

Eating Disorder Psychopathology: Compulsive Exercise Interventions

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Abstract

Background

Eating disorder psychopathology, on the basis of the clinical evidence generally reported, would appear to be more frequent among female sufferers than among males with their forms, dimensions and co-morbidities expressed as different typologies, such that in the males binge-eating disorder was over-representative as opposed to the excessive prevalence of anorexia nervosa and bulimia nervosa often combined with alexythemia among female sufferers.

Methods

A systematic review of the literature was performed to seek out the various factors affecting eating disorders among individuals, particularly women.

Results

Alexythemia nervosa, bulimia nervosa and syndromes associated with binge-eating, loss of behavioural control and disinhibition all contribute to a situation fraught with major public health

through eating disorders as expressed by binge, over- and compulsive eating habits, and place huge burden of personal suffering, social problems and financial loss.

Conclusion

The role of 'mindfulness' as a counterbalance to the loss and dysfunction of self-image and self-identity in combination with several other therapeutic measures offer promising avenues for interventional efforts., since patients presenting eating disorders often lack the motivation to attain recovery.

Eating disorders are considered to present a cornucopia of highly destructive disorder conditions that are increasingly prevalent and associated with an impairment of the health-related quality-of-life and escalations in current healthcare utilization, costs and suffering among the afflicted [1,2]. Dysfunctional thoughts and the recourse to physical exercise/activity remain the core symptoms of the eating disorders, i.e. bulimia nervosa and binge-eating disorder. It is unfortunately the case that in the pursuit of the psychopathological background of disorder, excessive exercise is identified as a predictor of poor outcome in eating disorders. Traceable temporal alterations of normal eating disorder psychopathology, general psychopathology and exercise propensity, together with the probable interactive effects of excessive exercise upon these changes during in-patient treatment of longstanding eating-disorders are sought after [3]. Observed abnormalities of eating behavior, whether or not expressed as deficient or over-exaggerated behaviors, that are found in individuals presenting anorexia nervosa or bulimia diagnosis have been defined by the compulsion behavioral characteristics; these are expressed through restrictive or unrestricted eating, over-indulgence exercise or sedentary lifestyles, and weight-monitoring or avoidance that are considered to be major contributors for disorder maintenance e.g. favourable treatment outcome are complicated, even rendered hazardous, by the compulsive desire for chronic, debilitating exercise. The excessive compulsive-obsessive syndromes shown by patients presenting variations on eating disorders are expressed often in the form of compulsive exercise behaviors, which are related vicariously with a less efficacious short-term response to treatment combined with poorer long-term outcomes [4,5]. To establish early diagnosis in anorexia patients, resting levels of bradycardia, or very low heart rate, during weight loss are displayed that recover during their body weight increase whereas chronotropic incompetence, the inability of the heart to increase its rate commensurate with increased activity or demand, is common in patients with cardiovascular disease, produces exercise intolerance which impairs quality-of-life, and is an independent predictor of major adverse indication, during exercise bouts is expressed among certain anorexic patients although the resting bradycardia is ameliorated. Anxiety and related self-destructive affective states, a key notion in the development and maintenance of eating disorders, describes a central aspect of psychopathology [6]. Further to the above health hazards, the perchance of suicide ideation liability presents a serious hazard for mortality. Eating disorders, while often over-represented among female sufferers, generally appear to be expressed differently among male and female disordered. Thus, excessive adherence to physical exercise programs of various sorts combined with fasting schedules presented the most common compensatory behaviours among male participants whereas among the females self-induced vomiting and laxative-diuretic abuse were more representative [7]. Among the latter, the most regularly found psychiatric co-morbidities were presenting mood and somatoform disorders,

whereas among men, anxiety and psychosis spectrum disorders were the most frequent ones. Borderline and histrionic personality disorders were prevalent in female eating disorders (see below), whereas narcissism and antisocial personality disorders were typically evident among the former individuals.

