will discuss methodolog-

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*Correspondence to: Nathalie Godart, MD, PhD, Institut Mutualiste Montsouris, 42 Boulevard Jourdan, Paris 75014, France. E-mail: nathalie.godart@imm.fr

¹ Department of Psychiatry, Institut Mutualiste Montsouris (IMM), Paris, France

² Unit 669 Paris Sud Innovation Group in Adolescent Mental Health: Troubles des Conduites Alimentaires de l'Adolescent, Institut National de la Santé et de la Recherche Médicale (INSERM), Cochin Hospital, Paris, France

³ University of Paris Descartes, Paris, France

⁴ University of Paris-Sud, Paris, France

⁵ Institute of Psychiatry, Kings College, London, United Kingdom

⁶ Department of General Practice, University of Paris 7 Denis Diderot, Paris, France

⁷ L'Ecole des Hautes Etudes en Santé Publique, Rennes, France

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ical issues. In the second part, we will present and discuss the results.

Method

We performed a computerized search (Medline and PsycINFO) for all studies on dropout from inpatient treatment for AN published between 1950 and 2008. In addition, a manual search was performed from the references sections of papers identified.

The search identified nine studies⁸⁻¹⁶; however, two of these studies^{15,16} were excluded because they did not differentiate patients with AN from patients with other eating disorders, such as bulimia nervosa (BN) or eating disorder not otherwise specified (EDNOS). The remaining seven studies were published between 1983 and 2006 (see Table 1, Lines 1-20). Two of them^{11,13} appear to have been conducted in the same treatment ward, although it is unclear whether they concern at least in part the same sample of patients. The diversity of sample compositions, treatment approaches, definitions of dropout, and the type of factors evaluated made it impossible to conduct a meta-analysis of all available studies. Therefore, the following is a descriptive review of methodological issues and findings.

Results

Table 1 presents all articles included in the review.

Methodological Issues

Methodological issues in comparing studies were identified in terms of differences in four factors: sample compositions, treatment modalities, definitions of dropout, and factors considered as predictors of dropout.

Sample Composition

Patient characteristics. The seven studies had widely varying sample sizes. In addition, patients differed on admission to inpatient care in terms of age, Body Mass Index (BMI) or percentage of ideal body weight, duration of illness in years and type of AN (restrictive vs. binge-eating/purging type) (see **Table 1**, Lines 2-6).

The number of patients included varied from 77¹³ to 268¹⁴ (see **Table 1**, Line 1). Statistical power and the number of factors considered depend largely on the sample size. Studies with small samples may not have enough power to adequately consider dropout from inpatient treatment, as it is most likely explained by a large number of factors.

Numbers of patients included per factor studied varied from ~ 11¹² to ~ 20.¹⁴ In most of the studies, the number of patients included reflects the number of patients admitted per year and the duration of the study, with most patients opting to participate in the research. However a few of the studies did have lower attrition rates.^{8,9,13}

Age of patients on admission ranged from a mean of 16.7 (SD = 2)¹⁴ to 27.1 (SD = 9)¹¹ (see **Table 1**, Line 2). Only one study¹⁴ focused on adolescents; the other studies concerned adult or mixed adolescent and adult samples. The factors leading younger patients to drop out of treatment may be different from those leading older, adult patients to do so. This may be especially true for patients who are minors and legally need their parents' approval to leave the hospital before the end of treatment.

BMI and the percentage of ideal body weight on admission were also variable: Mean BMI ranged from 13.5 (SD = 1.3)¹⁴ to 15.1 (SD = 1.8)¹² (see **Table 1**, Lines 3 and 4). Percentage of ideal body weight statistics were available for only two of the seven studies.^{9,12} The range in BMI on admission suggests varying clinical severity of patients included, with the most severely affected patients having the lowest BMI.¹⁸ Different factors may be related to dropping out of inpatient treatment for patients with different clinical profiles. Patients who have more weight to gain at the outset are likely to need longer hospitalizations and may encounter different roadblocks to the successful completion of treatment. However, it should be noted that age at admission may be in part responsible for the lowest BMI at admission observed because average BMI increases with age in the general population.¹⁹ In line with this point, the lowest BMI observed was identified in the study that had the youngest patients.¹⁴

Similarly, the duration of AN on admission (see **Table 1**, Line 5) varied across studies, from 20.4 months (SD = 17.2)¹⁴ to 7.8 years (SD = 6.1).¹² The duration of AN is most likely related to both the severity of the disorder, with patients having a longer duration also being more severely affected by the disorder, and to the age of patients, with younger patients having shorter illness durations. A longer duration of AN on admission to hospital suggests that patients may be more resistant to treatment²⁰ and that they may have already been treated unsuccessfully as inpatients, both of which are likely to lead to different risk factors for dropping out of treatment.

