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## Detection, treatment, and course of eating disorders in Finland: A population-based study of adolescent and young adult females and males

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### Abstract

**Objective:** We assessed the detection, treatment and outcomes of DSM-5 eating disorders in a nationwide community setting.

**Method:** The FinnTwin12 cohort comprises twins born in 1983–1987 in Finland ( $n = 5,600$ ), with follow-up starting at age 12. We outline treatment and outcomes of the 127 females and 15 males diagnosed with a lifetime DSM-5 eating disorder in interviews conducted for a subsample ( $n = 1,347$ ) in their early 20s.

**Results:** Only 45 (32%) of those diagnosed with eating disorder in the interviews had their condition detected in healthcare, and even fewer received treatment (30% of females, 13% of males). Anorexia nervosa (AN), bulimia nervosa, and atypical AN were detected and treated more often than other eating disorders. Five years after disease onset, 41% of those diagnosed had recovered. There were no statistically significant differences in the course of different eating disorders (log-rank  $p = 0.66$ ) but the outcome was more favourable among males (log-rank  $p = 0.008$ ). The likelihood of 5-year recovery did not differ between those who had and who had not received treatment (41.1% vs. 40.5%, log-rank  $p = 0.66$ ).

**Conclusion:** Although eating disorders are common and symptoms are persistent for many, they remain under-diagnosed and under-treated. In real-world settings, effectiveness of provided treatments may be limited.

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#### DATA AVAILABILITY STATEMENT

The data are not publicly available due to privacy or ethical restrictions. We encourage interested researchers to contact us about arrangements for secondary analyses.

#### SUPPORTING INFORMATION

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

#### CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

## Keywords

course; DSM-5; detection; eating disorders; treatment

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## 1 | INTRODUCTION

Eating disorders are common in the community. The lifetime prevalence estimates of interview-based community studies have ranged from 3.1% to 17.9% among females and 0.6% to 2.4% among males in the DSM-5 era (Fairweather-Schmidt & Wade, 2014; Micali et al., 2017; Mustelin, Lehtokari et al., 2016; Mustelin, Silen, et al., 2016; Silén et al., 2020; Smink et al., 2014; Stice et al., 2013; Udo & Grilo, 2018; Wade & O'Shea, 2015; Wagner et al., 2017). Still, only a minority of individuals with eating disorders have their conditions detected and receive appropriate mental healthcare (Hart et al., 2011; Treasure et al., 2020). Moreover, the perceived need for help, detection and treatment of eating disorders has been guided by stereotypes of young, skinny women, although eating disorders affect individuals of all ages, genders and body sizes (Mangweth-Matzek & Hoek, 2017; Mulders-Jones et al., 2017; Schaumberg et al., 2017; Sonnevile & Lipson, 2018).

A major shortcoming in the current knowledge is that most studies of the detection, treatment and course of eating disorders have focused on females, leading to gender bias (Bardone-Cone et al., 2018; Murray et al., 2017). In addition, research has been centred on anorexia nervosa (AN) and has seldom included estimates for bulimia nervosa (BN), binge eating disorder (BED), and other specified or unspecified feeding or eating disorders (OSFED, UFED; Bardone-Cone et al., 2018; Keel, 2018; Smink et al., 2013). Furthermore, the natural course of eating disorders, still, remains poorly understood (Brown et al., 2015). Lastly, studies investigating the association between interventions and eating disorder outcomes are limited and focus mostly on clinical samples.

To address these knowledge gaps, we assessed how DSM-5 classified eating disorders were detected and treated by healthcare providers among males and females in the community. Our aim was also to estimate the likelihood of recovery in various diagnostic subgroups of eating disorders and among treated versus untreated participants. We used data from the FinnTwin12 birth cohort, a longitudinal nationwide community-based study. In their early twenties, more than 1,300 males and females were interviewed using a standard semi-structured diagnostic interview.

## 2 | METHODS

### 2.1 | The FinnTwin12 birth cohort and intensively studied sample

The FinnTwin12 study is a longitudinal population-based study that comprises Finnish twins born in 1983–1987 ( $n = 5600$ , identified from the Finnish Central Population Registry). The twins were approached at ages 12, 14, 17.5 and 22 years. In all waves, the response rate was 85%–90% (Rose, Salvatore, et al., 2019).

The study includes an epidemiological sample (all participants) and an intensively studied sample (selected from the epidemiological sample). In the intensively studied sample (1,035

families), most families were selected randomly (72.3%, 748 families), and the rest (27.7%, 287 families) were enriched with families where parents showed signs for possible alcohol problems based on elevated scores on the Malmö-modified Michigan Alcoholism Screening Test (Mm-MAST; Seppä et al., 1990). The enrichment and other aspects of the study protocol have been described previously in more detail (Rose et al., 2004; Silén et al., 2020).

Data collection and analysis were carried out in accordance with the Declaration of Helsinki. The ethics committee of The Hospital District of Helsinki and Uusimaa (HUS) and the Institutional Review Board of Indiana University approved the study protocol, and all participants gave written informed consent.

## 2.2 | DSM-5 eating disorder diagnoses

During the fourth wave at the mean age of 22.4 years (2006–2009), the intensively studied subsample of twins ( $n = 1,347$ , including 709 females and 638 males, 73% of the target sample of twins interviewed at age 14) were interviewed using the eating disorder section of the Structured Clinical Interview for DSM-IV (SCID; First et al., 2002). All interviewers were healthcare professionals (registered nurses, graduate students in psychology, or masters of healthcare); the majority of the interviews were organized face-to-face ( $n = 709$ ), the rest by telephone. The interviewers had written a detailed description of each participant symptoms in their case notes; three experienced medical doctors (YS, AR, AK-R) reviewed interview scores and case notes and made consensus DSM-5 diagnoses (American Psychiatric Association, 2013). In total, 127 females and 15 males were diagnosed with a lifetime DSM-5 eating disorder (Silén et al., 2020). This amounted to a lifetime prevalence of 17.9% (one in six) for females and 2.4% (one in 40) for males (Silén et al., 2020). Three individuals had both AN and BN diagnoses. In 15 twin pairs (nine monozygotic) comprising 30 individual twins, both twins were diagnosed with an eating disorder. Our sensitivity analyses showed no statistically significant difference between the lifetime prevalence of eating disorders in the enriched and randomly selected samples among females (15.6% vs. 18.7%,  $p = 0.37$ ) or among males (3.8% vs. 1.8%,  $p = 0.16$ ; Silén et al., 2020).

## 2.3 | Detection in healthcare and treatment received

During the interview, participants were asked if any healthcare professional had ever diagnosed them with an eating disorder. Furthermore, they were asked about any eating disorder treatment that they had received. The treatment was categorized into partially overlapping groups: hospital treatment, outpatient treatment, medication, individual psychotherapy or family therapy, and treatment at a specialized eating disorder unit. Outpatient treatment was defined as any treatment appointments related to an eating disorder other than treatment in psychiatric or somatic hospital wards.

## 2.4 | Full recovery from eating disorder symptoms

At the end of the eating disorder assessment, the participants were asked about the time course of their symptoms. Participants were asked at what age their eating disorder symptoms had started, whether they were still suffering from eating disorder symptoms, and if not when they thought they had recovered. They were also asked what had helped them to recover. Interviewers wrote a detailed description in their case notes.