Systematic Review

In a study sample of eighty-four female patients that met with the criteria for the DSM-IV, regarding the collective disorders: Anorexia Nervosa, Bulimia Nervosa, or other Eating Disorders, that were Not Otherwise Specified, and assessed excessive exercise which is as defined as having engaged in more than 6 episodes of driven exercise during the initial week of treatment; the patients were given in-patient cognitive-behavioural therapy that included: physical exercise programs combined with nutritional counselling treatment over a period of twelve weeks [8]. Their dependent variables included repeated measurements during treatment and recorded measures of eating disorders: psychopathology, general psychopathology, and registered frequencies of exercise and body mass index. It was found that exercise and psychopathology during in-patient treatment of chronic eating disorders differed across this sample of excessive and non-excessive exercisers whereby the study failed to obtain notable results. In a clinical study of thirty-two female, adolescent and adult in-patients, according to DSM-IV, presenting eating disorder, it was observed that from the pre- to the post-intervention -phase, treated patients displayed significant reductions in compulsive exercise, drive for thinness (effect size: 0.48), depressive symptoms, general psychopathology and acceptance of emotions whereas those patients presenting anorexia nervosa displayed also a marked mean weight gain during the intervention [9]. The authors have placed emphasis also the promise of the results obtained from an integrative design for eating disorder patients' compulsive exercise obsessions as a novel therapeutic option. As a major public health concern, eating disorders as expressed by binge, over- and compulsive eating habits, place huge burden of personal suffering, social problems and financial loss. An abundance of individuals presenting obesity disorder report feelings of being unable to control their eating behavior or to regulate their food intake, i.e., the loss of control over eating, despite strenuous efforts [10]. Experiencing loss of control over eating predicts further eating pathology and is a key feature of binge eating. Mindfulness (i.e., the awareness and acceptance of current thoughts, feelings, sensations, and surrounding events) has emerged as a potential strategy to treat such eating disorder behaviors, but it is not known whether there is merit in investigating this strategy to address binge eating in postmenopausal women with obesity. Those participants who had displayed a lesser number of binge eating episodes were shown to be markedly greater exponents of mindfulness than those 'binge-afflicted' who displayed higher frequencies of binge eating episodes during the preceding month (see also [11]). In this vein, it was described that findings implicated the influence of 'recovery self-disclosures' in triggering recovery motivation among patients with eating disorders although the limitations of this approach involve discovering the thematic role of self-disclosure, post hoc, and the exclusive interview procedures of participants who self-identified as having recovered. One necessary line-of-approach would identify whether or not recovery self-disclosures may be applied and incorporated among those interventions to boost motivation for change and increase pro-recovery behaviors, especially for patients with these disorders [12].

Psychopathic Expression

Among anorexic patients' higher levels of an eating disorder presence showing restrictive eating, exercise and weight-monitoring compulsions was reported by thereby supporting the expostulations of disorder behaviour profiles as compulsive and obsessive expressions of anxiety [13]. Despite a potentially underpowered analysis (authors' words), that was applied to evaluate stringently the association between 'predictors of interest' and the 'compulsions outcome', which were overwhelmingly due to the small sample size. Further investigations should serve to reinforce these outcomes, optimally through the application of methods focused upon identifying the causal and mediatory effects. In an Anglo-German multi-country randomized controlled trial, N = 275 female participating patients, assigned randomly either to the guided-online self-help intervention, termed "EveryBody Plus", or to a waiting-list control group condition without access to the intervention. The outcomes are expected to provide (i) clinically relevant improvement in core symptoms, BMI, binge eating, compensatory behaviors, for the first time, and (ii) outcomes that include the frequency of core symptoms and eating disorder related attitudes and behaviors, in addition to the associated psychopathology [14]. In a sample of 187 female patients presenting bulimia nervosa and binge eating disorder and healthy controls were assigned to an outpatient, randomized controlled therapy trial intervention comparing cognitive behaviour therapy with the combination of physical exercise and dietary therapy; the participants were aged 18-40 years, presenting a body mass of 17.5-35 [15]. The authors obtained outcomes implying that both cognitive behavior therapy and combined of physical exercise and dietary therapy and PED-t reduced the compulsive exercise propensity from baseline levels although the reductions failed to achieve significance difference from the control group. It was concluded that both types of therapeutic interventions gave rise in significant improvements in compulsive exercise behavior, which reflected an alteration that was not obtained in the control group; nevertheless, the lack of any significant between-group differences appears to be related low levels of power in study design.