Inclusion/exclusion and recruitment criteria. Important differences in these studies were also observed notably in terms of the number of

TABLE 1. Description and results of the drop out studies reviewed

Ref.	Ref. 9	Ref. 12	Ref. 11	Ref. 8	Ref. 10	Ref. 14	Ref. 13
1	133/145 consecutive patients (12 cases were excluded because their clinical files were incomplete)	81/81 females	Consecutive first admission 166/166 patients (163 female and three male patients)	213/227 inpatient treatment episodes	First treatment episode 133/236	268 /268 consecutive hospitalizations patients	77/113 consecutive females 18 refused 18 excluded
2	Age (SD) or range	26.3 (7.4)	27.1 (9)	21.4 ^a	24.8 (6.8)	16.7 (2.0)	25.5 (7.8)
3	Admission BMI (SD)	15.1 (1.8)	14.9 (1.8)	14.6 ^a	14.6 ^a	13.5 (1.3)	15.0 (1.6)
4	%IBW at admission (SD)	30.9% (9.7) (per cent loss vs. ideal weight)	68.7% (8.4)				
5	Duration of illness at admission in years (if not mentioned) (SD) or range	3.1 (3.1)	7.8 (6.1)	5.1 ^a	6.9 ^a	20.4 months (17.2)	6.7 (7.2)
6	Percentage of binge-eating/purging subtype	Not mentioned	63% Binge purge behavior	30% AN binge-eating/purging subtype	47.3% bingeing/purging	19% AN purging subtype	41.4% Binge-eating/purging
7	Single or Multi-center	Single	Single	Multiple (5)	Single	Single	Single
8	Inclusion Period	12 years (1967–1979)	4 years (1994–1998)	18 months	13 years (1990–2003)	8 years (1996–2004)	5 years (2000–2005)
9a	Inclusion Criteria	–Diagnostic criteria for anorexia nervosa according to Feighner –Female	–DSM IV –Female –weight less than 80% IBW [according to the Metropolitan Life Insurance Tables (1959)] –Alcohol or drug dependence in the last 6 months –A bipolar illness or psychotic disorder	–DSM IV –male and female	–DSM IV /ICD 10 –male and female –First hospitalization	–DSM IV –Female	–DSM-IV (EDE) –Female
9b	Exclusion criteria	male	Not mentioned	Not mentioned	Patients with atypical anorexia nervosa (ICD 10)	–Male –Diabetes ^b –Physical illness ^b –Neurological illness ^b	–Patients who were victims of sexual abuse after age 18 and after the onset of their eating disorder
10	Type of treatment	A: First phase 1967–1974: Medical regime combined with psychotropic drug 1974–1979: three different forms of behavior therapy consecutively applied: type 1: deprivation with isolation and reinforcement of weight gain Behavior therapy type 2: deprivation and isolation only at beginning of treatment Behavior therapy type 3: no deprivation, weight gain contract B: Second phase when patient reached her target weight (at least 90% of her ideal body weight) Group psychotherapeutic program	Multi-disciplinary approach –Medical management and group therapy –Individual, family and group therapy –Nutritional rehabilitation. Behavioral two phase model: weight gain and maintenance	24-h inpatient treatment, each service with its own unique service and provision issues, informed by common clinical practice guidelines and treatment philosophies	Psychodynamic orientation –Individual and group sessions –Body oriented therapy –Art therapy –Cognitive interventions. Treatment contract with minimum weight gain of 500-750g/week After reaching the target weight, patients treated for another 8 weeks to stabilize weight gain and prepare for discharge	Multidisciplinary approach Psychodynamic background –Individual and group sessions –Body oriented therapy –Art therapy –Normalization of eating –Restoration of body weight Weight contract based on two weights: 1) separation end weight: The patient cannot meet or communicate with the outside world 2) final discharge weight: weight to be reached in order to be discharged	Intensive group therapy directed at normalization of eating behavior and restoration of body weight.

