Compulsivity in Anorexia Nervosa and Relevant Interventions

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Abstract. The aim of this review is to find out the relationship between compulsivity and Anorexia Nervosa (AN) and the relevant interventions to date. AN is a type of eating disorders that includes two subtypes: restricting and purging subtypes. Females between 13 and 20 years old are more likely to suffer from AN and the death rate is extremely high. The restricting subtype of AN patients are obsessed with weight loss by doing excessive exercises. This review paper discussed the trait of compulsivity and the effect of anxiety in AN. This review also discussed the unconscious compulsivity in AN that makes AN even more difficult to be treated. Most of the AN patients have compulsive exercises in their daily lives. All the studies that were discussed in this paper used varies methods and established that there is a positive correlation between compulsivity and AN. By knowing it, relevant interventions can be designed to target this aspect. Healthy routines and healthy beliefs can replace the unhealthy compulsive exercise in AN. One limitation of previous studies is that they mainly focused on the compulsive trait and relevant interventions after the AN diagnosis. Future study should investigate more regarding the premorbid and prodromal phases of AN, to understand its dynamic development over time. This paper can guide the design of intervention and prevention programs for AN.

Keywords: Compulsivity · Anorexia Nervosa · Eating Disorder · Compulsive Exercise

1 Introduction

Compulsivity, according to DSM-5 diagnosis criteria, is ritualistic behaviors that an individual performs in order to mitigate the anxiety that stems from obsessive thoughts. Study has shown that the effect of interpersonal sensitivity on forced exercise was enhanced by high levels of trait compulsivity over time [1]. There are also evidence indicating that patients with eating disorders take part in compulsive exercise or binge eating as a method to deal with their emotions [2]. However, most studies examining compulsivity in psychological disorders have limitations due to small sample size, time interference,

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G. Ali et al. (Eds.): ISEMSS 2022, ASSEHR 687, pp. 1085–1093, 2022.
https://doi.org/10.2991/978-2-494069-31-2_127

individual difference, multiple external changes, and uncertainties. There is a lack of consistent understanding regarding the exact definition of compulsivity [3]. Anorexia Nervosa (AN) is an eating disorder characterized by the maintenance of a bodyweight that is well below average, through starvation and/or excessive exercise [2]. Symptoms of AN can be characterized into several types. Patients with AN tend to extremely restrict their eating behavior. Patients always pursue extreme thinness and are extremely thin. They have a relentless pursuit of thinness and unwilling to maintain a normal or healthy weight. Patients with AN also have intense fear of gaining weight. Plus, one of the characteristics is their distorted body image. They also have a level of self-esteem that is heavily influenced by perceptions of body weight and shape or a denial of the seriousness of low body weight. AN has been proven to be related to genetic factors, negative emotions, and anxiety [4].

There are two subtypes of AN: restricting type and binge-eating/purging subtypes. Restricting subtype refers to individuals who lost weight through dieting and excessive exercise. Binge-eating/purging subtype refers to individuals who lost weight through vomiting and intermittent binge eating [5]. Although the incidence rate is approximately 0.5 percent to 1.0 percent in America, which is relatively low, the long-term mortality is about 20 percent due to dangerous medical complications [6]. According to DSM-5, the molarity rate of AN is the second highest among all the psychologic illnesses. The symptoms of AN include menstrual periods cease, muscle weakness and wasting, fragile hair and nails, etc. In addition, many patients experience depression, anxiety, arability, fatigue, and poor concentration at the same time.

Expect the common symptoms, it has some unique characteristics. First, young women are most likely to develop AN, especially those between 13 years old and 20 years old [6]. One powerful explanation is that the brain provides an abnormal response to the increased blood level of estrogen during puberty [7–11]. Second, studies have shown that AN is much more common in certain occupations, such as dancers, actors, and athletes. Also, the athletes who are involved in sports that emphasize leanness to achieve better performances are easier to get AN [12]. Besides, the negative impact of anorexia is significant. Based on research, AN causes malnutrition that affects organs all over the body with multiple medical complications. Moreover, these negative influences may maintain for a long time even after the patients start to refeed [6]. Regarding the behavioral aspect, anorexics eat very little due to their extreme fear of fatness. They care about and control the intake of calories, especially fat [13]. Also, anorexics check their weight frequently. Any fluctuations will get their attention. Therefore, they may have some depressive, anxious, and compulsive behaviors [14, 15].