The criterion for recovery was multidimensional. To be classified as recovered, participants themselves had to express that they thought they no longer suffered from an eating disorder. If a participant reported that he or she had still been suffering from any eating disorder behaviour (e.g., restrictive eating or binge eating, compensatory behaviours, excessive exercise) or psychological symptoms (e.g., persistent body image concerns, fear of weight gain, fatphobia) during the last year, they were considered still having symptoms (not recovered). Since eating disorders sometimes involve denying the seriousness of symptoms, for a participant to be classified as recovered, participants' description of recovery had to be clinically meaningful; moreover, a current body mass index (BMI) of 18.5 kg/m<sup>2</sup> or higher was required.

## 2.5 | Statistical analysis

We conducted Pearson chi-squared tests for cross-tabulations and adjusted the *p*-values for the sampling of twins within twin pairs. Recovery rates were analysed using Kaplan-Meier analysis and life tables, and differences in the likelihood of recovery between subgroups were assessed using log-rank tests. We also used Cox proportional hazards models to calculate hazard ratios when analysing the role of eating disorder subtypes in the recovery estimates between sexes. We used Schoenfeld residuals to test that the proportional hazards assumption was not violated. Because of missing data on the onset of an eating disorder for two participants, recovery analysis included 140 participants. All analyses were conducted using Stata Statistical Software, version 14.

## 3 | RESULTS

### 3.1 | Eating disorder detection in health-care

There were 142 community-based participants diagnosed with a lifetime DSM-5 eating disorder in our interviews. For the 140 participants for whom we had data on eating disorder onset, the mean age of onset was 16.5 years (standard deviation [SD] 2.9, range 9–22). They were followed up for recovery for a mean of 4.0 years (SD 2.9, range 0.5–13). Of the 142 participants with an eating disorder, 45 (32%) had had their disorder detected by healthcare professionals. The likelihood of detection was similar for females (41 [32%]) and males (4 [27%]), chi-square *p* for difference 0.7. AN (57%), BN (50%), and OSFED atypical AN (44%) were detected more often than were BED (33%), other OSFEDs (12%), or UFED (5%) (Table 1), chi-square *p* for difference 0.0001.

### 3.2 | Received treatment for eating disorder

Forty participants received at least some treatment for an eating disorder (89% of those detected by healthcare professionals, 28% of those diagnosed in the present study). In detail, 30% of females received treatment (*n* = 38) versus 13% of males (*n* = 2), chi-square *p* for difference 0.19. The likelihood of being detected by healthcare professional but not receiving treatment was more marked among males among males (*n* = 2 [50%]) than among females (*n* = 3 [7%]); chi-square *p* for difference 0.03. Treatment was more common in AN (52%), BN (50%), and OSFED AN (38%) than in BED (17%), other OSFEDs (12%), or UFED (2%; Table 1), chi-square *p* for difference 0.0001.

All treated participants had received outpatient treatment. Only 5.6% ( $n = 8$ ) of those diagnosed with an eating disorder had received inpatient treatment (Table 1). Of them, six had been diagnosed with AN only, one with both AN and BN, and one with BN only.

Twelve individuals (8.5% of those diagnosed) reported receiving psychotropic medication for the treatment of an eating disorder (Table 1). The medications received were the following: fluoxetine (7), sertraline (2), citalopram (1), mirtazapine (1), and quetiapine (2). The medication was most commonly associated with AN and BN as only one out of the 81 participants with an eating disorder outside these diagnostic groups had received medication for the treatment of his or her eating disorder.

Nine participants (7% of those diagnosed) had received individual psychotherapy, and one family therapy (Table 1). Psychotherapy was most common with participants suffering from AN (7/46 [15%]).

Six participants (4% of those diagnosed) had received treatment at a unit that was specialized in the treatment of eating disorders (Table 1). A total of 19 participants (13% of those diagnosed) reported that a school nurse had been involved in the detection or treatment of their eating disorder. In total, school nurses were involved in 42% of the cases detected in healthcare.

### 3.3 | COURSE

**3.3.1 | Eating disorder symptoms at the time of the interview**—Of those with a lifetime DSM-5 eating disorder, 84/127 females (66%) and 4/15 males (27%) had suffered from eating disorder symptoms during the last 12 months preceding the interview in their early 20s.

**3.3.2 | The course of eating disorders, 5-year recovery rate and mean duration**—Figure 1 shows the course of each eating disorder for both genders combined. Both genders were analysed together because of the small number of males. There were no statistically significant differences in the course of different eating disorders (log-rank  $p = 0.66$ ) or OSFED subgroups (log-rank  $p = 0.60$ , Figure S1). Table 2 shows the 5-year recovery rates for each diagnosis for both genders combined and the mean duration of each specific eating disorder at the time of the interview among those who were fully recovered and for the whole sample.

The 5-year recovery rate of all eating disorders combined was 40.7%; 64% among males, and 37% among females. In general, males had a shorter duration of eating disorder symptoms and recovered more often than did females (log rank  $p = 0.008$ ; Figure 2). This difference in recovery was not explained by the different distribution of eating disorder subtypes between males and females. The hazard ratio for recovery was 2.3 (95% CI 1.3–4.0) for males versus females in unadjusted models and 2.2 (95% CI 1.1–4.2) in models adjusted for ED subtypes.

**3.3.3 | Association between treatment and course of eating disorders**—Figure 3 shows the course of eating disorders in those who received treatment for their eating

disorder versus those who remained untreated. The Figure S2 shows the course for each eating disorder. Table 2 shows the 5-year recovery rates in the same groups. Altogether, there was no difference between treated and untreated groups.

Among those with any eating disorder, the 5-year recovery rate was 41.1% for the treated versus 40.5% for the untreated (log rank  $p = 0.66$ ).

## 4 | DISCUSSION

Our results show that while DSM-5 eating disorders affect one in six females and one in 40 males in the community, only one-third of those affected are detected by healthcare providers, and even fewer receive treatment. Detection and treatment disparities are evident as atypical disorders are rarely recognized and treated even more rarely. Furthermore, many individuals with an eating disorder seem to suffer from symptoms for years. Five years after disease onset, less than two-fifths of females and two-thirds of males had recovered. We did not observe significant differences in the course of different diagnostic groups. Additionally, the likelihood of a 5-year recovery was around 40 percent in both treated and untreated groups. Together, our results indicate that the commonness and persistence of eating disorders are not matched with healthcare efforts.

### 4.1 | The detection of DSM-5 eating disorders by the healthcare system

Supporting previous observations, we found that most adolescents and young adults who meet the diagnostic criteria for eating disorders are not detected by the healthcare system (Hart et al., 2011; Micali, N. et al., 2017; Mohler-Kuo et al., 2016; Mustelin, Lehtokari et al., 2016; Mustelin, Silen, et al., 2016; Solmi et al., 2016; Smink et al., 2014). The likelihood of detection was similar among females and males—between a quarter and one-third of cases were detected. Furthermore, in line with previous studies (Mustelin, Lehtokari et al., 2016; Mustelin, Silen, et al., 2016; Smink et al., 2014), eating disorders with typical representations, such as AN, BN and atypical AN, were more often detected and subsequently treated than other specified or unspecified eating disorders.

