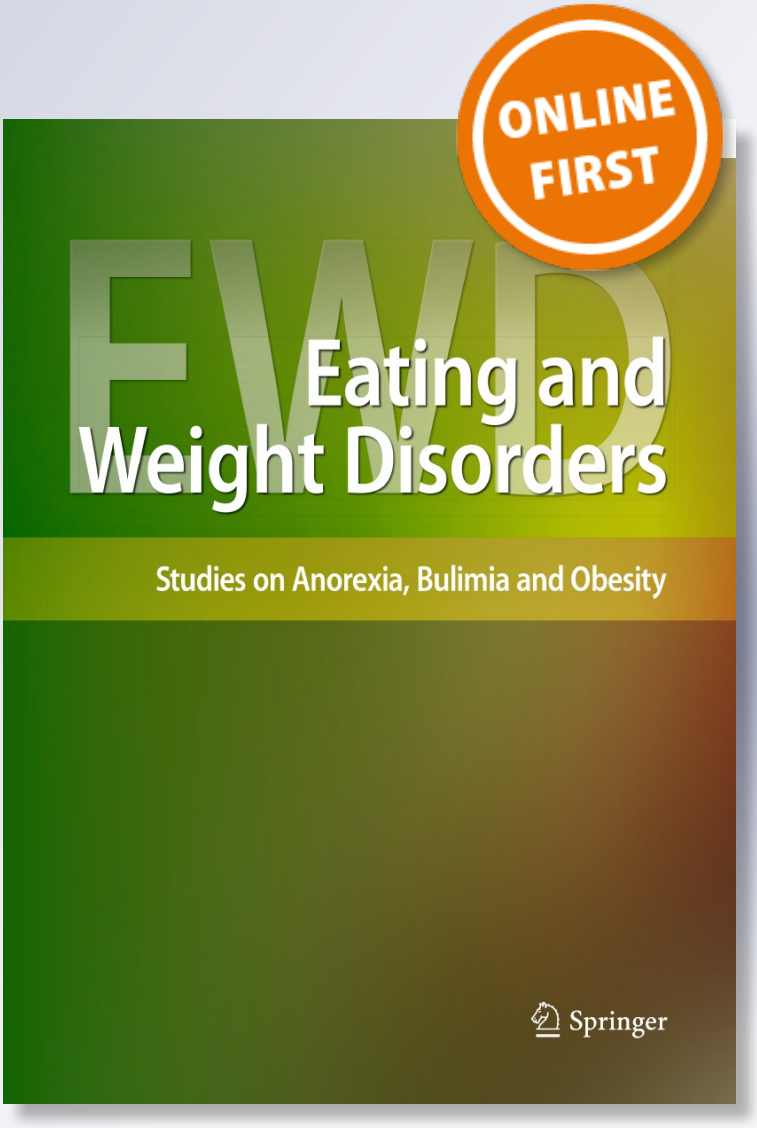
Individuals who self-identify as having "orthorexia nervosa" score in the clinical range on the Eating Attitudes Test-26

Thomas M. Dunn, Nicole Hawkins, Stacey Gagliano & Kristen Stoddard

Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity

e-ISSN 1590-1262

Eat Weight Disord
DOI 10.1007/s40519-019-00651-6



Springer

Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity
https://doi.org/10.1007/s40519-019-00651-6

ORIGINAL ARTICLE

Individuals who self-identify as having "orthorexia nervosa" score in the clinical range on the Eating Attitudes Test-26

Thomas M. Dunn[1,2] · **Nicole Hawkins**[3] · **Stacey Gagliano**[1] · **Kristen Stoddard**[1]

Received: 24 July 2018 / Accepted: 31 January 2019

Abstract

Purpose In recent years, there has been growing interest in pathologically healthful eating, often called orthorexia nervosa (ON). Much of the literature in this area has been about point prevalence of ON in particular populations, which range from less than 1% to nearly 90% depending on the study. Despite this interest, there has been no extensive examination of whether those with pathologically healthful eating are detected by screening instruments that identify disordered eating. This study examines whether individuals who self-report suffering from ON score in the clinical range on the 26-item Eating Attitudes Test (EAT-26).

