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Eating Disorders
The Journal of Treatment & Prevention

ISSN: 1064-0266 (Print) 1532-530X (Online) Journal homepage: www.tandfonline.com/journals/uedi20

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To cite this article: Cassandra E. Friedlich, Andrea Covarrubias, Hyoungjin Park & Stuart B. Murray (2023) Updates in the treatment of Eating Disorders in 2022: a year in review in Eating Disorders*: The Journal of Treatment & Prevention*, Eating Disorders, 31:2, 128-138, DOI: 10.1080/10640266.2023.2179774

To link to this article: https://doi.org/10.1080/10640266.2023.2179774

EATING DISORDERS
2023, VOL. 31, NO. 2, 128–138
https://doi.org/10.1080/10640266.2023.2179774

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Updates in the treatment of Eating Disorders in 2022: a year in review in Eating Disorders*: The Journal of Treatment & Prevention*

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ABSTRACT

A broad array of important and diverse studies surrounding the treatment of eating disorders were published in *Eating Disorders: The Journal of Treatment & Prevention* in 2022. Novel interventions such as neurosurgical and neuromodulatory treatments were discussed, as evidence continues to mount around their potential utility in treating eating disorders, in particular namely anorexia nervosa. Important pragmatic and theoretical developments around feeding and refeeding approaches emerged, and are also discussed. In this review, we carefully review evidence alluding to the potential efficacy of exercise in partially ameliorating binge eating disorder symptomatology, while examining broader evidence underscoring the importance of therapeutically ameliorating compulsive exercise in anorexia nervosa and bulimia nervosa. In addition, we overview evidence relating to the risk and sequelae associated with premature discharge from intensive eating disorder treatment, as well as the efficacy of CBT versus group therapy-based maintenance treatments. Finally, important developments around the use of open versus blind weighing in treatment are assessed. Overall, the articles published in Eating Disorders: The Journal of Treatment & Prevention in 2022 evidence the promise of treatment advances in the field and requires further work to address the development of efficacious treatments to achieve greater outcomes for those with eating disorders.

Clinical Implications

- This review examines advances in research relating to the treatment of eating disorders in 2022
- Novel treatments demonstrating promise for the treatment of eating disorders include advanced neuromodulatory interventions as well as high-calorie refeeding for anorexia nervosa.

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

- Emerging evidence suggests that physical exercise may be beneficial for individuals experiencing binge-eating disorder, and other eating disorders, though caution must be applied.
- Protocols for and after patient discharge from intensive care for eating disorders are critical in reducing relapse and supporting the maintenance of treatment outcomes.

Eating Disorders (EDs) comprise a class of psychiatric diagnoses that can be greatly distressing to the individual afflicted both psychologically and physiologically. Among the most lethal psychiatric disorders, EDs lead to 10,200 deaths per year in the United States (U.S.) alone and have a staggering lifetime prevalence rate of 28.8 million Americans (Deloitte Access Economics, 2020). EDs may span a range of symptoms including food restriction, binge eating, purging, and other compensatory methods, fear-based and sensory aversions to food, and advanced disease-related medical sequelae such as neurologic, gastrointestinal, osteopathic, and cardiac issues (Westmoreland et al., 2016). Alarmingly, even with cutting-edge existing treatments, remission rates are modest. For instance, empirical data suggest that approximately 25% to 33% of medically stable adolescents remit from anorexia nervosa (AN) (Lock & Le Grange, 2019), up to 30% of those with BN fully remit from symptoms throughout treatment (Linardon et al., 2017), and between 18% to 86% of those with binge eating disorder (BED) remit during treatment (Peat et al., 2017). However, even among those who do recover, relapse is reported in up to one-third of individuals across ED diagnoses (Sala et al., 2023). As such, and while improvements in treatment outcomes have been slow to advance, novel treatment approaches are critically important.

