

Predictors of recovery in eating disorders: a focus on different definitions

Bree, E.S.J. van; Slof-Op'tLandt, M.C.T.; Furth, E.F. van

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BRIEF REPORT

EATING DISORDERS WILEY

Predictors of recovery in eating disorders: A focus on different definitions (1)

Eline S. J. van Bree MSc^{1,2} Eric F. van Furth PhD^{1,2}

¹GGZ Rivierduinen Eating Disorders Ursula, Leiden, Netherlands

²Department of Psychiatry, Leiden University Medical Center, Leiden, Netherlands

Correspondence

Eline S. J. van Bree, Rivierduinen Eating Disorders Ursula, PO Box 405, 2300 AK Leiden, Netherlands. Email: e.vanbree@rivierduinen.nl

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Eline S. J. van Bree MSc^{1,2} | Margarita C. T. Slof-Op't Landt PhD^{1,2}

Abstract

Objective: Only half of the patients with eating disorders (EDs) fully recover. To increase these rates, knowledge about predictors is essential. Previous studies found that purging behaviors, BMI, ED duration, and depression, predicted symptomatic ED recovery. The current study investigated these four predictors for symptomatic improvement and the subjective experience of recovery.

Method: Participants who completed the baseline and second wave of the Netherlands Eating disorder Registry (NER) (N = 374), were categorized into: (1) Subjective recovery; (2) Clinical improvement; (3) Symptomatic recovery. Using regression analyses, it was investigated if the four baseline factors predicted recovery at wave two. Effects were compared among a binge-purging and restricting group.

Results: In total, 136 participants were subjectively recovered, 135 showed clinical improvement, and 70 were symptomatically recovered. Overlap occurred between definitions. Lower depression scores predicted subjective recovery (OR 0.77, p < .001) and clinical improvement (OR 0.80, p < .001), and shorter ED duration predicted all definitions (OR 0.99, p < .001; OR 0.99, p < .001; OR 0.99, p = .013). Similar effects were found in the binge-purging group.

Discussion: Our study emphasized that the same predictors, like depression, apply to symptomatic improvement and the personal experience of recovery. Depression appears an important factor during ED treatment.

Public significance: Recovery rates for EDs are low. To understand this, knowledge about predictors of ED recovery is essential. This study examined the effects of four established predictors across symptomatic improvement and subjective recovery (a more personal experience of recovery). Lower depression scores predicted both, indicating that depression appears important for multiple definitions of recovery and therefore warrants attention during ED treatment.

KEYWORDS

BMI, depression, eating disorders, predictors, purging behaviors, recovery

1 | INTRODUCTION

Eating Disorders (EDs) are a public health concern with severe consequences including high mortality (Field et al., 2012), treatment dropout and unsatisfactory recovery rates. Recovery rates on average remain below 50%, and depend highly on how recovery is defined (Bardone-Cone et al., 2019; Smink et al., 2013). While some definitions solely focus on symptomatic improvement, involving different standards for body mass index (BMI) and ED behaviors, others emphasize the personal experience of recovery; like the recovery movement highlighting emotional, social, and psychological well-being (Bardone-Cone et al., 2018; Dawson et al., 2014; de Vos et al., 2017; Wetzler et al., 2020). Our study examined different recovery definitions with self-reported cohort data: one based on people's own sense of recovery (subjective recovery), and two on symptomatic improvement: clinical improvement (based on the EDE-Q; Dingemans et al., 2016) and symptomatic recovery (criteria derived from Bardone-Cone et al. (2018)). We previously showed that, besides substantial overlap, symptomatic recovery was not a prerequisite for people to report subjective recovery, and both were associated with similar improvements in multiple life facets (Slof-Op't Landt et al., 2019).

Knowledge about predictors is imperative to increase ED recovery. Prior studies have shown that depression (Dingemans et al., 2020; Franko et al., 2018; Wild et al., 2016), purging behaviors (Lock et al., 2013; Thompson-Brenner et al., 2015), BMI (Forman et al., 2014; Franko et al., 2018; Lock et al., 2013), and ED duration (Franko et al., 2018; Wild et al., 2016) are the most frequently examined ED recovery predictors. Although these studies used different recovery definitions, all were based on symptomatic improvement. Knowing if predictors affect subjective recovery besides symptomatic improvement can improve our understanding of the complicated recovery process. The simultaneous examination of these four predictors, could help to determine if some have a bigger influence than others, whereby aiding treatment targets. Finally, the majority of these studies examined patients following treatment, possibly making findings less generalizable to the overall ED population (Dingemans et al., 2015).