Method Individuals ($n = 354$) sampled from both clinical and non-clinical settings were administered the EAT-26 to determine whether those who self-identify as having ON scored in a range that suggests disordered eating.

Results Participants who self-report suffering from ON had a mean EAT-26 score of 30.89 (SD 12.60) scoring in a range that urges individuals to seek additional advice on whether there is an eating disorder present (scores of 20 and higher fall in a range suggesting a possible eating disorder). Furthermore, those in the ON group scored no differently than those reporting other eating disorders, but significantly higher than a non-clinical control group.

Conclusions Our findings indicate that a screening instrument for a possible eating disorder is sensitive to pathologically healthful eating (but has no specificity).

Level of evidence Level III, case control analytic study.

Keywords Orthorexia nervosa · Pathologically healthful eating · EAT-26

Introduction

Pathologically healthful eating, so-called "orthorexia nervosa," has been of interest to eating disorder scholars and clinicians in recent years. While this alleged condition has yet to be widely accepted, it is believed that those with ON transition from an appropriate desire for healthy eating into pathological obsession for clean eating that leads to malnutrition or other medical problems, and/or social dysfunction [1]. There are case reports in the literature that note individuals without disrupted body image who have severely restricted their intake to the point of provoking malnutrition and other complications that can medically debilitating [2–4]. While not yet codified in a classification system such as the Diagnostic and Statistical Manual of the American Psychiatric Association, diagnostic criteria for ON have been published and are widely cited [5], please see Dunn and Bratman for a more in-depth discussion of ON [5].

Measuring so-called ON, particularly assessing prevalence, is prominent in the literature. This may have to do with the seminal work by Donini and colleagues [6], whose work was the first scholarly effort in the area of pathologically healthful eating. They studied the prevalence of ON in an Italian sample. Since then, many others have used a version of Donini et al.'s ON instrument the, "ORTO-15,"

A version of this paper was presented as a poster at the 2018 annual meeting of the Association for Psychological Science.

This article is part of topical collection on Orthorexia Nervosa.

✉ Thomas M. Dunn
Thomas.dunn@unco.edu

[1] School of Psychological Sciences, University of Northern Colorado, Campus Box 94, Greeley, CO, USA

[2] Behavioral Health Service, Denver Health Medical Center, Denver, CO, USA

[3] Center for Change, Orem, UT, USA

Published online: 11 February 2019

in community samples in a variety of counties, including Turkey, Hungary, Poland, Brazil, Spain, Austria, and the US [7–14]. Point prevalence rates for ON, typically based on the ORTO-15 or one if its derivatives, vary widely, ranging from less than 1% to nearly 90% in some samples. This has led some to suggest great caution be used when trying to identify ON using the ORTO-15, as this instrument has questionable psychometric properties. It likely identifies healthy eating effectively, but is less sensitive to pathologically healthful eating, and, therefore, has inflated results [15, 16]. Despite this work, there is little in the peer-reviewed literature that examines whether traditional tools designed to identify those with disordered eating are sensitive to pathologically healthful eating.

Identifying individuals with eating disorders (ED) is important, as those with EDs are known to have significant disease burden. These burdens include psychiatric comorbidity, such as mood disorders, impulse control disorders, substance abuse, anxiety, and personality disorders [17–26]. In addition, there are often co-occurring medical complications. For those with anorexia nervosa (AN), medical complications include cardiac arrhythmia, hypotension, dermatologic changes, amenorrhea, infertility, respiratory failure, and osteoporosis [27–32]. Those with bulimia nervosa (BN) can develop esophageal injuries, electrolyte imbalances, and hypovolemia from self-induced vomiting and laxative abuse [33, 34]. Suffers from binge-eating disorder (BED) are known to have medical problems associated with obesity, such as diabetes, hypertension, dyslipidemias, and sleep disorders [35, 36]. The medical complications of Avoidant/Restrictive Food Intake Disorder (ARFID) tend to be related to malnutrition and often present with similar health complications as those with AN [37, 38]. With these medical comorbidities, it is not a surprise that suffering from an ED is associated with increased risk of mortality [39–41].