TABLE 1. (Continued)

Ref.	Ref. 9	Ref. 12	Ref. 11	Ref. 8	Ref. 10	Ref. 14	Ref. 13
11	Discharge target	Two phased contract: A. 90% IBW B. Sufficient psychotherapeutic progress	90% IBW maintained for 2 weeks	BMI: 20	Varies for each site	BMI between 18 and 19	BMI 20
12	Average duration of hospitalization for all patients and for patients who dropped out of (SD)	Phase A: 8–15 weeks Phase B: 9–12 months Not mentioned	Completers: 106 days (47) DO = 36 (21) days	All patients: 10.6 weeks (6.3)	Not mentioned	All patients: 19.1 weeks ^a DO = 10 (7.5) weeks Completers = 23.3 (9.5) weeks	All patients: 12.4 weeks (5.8)
13	Drop-out (Patient vs. Staff initiated)	Patient. (parents must sign a paper stating that they officially take responsibility for the discharge against medical advice if inpatients are under 21 years)	Patient	Staff or patient	Patient	Staff or patient	Staff or patient
14	Drop out (DO) criteria	Discharge before the end of the global inpatient program	Discharge prior to reaching their target weight of 90% of IBW and maintaining it for a minimum of 2 weeks	Discharge before achieving a BMI of 20 Discharged by staff because of lack of progress, repeated violation of program norms (e.g., purging on the unit), on the development of serious comorbidity (e.g., psychosis)	1. Self-discharged from hospital against medical advice (AMA) 2. Simply left the inpatient setting resulting in the designation of absent without leave (AWOL)	Any one-sided (team or patient) decision for a premature termination of treatment before planned regular discharge date. -Patients are discharged by team with the possibility of return if there is a stagnation of weight over a longer period of time -Patients are discharged by team mainly because of insufficient weight gain or motivation	Patients may choose to leave the program at any time because of lack of progress (failure to gain weight) or repeated violation of program norms (e.g. purging on the unit). Staff may also choose to discharge patients, typically due to lack of progress or repeated violation of program norms
15	Timing of drop out	Group A: leaving during the first phase of treatment Group A1: Drop out within one week after admission Group A2: Drop out between the 2nd week after admission and the beginning of the 2nd treatment phase Group B: leaving during the 2nd phase of treatment Group C: completers	Early DO: ≤ 80% of IBW (mean stay of 22.62 days) Late DO: ≥ 81% of IBW (mean stay of 48.64 days),	No distinction	No distinction	Early DO: during the first six week of therapy Middle DO: after six weeks but before reaching the target weight Late DO: after reaching the target weight during the phase focused on preparation and discharge	No distinction

TABLE 1. (Continued)

Ref.	Ref. 9	Ref. 12	Ref. 11	Ref. 8	Ref. 10	Ref. 14	Ref. 13
16	% drop-out Total = 57.6 % Group A = 21.8% (A1=9.8%, A2=12%) Group B = 35.8%	Total = 33.3% Early = 16% Late = 17.3%	Total = 51%	Total = 20.2%	Total = 31.6% Early = 9.7% Middle = 15.0% Late = 6.8% Staff initiated: 12.8% Patient initiated: 18.8%	Total = 24.6% Early = 9% Late = 15.6 % Staff initiated: 50% Patient initiated: 50%	Total = 36% CSA: 43% No CSA: 57% (No sig. difference)
17	Non significant variables for DO(univariate)	<ul style="list-style-type: none"> -Lowest BMI -Percent of IBW at time of admission -Age at admission -Age at onset of AN -Duration of illness -Number of previous hospitalizations 	<ul style="list-style-type: none"> -Frequency of binge eating and purging behaviour in the 3 months before admission -Max et min previous weight -Age at admission -Age at onset -Duration of illness 	<ul style="list-style-type: none"> -Bulimia 	<ul style="list-style-type: none"> -Binging/purging (DO : 52.4% ; completers : 45,1%) -BMI at admission -Minimal BMI -Age at admission -Age of onset -Duration of illness 	<ul style="list-style-type: none"> -AN subtype -Max et min previous BMI -Age at admission -Duration of illness -Number of previous hospitalisations -Length since first treatment 	<ul style="list-style-type: none"> -Patients with CSA (single or multiple episode of abuse)
			<ul style="list-style-type: none"> -Previous use of specialized treatment for an eating disorder -Marital status -Employment status -Living situation 	<ul style="list-style-type: none"> -Previous inpatient treatment in an eating disorders unit -Previous outpatient treatment -Previous daypatient treatment -Inpatient readmission within 28 days -Mean (SD) age in years - Mean (SD) number of years since first diagnosis -domiciled in city where treatment is provided Male -Never married 	<ul style="list-style-type: none"> -Psychiatric in-patient -Previous drop out 	<ul style="list-style-type: none"> -Educational status -Socioeconomic status 	
				<ul style="list-style-type: none"> -Living with -Education -Partnership -Gender 			
				<ul style="list-style-type: none"> Clinical features : <ul style="list-style-type: none"> -Excessive exercising, -Laxative abuse, -Diuretic abuse, -Appetite suppressant use, -Vomiting over last 3 months, -Objective bingeing over last 3 months -Presence of any abnormal biochemical status, -Abnormal ECG, -Clinical dehydration, 			