The current study was the first to simultaneously investigate the predictive effects of purging behaviors, BMI, ED duration and depression, across two definitions based on symptomatic improvement (clinical improvement and symptomatic recovery) and for the subjective sense of recovery. Self-reported data from the longitudinal naturalistic Netherlands Eating disorder Registry (NER N = 566; Slof-Op't Landt et al., 2019) cohort was used to investigate this. Because the NER is comprised of people with no, limited or extensive treatment history, better generalizability of findings to the overall ED population was expected. Based on prior studies (Dingemans et al., 2020; Forman et al., 2014; Franko et al., 2018; Lock et al., 2013; Thompson-Brenner et al., 2015; Wild et al., 2016) we hypothesized that the four factors would predict one or both forms of symptomatic improvement. Given the substantial overlap between subjective and symptomatic recovery (Slof-Op't Landt et al., 2019), we also expected prediction for

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subjective recovery. Effects were examined separately for a bingepurging and restricting group; as purging behaviors exclusively predicted binge-purging ED recovery (Lock et al., 2013; Thompson-Brenner et al., 2015) and BMI restricting ED recovery (Forman et al., 2014; Lock et al., 2013).

2 | METHODS

2.1 | Participants

The NER was initiated in 2015 by GGZ Rivierduinen Eating Disorders Ursula, the VU University and the Dutch ED patient organization (Slof-Op't Landt et al., 2019), and approved by the Permanent Committee Science and Ethics (VU University). The NER is a continuing online longitudinal register in which people from 12 years or older, with a self-reported current or past experience of an ED or ED-related problems, can participate. Initially participants complete the baseline questionnaire and subsequently they receive invitations for yearly follow-up waves. Data from participants who completed the baseline and second wave (N = 566) were used in the current study. Because of the ongoing inflow of participants (from 2015 until now) follow-up time varied (1 month-5 years). There were no significant differences on predictors (p = .153, p = .274, p = .685, p = .470) or ED psychopathology (p = .108) at baseline between participants who did and did not complete the second wave.

2.2 | Measures

2.2.1 | The Eating Disorder Examination-Questionnaire (EDE-Q 6.0).

The self-reported EDE-Q (Fairburn & Beglin, 2008) questionnaire shows good reliability and validity (Aardoom et al., 2012). It assesses ED psychopathology and related behaviors over the last 28 days. A global score can be calculated by averaging the 22 items, higher scores indicate more ED psychopathology. The global score accurately distinguished Dutch ED patients and healthy individuals by using a clinical 2.17 cutoff (Dingemans et al., 2016). Additionally, the EDE-Q assesses laxative use and self-induced vomiting, which were combined to calculate baseline purging behaviors.

2.2.2 | Patient health questionnaire for anxiety and depression (PHQ-4).

The PHQ-4 was used to assess baseline depression and shows good reliability and validity (Ware et al., 1996). It contains two items measuring depression on a 5-point Likert scale ranging from 0 "Not at all" to 4 "Nearly every day." These items were summed, higher scores indicated worse depression symptoms.

TABLE 1	Sample characteristics	at baseline and	wave 2, for s	ubgroups see	Table S1.
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	Wave 0 M (SD)	Range	Wave 2 M (SD)	Range
Age	26.5 (9.1)	14-45	30.3 (8.9)	15-63
BMI % (<18 years)	27.6 (22.3)	2.16-76.73	-	-
BMI (≥18 years)	20.8 (5.4)	12.5-47.6	21.8 (5.8)	10.9-55.8
EDEQ-total score	4.0 (1.2)	0.7-6.0	3.0 (1.7)	0-6.1
	Percentages			
Gender	99% F (1%)			
Ever followed treatment	84.5% ^a			
Education				
Low	13.6%			
Medium	42.5%			
High	43.9%			
Ethnicity				
Dutch	94.7%			
Moroccan/Turkish	1.6%			
West-European	3.7%			

^aPeople who reported that they ever followed treatment for their ED, including people who followed treatment at wave 0 and who did in their past. Abbreviations: BMI, body mass index; *SD*, standard deviation.

2.3 | Measures of recovery

From the 566 NER participants, 192 reported ED recovery at baseline and were excluded, leaving 374 participants with an ED diagnoses at baseline for the analyses. Recovery at wave two was determined according to the following definitions:

• Subjective recovery:

Based on one item in which participants stated that they experienced eating problems in the past.