Among both children and adolescents, the prevalence of eating disorders appears to be more-or-less commonplace with a typical abnormal onset of eating disorders occurs during the mid-to-later stage of adolescence affective consequences greater among female children and adolescents than that among males. Despite this situation, the current rates of these disorders are seemingly undergoing an elevated incidence among the younger children, the male subjects, and certain minority groups, [2]. Recorded warning signs may be observed through observations of abrupt changes in weight or growth percentiles, the exaggerated preoccupation with calories or weight, altered, often inappropriate eating habits, excessive compulsive exercise, loss of menses and pubertal delay, and a distorted perception of body size, include dietary restriction, e.g. anorexia nervosa, avoidant restrictive food intake disorder, with common short-term medical sequelae involving weight loss, bradycardia, hypotension, fatigue, and irritability. Juvenile patients presenting a psychopathology that involved binge eating or purging behaviors, e.g. bulimia nervosa and binge-eating disorder, display related issues expressing significant weight fluctuations, gastrointestinal dysfunction, and electrolyte disturbances. Therapeutically, the utility of out-patient management combined with medical monitoring, psychotherapy, and access to dietary support and family-based treatment offers the recommended approach for children and adolescents presenting anorexia nervosa Miller and Bravender, (2018) [16]. Psychopathology may take the form of personal attributes not necessarily related to disorder but rather often associated with high performance, as for example 'perfectionism' behavior, which constitutes personal striving for flawlessness and setting high performance standards, accompanied by critical

self-evaluations and concerns regarding others' evaluation, and provides a trans-diagnostic process, a mechanistic label presented across disorders, and which is either a risk factor or a maintaining factor for the disorder; perfection attribute elevates the risk and maintaining factor for eating disorders, anxiety disorders and depression. Applying guided internet-based cognitive behavioural therapy, marked reductions in the symptoms of obsessive-compulsive and eating disorders was observed that was concurrent with positive effects upon other transdiagnostic processes thereby giving outcomes linked to improved self-esteem, reduced intolerance of uncertainty and fear of self-compassion as well as promising follow-up results [17].

Psychopathic Alexithymia

The tendencies to 'internalize' and/or 'externalize' commonly occurring among children, or during childhood, as expression in a general psychopathology bears a sufficiency of risk for disorder-fruitation at adolescent and early adulthood [18-20]. Alexithymia, the inability to identify, express feelings, and not distinguish between emotions and bodily sensations, is defined by three factors: a) difficulty of identifying feelings and differences between feelings and bodily sensations; b) difficulty of describing feelings; and c) externally oriented thinking. It's considered that people with eating disorders have specific deficits in identify and communicate their feelings [21,22]. Among female patients presenting eating disorders, it has been shown In a cross-sectionally-designed study and psychometric character design of a single sample, formed of 435 persons suffering eating disorder, presenting an age range of 12-68 years, with a representation of 91% female participants, these patients presenting alexithymia showed overwhelmingly particular difficulty of identifying feelings and differences between feelings and bodily sensations and difficulty of describing feelings [23]. In a study using a 'pleasant-affective' touch paradigm that consisted of gentle stroking with a soft brush administered to the forearm or palm during a functional neuroimaging analysis it was observed that anorexia patients expressed lower brain imaging response in comparison with the control-women during the anticipation of touch, but with a greater response when experiencing touch in the right ventral mid-insula. Among the former, the reduced anticipatory responding was related to higher levels of harm avoidance [24]. The study upon anorexia patients implied also that lower levels of responding during touch anticipation were linked to greater body dissatisfaction and higher perceived touch intensity ratings. Furthermore, both anorexia and borderline personality disorder patients presented a similar overall level of alexithymia, after taking into account the intelligence level, depressive symptoms, and state and trait anxiety [25]. Finally, the analyses, using different measurements of social-emotional functioning indicated that there were impairments among women presenting anorexia and/or history of anorexia in comparison with healthy controls; concurrently, oxytocin levels were lower among the former compared with the latter [26]. Across groups, low oxytocin levels were associated with the difficulty in identifying/defining feelings and overall alexithymia. It appears too that the psychopathological burden of anorexia markedly exceeds that of bulimia (Hansson *et al.*, 2015) [27].