Of equal yet more recent concern, the COVID-19 global pandemic has had a significant impact on mental health, including on the development and exacerbation of EDs (Rodgers et al., 2020). The stress and uncertainty caused by the pandemic, along with changes in lifestyle, such as social isolation and decreased physical activity, have contributed to increased disordered eating behaviors (Rodgers et al., 2020). In the context of the COVID-19 pandemic, the prevalence of EDs has increased markedly, with one specialized inpatient unit for instance, noting that admissions *doubled* during the COVID-19 pandemic (Otto et al., 2021). Additionally, access to treatment for EDs may have been disrupted, leading to further challenges in addressing this issue. A study by Birgegård et al. (2022) in *Eating Disorders: The Journal of Treatment & Prevention* found illustrated that broader psychiatric risk was also exacerbated among those with EDs, noting in Sweden that during the pandemic those with more severe EDs demonstrated higher levels of anxiety, and subsequently further increased ED symptomatology. Furthermore, treatment utilization was concerningly low, and for individuals in treatment, there was a reported decrease in the level of care they were receiving as well as the frequency in which they had treatment sessions. This underscores the urgent

need to optimize ED patient care and outcomes, which in itself is a longstanding concern, and has been inflamed by the complexities brought about by the COVID-19 pandemic.

In aiming to meet this need, several important advances in the treatment of EDs have been put forth in *Eating Disorders: The Journal of Treatment & Prevention* in 2022. This review summarizes these recent contributions to the literature relating to the treatment of ED developments, spanning (i) novel treatment interventions including neurosurgery, neuromodulation, and high-calorie refeeding (HCR) to treat EDs, namely AN (ii) the role of exercise in the treatment of EDs, especially in BED (iii) an assessment of factors predicting premature discharge from ED treatment and discharge planning efforts that include examining the efficacy of cognitive behavioral therapy (CBT) and group-based maintenance treatments, as well as exploring the impact of open versus blind weighing.

Novel treatments

Traditional methods of treating various EDs have focused primarily on medication and behavioral therapy. Like many other mental health disorders, medication and therapy became the most common approach in clinical practice for treating EDs. However, recent meta-analyses of these approaches reveal limited efficacy in treating EDs (Murray et al., 2019). The dearth of variety in treatment options for EDs has opened up an exciting opportunity for various novel treatment options to overcome the current methods of treatment. As such, the current field of research in EDs has begun expanding into different novel methods of treatment.

A recent literature review overviewing neurosurgical and neuromodulatory procedures to target EDs—specifically AN—has shown promising evidence of their value as future treatment options (Murray et al., 2022). The literature review assessed 20 different trials of various brain-based neuromodulatory interventions for severe and chronic AN, including stereotactic ablation, deep brain stimulation (DBS), rTMS (repetitive transcranial magnetic stimulation) and tDCS (transcranial direct current stimulation). Cumulatively, this emerging evidence base suggests that stereotactic ablation and DBS show promising results, while rTMS and tDCS showed modest and mixed results. While this review acknowledges the relatively low sample size of studies, which limits the generalizability of the efficacy of the novel treatments, this review also notes the absence of long-term follow-up data, which is critical in documenting the long-term effects of each intervention, respectively. Importantly, with the relatively lower efficacy of noninvasive approaches, such as rTMS and tDCS, future efforts may seek to improve the methodology, dosing, or administrative site of the treatments, ultimately offering improved options around non-invasive yet efficacious methods of brain modulation.

Alongside brain-based interventions, one other novel treatments overviewed in *Eating Disorders: The Journal of Treatment & Prevention* in 2022 relates to high-calorie refeeding (HCR) in AN, which attempts to quickly and effectively restore a patient's weight while successfully mitigating the risk for refeeding syndrome. Initial treatments using a rapid refeeding approach demonstrated increased levels of anxiety in AN patients, although the level of anxiety plateaued and normalized throughout the duration of the inpatient treatment (Kezelman et al., 2016). A study by Akgül et al. (2022) assessed adolescents and young adults who were hospitalized with AN and malnutrition-related sequelae. The HCR protocol provided three meals and three snacks a day, with a nasogastric tube given as needed. Contrary to the initial belief that rapid refeeding and HCR would increase levels of patient distress, this pilot study demonstrated no significant increase in anxiety throughout the refeeding process. In concert with the reduced length of admission characteristic of HCR protocols, these data further underscore the utility of this approach and support the potential implementation of rapid refeeding as a novel method of administering HCR while avoiding refeeding syndrome.