Potential ramifications of pathologically healthful eating are not well understood. However, because of the malnutrition that may accompany this condition, it is likely that those with ON have health effects similar to those with AN and ARFID. Having any ED takes a toll. The cumulative effect is that those with EDs are known to have significant medical, psychiatric, social, and economic burden from their disease [42, 43]. Those with so-called ON are likely no different than those with other EDs. Given the potential disease burden of pathologically healthful eating, it is imperative to identify those with disordered eating as early as possible [44].

To our knowledge, there are no peer-reviewed studies that discuss whether eating disorder screening instruments are sensitive to pathologically healthful eating. There is believed to be overlap between ON and traditional EDs, particularly AN, in that both types of patients are believed to exhibit obsessive/compulsive features, poor insight into the condition, guilt, functional impairment, and cognitive rigidity [14, 45]. Therefore, we hypothesized that an eating disorder screening instrument would be sensitive to symptoms consistent with pathologically healthful eating.

Method

Participants

Data collection commenced after the institutional review board at the University of Northern Colorado approved research with human participants. Informed consent was obtained from all individuals included in the study. Individuals who participated in the study ($n = 364$) were recruited from a variety of sources. To assure that there was a sample of individuals who did not have an ED, students from a mid-sized US university were recruited ($n = 236$). Being actively in treatment for an ED was an exclusion criteria to assure our control group could function as a non-clinical control group. Those from the college ranks who reported being in treatment for an ED ($n = 30$), we reassigned into a clinical group. Most participated in return for extra-credit in a course or to complete a research requirement for an introductory psychology course. Clinical subjects had the inclusion criterion of reporting presently being in active treatment for an eating disorder and were recruited from several sources, including from an inpatient eating disorder program ($n = 38$), as well as solicited through social media ($n = 90$). Ten of the 364 participants did not complete the entire study, resulting in a total of 354 subjects.

Materials and procedure

The Eating Attitudes Test (EAT) was developed in the late 1970s as a 40-item instrument to detect AN [46]. Later studies found that the instrument was sensitive to BN as well as other types of disordered eating [47, 48]. A subsequent factor analysis found that 14 items could be discarded. The resulting 26-item tool has almost the same psychometric properties as the original instrument, making the "EAT-26" as effective as the original "EAT-40" [49]. Over the years, the instrument has continued to be of value even as the diagnostic criteria have been revised [50]. Given that the EAT-26 is self-administered in a short time and is sensitive to different EDs, it has been translated into other languages, and found to be useful in samples of children and adolescents [51, 52]. It is among the most widely used screening instruments for EDs. With its pedigree, it is an ideal instrument to determine whether potential pathologically healthful eating can be detected by a screening tool. The original scoring method was used.

Permission to reproduce the EAT-26 was obtained by the River Centre Foundation. It was then made available in two formats, a pencil and paper version, and one that could be accessed online. The online version was hosted by Qualtrics. College students and those participants recruited through social media were given a link to the study. Those participating from the clinical site used the pencil and paper version of the EAT-26 that was laid out precisely the same way as the online version. These responses were then manually entered into Qualtrics as well. Participants responded to the EAT-26 as well as answering demographic questions about themselves.

Participants self-identified their ED by endorsing a question of whether they were presently in treatment for an ED by selecting their particular condition from a range of diagnoses. Participants were only permitted to identify one disorder. Based on their self-report of what they were in treatment for, they were placed into one of the seven groups. Those reporting no history of an ED were placed into a control group. The remainder were sorted into one of the six remaining groups based on which ED they identified.

Results

Of the 354 participants, 307 (86.7%) identified as women; 7 (3.0%) did not identify their gender. The mean age was 21.6 years (SD 12.9). On the EAT-26, scores above a 20 indicate concern for disordered eating. We used the instrument's original scoring rubric. A Cronbach's alpha was calculated for the whole sample, and it was an acceptable .75. Table 1 shows mean EAT-26 score by group.

One-way ANOVA indicated significant differences between groups, $F(6, 348) = 25.46$, $p < .001$. Post-hoc analysis using Least Significant Difference indicates that the control group scored significantly ($p < .05$) lower than all of the clinical groups. However, there were no statistically significant differences found between the four groups identified with DSM-5 EDs (AN, BN, ARFID, BED). Most noteworthy is that the mean group score for those reporting orthorectic behavior exceeded the clinical cut score (20) and was not statistically different than any of the other ED groups.