In short, the restricting subtype of AN patients are more likely to lose weight through dieting and excessive exercise. This abnormal eating behavior has seriously affected the physical and mental health of AN patients. As mentioned above, if they were not stopped or being treated, the probability of their death is much higher than the average of people. Fortunately, some therapies and interventions have been developed in recent years. The most effective and popular one is cognitive behavior therapy-AN (CBT-AN). CBT-AN is an active three-phase treatment aimed at restoring weight and normal eating habits by challenging underlying beliefs and thoughts through cognitive restructuring and behavior change [16]. Nevertheless, this approach has usually been applied to AN from the aspect

of keeping a healthy diet, without any intervention regarding compulsive behaviors, such as excessive exercise. Therefore, this review aims to analyze the compulsivity in AN and the relevant interventions that have been developed. Both conscious and unconscious compulsivity in AN were discussed. Interventions related to compulsive exercise in AN were also included. This paper can contribute to future prevention and intervention programs for AN.

2 The Compulsive Trait in AN

2.1 The Contribution of Compulsive Trait and Anxiety to AN Symptoms

In general, anxiety is a natural response to stress that can be beneficial in certain circumstances [17]. However, excess anxiety may have negative influence on people. The symptoms of anxiety include compulsive traits, dizziness, muscle tension, and constant worry [18]. Compulsive traits of AN patients refer to purging and compulsive exercises. Understanding whether they are related is important. One of current study looks at the independent links between impulsivity and compulsivity and eating disorder symptoms [19]. Women diagnosed AN according to DSM-5 completed and assessed questionnaires that included variables like impulsivity and obsessiveness. The authors hypothesized that this feature of impulsivity was specifically linked to eating anxiety and eating out of control (LOC). A total of 118 eligible women participated in the study, 81 of whom completed measures of impulsivity and obsessiveness. In measurement, the author uses four interviews. The result indicates that restraint, food anxiety, and weight anxiety were all found to be connected with compulsivity. For example, Favaro and Santonastaso found the relevance between compulsive and self-induced purging from an ED sample [20]. Many studies on personality factors have stressed impulsivity and obsessiveness. The most recent notion is that they arrived in different forms [21].

Because of the association between anxiety and compulsion, the research focus on the link between AN and anxiety [22]. The authors claim that high levels of anxiety magnify the anti-anxiety effects of food restriction. To support their hypothesis, the authors provide a new model. Unlike other theories, the authors incorporate anxiety into the model and suggests a mechanism by which anxiety functions in AN to explain the occurrence of reinforcement and goal-directed system anomalies [23]. At the same time, the authors claim that because anxiety might perpetuate AN, treatments aimed at reducing eating anxiety, such as AN Exposure and Response Prevention therapy (AN-EXRP), are recommended [24]. In result, the authors were able to emphasize the special relevance of anxiety to the aetiology of AN by expanding and altering the description of the condition.

2.2 The Unconscious Compulsivity in AN

AN distinctive temporary self-starvation behavior has been regarded as evidence of impulsivity, with similarities to addictive behavior. The similarities between obsessive-compulsive behavior in AN and substance use disorder (SUD) were investigated using a thematic qualitative analysis in this study [25]. The thematic qualitative analysis revealed

eight themes: impaired control, escalation of compulsive behaviour, emotional triggers, negative reactions, continuance of harmful behaviour, reduced function, and rehabilitative role. The important status of compulsive is included, too. These findings imply that patients with AN believe compulsivity is a key barrier to rehabilitation and that it is central to maintaining type 3 illnesses. The AN patients indicate the power of unconscious compulsive behaviors, such as loss of weight. The themes that emerged were identical to the DSM-V criteria for SUDs, and they corresponded to four sets of criteria (impaired control, social impairment, risky drug use, and drug criteria). These findings indicate the need for more study into probable impulsive behaviours and brain base parallels between AN and SUDs, which could influence the treatment approach for AN.