The role of exercise in treatment

Exercise can play a complex role in the psychopathology and treatment of EDs. More broadly, exercise is widely accepted and supported as a healthy means to cope with stress and improve overall physical health. Even in the context of psychopathology, evidence outside of the field indicates that both high and low-intensity physical activity is effective in reducing the risk of depression (Mammen & Faulkner, 2013; Teychenne et al., 2008) which is highly comorbid with EDs. However, some individuals with EDs experience maladaptive exercise-related cognitions and behaviors, which can give rise to compulsive exercise, which may be used as a means to control weight or burn off calories. This can lead to an unhealthy preoccupation with exercise, and can ultimately worsen ED symptoms. Compulsive exercise is often described as a rigid and highly-driven urge to exercise, associated with a perceived inability to cease exercising regardless of the risk of harmful consequences (Noetel et al., 2017).

In cases where compulsive exercise may be a contributing factor to eating psychopathology, addressing this behavior can be a key component of treatment. This may include helping the individual understand the role of exercise in their disorder, developing a more balanced and healthy relationship with exercise, and providing guidance on how to engage in safe and appropriate levels of physical activity. For instance, previous evidence suggests that when used with caution, weight-bearing exercise can be protective of bone mineral density for adolescents with AN (Nagata et al., 2019). Nevertheless, there are currently no standardized guidelines for treating compulsive exercise or

a consensus on which forms of treatment are most effective (Hallward et al., 2022).

In more closely assessing the potential role of exercise in the treatment of BED, Smith et al. (2022) examined temporal associations between physical activity (PA), affective functioning, and eating-related cognitions and behaviors in patients with binge-eating disorders, measured via ecological momentary assessment (EMA). BED is associated with obesity, elevated risk of diabetes, and emotional dysregulation (McCuen-Wurst et al., 2018), and little is known about how physical activity can improve symptomatology and emotional functioning in daily life. After one week of EMA, results suggest that patients who reported higher levels of physical activity had more adaptive affective functioning (i.e., higher positive affect and higher body satisfaction) and eating regulation, as reflected by lower overeating. However, this effect was not significant for loss of control eating (LOC), craving, or negative emotionality (i.e., negative affect and emotion regulation difficulties), and within-subject effects were not significant in any model. (Smith et al., 2022). This study is impactful in that it is the first to demonstrate links between physical activity and naturalistic eating behavior in BED, specifically overeating (Smith et al., 2022). Though the findings highlight the importance of physical activity for BED patients, it is necessary for future research to identify the duration and type of exercise using objective measurements of PA and to consider physical inactivity as a potential treatment target in this population.

Relatedly, a systematic review from Hallward et al. (2022) which included 11 studies, assessed methods to target the reduction of both compulsive exercise and eating psychopathology mainly among females with AN and BN. Each participant was diagnosed with AN, BN, or an eating disorder not otherwise specified (EDNOS), and a small portion of BED. All studies used psychoeducation to address participants' attitudes, beliefs, and thoughts about exercise. Focus on psychoeducation helps individuals recognize and reduce negative attitudes and beliefs around exercise and develop a more positive and healthy relationship with it. The studies predominantly approached and treated compulsive exercise mainly through exercise psychoeducation, although in some instances, supervised sessions of exercise were also deployed. The findings show that eating psychopathology was reduced across all studies, suggesting that targeting compulsive exercise should be a core component of all ED treatment (Hallward et al., 2022).

Taken together, these somewhat contrasting findings suggest that while *compulsive* exercise should be therapeutically targeted and ameliorated in treatment for *all* EDs, yet suggest that supervised and non-compulsive exercise may have a role to play in limiting the propensity for compulsive exercise, while also offering additional avenues for affect regulation.