The poor detection rate of eating disorders is a multidimensional issue. Many individuals with eating disorders do not recognize the severity of their symptoms and the need for treatment, or fear that their symptoms will be belittled (Cachelin & Striegel-Moore, 2006; Grillot & Keel, 2018). Identifying an eating disorder and referring a patient for treatment can also be difficult for healthcare professionals due to a shortage of available treatments and a lack of skills in both primary and secondary healthcare (Waller et al., 2014). Increasing detection of eating disorders requires public discussion to reduce the stigma associated with these disorders and education of both the public and healthcare professionals about the diversity of symptoms and weights, treatment options, and available specialized outpatient facilities (Duncan et al., 2017; House et al., 2012; Sangha et al., 2019; Waller et al., 2014).

### 4.2 | Actualized treatment

In our sample, only one out of four had received any treatment for their eating disorder. The scarcity of treatment in our setting matches previous reports, indicating a significant discrepancy between the need for help and the available services (Micali et al., 2017; Solmi

et al., 2016; Smink et al., 2014; Wagner et al., 2017). Previous literature indicates that males seek and receive treatment less often for eating disorders than females (Limbers et al., 2018; Mangweth-Matzek & Hoek, 2017; Sonnevile & Lipson, 2018). In our sample, the change of being detected in healthcare but not receiving treatment was more marked among males. However, the difference in the actual treatment rates was not statistically significant.

In Finland, schools at all levels, including universities, have health and welfare services to support the well-being of all students. In our sample, 42% of those detected by healthcare providers reported that a public health nurse working in school health had been involved in the detection or taken part in the treatment. The true rate is probably even higher because none of the participants who had received eating disorder treatment at a specialized unit or at the hospital ward mentioned school nurses' appointments, although many referrals likely go through the school health system to tertiary care. In any event, school nurses seem to have an important role in the detection and treatment of eating disorders in Finland, although their roles may not exist or be the same in other countries. Raising the awareness of the commonness and diversity of eating disorder symptoms among those healthcare professionals who work closely with adolescents and young adults could be an effective way to improve the detection and treatment rates of eating disorders.

#### 4.3 | The natural course of DSM-5 eating disorders

We found that after 5 years after eating disorder onset, approximately 40% of those diagnosed were recovered in each diagnostic group except that only 20% of those with BN had recovered. Although this difference was not statistically significant, the persistence of BN symptoms has been well-documented in some previous studies (Agras et al., 2009; Glazer et al., 2019; Keski-Rahkonen et al., 2009; Kessler et al., 2013). Moreover, the persistence of symptoms in OSFED and UFED emphasizes the seriousness of these diagnoses and supports some previous findings (Mustelin, Lehtokari et al., 2016; Wade & O'Shea, 2015). Adding to the scarce literature to date (Riesco et al., 2018), we did not find significant differences in the outcomes of different OSFED subtypes, although these results were based on very few participants in some OSFED subcategories.

Samples, definitions of recovery, measurements, and follow-up times vary widely between studies conducted in the DSM-5 era challenging comparison (Glazer et al., 2019; Kessler et al., 2013; Mustelin Lehtokari et al., 2016; Mustelin, Silen, et al., 2016; Stice et al., 2013; Udo & Grilo, 2018; Wade & O'Shea, 2015). Some studies have found that recovery from eating disorders takes many years: up to 11.4 for AN, 12.2 for BN, and 15.9 for BED (mean years with episode; Udo & Grilo, 2018). Conversely, others have found eating disorder episode durations to average as little as 8 months for AN, 2.9 for BN, 3.3 for BED, 11.6 for atypical AN, 3.5 for subthreshold BN, 3.0 for subthreshold BED, and 5 for purging disorder (PD). The corresponding 1-year remission rates were 75% for AN, 93% for BED, 71% for atypical AN, 94% for PD, and 100% for BN, subthreshold BN, and BED (Stice et al., 2013). Among US adolescent and young adult females, 63% of those with eating disorder had their symptoms remitted 1–3 years after detection (Glazer et al., 2019). In our other Finnish twin sample (FinnTwin 16), the 5-year recovery rate among women was 72% for AN, 60% for OSFED/UFED, and 55% for BN with weekly symptoms (Keski-Rahkonen et al., 2009;

Mustelin Lehtokari et al., 2016; Mustelin, Silen, et al., 2016). In sum, our recovery rates seem to be in the lower end and disease duration in the higher end of previous DSM-5 estimates.

The low recovery rates in our study are probably partly due to limits concerning the follow-up time and our strict criteria for recovery. Traditionally, physical dimensions and eating disorder symptoms have been used as a base for the definition of recovery (Vall & Wade, 2015). However, because psychological, emotional, social, and appearance-related aspects seem to be essential for patients (de Vos et al., 2017; Emanuelli et al., 2012), it has been recommended that the definition of recovery should also comprise such aspects (Bardone-Cone et al., 2018). Our definition of recovery was multidimensional, combining participants' perceptions, BMI, and clinical judgement.

It is noteworthy that a proportion of the non-recovered might have suffered from residual symptoms and no longer fulfilled the full diagnostic criteria for an eating disorder. Moreover, the absence of eating disorder symptoms is not always necessary for patients to consider themselves recovered. Personal recovery often comprises a more holistic perspective, including finding a purpose and identity outside the eating disorder, self-compassion, empowerment, hope, meaning and supportive relationships (Slof-Op 't Landt et al., 2019; Wetzler et al., 2020).

Nevertheless, our results seem to align with recovery documented by rigorous long-term studies. After 20 years of follow-up, only approximately 40% of AN and BN patients who had needed inpatient care had achieved remission (Fichter et al., 2017; Quadflieg & Fichter, 2019). Moreover, after 30 years, one in five of those with adolescent-onset AN still had a chronic eating disorder (Dobrescu et al., 2020). Finally, after 12 years, more than 30% of BED patients who had needed inpatient care still met the diagnostic criteria for an eating disorder (Fichter et al., 2008). Together with these results, our findings indicate that the symptoms are persistent for a substantial proportion of eating disorder sufferers, underscoring the seriousness of eating disorders.

The literature on gender differences in eating disorder outcomes is scarce (Strobel et al., 2018; Strobel et al., 2019; Strober et al., 2006). We found that males had a better eating disorder prognosis than did females. However, based on our data, we do not know whether they have better overall psychiatric prognosis. Numerous studies have shown the commonness of heterotypic continuity, that is, one psychiatric condition evolving to a different psychiatric state in the same individual at a later time (Lahey et al., 2014; Raevuori et al., 2009; Shevlin et al., 2017). Among males, the symptoms of the eating disorders may have evolved to some other disorder, like anxiety, depression, or substance use disorder.

#### 4.4 | The impact of treatments

We did not find a difference in the likelihood of recovery between individuals who did or did not receive treatment. Our results indicate that many individuals recover from their eating disorders without professional help, and many others suffer from longstanding symptoms despite receiving treatment. Still, our results do not imply that treatment has no effect. The participants were not randomly assigned to receive treatment, and those receiving treatment



may have had more severe forms of the disorder in the first place, increasing the probability of detection and subsequent treatment. Without detection and treatment, their outcome might have been less favourable. This confounding by indication has been well described in previous community-based studies assessing other psychiatric conditions (Spijker et al., 2001; van Beljouw et al., 2010). Moreover, our results cannot tell if the actualized treatment was sufficient. For example, only one in 10 of those who had been detected by healthcare professionals received treatment at a unit that was specializing in eating disorder treatment.