3 The Compulsive Exercise and Relevant Intervention in AN

3.1 The Compulsive Exercise

As one of the main characteristics of anorexia nervosa, compulsive exercise has been studied significantly. Compulsive exercise refers to excessive exercise patients take to lose weight and usually is out of control. Compulsive exercise has been proved to be closely related to the intensity of anorexia nervosa, and this also provides a promising treatment for eating disorders by dealing with other compulsive behaviors. In the study by Scharmer et al., 235 participants from the United States consist of 78% females completed Eating Disorder Examination Questionnaire (EDE-Q, a 36-item self-report questionnaire that use to assess disordered eating psychological, behavioral symptoms), Compulsive Exercise Test (CET, a 24-item self-report questionnaire for assessing both cognitive and behavioral factors of compulsive exercise), and Exercise Dependence Scale (a 21-item self-report questionnaire that examines both physical and psychological symptoms of obsessive exercise). Multiple linear regression analyses were used to determine which characteristics of exercise were only associated with EDE-Q scores, and dominance analysis was used to identify which were not [26]. The research reveals that compulsive exercise attributes are more significantly connected to the intensity of ED pathology than exercise dependence qualities. Conclusions claim that the results show that treatments focus on dealing with other compulsive behaviors may have a bright future of functioning as an option for problematic exercise in the context of eating disorders.

Another study is carried out to estimate the connection between intensity of compulsive exercise and severity of anorexia nervosa. High levels of compulsivity don't necessarily link to more severe eating disorders, but the more serious the eating the disorder, the generally higher level of compulsivity. Noetel et al. assessed 60 female adolescents who were diagnosed with AN. Participants completed CET, YEDE-Q (the adolescent version of EDE-Q), RCADS, (Revised Child Anxiety and Depression Scale, the assessment of DSM-IV certain anxiety disorders and depression's symptoms in youth aged between 7 and 18-years-old), ChOCL-R (Children's Obsessional Compulsive Inventory-Revised, measured OCD symptom severity and impairment), RSED (Rosenberg Self Esteem Scale, a 10-item self-report questionnaire that measures world-wide trait self-esteem) [27]. The result showed that in this study, there was no link between higher levels of compulsive exercise and eating disorder psychopathology or anxiety. Compulsive exercise

was also linked to higher eating disorder, anxiety, depression, and obsessive compulsiveness psychopathology scores, as well as lower self-esteem. Nevertheless, the value of compulsive exercise's mood improvement value did not mirror similar tendencies.

The study of compulsive exercise and anorexia nervosa has also been brought into the context of living quality, to be specific, the normal functioning of physical and psychological of life. Studies claim that higher level of compulsive exercise is linked to higher level of anorexia nervosa which is related to decreasing quality of life. In the study by Young and colleagues, 78 adults (4 are males) with AN who has a BMI between 14 and 18.5 and have exercised in the previous month completed EDE-Q, K-10 (Kessler-10 item distress scale, a 10-item measure of psychological distress), Padua Inventory (a 39-item measure of psychological distress specifically assesses obsessive-compulsive traits), EDQoL (Eating Disorder Quality of Life), ANSOCQ (Anorexia Nervosa Stages of Change Questionnaire), CET [28]. The findings show a weak positive relationship between compulsive exercise and eating disorder quality of life as well as a moderate positive association between compulsive exercise and ED psychopathology.