Discharge planning

Completing the full course of ED treatment is critical in helping patients achieve remission. Prior research has shown that patients with EDs have markedly improved outcomes with regard to (i) ED symptomatology, (ii) psychological functioning, and (iii) body image, when they have completed treatment, relative to those whose care was terminated prematurely (Björk et al., 2009). Concerningly, early discharge or premature termination of treatment (PTT) has been found to be a common occurrence in the treatment of EDs in adult populations with figures ranging from 20–73% across different levels of care (Fassino et al., 2009).

Gorrell et al. (2022) set out to elucidate the precise factors leading patients to have PTT using secondary data analysis on 6024 treatment-seeking adults' in higher-level care treatment settings, who met DSM-5 criteria for AN. It was revealed that there were no differences found in the proportion of individuals who had PTT based on PTT type (i.e., routine, administrative, patient/parent request, against medical advice (AMA), or resource constraint), but findings did show that participants enrolled in an inpatient treatment program were more likely to have a non-routine discharge (Gorrell et al., 2022). While speculative, the authors suggest that this may be influenced by more intensive treatment possibly not having as much coverage by insurance, or the greater severity of illness influencing treatment engagement among patients. In keeping with this, participants with heightened binge eating (BE) at admission and lower levels of cognitive restraint were more likely to be discharged by administrative request and AMA (Gorrell et al., 2022). This finding may be due in part to those with BE experiencing heightened distress as a result of treatment, and those with lower cognitive restraint scores believing they are well enough to leave care—though often untrue (Gorrell et al., 2022).

Following patient discharge from intensive ED treatment, the maintenance of therapeutic techniques and progress is imperative to supporting longer-term remission. Open weighing is a procedure commonly implemented in cognitive behavioral therapy (CBT) and family-based treatment (FBT) for EDs to discuss the patient's weight openly each week with a therapist (Wagner et al., 2022). This approach to monitoring and exposing patients to their weight has been found over time to decrease distress, increase the patient's comfort with weight change, and improve weight-related cognitive distortions (Waller & Mountford, 2015). Alternatively, blind weighing in which a patient's weight is not disclosed to them is more often used in the treatment of AN (Kelly-Weeder et al., 2018), especially when patients are undergoing refeeding protocols in which they are gaining weight at a more rapid pace than they may be able to psychologically tolerate (Murray et al., 2016).

A study by Wagner et al. (2022) examined adult patients, adolescent patients, and the parents of patients with AN, BN, and other specified feeding

and eating disorders preferences for either a blind or open-weighing treatment protocol. The results demonstrate that most patients initially have more favorable views of blind weighing versus open weighing in the short term, but the differences in long-term effectiveness were insignificant. With regard to differences in age cohorts, adolescent patients preferred blind weighing while about two-thirds of adult patients preferred open weighing (Wagner et al., 2022). The study also revealed that past experience with either method of weighing corresponded with more favorable views of the particular treatment the patient received. In addition, it is theorized that participants may be more favorable to the weighing protocol they deem insufficient so as to maintain a level of control over their condition that could be possible with open weighing, per se (Froreich et al., 2020). In this vein, it is critical that clinicians are aware of this possibility and that further research investigates how patient perceptions of weighing interventions affect treatment outcomes and relapse.

With such high relapse rates in EDs spanning BED, BN, and AN, mitigating relapse risk is essential, and maintaining treatment outcomes through specialized interventions can be a vital way of supporting remission. To understand the efficacy of different maintenance treatments, MacDonald et al. (2022) compared a group-based intensive outpatient program (IOP) with individual CBT for EDs. The group-based maintenance treatment included one supported meal and up to five group therapy sessions a week for 16 weeks in which participants were expected to continue adhering to their prescribed meal plan and use tools targeted toward keeping up with newly learned behaviors. The CBT maintenance program focused on relapse prevention, cognitive restructuring, and inducing a greater sense of autonomy in the participants through 16 sessions over the span of 14 weeks. Using a retrospective sequential cohort design, the participants had previously been involved in intensive day treatment or inpatient treatment programs at the investigators' Centre for Mental Health, in Toronto, Canada. The patients met criteria for either anorexia nervosa, restrictive subtype (AN-R), anorexia nervosa, binge and purge subtype (AN-BP), bulimia nervosa (BN), or purging disorder (PD) in which they achieved at least partial remission (MacDonald et al., 2022).