Exercise Benefit

In order to investigate exercise tolerance-intolerance liabilities among a sample group of young female participants, ninety-two girls presenting anorexia and aged from 13-20 years, with a median age of 15 years, performed cardiopulmonary exercise tolerance tests using a bicycle ergometer during the post-treatment recovery phase. Participants showing a peak-heart rate of more than 160 beats/min upon subjective maximum

loading were assigned to the 'CI+' group (the chronotropic incompetence-plus group, N=7), and those with a peak-HR of less than 160 beats/min were assigned to the 'CI-' group (the chronotropic-minus N=85). It was discovered that the peak-oxygen uptake (VO₂) of both groups was below the normal range. Despite there being no difference in peak-oxygen uptake between these groups, both the resting-HR and the heart rate differences (from peak-HR - resting-HR) were markedly lower in the 'CI+' group compared to the 'CI-' group (82±8 vs. 93±16 beats/min, respectively; 72±14 vs. 89±13 beats/min, respectively), implying lower exercise tolerance in patients with chronotropic incompetence during the recovery phase of anorexia [28].

The authors concluded that chronotropic incompetence offers a reliable index of the insufficient recovery among anorexic patients that may be applied to derive the most suitable exercise interventions the disorder. To assess the risk of mortality hazard, 690 female college students from twenty-eight US colleges participated in a study to screen for positives presenting an eating disorder diagnosis, with the exclusion of anorexia nervosa patients, were screened for suicide ideation [29]. Measures of psychopathology, eating disorder behaviors (including binge eating, vomiting, laxatives, compulsive exercise), concomitant co-morbid psychopathology (such as the occurrence of depression, anxiety, insomnia), weight/shape concerns, eating disorder-related clinical impairments, and body mass index scores were all registered. Surprisingly and worryingly, it was observed that 25.6 percent of the female college student sample reported suicide ideation with all the examined variables showing significant and independent associations with suicide ideation, except for the expressions of compulsive exercise while depression, anxiety, and vomiting indications persisted as marked correlates of suicide ideation. Finally, through application of the interventional therapy, "compulsive Exercise Activity therapy", which has been termed LEAP a programme integrated with manualized cognitive behavioral therapy, for anorexia marked improvements over time in all outcomes, that included both primary such as pathological exercise cognitions and secondary including persisting exercise frequency, body mass index, eating disorder symptoms, anorexia stage-of-change, anxiety/depression symptoms, and health-related quality-of-life [30,31].

Conclusion

The agglomeration of symptom profiles and syndromes that define the psychopathology of anorexia nervosa and related eating disorders must be viewed with the utmost consideration, taking into account both incidence and prevalence, since they represent serious health hazards and, indeed, life-threatening conditions. Compulsive, excessive exercise, chronotropic incompetence, less efficacious short-term response to treatment combined with poorer long-term outcomes and dysfunctional thoughts and cognitions all merge to exacerbate the debilitating disorder and provoke the physiopathologic determinants recovery and non-recovery. Nevertheless, several more-or-less recent therapeutic interventions, such as Compulsive Exercise Activity therapy, cardiopulmonary exercise tolerance testing, and cognitive behavior therapy in combination with physical exercise and dietary therapy and PED-t convey the impression, tentatively, of therapeutic benefit.

Bibliography

1. Rennick-Egglestone, S., Morgan, K., Llewellyn-Beardsley, J., Ramsay, A., McGranahan, R., Gillard, S., *et al.* (2019). Mental Health Recovery Narratives and Their Impact on Recipients: Systematic Review and Narrative Synthesis. *Can J Psychiatry*, 706743719846108.