TABLE 1. (Continued)

Ref.	Ref. 9	Ref. 12	Ref. 11	Ref. 8	Ref. 10	Ref. 14	Ref. 13	
		-BSQ, mean (SD) -EAT, mean (SD) -RSE, mean (SD) -BDI, mean (SD) -SCL-90-R, mean (SD) -IIP, mean (SD)		-Mean (SD) EAT score -Mean (SD) Rosenberg Self-esteem score -Mean (SD) Beck depression Inventory score Psychological measures Mean (SD) EDI-2 scale scores (1) -Comorbidity -Any additional Axis I or Axis II disorder -History of illicit drug use over preceding 3 months -History of hazardous, harmful, or dependant alcohol consumption over preceding 3 months -History of self-harm over lifetime -History of self-harm over preceding 3 months -History of suicide attempt over lifetime -History of suicide attempt over preceding 3 months 39 (31 without subscales)	-SCL-90-R, mean (SD) (3) -IIP-C, mean (SD) (4) -EDI, Mean (SD) (2) Comorbidity with : -A personality disorder(DSM IV), -Obsessive-compulsive disorders (DSM IV, ICD 10) -Without comorbidity			
TOTAL number of Non significant factors for DO	12	9	9	2	41 (18 without subscales)	8	1	
18	None	None	Higher weight concern (EDE) Lower restraint (EDE) Higher maturity fears (EDI)	AN purging type Lower BMI at admission		Higher BMI at admission Lower BMI at discharge Later age at onset Longer Duration of hospitalization	AN-B with history of childhood sexual abuse	
Risk factor for DO multivariate	0	0	3	2	2	4	1	
TOTAL number of risk factor for DO multivariate	0	0	3	2	2	4	1	

Notes: AD, administrative discharge; AN, Anorexia Nervosa; BMI, Body Mass Index; BDI, Beck Depression Inventory; BN, Bulimia Nervosa; BSO, Behavior Screening Questionnaire; CSA, Childhood Sexual Abuse; DO, Drop out; DSM IV, Diagnostic and Statistical Manual-Revision 4; EAT, Eating Attitudes Test; ECG, Electrocardiogram; EDI II, Eating Disorder Inventory II, second version; (1) Subscales: Drive for thinness-Body dissatisfaction-Ineffectiveness-Perfectionism-Interpersonal distrust-Interceptive awareness-Maturity fears-Ascetism-Impulse regulation-Social insecurity. (2) Subscales: Drive for thinness-Bulimia-Body dissatisfaction-Ineffectiveness-Perfectionism-Interpersonal distrust-Interceptive awareness-Maturity fears. (5) Subscales-Maturity fears-Ineffectiveness-Drive for thinness-Impulse regulation; EDNOS, Eating disorder not otherwise specified; IBW, Ideal body weight; ICD 10, International Classification of Diseases; IIP-C, Inventory of Interpersonal Problems; (4) Subscales PA, dominance; BC, vindictive; DE, cold; FG, socially avoidant; HI, non-assertive; JK, exploitable; LM, overly nurturing; NO, intrusive; SCL-90R: Symptom Checklist 90R; (3) Subscales: Somatization-Obsessive-compulsive-Interpersonal sensitivity-Depression-Anxiety-Anger- hostility-Phobic anxiety-Paranoid ideation-Psychoticism-GSI; RSE, Rosenberg Self-Esteem scale; SD, Standard deviation.

^a Calculated using data provided in paper.
^b Not mentioned in the paper.
^c Information not presented in the paper.

treatment centers, the length of the inclusion period, the reinclusion of a rehospitalized patient already included in research, the number of patients included, the sex of patients included, the diagnostic criteria used and other inclusion or exclusion criteria.

Of the seven studies considered, one was a multicenter project,⁸ while the others were single-center projects (see **Table 1**, Line 7). Examining this issue through data collected in more than one hospital center may reduce the effect of the type of treatment on factors related to dropping out of treatment.

The length of the inclusion period was also variable, lasting 18 months in the multicenter study⁸ and 13 years in the research with the longest inclusion period¹⁰ (see **Table 1**, Line 8). For one study, the length of the inclusion period was not reported.¹¹ Comparing studies with largely different inclusion periods is problematic because a longer inclusion period increases the possibility that a third factor (e.g., factors related to treatment changes) will influence results.