There were no differential outcomes found between the two maintenance treatments. Each treatment had similar trajectories of patients' symptoms returning to a clinically significant level adjusted for differences between ED diagnoses (MacDonald et al., 2022). In other words, of the 51.6% of patients who returned to clinically significant symptoms by the 12-month follow-up, the type of maintenance treatment they received was an insignificant predictor of their relapse. The investigators state the lack of difference between maintenance treatments can be seen as a function of the group-based IOP cohort spending more time in therapy, thus balancing out the highly personalized and often more effective outcomes of CBT. In sum, the study concludes that while

both interventions rendered similar results and efficacy, CBT is reported to be a more time-conscious, resource-conserving, and personally adaptive treatment in helping patients heal and integrate back into life outside the hospital.

Conclusions and future directions

The ongoing quest to pursue novel interventions and improve patient outcomes is critical. While treatment outcomes for AN in particular have plateaued (Murray et al., 2019), now more than ever is a critical period for developing and elucidating the promise of emerging treatments. Brain-based, neurosurgical, and neuromodulatory treatments show promising results in treating AN (Murray et al., 2022), as well as high-calorie refeeding in order to more rapidly and effectively treat malnutrition (Akgül et al., 2022).

Regarding exercise, it is common knowledge that physical activity can improve psychological and physical well-being, yet at the same time, evidence has demonstrated that exercise can become a compensatory behavior for individuals with EDs, and may become a central illness-sustaining feature (Taranis & Meyer, 2011). However, recent evidence shows that when used with caution, exercise can be an important part of the treatment. Moreover, in the last year evidence illustrates that controlled physical activity may be useful in treating body satisfaction and overeating in BED (Smith et al., 2022), and can also be useful in treating compulsive exercise in AN and BN when paired with psychoeducation (Hallward et al., 2022). The challenge for the field looking ahead is establishing ways in which exercise can be healthfully integrated into ED treatment, mitigating the risk for relapse as opposed to becoming a weight-control mechanism.

Lastly, with the first months after ED treatment being robustly characterized by a heightened risk for relapse, this is a sensitive time that necessitates discharge planning and maintenance treatment protocols of the highest caliber to ensure patients reach remission. Additionally, once a patient is discharged from treatment, in order to avoid relapsing to clinically significant levels, maintenance interventions should be employed to help individuals adhere to their newly learned behaviors and maintain the progress of treatment. Different types of maintenance treatments such as CBT and group-based treatments need further study as well as the continued assessment of blind versus open weighing protocols. It is vital that these various treatment methods are studied more extensively so clinicians and medical professionals can ensure positive treatment effects are maintained once initial care has ceased.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

References

Akgül, S., Bonny, A. E., Manos, B. E., Jackson, K., & Holland-Hall, C. (2022). Rapid refeeding does not worsen anxiety in adolescents with anorexia nervosa: A pilot study. *Eating Disorders*, *30*(6), 587–601. https://doi.org/10.1080/10640266.2021.1939920

Birgegård, A., Abbaspour, A., Borg, S., Clinton, D., Mantilla, E. F., Savva, A., Termorshuizen, J. D., & Bulik, C. M. (2022). Longitudinal experiences and impact of the COVID-19 pandemic among people with past or current eating disorders in Sweden. *Eating Disorders*, *30*(6), 602–617. https://doi.org/10.1080/10640266.2021.1985286

Björk, T., Björck, C., Clinton, D., Sohlberg, S., & Norring, C. (2009). What happened to the ones who dropped out? Outcome in eating disorder patients who complete or prematurely terminate treatment. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, *17*(2), 109–119. https://doi.org/10.1002/erv.911

Deloitte Access Economics. *The social and economic cost of eating disorders in the United States of America: A report for the strategic training initiative for the prevention of eating disorders and the Academy for Eating Disorders*. June. 2020. Available at: https://www.hsph.harvard.edu/striped/report-economic-costs-of-eating-disorders/.