Our finding of the weak association of treatment with eating disorder outcome is in accordance with previous longitudinal studies. Two community-based studies have found negligible associations of detection with the outcome of AN and BN (Keski-Rahkonen et al., 2009; Mustelin, Silen, et al., 2016), and one community-based study found no association of treatment with the outcome of DSM-IV defined AN (Dobrescu et al., 2020). Similarly, treatment was not associated with the 5-year outcome among DSM-IV defined AN, BN, and EDNOS patients who were seeking treatment (Ben-Tovim et al., 2001). Together the results indicate that real-world treatments may have limited effectiveness, and implementation studies are vitally important to improve care.

#### 4.5 | Limitations and strengths

Our study has some important limitations that should be considered when interpreting our results. First, some aspects of our sample could complicate the generalization of our results. We studied twins, and multiple births are a known risk factor for AN (Goodman et al., 2014). In our study, a subsample was enriched with participants with a family risk for alcohol problems, but the enrichment did not significantly affect eating disorder occurrence (Silén et al., 2020). Second, the age of our sample should be taken account when interpreting our results. Participants had not yet passed the upper limit of the age of peak incidence of eating disorders. In particular, BN and BED tend to have a later onset than does AN (Micali et al., 2013; Mitchison & Hay, 2014; Striegel-Moore & Franko, 2003). Thus, some participants may have been too young for developing an eating disorder or having a sufficient time after its onset to come to healthcare providers' attention. Moreover, with a longer follow-up, the mean duration would probably have been longer and the recovery rates higher. Third, the numbers of some eating disorder subtypes were too low to make far-reaching conclusions. Fourth, the assessment of symptoms, detection, treatment, and course was retrospective, sometimes occurring years after the original events; this could lead to recall bias. We also only had information about detection and treatment from the respondents; this could lead to information bias. Fifth, we did not have information about comorbid psychiatric disorders. For this reason, we do not know whether eating disorder symptoms were influenced by other psychiatric conditions. Sixth, we did not have information about the impairment related to eating disorders. We do not know whether the onset of OSFED or UFED posed as much of a threat to physical, psychological, and social health compared with, for example, AN or BN. Last, our results did not reflect the most recent detection and treatment efforts.

However, we believe that these limitations are offset by several strengths. Our population-based study design permitted us to assess eating disorder detection, treatment, and course in

a naturalistic setting. Furthermore, our assessment protocol was rigorous, including a structured clinical interview of all participants, and our analyses included both genders and a variety of eating disorders. Finally, our definition of recovery was multifaceted, and it included the participants' self-assessment of recovery.

## 5 | CONCLUSION

Although eating disorders are common and symptoms are persistent for many, only one in three are detected in healthcare, and even fewer receive any treatment. Furthermore, real-world treatments seem to have limited effectiveness. These results underscore the need for immediate actions to improve the detection and treatment of eating disorders.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Abbreviations:

<b>AN</b>	anorexia nervosa
<b>Atypical AN</b>	atypical anorexia nervosa
<b>BED</b>	binge eating disorder
<b>BN</b>	bulimia nervosa
<b>CI</b>	confidence interval
<b>DSM-5</b>	Diagnostic and Statistical Manual of Mental Disorders fifth edition
<b>ED</b>	eating disorder
<b>EDNOS</b>	eating disorder not otherwise specified
<b>Mm-MAST</b>	the Malmö-modified Michigan Alcoholism Screening Test
<b>OSFED- BED</b>	binge eating disorder of low frequency and/or limited duration

<b>OSFED</b>	other specified feeding or eating disorder
<b>OSFED-BN</b>	bulimia nervosa of low frequency and/or limited duration
<b>PD</b>	purging disorder
<b>SCID</b>	the Structured Clinical Interview for DSM-IV
<b>SD</b>	standard deviation
<b>UFED</b>	unspecified feeding or eating disorder

## REFERENCES

- Agras WS, Crow S, Mitchell JE, Halmi KA, & Bryson S. (2009). A 4-year prospective study of eating disorder NOS compared with full eating disorder syndromes. *International Journal of Eating Disorders*, 42(6), 565–570. 10.1002/eat.20708
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed. (DSM-5™) ed.)* American Psychiatric Association
- Bardone-Cone AM, Hunt RA, & Watson HJ (2018). An overview of conceptualizations of eating disorder recovery, recent findings, and future directions. *Current Psychiatry Reports*, 20(9), 79-018-0932-9. 10.1007/s11920-018-0932-9
- Ben-Tovim DI, Walker K, Gilchrist P, Freeman R, & Kalucy RA (2001). Outcome in patients with eating disorders: A 5 year study. *Lancet*, 357(9264), 1254–1257. 10.1016/S0140-6736(00)04406-8 [PubMed: 11418150]
- Brown T, Klein K, & Keel PK (2015). The “Natural” course of eating disorders. In Smolak L. & Levine MP (Ed.), *The Wiley handbook of eating disorders* (pp. 757–769). NY Wiley. 10.1002/9781118574089.ch55
- Cachelin FM, & Striegel-Moore RH (2006). Help seeking and barriers to treatment in a community sample of Mexican American and European American women with eating disorders. *International Journal of Eating Disorders*, 39(2), 154–161. 10.1002/eat.20213
- de Vos JA, LaMarre A, Radstaak M, Bijkerk CA, Bohlmeijer ET, & Westerhof GJ (2017). Identifying fundamental criteria for eating disorder recovery: A systematic review and qualitative meta-analysis. *Journal of Eating Disorders*, 5(34) 10.1186/s40337-017-0164-0
- Dobrescu SR, Dinkler L, Gillberg C, Råstam M, Gillberg C, & Wentz E. (2020). Anorexia nervosa: 30-year outcome. *The British Journal of Psychiatry : Journal of Mental Science*, 216(2), 97–104. 10.1192/bjp.2019.113
- Duncan AE, Ziobrowski HN, & Nicol G. (2017). The prevalence of past 12-month and lifetime DSM-IV eating disorders by BMI category in US men and women. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, 25(3), 165–171. 10.1002/erv.2503 [PubMed: 28127825]
- Emanuelli F, Waller G, Jones-Chester M, & Ostuzzi R. (2012). Recovery from disordered eating: Sufferers’ and clinicians’ perspectives. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, 20(5), 363–372. 10.1002/erv.2159 [PubMed: 22411482]
- Fairweather-Schmidt AK, & Wade TD (2014). DSM-5 eating disorders and other specified eating and feeding disorders: Is there a meaningful differentiation? *International Journal of Eating Disorders*, 47(5), 524–533. 10.1002/eat.22257
- Fichter MM, Quadflieg N, Crosby RD, & Koch S. (2017). Long-term outcome of anorexia nervosa: Results from a large clinical longitudinal study. *International Journal of Eating Disorders*, 50(9), 1018–1030. 10.1002/eat.22736
- Fichter MM, Quadflieg N, & Hedlund S. (2008). Long-term course of binge eating disorder and bulimia nervosa: Relevance for nosology and diagnostic criteria. *International Journal of Eating Disorders*, 41(7), 577–586. 10.1002/eat.20539