The EAT-26 also consists of three subscales: Dieting, Bulimia and Food Occupation, and Oral Control [48]. Items for each scale are calculated by summing scores across items on the subscale. Table 2 contains these scores.

A one-way ANOVA was calculated comparing mean subscale scores across groups. On the Dieting subscale, there were statistically significant differences: $F(6, 348) = 18.61$, $p < .001$. Post-hoc Least Significant Difference analysis indicated that all groups scored significantly higher than the Control group, except BED which was not statistically different. On the Bulimia and Food Control scale: $F(6, 348) = 18.21$, $p < .001$, post-hoc Least Significant Difference analysis indicated that all groups scored significantly higher than the Control group, except BED which was not statically different. Those in the ON group, had significantly higher scores than BN group, but did not score statistically different than those in the AN group. Finally, on the Oral Control scale: $F(6, 348) = 9.23$, $p < .001$. Post-hoc Least Significant Difference analysis indicated that the Control group was statistically different than the other groups, except for the BN group. There were no statistically significant differences between the ON and any other group other than the Control.

Table 1 Mean EAT-26 score by group

Group	*N* (%)	Mean EAT-26 score (SD)
Control—no eating disorder	206 (58)	14.66 (11.94)
Anorexia nervosa	52 (15)	27.33 (15.70)
Bulimia nervosa	30 (8)	25.49 (9.78)
ARFID	6 (2)	29.53 (15.54)
Binge-eating disorder	5 (1)	16.20 (13.62)
Orthorexia nervosa	44 (12)	30.89 (12.60)
Other disordered eating	11 (3)	31.09 (14.80)

Table 2 Group mean (and SD) EAT-26 scores across subscales

Group	Dieting	Bulimia and food preoccupation	Oral control
Control—no eating disorder	7.58 (7.99)	3.10 (3.65)	2.39 (2.77)
Anorexia nervosa	16.32 (10.53)	6.90 (4.34)	4.77 (3.39)
Bulimia nervosa	16.00 (9.99)	6.33 (4.91)	3.53 (3.88)
ARFID	16.67 (10.75)	6.67 (3.88)	5.00 (3.28)
Binge-eating disorder	9.00 (9.54)	4.60 (2.51)	2.00 (1.38)
Orthorexia nervosa	18.18 (8.73)	8.08 (4.65)	4.80 (3.27)
Other eating disorder	23.36 (4.67)	9.09 (3.18)	6.55 (3.70)

Discussion

The mean EAT-26 score for those identifying as having ON fell into the range indicating concern for having an ED. Furthermore, the mean EAT-26 score was significantly higher than the control group. As the previous studies have noted [48], the EAT-26 is sensitive to a range of disordered eating, and these findings suggest that this is also the case with pathologically healthful eating. As ON tends to be inconsistent with the unifying feature of AN and BN of self-evaluation being unduly influenced by body shape or weight, it is likely that the EAT-26 is sensitive (but not specific) to other features of disordered eating. This may include obsessive/compulsive features [14].

Based on analysis of the subscales, the ON group had a very high score on the Diet subscale. This is consistent with what we think that we know about pathologically healthful eating, in that these individuals can develop malnutrition based on rigid rules about dieting [5]. Interestingly, the ON group scored higher than the BN group on the Bulimia and Food Occupation subscale. Finally, the ON group had a higher Oral Control score than the Control group, but not when compared with the other clinical groups. This may reflect the restricting nature of pathologically healthful eating.

These results should be interpreted with some caution, however, as there are some potential confounds that may pose limitations. The first is that there is no "official" diagnosis for ON, and some argue that the condition does not exist. This limits the ability for researchers to conduct studies with such individuals as we still do not know enough about this possible condition. We tried to overcome this by enrolling participants if they acknowledged being in active treatment for an eating disorder. We then sorted participants based on their self-reported diagnosis. Of course, this is placing a great deal of faith in people to accurately communicate their particular condition. Participants self-identifying their condition could lead to individuals in the ON group who truly suffered from AN or BN. This could artificially inflate the ON group EAT-26 score.