Fassino, S., Pierò, A., Tomba, E., & Abbate Daga, G. (2009). Factors associated with dropout from treatment for eating disorders: A comprehensive literature review. *BMC Psychiatry*, *9* (1), 67. https://doi.org/10.1186/1471-244X-9-67

Froreich, F. V., Ratcliffe, S. E., & Vartanian, L. R. (2020). Blind versus open weighing from an eating disorder patient perspective. *Journal of Eating Disorders*, *8*(1), 1–14. https://doi.org/10.1186/s40337-020-00316-1

Gorrell, S., Rienecke, R. D., Duffy, A., Huston, E., Mehler, P. S., Johnson, C., Manwaring, J., McClanahan, S., Blalock, D. V., & Le Grange, D. (2022). Understanding non-routine discharge: Factors that are associated with premature termination from higher levels of care in adults with anorexia nervosa. *Eating Disorders*, *30*(6), 686–699. https://doi.org/10.1080/10640266.2021.2011648

Hallward, L., DiMarino, A., & Duncan, L. R. (2022). A systematic review of treatment approaches for compulsive exercise among individuals with eating disorders. *Eating Disorders*, *30*(4), 411–436. https://doi.org/10.1080/10640266.2021.1895509

Kelly-Weeder, S., Kells, M., Jennings, K., Dunne, J., & Wolfe, B. (2018). Procedures and protocols for weight assessment during acute illness in Individuals with Anorexia Nervosa: A national survey. *Journal of the American Psychiatric Nurses Association*, *24*(3), 241–246. https://doi.org/10.1177/1078390317717790

Kezelman, S., Rhodes, P., Hunt, C., Anderson, G., Clarke, S., Crosby, R. D., & Touyz, S. (2016). Adolescent patients' perspectives on rapid-refeeding: A prospective qualitative study of an inpatient population. *Advances in Eating Disorders*, *4*(3), 277–292. https://doi.org/10.1080/21662630.2016.1202124

Linardon, J., Wade, T., de la Piedad Garcia, X., & Brennan, L. (2017). Psychotherapy for bulimia nervosa on symptoms of depression: A meta-analysis of randomized controlled trials. *The International Journal of Eating Disorders*, *50*(10), 1124–1136. https://doi.org/10.1002/eat.22763

Lock, J., & Le Grange, D. (2019). Family-based treatment: Where are we and where should we be going to improve recovery in child and adolescent eating disorders. *The International Journal of Eating Disorders*, *52*(4), 481–487. https://doi.org/10.1002/eat.22980

MacDonald, D. E., McFarlane, T., Trottier, K., Mahan, M., & Olmsted, M. P. (2022). Maintenance treatment for eating disorders following inpatient or day treatment: Outcomes of intensive outpatient group and individual CBT treatments. *Eating Disorders*, *30*(4), 453–469. https://doi.org/10.1080/10640266.2021.1969787

Mammen, G., & Faulkner, G. (2013). Physical Activity and the Prevention of Depression: A Systematic Review of Prospective Studies. *American Journal of Preventive Medicine*, *45*(5), 649–657.

McCuen-Wurst, C., Ruggieri, M., & Allison, K. C. (2018). Disordered eating and obesity: Associations between binge-eating disorder, night-eating syndrome, and weight-related comorbidities. *Annals of the New York Academy of Sciences*, *1411*(1), 96–105. https://doi.org/10.1111/nyas.13467

Murray, S. B., Loeb, K. L., & Le Grange, D. (2016). Dissecting the core fear in anorexia nervosa: Can we optimize treatment mechanisms? *JAMA Psychiatry*, *73*(9), 891–892. https://doi.org/10.1001/jamapsychiatry.2016.1623

Murray, S. B., Quintana, D. S., Loeb, K. L., Griffiths, S., & Le Grange, D. (2019). Treatment outcomes for anorexia nervosa: A systematic review and meta-analysis of randomized controlled trials. *Psychological Medicine*, *49*(4), 535–544. https://doi.org/10.1017/S0033291718002088