• Clinical improvement:

Participants with an EDE-Q global score below cutoff (2.17) and/or at least a 50% decreased score (Dingemans et al., 2016).

• Symptomatic recovery:

Derived from Bardone-Cone et al. (2018), participants reported a healthy BMI (adults: BMI >18.5, adolescents: BMI% > 5%, self-reported weight and height), abstinence of ED behaviors (EDE-Q: binge eating, purging behavior, fasting) in the past month, and low levels of ED cognitions (EDE-Q < 2.17).

2.4 | Data-analysis

To investigate the effects of purging behaviors, BMI, ED duration (time since first presentation of ED problems) and depression on recovery, multivariate logistic regression analyses were performed. Predictors were entered as independent variables, and subjective recovery, clinical improvement, and symptomatic recovery as dependent. Time difference (months) between baseline completion and wave two was included as a covariate. Multiple testing was adjusted with a Bonferroni correction (significance level: p [.05/4] = .013). Additionally, analyses were performed separately for participants who experienced at least one binge/purge episode (labeled the binge-purging group) and who did not (labeled the restricting group [59,3% reported a BMI < 18.5]). An a priori power analysis with power = .80 and p = .013 was executed with 12 (4 predictors for 3 definitions) *t*-tests in a 10% random sample group. The average required participant amount to detect an effect was 48 for subjective recovery, 41 for clinical improvement and 293 for symptomatic recovery.

3 | RESULTS

3.1 | Participants

The mean age of the 374 participants was 26.5 years (SD = 9.1) at baseline (Table 1 and Table S2). The majority was female (99.2%), with a high education level (59.6%), and Dutch ethnicity (96.2%). The sample had 298 (79.7%) participants in the binge-purging group and 76 (20.3%) in the restricting group. Participants reported their received diagnosis, 186 (49.7%) had anorexia nervosa, 56 (15%) bulimia nervosa, 15 (4%) binge-ED, and 116 (31%) other specified feeding or ED. Average time between questionnaire completion was 47 months (standard deviation (SD) = 23.8). At wave two, 136 (36.4%) participants showed subjective recovery, 135 (36.1%) clinical improvement and 70 symptomatic recovery (18.7%). Definitions partly

TABLE 2 Multivariate logistic regression analyses outcomes for the overall sample.

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	В	SE	р	Odds	CI
Subjective recovery					
BMI	<-0.01	0.03	.778	0.99	[0.94, 1.05]
Purging behaviors	-0.01	0.01	.224	0.99	[0.97, 1.01]
ED duration	<-0.01	<0.01	<.001	0.99	[0.99, 1.00]
Depression	-0.26	0.07	<.001	0.77	[0.67, 0.88]
Clinical improvement					
BMI	0.02	0.02	.286	1.02	[0.98, 1.07]
Purging behaviors	-0.01	<0.01	.270	0.99	[0.97, 1.01]
ED duration	<-0.01	<0.01	<.001	0.99	[0.99, 1.00]
Depression	-0.22	0.06	<.001	0.80	[0.71, 0.91]
Symptomatic recovery					
BMI	<0.01	0.03	.924	1.00	[0.95, 1.06]
Purging behaviors	-0.01	0.01	.384	0.99	[0.97, 1.01]
ED duration	<-0.01	<0.01	.013	0.99	[0.99, 1.00]
Depression	-0.04	0.08	.604	0.96	[0.83, 1.12]

Abbreviations: BMI, body mass index; CI, confidence interval; SE, standard error.

overlapped, 103 participants showed subjective recovery and clinical improvement, 64 subjective and symptomatic recovery, and 70 symptomatic recovery and clinical improvement.

3.2 Multivariate predictor analyses

Logistic regression was performed to find predictors for clinical improvement, symptomatic, and subjective recovery (Table 2 and Table S1). Inclusion of the covariate time did not affect results. Shorter ED duration (OR 0.99, CI 0.99-1.00, p < .001) and lower depression scores (OR 0.77, CI 0.67-0.88, p < .001) predicted subjective recovery and clinical improvement (OR 0.99, CI 0.99-1.00, p < .001, OR 0.80, CI 0.71-0.91 p < .001). Symptomatic recovery was predicted by shorter ED duration (OR 0.99, CI 0.99–1.00, p = .013).

Subgroup analyses (Table S2) showed comparable results for the binge-purging group: shorter ED duration and lower depression scores predicted subjective recovery and clinical improvement. Suggestive results were found for shorter ED duration, lower depression, and higher BMI on subjective recovery and symptomatic improvement in the restricting group.