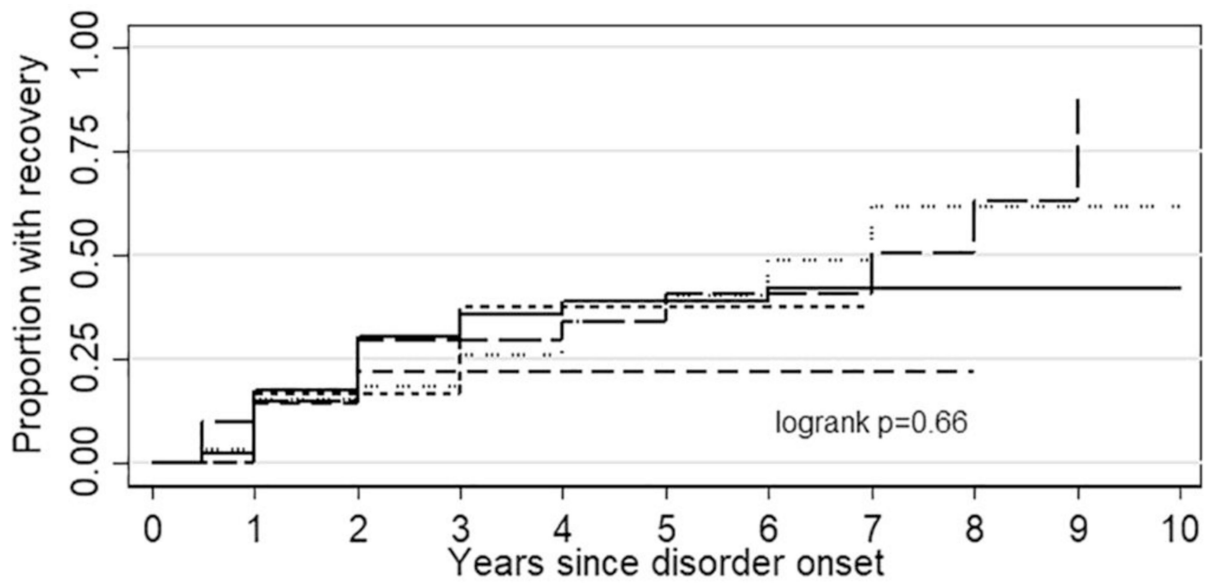
- First MB, Spitzer RL, Gibbon M, & Williams JB (2002). Structured clinical interview for DSM-IV-TR axis I disorders, research version, patient edition. (SCID-I/P). New York, NY: State Psychiatric Institute & Biometrics Research.
- Glazer KB, Sonnevile KR, Micali N, Swanson SA, Crosby R, Horton NJ, Eddy KT, & Field AE (2019). The course of eating disorders involving bingeing and purging among adolescent girls: Prevalence, stability, and transitions. *Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 64(2), 165–171. S1054-139X(18)30438-5
- Goodman A, Heshmati A, Malki N, & Koupil I. (2014). Associations between birth characteristics and eating disorders across the life course: Findings from 2 million males and females born in Sweden, 1975-1998. *American Journal of Epidemiology*, 179(7), 852–863. 10.1093/aje/kwt445 [PubMed: 24553681]
- Grillot CL, & Keel PK (2018). Barriers to seeking treatment for eating disorders: The role of self-recognition in understanding gender disparities in who seeks help. *International Journal of Eating Disorders*, 51(11), 1285–1289. 10.1002/eat.22965
- Hart LM, Granillo MT, Jorm AF, & Paxton SJ (2011). Unmet need for treatment in the eating disorders: A systematic review of eating disorder specific treatment seeking among community cases. *Clinical Psychology Review*, 31(5), 727–735. 10.1016/j.cpr.2011.03.004 [PubMed: 21501580]
- House J, Schmidt U, Craig M, Landau S, Simic M, Nicholls D, Hugo P, Berelowitz M, & Eisler I. (2012). Comparison of specialist and nonspecialist care pathways for adolescents with anorexia nervosa and related eating disorders. *International Journal of Eating Disorders*, 45(8), 949–956. 10.1002/eat.22065
- Keel P. (2018). Epidemiology and course of eating disorders. In Agras WS & Robinson A. (Eds.), *The oxford handbook of eating disorders* (2nd ed.) Oxford University Press. 10.1093/oxfordhb/9780190620998.013.3
- Keski-Rahkonen A, Hoek HW, Linna MS, Raevuori A, Sihvola E, Bulik CM, Rissanen A, & Kaprio J. (2009). Incidence and outcomes of bulimia nervosa: A nationwide population-based study. *Psychological Medicine*, 39(5), 823–831. 10.1017/S0033291708003942 [PubMed: 18775085]
- Kessler RC, Berglund PA, Chiu WT, Deitz AC, Hudson JI, Shahly V, Aguilar-Gaxiola S, Alonso J, Angermeyer MC, Benjet C, Bruffaerts R, de Girolamo G, de Graaf R, Maria Haro J, Kovess-Masfety V, O'Neill S, Posada-Villa J, Sasu C, Scott K, & Xavier M. (2013). The prevalence and correlates of binge eating disorder in the world health organization world mental health surveys. *Biological Psychiatry*, 73(9), 904–914. 10.1016/j.biopsych.2012.11.020 [PubMed: 23290497]
- Lahey BB, Zald DH, Hakes JK, Krueger RF, & Rathouz PJ (2014). Patterns of heterotypic continuity associated with the cross-sectional correlational structure of prevalent mental disorders in adults. *JAMA Psychiatry*, 71(9), 989–996. 10.1001/jamapsychiatry.2014.359 [PubMed: 24989054]
- Limbers CA, Cohen LA, & Gray BA (2018). Eating disorders in adolescent and young adult males: Prevalence, diagnosis, and treatment strategies. *Adolescent Health, Medicine and Therapeutics*, 9, 111–116. 10.2147/AHMT.S147480
- Mangweth-Matzek B, & Hoek HW (2017). Epidemiology and treatment of eating disorders in men and women of middle and older age. *Current Opinion in Psychiatry*, 30(6), 446–451. 10.1097/YCO.0000000000000356 [PubMed: 28825955]
- Micali N, Hagberg KW, Petersen I, & Treasure JL (2013). The incidence of eating disorders in the UK in 2000–2009: Findings from the general practice research database. *BMJ Open*, 3(5), e002646. 10.1136/bmjopen-2013-002646
- Micali N, Martini MG, Thomas JJ, Eddy KT, Kothari R, Russell E, Treasure J. (2017). Lifetime and 12-month prevalence of eating disorders amongst women in mid-life: A population-based study of diagnoses and risk factors. *BMC Medicine*, 15(1), 12-016-0766-4. 10.1186/s12916-016-0766-4
- Mitchison D, & Hay PJ (2014). The epidemiology of eating disorders: Genetic, environmental, and societal factors. *Clinical Epidemiology*, 6, 89–97. 10.2147/CLEP.S40841 [PubMed: 24728136]
- Mohler-Kuo M, Schnyder U, Dermota P, Wei W, & Milos G. (2016). The prevalence, correlates, and help-seeking of eating disorders in Switzerland. *Psychological Medicine*, 46(13), 2749–2758. 10.1017/S0033291716001136 [PubMed: 27444809]