2. Steinhausen, H. C. & Jakobsen, H. (2019). Incidence Rates of Treated Mental Disorders in Childhood and Adolescence in a Complete Nationwide Birth Cohort. *J Clin Psychiatry.*, 80(3).
3. Zeng, W., Chen, R., Wang, X., Zhang, Q. & Deng, W. (2019). Prevalence of mental health problems among medical students in China: A meta-analysis. *Medicine (Baltimore)*, 98(18), e15337.
4. Kurdyak, P., de Oliveira, C., Iwajomo, T., Bondy, S., Trottier, K. & Colton, P. (2019). Identifying Individuals with Eating Disorders Using Health Administrative Data. *Can J Psychiatry.*, 706743719844183.
5. Mitchison, D., Mond, J., Bussey, K., Griffiths, S., Trompeter, N., Lonergan, A., et al. (2019). DSM-5 full syndrome, other specified, and unspecified eating disorders in Australian adolescents: prevalence and clinical significance. *Psychol Med.*, 1-10.
6. Boncori, L., De Coro, A., Cuomo, G. & Luchese, K. (2011). Un Approcio Innovativo Al Testing Psicopatologico: Taleia. Parte 1. Validita di Contenuto e Scala di Controllo. *Italian J of Psychol*, 38, An Innovative Approach to Psychopathological testing: Taleia Part 1: Validity of the Content of a Control Scale.
7. Valente, S., Di Girolamo, G., Forlani, M., Biondini, A., Scudellari P, De Ronchi, D., Atti A. R. (2017). Sex-specific issues in eating disorders: a clinical and psychopathological investigation. *Eat Weight Disord.*, 22(4), 707-715.
8. Bratland-Sanda, S. & Vrabel, K. A. (2018). An investigation of the process of change in psychopathology and exercise during inpatient treatment for adults with longstanding eating disorders. *J Eat Disord.*, 6, 15.
9. Dittmer, N., Voderholzer, U., von der Mühlen, M., Marwitz, M., Fumi, M., et al. (2018). Specialized group intervention for compulsive exercise in inpatients with eating disorders: feasibility and preliminary outcomes. *J Eat Disord.*, 6, 27.
10. Smith, V. M., Seimon, R. V., Harris, R. A., Sainsbury, A. & da Luz, F. Q. (2019). Less Binge Eating and Loss of Control over Eating Are Associated with Greater Levels of Mindfulness: Identifying Patterns in Postmenopausal Women with Obesity. *Behav Sci (Basel).*, 9(4).
11. Fowler, N., Vo, P. T., Sisk, C. L. & Klump, K. L. (2019). Stress as a potential moderator of ovarian hormone influences on binge eating in women. *F1000Res.*, 8.
12. Wasil, A., Venturo-Conerly, K., Shingleton R. & Weisz, J. (2019). The motivating role of recovery self-disclosures from therapists and peers in eating disorder recovery: Perspectives of recovered women. *Psychotherapy (Chic)*.
13. Lloyd, E. C., Øverås, M., Rø Ø, Verplanken, B., Haase, A. M. (2019). Predicting the restrictive eating, exercise, and weight monitoring compulsions of anorexia nervosa. *Eat Weight Disord.*