Murray, S. B., Strober, M., Tadayonnejad, R., Bari, A. A., & Feusner, J. D. (2022). Neurosurgery and neuromodulation for anorexia nervosa in the 21st century: A systematic review of treatment outcomes. *Eating Disorders*, *30*(1), 26–53. https://doi.org/10.1080/10640266.2020.1790270

Nagata, J. M., Carlson, J. L., Golden, N. H., Murray, S. B., Long, J., Leonard, M. B., & Peebles, R. (2019). Associations between exercise, bone mineral density, and body composition in adolescents with anorexia nervosa. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(5), 939–945. https://doi.org/10.1007/s40519-018-0521-2

Noetel, M., Dawson, L., Hay, P., & Touyz, S. (2017). The assessment and treatment of unhealthy exercise in adolescents with anorexia nervosa: A Delphi study to synthesize clinical knowledge. *The International Journal of Eating Disorders*, *50*(4), 378–388. https://doi.org/10.1002/eat.22657

Otto, A. K., Jary, J. M., Sturza, J., Miller, C. A., Prohaska, N., Bravender, T., & Van Huysse, J. (2021). Medical admissions among adolescents with eating disorders during the COVID-19 pandemic. *Pediatrics (Evanston)*, *148*(4), 1. https://doi.org/10.1542/peds.2021-052201

Peat, C. M., Berkman, N. D., Lohr, K. N., Brownley, K. A., Bann, C. M., Cullen, K., Bulik, C. M. . . . Bulik, C. M. (2017). Comparative effectiveness of treatments for binge-eating disorder: Systematic review and network meta-analysis. *European Eating Disorders Review*, *25*(5), 317–328. https://doi.org/10.1002/erv.2517

Rodgers, R. F., Lombardo, C., Cerolini, S., Franko, D. L., Omori, M., Fuller-Tyszkiewicz, M., Linardon, J., Courtet, P., & Guillaume, S. (2020). The impact of the COVID-19 pandemic on eating disorder risk and symptoms. *The International Journal of Eating Disorders*, *53*(7), 1166–1170. https://doi.org/10.1002/eat.23318

Sala, M., Keshishian, A., Song, S., Moskowitz, R., Bulik, C. M., Roos, C. R., & Levinson, C. A. (2023). Predictors of relapse in eating disorders: A meta-analysis. *Journal of Psychiatric Research*, *158*, 281–299. https://doi.org/10.1016/j.jpsychires.2023.01.002

Smith, K. E., Mason, T. B., Anderson, L. M., Schaefer, L. M., Crosby, R. D., Engel, S. G., Crow, S. J., Wonderlich, S. A., & Peterson, C. B. (2022). Naturalistically assessed associations between physical activity, affective functioning, and binge eating among adults with

binge-eating disorder. *Eating Disorders*, *30*(2), 154–167. https://doi.org/10.1080/10640266.2020.1746121

Taranis, L., & Meyer, C. (2011). Associations between specific components of compulsive exercise and eating-disordered cognitions and behaviors among young women. *The International Journal of Eating Disorders*, *44*(5), 452–458. https://doi.org/10.1002/eat.20838

Teychenne, M., Ball, K., & Salmon, J. (2008). Physical activity and likelihood of depression in adults: A review. *Preventive medicine*, *46*(5), 397–411.

Wagner, A. F., Lane-Loney, S. E., & Essayli, J. H. (2022). Patient perceptions of blind and open weighing in treatment for eating disorders. *Eating Disorders*, *30*(2), 230–238. https://doi.org/10.1080/10640266.2021.1992156

Waller, G., & Mountford, V. A. (2015). Weighing patients within cognitive-behavioural therapy for eating disorders: How, when and why. *Behaviour Research and Therapy*, *70*, 1–10. https://doi.org/10.1016/j.brat.2015.04.004

Westmoreland, P., Krantz, M. J., & Mehler, P. S. (2016). Medical complications of Anorexia Nervosa and Bulimia. *The American Journal of Medicine*, *129*(1), 30–37. https://doi.org/10.1016/j.amjmed.2015.06.031