Each research team approached the issue of potentially reincluding a patient who had already been hospitalized and included in the study differently (see **Table 1**, Line 8). Although some studies specified that they included only the first inpatient treatment episode,^{10,11} others included patients who were rehospitalized during the inclusion period.^{9,14} Furthermore, while some studies included patients hospitalized consecutively who met other inclusion criteria,^{9,11,13,14} other studies did not specify whether the hospitalizations were consecutive^{8,10,12}

Although most studies included only female participants, three included both male and female participants^{8,10,11} (see **Table 1**, Lines 9a and 9b). However, it is possible that different factors predict dropout for male and female patients.

Diagnostic criteria for AN and the diagnostic method used also varied across the studies considered (see **Table 1**, Line 9a). One study used Feighner criteria,⁹ three used a DSM IV diagnosis only,^{8,12,14} one used a DSM IV diagnosis and an ICD 10 diagnosis,¹⁰ and only two^{11,13} used a diagnostic instrument to establish DSM IV diagnoses (Eating Disorder Examination (EDE²¹)).

Treatment Programs. The treatment programs used in each study differed in terms of the treatment itself, the average length of hospitalization, and discharge criteria.

The biggest differences across studies related to the type of treatment given to inpatients (see

Table 1, Line 10). Vandereycken and Pierloot's⁹ study occurred over a 12-year period and during this time, treatment protocols changed. Treatment was consistently biphasic, with a first phase (A) focused on weight gain and a second phase (B) focused on a group psychotherapeutic program. Changes occurred during phase (A), which evolved through four distinct methods: medical regime, behavior therapy focused on deprivation and isolation with reinforcement of weight gain, behavior therapy with deprivation and isolation only in the beginning of treatment, and finally, behavior therapy with a weight-gain contract, not including deprivation or isolation. Kahn and Pike¹² studied a behavioral two phase model (weight gain and maintenance), based on a multidisciplinary approach. Similarly, Woodside et al.¹¹ and Carter et al.,¹³ based in the same treatment center, used a two phase approach. The first phase included normalization of eating behavior and restoration of body weight and the second phase focused on individual and sometimes family psychotherapy, nutritional rehabilitation, group therapy and medical treatment. Few limitations to privileges were imposed during treatment. Two centers^{10,14} used psychodynamic approaches to treatment. Zeck et al.'s¹⁰ study included treatment with individual and group sessions, body oriented therapy, art therapy, nutritional education and cognitive interventions. A treatment contract with a minimum weight gain of 500–750 g/week was also used. The study of Godart et al.^{14,22} included individual and group sessions, body oriented therapy, art therapy, social work, normalization of eating and restoration of body weight. Treatment was biphasic and centered on two weights: (1) the separation end weight—until reaching this weight the patient is not allowed contact with her usual living environment. (2) Final discharge weight—the weight to be reached in order for discharge to occur. The multicenter study⁸ did not detail treatment practices, as they differed between centers.

Discharge criteria varied from one study to another (see **Table 1**, Line 11) and depended somewhat on the type of treatment provided. In two studies, patients were discharged when reaching a BMI of 20.^{11,13} In another study, patients were discharged when they reached a BMI of 18–19.¹⁰ Two studies used the criteria of 90% of IBW maintained for 2 weeks^{9,12} although one of these studies also required that sufficient psychotherapeutic progress be made in a second phase of treatment.⁹ Another study¹⁴ discharged patients when they reached a weight linked to their personal pre-AN percentage on the BMI curve, for an average BMI of 17.5. The

last study was unclear regarding discharge criteria,⁸ most likely because this study was multicenter and each center may have had its own discharge criteria.

In light of these large variations in treatment strategies and discharge criteria, average lengths of hospitalization were also highly variable, ranging from 10.6 weeks (SD = 6.3)¹¹ to ~ 1 year⁹ (see **Table 1**, Line 12).

Definition of Dropout. Definitions of dropout differed across the seven studies (see **Table 1**, Line 13). Although three of the studies defined dropout as any premature termination of inpatient treatment decided unilaterally by the patient,^{8,9,12} the four other studies defined dropout as a premature termination of inpatient treatment decided by the patient and/or the treatment team.^{10,11,13,14}

In addition, as criteria for dropout were closely related to treatment objectives, no two teams established the same weight criteria for dropout (see **Table 1**, Line 14). Some studies defined dropout in terms of IBW or BMI.^{11,12} For example, Kahn and Pike¹² defined premature termination as pursuing discharge before reaching 90% of ideal body weight and Woodside et al.¹¹ used the criteria of a body mass index of 20. Godart et al.¹⁴ defined dropout in terms of individualized weight goals: any patient who did not complete her therapeutic weight contract was considered a dropout. In addition, some studies used criteria in addition to the target weight to define dropout. Vandereycken and Pierloot⁹ also defined as dropouts patients who did not complete the psychotherapeutic aspect of care. Kahn and Pike¹² included as dropouts patients who did not complete the weight-stabilization phase of treatment after reaching their target weight.