3.2 Interventions for the Compulsivity in AN

Intervention for compulsivity is necessary as compulsive exercise and AN have always been inextricably linked. In this study, the researcher used questionnaires to explore the connection between them and found that the higher the scores of participants in CET, the higher their scores in EDE-Q. Compulsive exercise and AN have always been inextricably linked. In this study, the researcher used questionnaires—CET and EDE-Q to explore the connection between them. It is essential as it is the standard that used to measure AN and compulsivity and to estimate how serious they are so that the researchers can give correct interventions. In the study by Sweene, compulsive exercise (i.e. exercise that significantly interferes with important activities, occurs at inappropriate times or in inappropriate settings, or when the individual continues to exercise despite injury or other medical complications) and restrictive eating disorders (i.e., AN) were assessed using questionnaires (CET and EDE-Q) in a sample of 170 adolescents at one-year follow-up. Evaluation of the new patient was performed by a paediatrician with ED experience. Wearing only undergarments to measure height and weight and conduct a physical examination [29]. It was found that compulsive exercise is one of the distinguishing features of ED in adolescence. Therefore, stopping their compulsive exercises is useful during the intervention in order to disrupt the behaviors that perpetuate AN. During the course of treatment, people with ED are less likely to exercise to control their weight and avoid being down in spirits.

In long-term studies, it has been found that effective intervention of compulsive motor behavior in patients with AN can be used to treat AN more quickly and effectively. Improving the participants' health exercise method is an effective way to reduce their compulsive behaviors. To test this idea effectively, therapies that intervene in compulsive exercise have been combined with therapies that treat AN. Dittmer et al. evaluated the efficacy of healthy exercise behavior (HEB) as an addition to treatment as usual (TAU, i.e., routine hospitalization) to reduce compulsive exercise in 207 randomized controlled trials of adolescents and adult female with AN. HEB incorporates exercise-based therapy components into a cognitive-behavioral approach. The primary outcome was to evaluate

the severity of the exercise using the pre- and post-intervention engagement scale. Secondary results were other aspects of forced exercise, assessed through CET, weight gain, eating disorders and general psychopathology, and mood regulation [30]. They found that the TAU + HEB group showed significantly stronger reductions in the severity of compulsive exercise compared to TAU group. Obviously, from the experimental results, the reduction of compulsive exercise effectively alleviates AN.

AN is a psychological disease, so the problems are not only superficial but also composed of multi-level problems. The participants may have unhealthy cognition and compulsion in their subconscious. It is more important to treat the psychological and cognitive obstacles of the participants. Sometimes it is not necessary to change the compulsive behaviors of participants compulsively, but intervention can be achieved by changing their cognition of compulsive behaviors. In the study by Hay et al., they integrated the compulsive exercise activity therapy (LEAP) programme with manualized CBT-AN and compared to CBT-AN only, to see which one will be more efficient. 78 adults were chosen as participants seriously. There was no significant difference between groups except BMI [31]. In this study, all results have improved over time. The only difference between the groups was BMI. At six months follow-up, more people scored BMI $>$ 18.5 in LEAP group than in CBT-AN group. At last, the frequency of exercise for all participants decreased and ate more normally.

4 Conclusion

According to the previous research, compulsivity is related to AN. The most important and obvious compulsive behavior in AN is compulsive exercise. Based on previous studies, there is a clear link between compulsive exercise and AN. Plus, effectively targeting the compulsive behaviors in AN can reduce the unhealthy diet. However, some limitations must be mentioned. Previous research regarding the compulsion in AN are limited to abnormal eating-related patterns, such as excessive exercise and vomiting. Future research can focus more on the manifestation of other compulsive behaviors in AN and the relationship among them. In addition, previous studies focus more on the compulsive behavior of patients who are already diagnosed with AN. In the future, more attention could be paid to the compulsive behaviors of people in the premorbid and prodromal phases before the diagnosis. If people could pay more attention to the eating-related compulsive behaviors in the general population, the tendency might be detected early to prevent the development of AN. In sum, this review focuses on the relationship between compulsivity and AN. It made a general overview of the link between compulsive behavior and AN. Plus, it demonstrated effective interventions for compulsive exercise in AN. A reduction in compulsive exercise can alleviate AN symptom. This review can provide some guidance for future intervention research in AN.

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