4 DISCUSSION

This study aimed to investigate whether purging behaviors, BMI, ED duration, and depression predicted symptomatic improvement and subjective recovery in a population-based ED cohort. Lower depression scores predicted subjective recovery and clinical improvement and shorter ED duration predicted all three definitions at follow-up. Effects were similar for the binge-purging group but only suggestive for the restricting group.

Our hypothesis suggesting that the four factors would be independent from the recovery definitions was partially confirmed. Lower depression scores predicted two types of recovery while shorter ED duration predicted all three, suggesting that the same factors might predict subjective recovery and symptomatic improvement. Although prediction might not depend on how recovery is defined, examining effects with a uniform definition is important (Ackard et al., 2014: Bardone-Cone et al., 2018). Without such a definition, it remains unclear if people are truly recovered or only show remission. This influences the percentage of recovered participants and limits comparability of predictive effects.

Contrary to the literature, not all factors predicted symptomatic improvement in EDs. Comparable to previous studies lower depression scores increased recovery odds (Dingemans et al., 2020; Franko et al., 2018; Wild et al., 2016) and shorter ED duration increased recovery chances, although our odds of approximately one did not resemble previous findings (Franko et al., 2018; Wild et al., 2016). Predictive effects for BMI and purging behaviors might have been missed due to small subgroup samples, in which effects were particularly expected (Forman et al., 2014; Lock et al., 2013; Thompson-Brenner et al., 2015). Indeed suggestive results were found for BMI in the restricting group. Furthermore, continuous assessment of purging behaviors instead of on a dichotomous level (yes/no) could have decreased chances of finding an effect (Franko et al., 2018). Moreover, the self-report in the NER, might have resulted in under- or over reporting of ED sensitive topics like BMI and purging behaviors, limiting the reliability of results (Ackard et al., 2014). Lastly, previous studies investigating BMI or purging behaviors had short or very long follow-up periods (0.5, 1, 2, or 22 years; Forman et al., 2014; Franko et al., 2018; Lock et al., 2013; Thompson-Brenner et al., 2015), while the NER follow-up periods were in between, complicating the comparison of results.

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This study was the first to test the predictors purging behaviors, BMI, ED duration and depression simultaneously across different ED recovery definitions. Because the cohort included individuals with different ED and treatment experiences, the sample may better resemble the general ED population than previous studies. Sample sizes for clinical improvement were comparable to others (Franko et al., 2018; Lock et al., 2013; Wild et al., 2016), and sufficient to detect an effect. However, sample size was insufficient for symptomatic recovery and for the restricting group. Suggestive results were found for higher BMI and lower depression scores in the restricting group, and should further be studied. Furthermore, binge-EDs were under represented, as most NER participants had a history of anorexia nervosa, resulting in uncertainty about prediction in this subgroup. Future studies with larger samples comprised of all EDs are essential to examine predictive effects with more certainty. Finally, not every established predictor, like motivation and personality, was included (Levallius et al., 2016; Vall & Wade, 2015), therefore future studies should examine the maintenance of effects when extending the prediction model.

Our study showed that chances of ED recovery decrease when patients report a longer ED duration or higher depression scores. Given the extremely small odds ratios for ED duration clinical implications were not warranted. Depression predicted subjective recovery and clinical improvement, suggesting that the same factors might be important for the experience of recovery as well as recovery according to clinical standards. Based on depression severity at admission, therapists could decide to include depression elements into treatment (Franko et al., 2018; Vall & Wade, 2015) to increase recovery chances.

AUTHOR CONTRIBUTIONS

Eline S. J. van Bree: Conceptualization; formal analysis; writing – original draft; writing – review and editing. Margarita C. T. Slof-Op 't Landt: Conceptualization; supervision; writing – review and editing. Eric F. van Furth: Conceptualization; supervision; writing – review and editing.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

OPEN RESEARCH BADGES

This article has earned an Open Data badge for making publicly available the digitally-shareable data necessary to reproduce the reported results. The data is available at [insert provided URL from Open Research Disclosure Form].

DATA AVAILABILITY STATEMENT

Data will be available upon reasonable request.

ORCID

Eline S. J. van Bree bhttps://orcid.org/0000-0003-4312-142X Margarita C. T. Slof-Op't Landt https://orcid.org/0000-0001-6135-2163

Eric F. van Furth D https://orcid.org/0000-0002-1131-0886

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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