Some studies made no distinctions in the timing of dropout,^{8,11,13} meaning that dropping out of treatment in the beginning and at the end were not considered differently (see **Table 1**, Lines 15 and 16). Other studies separated patients who dropped out of care into various combinations of early, middle and late dropouts. Vandereycken and Pierloot⁹ divided patients into two categories: those who dropped out during phase (A) (focused on weight gain) and those who ended treatment during phase (B) (longer, psychotherapeutic) phase. The patients who dropped out of treatment during the first phase were then divided into two groups: those leaving within 1 week following admission and those leaving between the second week following admission and the beginning of the second treatment phase. Kahn and Pike¹² also categorized patients who dropped out of treatment into groups

of early and late dropouts. Patients were considered to be early dropouts if they were discharged at or below 80% of their IBW and late dropouts if they were discharged at or above 81% of their IBW. Godart et al.¹⁴ classified patients as early or late dropouts depending upon the timing of the dropout in relation to therapeutic objectives: patients who dropped out before the end of the separation period were early dropouts and patients who dropped out after completing the separation period were late dropouts. Finally Zeeck et al.¹⁰ created groups of early, middle and late dropouts. For that research, early dropouts left inpatient care during the first 6 weeks of therapy, while middle dropouts left after 6 weeks but before reaching their target weight, and late dropouts left after reaching their target weight during the phase focused on separation and preparation of discharge.

Factors Considered as Potential Predictors of Dropout. Studies also varied widely in regards to the number of factors considered as potential predictors of dropout. The number of factors considered in univariate analyses in the studies varied from 2¹³ to 48.¹⁰ Examining a larger number of factors increases the possibility of identifying predictors. However, in most of these studies, power was limited by small samples, and the authors may have been unable to consider a larger number of factors.

Findings

Significant Factors for Dropout: Univariate Analyses. All seven of the studies used univariate analyses to consider the relationship between various factors and dropout from inpatient treatment. Findings are presented below, in order of frequency of variable consideration, beginning with those variables the most often considered and ending with those considered by only one study. Variables examined by one or more studies but not found to be significant through univariate analyses are listed at the end of this section.

Out of seven studies, all except two^{9,13} examined the relationship between AN binge-eating/purging subtype and drop out from inpatient treatment through univariate analyses. Half of the studies^{8,11,12} found that the presence of AN binge-eating/purging subtype was related to an increased risk for dropout.

Six studies considered weight (BMI or IBW) on admission as a possible predictor for dropping out of inpatient care. Two studies found that higher BMI on admission was a risk factor for dropping out of care^{11,14}; the third found that a lower BMI on admission led to a greater risk for dropping out of

inpatient care.⁸ Similarly, one study evaluated the relationship between percentage IBW on admission and dropout but did not find any relationship.¹²

All the studies except for one¹³ considered age on admission. Only one found a relationship between this factor and dropping out of care, with older patients being more likely to dropout.⁹

Two studies evaluated weight (BMI) on discharge.^{10,14} Both found that lower BMI on discharge was related to dropout.

Three out of seven studies examined depression as a risk factor for dropout from inpatient treatment.^{10–12} Two studies considered depression dimensionally^{11,12} and the third categorically.¹⁰ Results are contradictory. One study found that higher scores on the Beck Depression Inventory (BDI²³) were related to dropping out of inpatient care,¹¹ although this relationship did not hold when analyses were controlled for AN subtype (see section on multivariate analyses). This finding may be explained by the relationship between increased scores on the BDI and severity of AN^{24,25}; thinner patients and those with more eating disorder symptoms tend to have higher Beck scores. In contrast, another study¹⁰ found that the absence of a categorical DSM IV diagnosis of depression was related to dropping out of care. In this case, depression may increase patients' awareness of their need for help, effectively keeping them in care. The third study found no relationship between symptoms of depression and premature termination of care,¹² although it is possible that this result is skewed by that study's exclusion criteria, which did not include patients with alcohol or substance abuse problems, who may also have been more likely to suffer from depression.