- Mulders-Jones B, Mitchison D, Girosi F, & Hay P. (2017). Socioeconomic correlates of eating disorder symptoms in an Australian population-based sample. *PLoS One*, 12(1), e0170603. 10.1371/journal.pone.0170603 [PubMed: 28141807]
- Murray SB, Nagata JM, Griffiths S, Calzo JP, Brown TA, Mitchison D, Blashill AJ, & Mond JM (2017). The enigma of male eating disorders: A critical review and synthesis. *Clinical Psychology Review*, 57, 1–11. S0272-7358(17) 30137-X [PubMed: 28800416]
- Mustelin L, Lehtokari VL, & Keski-Rahkonen A. (2016a). Other specified and unspecified feeding or eating disorders among women in the community. *International Journal of Eating Disorders*, 49(11), 1010–1017. 10.1002/eat.22586
- Mustelin L, Silén Y, Raevuori A, Hoek HW, Kaprio J, & Keski-Rahkonen A. (2016b). The DSM-5 diagnostic criteria for anorexia nervosa may change its population prevalence and prognostic value. *Journal of Psychiatric Research*, 77, 85–91. 10.1016/j.jpsychires.2016.03.003 [PubMed: 27014849]
- Quadflieg N, & Fichter MM (2019). Long-term outcome of inpatients with bulimia nervosa—results from the Christina Barz study. *International Journal of Eating Disorders*, 52(7), 834–845. 10.1002/eat.23084
- Raevuori A, Hoek HW, Susser E, Kaprio J, Rissanen A, & Keski-Rahkonen A. (2009). Epidemiology of anorexia nervosa in men: A nationwide study of Finnish twins. *PLoS One*, 4(2), e4402. 10.1371/journal.pone.0004402 [PubMed: 19204790]
- Riesco N, Agüera Z, Granero R, Jiménez-Murcia S, Menchón JM, & Fernández-Aranda F. (2018). Other specified feeding or eating disorders (OSFED): Clinical heterogeneity and cognitive-behavioral therapy outcome. *European Psychiatry: The Journal of the Association of European Psychiatrists*, 54, 109–116. 10.1016/j.eurpsy.2018.08.001 [PubMed: 30193141]
- Rose RJ, Dick DM, Viken RJ, Pulkkinen L, & Kaprio J. (2004). Genetic and environmental effects on conduct disorder and alcohol dependence symptoms and their covariation at age 14. *Alcoholism: Clinical and Experimental Research*, 28(10), 1541–1548. 00000374-200410000-00014
- Rose RJ, Salvatore JE, Aaltonen S, Barr PB, Bogl LH, Byers HA, Heikkilä K, Korhonen T, Latvala A, Palviainen T, Ranjit A, Whipp AM, Pulkkinen L, Dick DM, & Kaprio J. (2019). FinnTwin12 cohort: An updated review. *Twin Research and Human Genetics: The Official Journal of the International Society for Twin Studies*, 22(5), 302–311. 10.1017/thg.2019.83 [PubMed: 31640839]
- Sangha S, Oliffe JL, Kelly MT, & McCuaig F. (2019). Eating disorders in males: How primary care providers can improve recognition, diagnosis, and treatment. *American Journal of Men's Health*, 13(3), 1557988319857424. 10.1177/15579883198574
- Schaumberg K, Welch E, Breithaupt L, Hübel C, Baker JH, Munn-Chernoff MA, Yilmaz Z, Ehrlich S, Mustelin L, Ghaderi A, Hardaway AJ, Bulik-Sullivan EC, Hedman AM, Jangmo A, Nilsson I, Wiklund C, Yao S, Seidel M, & Bulik CM (2017). The science behind the academy for eating disorders' nine truths about eating disorders. *European Eating Disorders Review*. 25(6), 432–450. 10.1002/erv.2553 [PubMed: 28967161]
- Seppä K, Sillanaukee P, & Koivula T. (1990). The efficiency of a questionnaire in detecting heavy drinkers. *British Journal of Addiction*, 85(12), 1639–1645. 10.1111/j.1360-0443.1990.tb01654.x [PubMed: 2289065]
- Shevlin M, McElroy E, & Murphy J. (2017). Homotypic and heterotypic psychopathological continuity: A child cohort study. *Social Psychiatry and Psychiatric Epidemiology*, 52(9), 1135–1145. 10.1007/s00127-017-1396-7 [PubMed: 28550520]
- Silén Y, Sipilä PN, Raevuori A, Mustelin L, Marttunen M, Kaprio J, & Keski-Rahkonen A. (2020). DSM-5 eating disorders among adolescents and young adults in Finland: A public health concern. *International Journal of Eating Disorders*, 53(5), 520–531. 10.1002/eat.23236
- Slof-Op 't Landt MCT, Dingemans AE, de la Torre Y, Rivas J, & van Furth EF (2019). Self-assessment of eating disorder recovery: Absence of eating disorder psychopathology is not essential. *International Journal of Eating Disorders*, 52(8), 956–961. 10.1002/eat.23091
- Smink FR, van Hoeken D, & Hoek HW (2013). Epidemiology, course, and outcome of eating disorders. *Current Opinion in Psychiatry*, 26(6), 543–548. 10.1097/YCO.0b013e328365a24f [PubMed: 24060914]

- Smink FR, van Hoeken D, Oldehinkel AJ, & Hoek HW (2014). Prevalence and severity of DSM-5 eating disorders in a community cohort of adolescents. *International Journal of Eating Disorders*, 47(6), 610–619. 10.1002/eat.22316
- Solmi F, Hotopf M, Hatch SL, Treasure J, & Micali N. (2016). Eating disorders in a multi-ethnic inner-city UK sample: Prevalence, comorbidity and service use. *Social Psychiatry and Psychiatric Epidemiology*, 51(3), 369–381. 10.1007/s00127-015-1146-7 [PubMed: 26631229]
- Sonneville KR, & Lipson SK (2018). Disparities in eating disorder diagnosis and treatment according to weight status, race/ethnicity, socioeconomic background, and sex among college students. *International Journal of Eating Disorders*, 51(6), 518–526. 10.1002/eat.22846
- Spijker J, Bijl RV, de Graaf R, & Nolen WA (2001). Care utilization and outcome of DSM-III-R major depression in the general population. results from The Netherlands mental health survey and incidence study (NEMESIS). *Acta Psychiatrica Scandinavica*, 104(1), 19–24. 10.1034/j.1600-0447.2001.00363.x [PubMed: 11437745]
- Stice E, Marti CN, & Rohde P. (2013). Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. *Journal of Abnormal Psychology*, 122(2), 445–457. <https://doi.org/10.1037/a0030679> ; <https://doi.org/10.1037/a0030679> [PubMed: 23148784]
- Striegel-Moore R, & Franko DL (2003). Epidemiology of binge eating disorder. *International Journal of Eating Disorders*, 34, S19–S29. 10.1002/eat.10202
- Strobel C, Quadflieg N, Naab S, Voderholzer U, & Fichter MM (2019). Long-term outcomes in treated males with anorexia nervosa and bulimia nervosa-A prospective, gender-matched study. *International Journal of Eating Disorders*, 52(12), 1353–1364. 10.1002/eat.23151
- Strobel C, Quadflieg N, Voderholzer U, Naab S, & Fichter MM (2018). Short- and long-term outcome of males treated for anorexia nervosa: A review of the literature. *Eating and Weight Disorders: EWD*, 23(5), 541–552. 10.1007/s40519-018-0538-6 [PubMed: 30027397]
- Strober M, Freeman R, Lampert C, Diamond J, & Teplinsky CDM (2006). Are there gender differences in core symptoms, temperament, and short-term prospective outcome in anorexia nervosa? *International Journal of Eating Disorders*, 39(7), 570–575.
- Treasure J, Duarte TA, & Schmidt U. (2020). Eating disorders *Lancet* (London, England), Vol. 395(10227), 899–911. 10.1016/S0140-6736(20)30059-3
- Udo T, & Grilo CM (2018). Prevalence and correlates of DSM-5-defined eating disorders in a nationally representative sample of U.S. adults. *Biological Psychiatry*, 84(5), 345–354.S0006-3223(18)31440-9 [PubMed: 29859631]
- Vall E, & Wade TD (2015). Predictors of treatment outcome in individuals with eating disorders: A systematic review and meta-analysis. *International Journal of Eating Disorders*, 48(7), 946–971. 10.1002/eat.22411
- van Beljouw IM, Verhaak PF, Cuijpers P, van Marwijk HW, & Penninx BW (2010). The course of untreated anxiety and depression, and determinants of poor one-year outcome: A one-year cohort study. *BMC Psychiatry*, BMC Psychiatry, 10(86) 10.1186/1471-244X-10-86
- Wade TD, & O’Shea A. (2015). DSM-5 unspecified feeding and eating disorders in adolescents: What do they look like and are they clinically significant? *International Journal of Eating Disorders*, 48(4), 367–374. 10.1002/eat.22303
- Wagner G, Zeiler M, Waldherr K, Philipp J, Truttmann S, Dur W, Treasure JL, & Karwautz AFK (2017). Mental health problems in Austrian adolescents: A nationwide, two-stage epidemiological study applying DSM-5 criteria. *European Child & Adolescent Psychiatry*, 26(12), 1483–1499. 10.1007/s00787-017-0999-6 [PubMed: 28540609]
- Waller G, Micali N, & James A. (2014). General practitioners are poor at identifying the eating disorders. *Advances in Eating Disorders* (Abingdon, England), 2(2), 146–157. 10.1080/21662630.2013.859437
- Wetzler S, Hackmann C, Peryer G, Clayman K, Friedman D, Saffran K, Silver J, Swarbrick M, Magill E, van Furth EF, & Pike KM (2020). A framework to conceptualize personal recovery from eating disorders: A systematic review and qualitative meta-synthesis of perspectives from individuals with lived experience. *International Journal of Eating Disorders*, 53(8), 1188–1203. 10.1002/eat.23260