There are also some who suggest that pathologically healthful eating is a phase of recovery from AN [53]. If this were the case, this would certainly create a group that scores in a similar manner to those with AN. It is also possible those in the ON group had enough AN symptomatology that accounted for the mean EAT-26 score exceeding 20 and being significantly higher than the control group. It may also be that ON is no different than AN and that pathologically healthful eating is simply a variant of a known eating disorder. This would of course could account for why those in our ON group scored in the manner that they did. Finally, some have suggested that there is overlap between ON and Avoidant/Restrictive Food Intake Disorder (ARFID) [54]. This, too, could account for the mean score of the ON group. However, when considering that ON and ARFID share overlap, these results are relatively robust considering some psychometric measures may not be sensitive to the disorder [54].

There were some notable areas where the ON group was not statistically different from the other ED groups. For example, BED is quite different from restricting EDs in that these individuals typically gain weight through compulsive eating [5]. However, those in the study who self-identified as having BED were infrequent ($n = 5$). It is likely that the study was underpowered to detect statistically significant differences between the ON and BED group if such differences exist. It may also be that there was insufficient power to detect statistical differences between the ARFID group ($n = 6$) and ON group. However, given the suggested overlap mentioned above regarding ARFID and ON, it is not surprising that these groups were not statistically different.

Finally, a remaining confound is that not all individuals responded to the study items in the same medium. Some took the instrument in a pencil and paper form, while others (mainly those recruited through social media) responded to the items in an online format. We attempted to minimize differences due to two different media in use by having the pencil and paper format closely resemble what those who viewed a screen saw.

It is important that screening instruments can identify pathologically healthful eating, as this alleged condition can be quite debilitating with severe health ramifications. While more study is needed, it is likely that the health and social complications that accompany pathologically healthful eating are similar to the burden of suffering from other EDs. Given that ON is not codified by a sanctioned classification system, it is likely underappreciated [55]. This makes identifying those with the condition more difficult. However, the sensitivity of the EAT-26 to pathologically healthful is promising. This screening instrument is often used to signal individuals that their dietary habits are concerning and to encourage them to discuss their eating with a trained professional. Clearly, any first step in the treatment of ON is a discussion between patient and clinician. Future research in this area should examine whether other screening instruments, such as the SCOFF [56] or EDE-Q [57] can also identify those with purported ON.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individuals included in the study.