14. Vollert, B., Beintner, I., Musiat P, Gordon G, Görlich D, Nacke B, Schmidt-Hantke J, Potterton R, Spencer L, Grant N, Schmidt U, Jacobi C (2018) Using internet-based self-help to bridge waiting time for face-to-face outpatient treatment for Bulimia Nervosa, Binge Eating Disorder and related disorders: Study protocol of a randomized controlled trial. *Internet Interv.*, 16, 26-34.
15. Schlegl, S., Dittmer, N., Hoffmann, S. & Voderholzer, U. (2018). Self-reported quantity, compulsiveness and motives of exercise in patients with eating disorders and healthy controls: differences and similarities. *J Eat Disord.*, 6, 17.
16. Miller, C. & Bravender, T. (2018). Mental Disorders and Learning Disabilities in Children and Adolescents: Eating Disorders. *FP Essent.*, 475, 23-29.
17. Kothari, R., Barker, C., Pistrang, N., Rozental, A., Egan, S., Wade, T., et al. (2019). A randomised controlled trial of guided internet-based cognitive behavioural therapy for perfectionism: Effects on psychopathology and transdiagnostic processes. *J Behav Ther Exp Psychiatry.*, 64, 113-122.
18. Hemming, L., Haddock, G., Shaw, J. & Pratt, D. (2019). Alexithymia and Its Associations With Depression, Suicidality, and Aggression: An Overview of the Literature. *Front Psychiatry*, 10, 203.
19. Sallis, H., Szekely, E., Neumann, A., Jolicoeur-Martineau, A., van IJzendoorn, M., Hillegers, M., et al. (2019). General psychopathology, internalising and externalising in children and functional outcomes in late adolescence. *J Child Psychol Psychiatry*.
20. Whittle, S., Vijayakumar, N., Simmons, J. G. & Allen, N. B. (2019). Internalizing and Externalizing Symptoms Are Associated With Different Trajectories of Cortical Development During Late Childhood. *J Am Acad Child Adolesc Psychiatry.*, pii: S0890-8567(19), 30273-30274.
21. Garcia, D., Granjard, A., Lundblad, S. & Archer, T. (2017). A dark past, a restrained present, and an apocalyptic future: time perspective, personality, and life satisfaction among anorexia nervosa patients. *PeerJ.*, 5, e3801.
22. Lundblad, S., Magnusson, J., Hansson, B. & Archer, T. (2015). Cognitive-affective status in anorexia nervosa: self-image and absence of positive emotions. *Clin Exp Psychol.*, 1, 1.
23. Barriguete-Meléndez, J. A., Pérez-Bustinzar, A., Vega-Morales, R. I., Córdova-Villalobos, J. Á., Sánchez-González, J. M., Peón, P. B. & Rojo-Moreno, L. (2019). Prevalence of alexithymia in eating disorders in a clinical sample of 800 Mexican patients. *Cir Cir.*, 86(1), 38-43.
24. Bischoff-Grethe, A., Wierenga, C. E., Berner, L. A., Simmons, A. N., Bailer, U., Paulus, M. P. & Kaye, W. H. (2018). Neural hypersensitivity to pleasant touch in women remitted from anorexia nervosa. *Transl Psychiatry.*, 8(1), 161.
25. Pluta, A., Kulesza, M., Grzegorzewski, P. & Kucharska, K. (2018). Assessing advanced theory of mind and alexithymia in patients suffering from enduring borderline personality disorder. *Psychiatry Res.*, 261, 436-441.

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26. Schmelkin, C., Plessow, F., Thomas, J. J., Gray, E. K., Marengi, D. A., Pulumo, R., et al. (2017). Low oxytocin levels are related to alexithymia in anorexia nervosa. *Int J Eat Disord.*, 50(11), 1332-1338.
 27. Lundblad, S., Hansson, B. & Archer, T. (2014). Affect-group intervention for alexithymia in eating disorders. *Int J Emerg Ment Heal Hum Resourc.*, 17, 219-223.
 28. Yoshida, Y., Maeda, J., Fukushima, H., Tokita, N., Yamagishi, H. & Tokumura, M. (2019). Chronotropic incompetence to exercise in anorexia nervosa patients during the body-weight recovery phase as an index of insufficient treatment. *Heart Vessels*, 34(4), 711-715.
 29. Goel, N. J., Sadeh-Sharvit, S., Flatt, R. E., Trockel, M., Balantekin, K. N., Fitzsimmons-Craft, E. E., et al. (2018). Correlates of suicidal ideation in college women with eating disorders. *Int J Eat Disord.*, 51(6), 579-584.
 30. Hansson, B., Lundblad, S., Torgerson, J. S. & Lindroos, A. K. (2016). Anorexia nervosa and obesity: a psychological health comparison. *Arch Depress Anxiety*, 2, 015-018.
 31. Hay, P., Touyz, S., Arcelus, J., Pike, K., Attia, E., Crosby, R. D., et al. (2018). A randomized controlled trial of the compulsive ExerciseActivity TheraPy (LEAP): A new approach to compulsive exercise in anorexia nervosa. *Int J Eat Disord.*, 51(8), 999-1004.