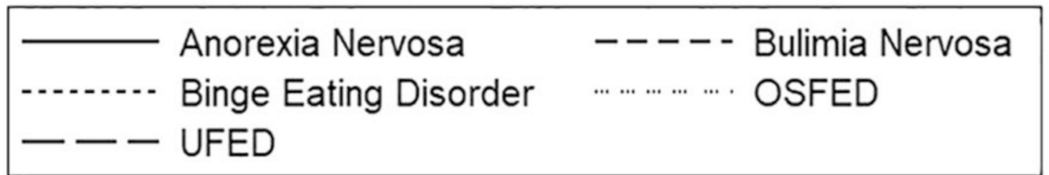
**Key points**

- Although eating disorders affected one in six females and one in 40 males in the community, only one-third of these cases were detected by healthcare providers, and even fewer received any treatment. Atypical disorders remain rarely recognized and treated.
- Eating disorder symptoms can be persistent for many sufferers; 5 years after disease onset, less than two-fifths of the females and two-thirds of the males had recovered.
- Real-world treatments available in healthcare may have limited effectiveness, as the likelihood of recovery within 5 years was 40 percent in both treated and untreated groups.



Number in follow-up

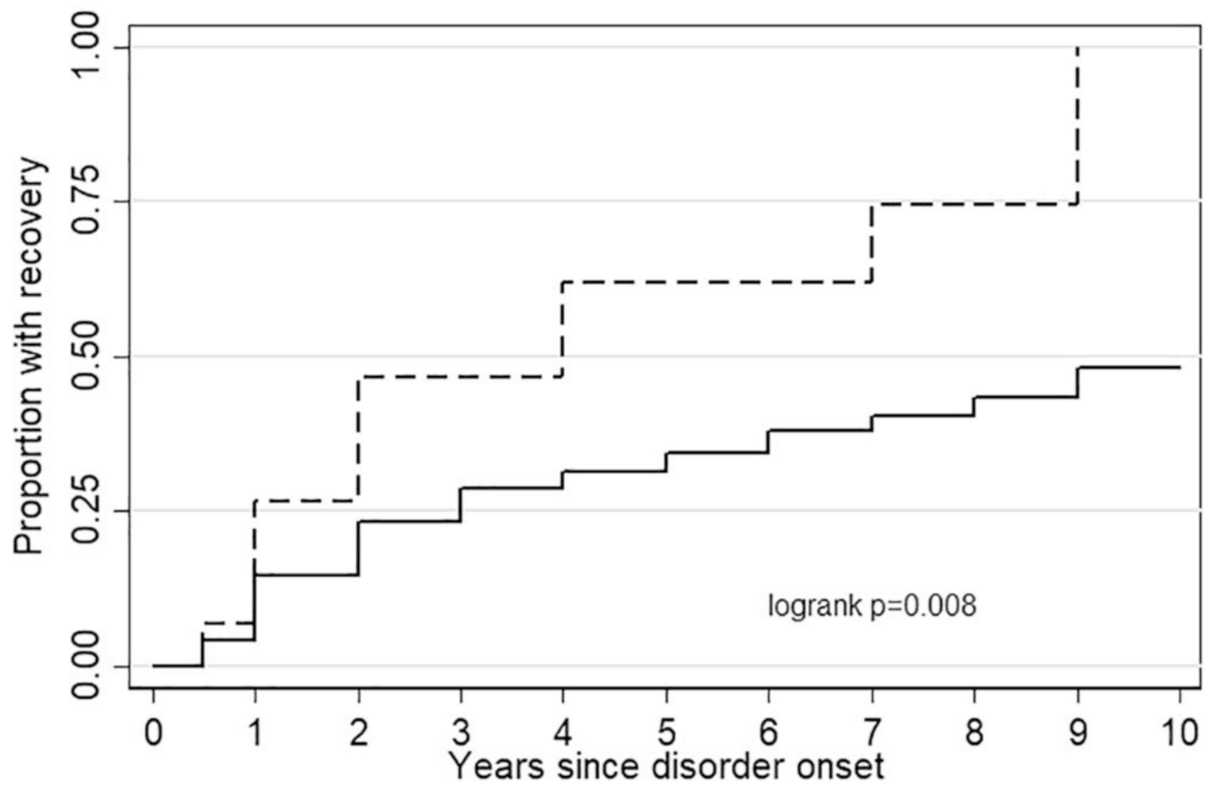
AN	46	45	38	27	20	19	19	13	12	8	6
BN	14	14	11	8	7	7	5	4	2	0	0
BED	6	6	5	4	3	3	2	1	0	0	0
OSFED	33	32	25	22	18	11	7	4	3	2	2
UFED	41	36	29	18	15	10	7	6	4	3	0