References

1. Bratman S (2017) Orthorexia vs. theories of healthy eating. Eat Weight Disord 22:381–385. https://doi.org/10.1007/s40519-017-0417-6
2. Moroze RM, Dunn TM, Holland JC, Yager J, Weintraub P (2015) Microthinking about micronutrients: a case of transition from obsessions about healthy eating to near-fatal "orthorexia nervosa" and proposed diagnostic criteria. Psychosomatics 56:397–403. https://doi.org/10.1016/j.psym.2014.03.003
3. Park SW, Kim JY, Go GJ, Jeon ES, Pyo HJ, Kwon YJ (2011) Orthorexia nervosa with hyponatremia, subcutaneous emphysema, pneumomediastimum, pneumothorax, and pancytopenia. Electrolyte Blood Press 9:32–37. https://doi.org/10.5049/EBP.2011.9.1.32
4. Yen LH (2011) Case report when healhty eating becomes unhealhty—atypical eating disorder in a male patient. ASEAN J Psychiatry 12:194–197
5. Dunn TM, Bratman S (2016) On orthorexia nervosa: a review of the literature and proposed diagnostic criteria. Eat Behav 21:11–17. https://doi.org/10.1016/j.eatbeh.2015.12.006
6. Donini L, Marsili D, Graziani M, Imbriale M, Cannella C (2004) Orthorexia nervosa: a preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. Eat Weight Disord 9:151–157. https://doi.org/10.1007/bf03325060
7. Bosi ATB, Çamur D, Güler Ç (2007) Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine (Ankara, Turkey). Appetite 49:661–666. https://doi.org/10.1016/j.appet.2007.04.007
8. Aksoydan E, Camci N (2009) Prevalence of orthorexia nervosa among Turkish performance artists. Eat Weight Disord 14:33–37. https://doi.org/10.1007/bf03327792
9. Alvarenga M, Martins M, Sato K, Vargas S, Philippi S, Scagliusi F (2012) Orthorexia nervosa behavior in a sample of Brazilian dietitians assessed by the Portuguese version of ORTO-15. Eat Weight Disord 17:e29–e35. https://doi.org/10.1007/BF03325325
10. de Souza QJOV, Rodrigues AM (2014) Risk behavior for orthorexia nervosa in nutrition students. Rev Chil Nutr 63:200–204. https://doi.org/10.1590/0047-2085000000026
11. Brytek-Matera A, Krupa M, Poggiogalle E, Donini LM (2014) Adaptation of the ORTHO-15 test to Polish women and men. Eat Weight Disord 19:69–76. https://doi.org/10.1007/s40519-014-0100-0
12. Valera JH, Ruiz PA, Valdespino BR, Visioli F (2014) Prevalence of orthorexia nervosa among ashtanga yoga practitioners: a pilot study. Eat Weight Disord 19:469–472. https://doi.org/10.1007/s40519-014-0131-6
13. Missbach B, Hinterbuchinger B, Dreiseitl V, Zellhofer S, Kurz C, König J (2015) When eating right, is measured wrong! A validation and critical examination of the ORTO-15 questionnaire in German. PLoS One 10:1–15. https://doi.org/10.1371/journal.pone.0135772
14. Koven NS, Abry AW (2015) The clincal basis of orthorexia nervosa: emerging perspectives. Neuropsychiatr Dis Treat 11:285–394. https://doi.org/10.2147/NDT.S61665
15. Dunn TM, Gibbs J, Whitney N, Starosta A (2017) Prevalence of orthorexia nervosa is less than 1%: data from a US sample. Eat Weight Disord 22:185–192. https://doi.org/10.1007/s40519-016-0258-8