Two studies considered whether the "Maturity Fears" subscales of either the Eating Disorder Inventory 2 (EDI 2^{10,26}; or the EDE^{11,21}) were related to dropping out of hospital care.¹¹ They both found that greater maturity fears lead to premature termination of treatment, although this finding was only marginally significant ($p < .053$) in the study using the EDI.¹⁰

Other factors found to be significantly related to dropout from inpatient treatment for AN were evaluated by only one set of authors. Patient personality factors included higher scores on the "domineering" and "intrusive" subscales of the Inventory of Interpersonal Problems (IIP-C²⁷).¹⁰ Aspects of the patient's eating disorder related to dropping out of inpatient care included higher "weight concerns" scores and lower "restraint" scores on the EDE,^{11,21} increased fluid restriction,⁸ a greater number of symptoms at admission on the SCL-

90R,¹⁰ more previous hospitalizations,¹⁰ longer length of hospitalization,¹⁴ later age of onset,¹⁴ total weight loss at admission,⁹ education⁹ and socioeconomic status⁹.

Finally, no relationship with inpatient treatment dropout was identified for some factors that were considered in multiple studies (see **Table 1**, Line 17). Five out of the seven studies provided a detailed listing of all the factors examined, including those that were not significant.^{8,10–12,14} All five of these studies evaluated age on admission, the duration of illness, and the number of previous hospitalizations and failed to find a significant relationship between these factors and dropout. Four out of the five studies considered the patient's minimum BMI^{10–12,14} although only two evaluated maximum BMI^{11,14} and assorted sociodemographic variables.^{8,10,11,14} Age at the time of onset was evaluated by three out of the five studies^{10,12,13} but no relationship with dropout from inpatient care was found.

Significant Factors for Dropout: Multivariate Analyses.

While univariate analyses may help us to select which factors are related to dropout, multivariate analyses also take into account interactions that may occur in between factors, giving us a more complete understanding of these relationships. Because the use of these analyses has popularized over the last decade, only five out of seven studies—the most recent studies—included multivariate analyses^{8,10,11,13,14} (see **Table 1**, Line 18). Findings are listed in the order of frequency of variable consideration, with those variables the most frequently considered in multivariate analyses listed first and those variables considered by only one study last.

Two factors were found to be related to dropout from inpatient care through multivariate analyses in more than one study: BMI on admission^{8,14} and AN binge-eating/purging type.^{8,13} Results regarding BMI on admission were contradictory: although one study found that lower BMI on admission was linked to dropping out of care,⁸ the other found that higher BMI on admission was related to higher levels of dropout.¹⁴ A relationship with dropout was also found through multivariate analyses in more than one study for the presence of AN binge-eating/purging type.^{8,13} Although the first study found a direct relationship between these variables,⁸ the second found that this relationship was significant in cases of childhood sexual abuse.¹³

Regarding factors found to be significant in only one study, Godart et al.¹⁴ found that a later age of AN onset, a longer duration of hospitalization and

a lower BMI at discharge were also related to dropping out of hospitalization.^{14,28} The other studies found that the intensity of eating disorder symptoms (higher weight concern, higher maturity fears on the EDE, and lower restraint fears on the EDI),¹¹ and greater psychiatric difficulty in general (number of symptoms on the SCL-90R)¹⁰ were related to dropping out of inpatient treatment.

Finally, Zeeck et al.¹⁰ also found that the absence of a categorical DSM IV diagnosis of depression was related to more frequent dropout.

Discussion

The seven studies reviewed in this article considered factors related to dropout from inpatient care. Ten factors were found to be significant in multivariate analyses and only two factors were identified as significant through multivariate analyses in more than one study (AN binge-eating/purging type and BMI on admission), even though some factors were considered in multiple studies. Furthermore, some results, like those concerning BMI on admission, are contradictory. The methodological issues presented in the first part of the results may explain the lack of consistent findings. This discussion will first consider some of the most important methodological difficulties identified in these studies and then, the results of these studies, in light of the methodological considerations raised.

Rates of dropout may be influenced by sample compositions, treatment modalities, and definitions of dropout. First, in terms of sample compositions, one of the biggest differences noted is related to age, with one study concerning adolescents and young adults¹⁴ and the others, adults. We believe that additional factors, and particularly factors related to the patient's family environment, may predict dropout for adolescents. Research on outpatient treatment for AN has indicated that maternal criticism may predict treatment completion.^{29,30} Because in most cases parents have the legal authority to require their daughter to stay in, or dropout of care, we also believe that parental psychiatric difficulties may influence parental decisions and be related to dropout for this patient group. An additional area for study is therefore the relationships between factors related to adolescent patients' parents and drop out from inpatient treatment.

We also found that treatment modalities differed enormously from one study to another. Although a

number of the treatment programs stated that they discharge a patient due to lack of weight gain or progress,¹⁰⁻¹⁴ the amount of time a patient is allowed to stay at the hospital while stagnating or losing weight appears to vary greatly from one team to another. For example, in one program¹⁰ patients are required to gain a minimum of 500-750 g per week or they may be discharged, while in another,¹⁴ patients may be discharged for lack of weight gain only after many months. These differences in clinical practice may have a non-negligible impact on rates of administrative discharge and on which predictive factors emerge as significant.