**FIGURE 1.**

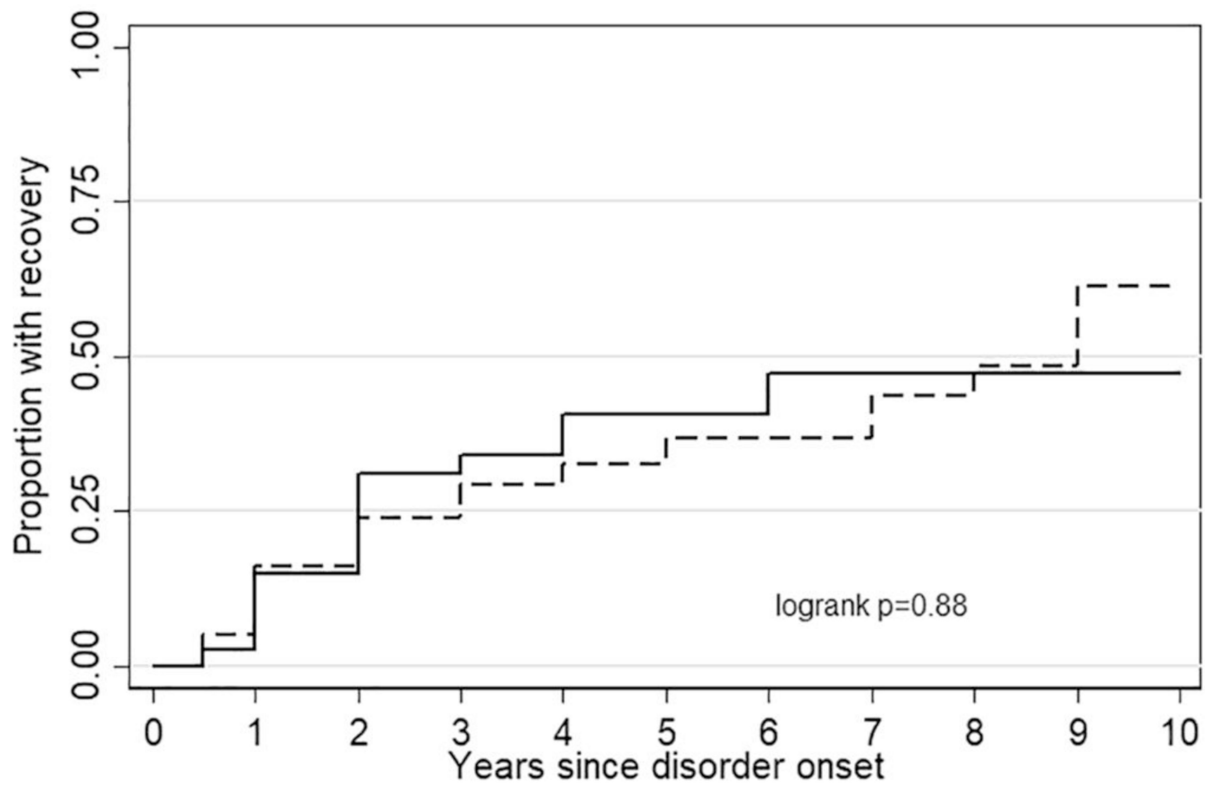
Recovery from anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), other specified feeding and eating disorders (OSFED) and unspecified feeding and eating disorders (UFED). Females and males were analysed together





Number in follow-up		0	1	2	3	4	5	6	7	8	9	10
Males		15	14	11	8	7	5	4	3	1	1	0
Females		125	119	97	71	56	45	36	25	20	12	8

**FIGURE 2.**  
Recovery from DSM-5 eating disorders among females versus males



Number in follow-up		0	1	2	3	4	5	6	7	8	9	10
Untreated	100	94	76	56	43	32	22	18	12	8	5	
Treated	40	39	32	23	20	18	18	10	9	5	3	

----- Untreated
———— Treated

**FIGURE 3.** Recovery from eating disorders by those who received treatment for eating disorder versus those who remained untreated. Females and males were analysed together

Detection and treatment of DSM-5 eating disorders in a population sample of adolescents and young adults

TABLE 1

Eating disorder diagnosis (N)	Gender	Participants diagnosed in the present study	Detection in health care	Any treatment	Hospital treatment	Medication	Psychotherapy	Treatment at eating disorder specialist unit
Specified eating or feeding disorder								
Anorexia nervosa <sup>a</sup>	Females	44	24	22	6	7	6	3
	Males	2	2	2	1	1	1	1
Bulimia nervosa <sup>a</sup>	Females	17	8	8	1	4	1	1
	Males	1	1	1	1	1	0	1
Binge eating disorder	Females	4	1	1	0	0	0	0
	Males	2	1	0	0	0	0	0
Other specified feeding or eating disorder								
OSFED atypical AN	Females	15	7	6	0	1	1	1
	Males	1	0	0	0	0	0	0
OSFED low frequency and/or limited duration BN	Females	3	0	0	0	0	0	0
	Males	0	0	0	0	0	0	0
OSFED low frequency and/or limited duration BED	Females	5	1	1	0	0	1	0
	Males	0	0	0	0	0	0	0
OSFED purging disorder	Females	9	1	1	0	0	0	0
	Males	0	0	0	0	0	0	0
Total OSFED	Females	32	9	8	0	1	2	1
	Males	1	0	0	0	0	0	0
Unspecified feeding or eating disorder								
	Females	32	1	1	0	0	1	0
	males	10	1	0	0	0	0	0
Any eating disorder	Females	127	41	38	7	11	9	5
	Males	15	4	2	1	1	1	1

Abbreviations: AN, anorexia nervosa; BED, binge eating disorder; BN, bulimia nervosa; OSFED, other specified feeding or eating disorder; UFED unspecified feeding or eating disorder.

Three individuals had both AN and BN diagnoses (two females, one male).

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**TABLE 2**

The mean duration of eating disorders among all those with an eating disorder and those recovered and 5-year recovery rates among all those with an eating disorder, those who received treatment, and those who remained untreated

Eating disorder diagnosis	Mean duration of eating disorder (years), full sample (SD, range)	Mean duration of eating disorder of those recovered (years), (SD, range)	5-year recovery rate, full sample (95% CI)	5-year recovery rate for those treated for an eating disorder (95% CI)	5-year recovery rate for those not treated for an eating disorder (95% CI)	p-value for difference in 5-year recovery rates for treated vs. untreated, (log-rank)
Anorexia nervosa	4.6 (3.4, 0.5–13)	2.0 (1.4, 0.5–6)	41.5% (28.2–58.0%)	40.0% (23.2–62.8%)	43.2% (24.4–68.1%)	<i>p</i> = 0.99
Bulimia nervosa	4.2 (2.9, 0.5–9)	1.3 (0.6, 1–2)	23.1% (8.1–55.8%)	28.6% (8.0–74.2%)	16.7% (2.5–72.7%)	<i>p</i> = 0.52
Binge eating disorder (BED)	4.0 (2.4, 1–7)	2.0 (1.4, 1–3)	40.0% (11.8–87.4%)	0%	57.0% (18.1–97.1%)	<i>p</i> = 0.47
Other specified feeding or eating disorder (OSFED)	3.9 (2.6, 0.5–11)	3.0 (2.1, 0.5–7)	43.1% (26.7–64.2%)	53.3% (24.4–87.5%)	38.9% (20.8–64.7%)	<i>p</i> = 0.33
Unspecified feeding or eating disorder (UFED)	3.2 (2.5, 0.5–9)	3.3 (3.1, 0.5–9)	42.6% (27.4–61.8%)	0%	43.3% (28.0–62.7%)	<i>p</i> = 0.54
Any eating disorder	4.0 (2.9, 0.5–13)	2.6 (2.3, 0.5–9)	40.7% (32.3–50.0%)	41.1% (27.2–58.7%)	40.5% (30.5–52.3%)	<i>p</i> = 0.66

Note: Females and males were analysed together.

Abbreviations: CI, confidence interval; SD, standard deviation.