16. Missbach B, Dunn TM, König JS (2016) We need new tools to assess orthorexia nervosa. A commentary on "prevalence of orthorexia nervosa among college students based on Bratman's test and associated tendencies". Appetite 108:521–525. https://doi.org/10.1016/j.appet.2016.07.010
17. McElroy SL, Crow S, Blom TJ, Biernacka JM, Winham SJ, Geske J, Cuellar-Barboza AB, Bobo WV, Prieto ML, Veldic M (2016) Prevalence and correlates of DSM-5 eating disorders in patients with bipolar disorder. J Affect Disord 191:216–221. https://doi.org/10.1016/j.jad.2015.11.010
18. Fernandez-Aranda F, Poyastro Pinheiro A, Tozzi F, La Via M, Thornton LM, Plotnicov KH, Kaye WH, Fichter MM, Halmi KA, Kaplan AS (2007) Symptom profile of major depressive disorder in women with eating disorders. Aust N Z J Psychiatry 41:24–31. https://doi.org/10.1080/00048670601057718
19. Fernández-Aranda F, Pinheiro AP, Thornton LM, Berrettini WH, Crow S, Fichter MM, Halmi KA, Kaplan AS, Keel P, Mitchell J (2008) Impulse control disorders in women with eating disorders. Psychiatry Res 157:147–157. https://doi.org/10.1016/j.psychres.2007.02.011
20. Waxman SE (2009) A systematic review of impulsivity in eating disorders. Eur Eat Disord Rev 17:408–425. https://doi.org/10.1002/erv.952
21. Harrop EN, Marlatt GA (2010) The comorbidity of substance use disorders and eating disorders in women: prevalence, etiology, and treatment. Addict Behav 35:392–398. https://doi.org/10.1016/j.addbeh.2009.12.016
22. Bulik CM, Klump KL, Thornton L, Kaplan AS, Devlin B, Fichter MM, Halmi KA, Strober M, Woodside DB, Crow S (2004) Alcohol use disorder comorbidity in eating disorders: a multicenter study. J Clin Psychiatry 65:1000–1006. https://doi.org/10.4088/JCP.v65n0718
23. Ulfvebrand S, Birgegård A, Norring C, Högdahl L, von Hausswolff-Juhlin Y (2015) Psychiatric comorbidity in women and men with eating disorders results from a large clinical database. Psychiatry Res 230:294–299. https://doi.org/10.1016/j.psychres.2015.09.008
24. Swinbourne JM, Touyz SW (2007) The co-morbidity of eating disorders and anxiety disorders: a review. Eur Eat Disord Rev 15:253–274. https://doi.org/10.1002/erv.784
25. Godt K (2008) Personality disorders in 545 patients with eating disorders. Eur Eat Disord Rev 16:94–99. https://doi.org/10.1002/erv.844
26. De Bolle M, De Clercq B, Pham-Scottez A, Mels S, Rolland J-P, Guelfi JD, Braet C, De Fruyt F (2011) Personality pathology comorbidity in adult females with eating disorders. J Health Psychol 16:303–313. https://doi.org/10.1177/1359105310374780
27. Mehler PS, Brown C (2015) Anorexia nervosa—medical complications. J Eat Disord 3:11–19. https://doi.org/10.1186/s40337-015-0040-8
28. Sachs KV, Harnke B, Mehler PS, Krantz MJ (2016) Cardiovascular complications of anorexia nervosa: a systematic review. Int J Eat Disord 49:238–248. https://doi.org/10.1002/eat.22481
29. Rylander M, Brinton JT, Sabel AL, Mehler PS, Gaudiani JL (2017) A comparison of the metabolic complications and hospital course of severe anorexia nervosa by binge-purge and restricting subtypes. Eat Disord 25:345–357. https://doi.org/10.1080/10640266.2016.1269555