We believe that it is imperative for researchers to concur on a definition of dropout. First, we propose distinguishing premature administrative discharge from patient dropout. Although this differentiation can be difficult, stricter treatment programs are likely to have higher administrative dropout rates (for the above-mentioned reasons) and such a distinction would clarify and facilitate the comparison of different teams' dropout rates. Furthermore, we suggest that future researchers differentiate early and late dropouts. The motivations for dropping out of care are likely to vary as a function of dropout timing.¹⁶ Clinical experience suggests that dropping out of care early in the hospitalization may be related to impulsivity, while dropping out later during inpatient treatment would be related to a stagnation of progress (i.e., lack of weight gain).

Regarding the results of this literature review, the most frequently examined factor was AN Binge-eating/Purging type (see Table 1, Lines 17 and 18). Five studies considered this factor in univariate analyses and three found it to be significant.⁸ Two out of the five studies using multivariate analyses evaluated this factor and found it to be significant in multivariate analyses,^{8,13} although one of these studies found that this relationship was significant only in cases of childhood sexual abuse.¹³ AN binge-eating/purging type was found to be associated with more frequent dropout from inpatient treatment in a multicenter study. This finding is in line with results regarding dropout from outpatient treatment for eating disorders¹⁷ and may be due to the impulsivity often considered characteristic of AN binge-eating/purging type.³¹ The finding of Woodside et al.¹¹ that patients with AN binge/purging type were not only more likely to drop out of treatment, but to drop out of treatment earlier than patients without this subtype suggests that impulsivity may indeed play a role in the decision to drop out of care. These authors suggest that therapeutic progress with such patients may occur primarily during the first weeks of treatment and that

dropout may occur when progress slows down. Other authors have argued that the disruption in purging behavior inherent to the structure of inpatient care may cause some patients to drop out.⁸

The second factor frequently considered by these studies was body weight on admission, either in terms of BMI or percentage of IBW (see Table 1, Lines 17 and 18). Results here were also contradictory, with one team finding that lower weight lead to increased dropout⁸ and one finding that higher weight was related to increased dropout.¹⁴ The first finding suggests that most patients who dropout do so in the beginning of treatment when their weight is still low. This finding is most likely the consequence of a definition of dropout closely related to weight goals. Furthermore, patients with the lowest BMI on admission are usually considered to have the most serious cases of AN and the least favorable outcome.¹⁸ However, the second finding calls into question this point of view. Although patients may be most frequently hospitalized for a very low BMI, they may also be hospitalized if their lives are in danger for other physical or psychological reasons. For example, significant quantities of rapid weight loss may cause somatic complications, and also lead patients to be hospitalized with a relatively high weight. We believe that a third factor, like impulsivity, that may cause such patients both to lose weight rapidly and to drop out of hospital care.

The absence of a DSM IV diagnosis of depression is related to dropping out of care¹⁰ (see Table 1, Line 18). It appears that patients with AN and comorbid depression may be more conscious of their need and suffering (and therefore more accepting of help) than their counterparts without comorbid depression, who may at times emphasize their independence by refusing treatment and dropping out of inpatient care.¹⁰

Conclusion

This review emphasizes the need for further research, which should address several issues. First, authors need to concur on clear definitions of patient or staff-initiated dropout, as very different factors may lead staff and patients to prematurely terminate care. Although clinically it can sometimes be difficult to differentiate staff- and patient-initiated dropouts, future research should analyze these categories separately as much as possible. Furthermore, because it is likely that a number of factors explain drop out from inpatient care, studies with larger samples and thereby greater power are needed. Finally, in so far as multicenter studies

allow researchers to include larger samples and to avoid biases specific to any one treatment center or treatment model, future studies should, wherever possible, include more than one hospital ward.

Weight on admission, AN subtype and the absence of depression appear to be related to dropout from inpatient care. More research is needed on these factors, as well as a certain number of others identified by individual studies, and how they may relate to personality factors like impulsivity. Although none of the studies reviewed here addressed patients' family relationships, we believe that future research should consider the role of parental criticism in predicting treatment completion. Furthermore, future research should consider whether the therapeutic alliance of the patient and her family to clinicians predicts dropout, as we believe that a good therapeutic alliance will also relate to treatment completion. Increasing our knowledge about the reasons that patients do not adhere to inpatient care will allow us to tailor treatment for those patients at risk for dropping out, with the goal of avoiding the less favorable outcome that such patients may experience.

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