30. Strumia R (2009) Skin signs in anorexia nervosa. Dermatoendocrinology 1:268–270. https://doi.org/10.4161/derm.1.5.10193
31. Katz MG, Vollenhoven B (2000) The reproductive endocrine consequences of anorexia nervosa. BJOG 107:707–713. https://doi.org/10.1111/j.1471-0528.2000.tb13329.x
32. Grinspoon S, Thomas E, Pitts S, Gross E, Mickley D, Miller K, Herzog D, Klibanski A (2000) Prevalence and predictive factors for regional osteopenia in women with anorexia nervosa. Ann Intern Med 133:790–794. https://doi.org/10.7326/0003-4819-133-10-200011210-00011
33. Mehler PS (2011) Medical complications of bulimia nervosa and their treatments. Int J Eat Disord 44:95–104. https://doi.org/10.1002/eat.20825
34. Mehler PS, Crews C, Weiner K (2004) Bulimia: medical complications. J Womens Health 13:668–675. https://doi.org/10.1089/1540999041783127
35. Mitchell JE (2016) Medical comorbidity and medical complications associated with binge-eating disorder. Int J Eat Disord 49:319–323. https://doi.org/10.1002/eat.22452
36. Olguin P, Fuentes M, Gabler G, Guerdjikova AI, Keck PE, McElroy SL (2017) Medical comorbidity of binge eating disorder. Eat Weight Disord 22:13–26. https://doi.org/10.1007/s40519-016-0313-5
37. Peebles R, Lesser A, Park CC, Heckert K, Timko CA, Lantzouni E, Liebman R, Weaver L (2017) Outcomes of an inpatient medical nutritional rehabilitation protocol in children and adolescents with eating disorders. J Eat Disord 5:7. https://doi.org/10.1186/s40337-017-0134-6
38. Strandjord SE, Sieke EH, Richmond M, Rome ES (2015) Avoidant/restrictive food intake disorder: illness and hospital course in patients hospitalized for nutritional insufficiency. J Adolesc Health 57:673–678. https://doi.org/10.1016/j.jadohealth.2015.08.003
39. Arcelus J, Mitchell AJ, Wales J, Nielsen S (2011) Mortality rates in patients with anorexia nervosa and other eating disorders: a meta-analysis of 36 studies. Arch Gen Psychiatry 68:724–731. https://doi.org/10.1001/archgenpsychiatry.2011.74
40. Fichter MM, Quadflieg N (2016) Mortality in eating disorders results of a large prospective clinical longitudinal study. Int J Eat Disord 49:391–401. https://doi.org/10.1002/eat.22501
41. Smink FR, Van Hoeken D, Hoek HW (2012) Epidemiology of eating disorders: incidence, prevalence and mortality rates. Curr Psychiatry Rep 14:406–414. https://doi.org/10.1007/s11920-012-0282-y
42. 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. J Abnorm Psychol 122:445–457. https://doi.org/10.1037/a0030679
43. Mitchison D, Hay P, Slewa-Younan S, Mond J (2012) Time trends in population prevalence of eating disorder behaviors and their relationship to quality of life. PLoS One 7:1–7. https://doi.org/10.1371/journal.pone.0048450
44. Becker AE, Franko DL, Nussbaum K, Herzog DB (2004) Secondary prevention for eating disorders: the impact of education, screening, and referral in a college-based screening program. Int J Eat Disord 36:157–162. https://doi.org/10.1002/eat.20023
45. Koven NS, Senbonmatsu R (2013) A neuropsychological evaluation of orthorexia nervosa. Open J Psychiatr 3:214–222. https://doi.org/10.4236/ojpsych.2013.32019
46. Garner DM, Garfinkel PE (1979) The Eating Attitudes Test: an index of the symptoms of anorexia nervosa. Psychol Med 9:273–279. https://doi.org/10.1017/S0033291700030762
47. Gross J, Rosen JC, Leitenberg H, Willmuth ME (1986) Validity of the Eating Attitudes Test and the Eating Disorders Inventory in bulimia nervosa. J Consult Clin Psychol 54:875. https://doi.org/10.1037/0022-006X.54.6.875
48. Garfinkel PE, Newman A (2001) The eating attitudes test: twenty-five years later. Eat Weight Disord 6:1–21. https://doi.org/10.1007/BF0333974
49. Garner DM, Olmsted MP, Bohr Y, Garfinkel PE (1982) The eating attitudes test: psychometric features and clinical correlates. Psychol Med 12:871–878. https://doi.org/10.1017/S0033291700049163
50. Mintz LB, O'Halloran MS (2000) The Eating Attitudes Test: validation with DSM-IV eating disorder criteria. J Pers Assess 74:489–503. https://doi.org/10.1207/S15327752JPA7403_11
51. Maloney MJ, McGUIRE JB, Daniels SR (1988) Reliability testing of a children's version of the Eating Attitude Test. J Am Acad Child Adolesc Psychiatry 27:541–543. https://doi.org/10.1097/00004583-198809000-00004
52. Jackson SC, Keel PK, Ho Lee Y (2006) Trans-cultural comparison of disordered eating in Korean women. Int J Eat Disord 39:498–502. https://doi.org/10.1002/eat.20270
53. Segura-Garcia C, Ramacciotti C, Rania M, Aloi M, Caroleo M, Bruni A, Gazzarrini D, Sinopoli F, De Fazio P (2015) The prevalence of orthorexia nervosa among eating disorder patients after treatment. Eat Weight Disord 20:161–166. https://doi.org/10.1007/s40519-014-0171-y
54. Cooney M, Lieberman M, Guimond T, Katzman DK (2018) Clinical and psychological features of children and adolescents diagnosed with avoidant/restrictive food intake disorder in a pediatric tertiary care eating disorder program: a descriptive study. J Eat Disord 6:1–7. https://doi.org/10.1186/s40337-018-0193-3
55. Cena H, Barthels F, Cuzzolaro M, Bratman S, Brytek-Matera A, Dunn T, Varga M, Missbach B, Donini LM (2018) Definition and diagnostic criteria for orthorexia nervosa: a narrative review of the literature. Eat Weight Disord. https://doi.org/10.1007/s40519-018-0606-y
56. Morgan JF, Reid F, Lacey JH (1999) The SCOFF questionnaire: assessment of a new screening tool for eating disorders. BMJ 319:1467–1468. https://doi.org/10.1136/bmj.319.7223.1467
57. Mond JM, Hay PJ, Rodgers B, Owen C, Beumont PJ (2004) Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating disorders in community samples. Behav Res Ther 42:551–567. https://doi.org/10.1016/S0005-7967(03)00161-X