

Online Multidisciplinary Intervention for Severe Binge Eating Behaviors in an Adolescent with Anorexia Nervosa: A Case Report

Zeng H¹, Lv N², Lin Y³, Cai X², Yang J¹ and Xu H^{4*}

¹Shenzhen University General Hospital, China

²Mental Health Center, Xianyue Hospital, China

³The First Affiliated Hospital of Xiamen University, China

⁴The Affiliated Kangning Hospital of Wenzhou Medical University, Zhejiang Provincial Clinical Research Center for Mental Disorders, China

*Corresponding author:

Haiyun Xu,

The Affiliated Kangning Hospital of Wenzhou Medical University, Zhejiang Provincial Clinical Research Center for Mental Disorders, China

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1. Introduction

Eating disorders are serious mental disorders that damage physical health and disturb the psychosocial functioning of patients. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), eating disorders encompass anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), avoidant/restrictive food intake disorder, and other specified feeding or eating disorders [1]. The clinical picture of these phenotypes, however, may become more complex over time and the profile of them in childhood differ from that of adults in the later stages of illness [2]. Here we presented the case of an adolescent girl who developed severe binge eating behaviors two years after a previous diagnosis of AN. Because of the COVID-19 epidemic, this patient received an online intervention provided by a multidisciplinary team (MDT). The intervention program effectively relieved the patient's binge eating behaviors, improved her mental health status, and returned her to the normal life of a middle school student.

2. Case

A 16-years-old girl, because of persistent binge eating behaviors, was brought to the Psychological Outpatient Department on April 9, 2021. She was diagnosed with AN in early 2019 and treated ef-

fectively as evidenced by the fact that her body mass index (BMI) significantly increased from 13.22 to 18.22 and she returned to her school life. Her manifestations of AN relapsed in September 2020 because of academic pressure. Her BMI dropped to 15.22 due to restricting food intake. In January 2021, the patient developed binge eating behaviors without purging. This eating behavior aggravated in April as indicated by continuous eating fast food from morning to midnight every day. To control her body weight, she run for 8-10 kilometers on a treadmill 2-3 times a week, instead of purging.

A physical examination was done when the patient presented the outpatient department on April 9, 2021. Her BMI was 24.03, cardiopulmonary examination was normal. She was conscious and answered questions correctly but felt down and reported amenorrhea. She had a strong sense of inferiority for her body shape and dare not look at herself on a mirror but could not help doing it. She was afraid of going out as she thought that passers-by would talk about her body shape. The eating behaviors of the patient were scored by Eating Disorder Examination Questionnaire (EDE-Q6.0), which is a self-report questionnaire version of the EDE interview widely used to assess the severity and type of eating disorder pathology [3], and by BMI-based silhouette matching test (BMI-SMT),

a body-esteem scale for adolescents and adults [4]. The mental health status of the patient was assessed using the Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder 7-item (GAD-7). The sleep quality of the patient was assessed by the Athens insomnia scale (AIS), and the recovery status was assessed by the Canadian Personal Recovery Outcome Measure (C-PROM). All the above assessments were done in weeks 2 and 8, except for C-PROM which was done in weeks 2, 4, and 8. In addition, two batches of laboratory analyses were done in weeks 0 and 8 to measure plasma levels of the hormones progesterone, prolactin, luteinizing hormone, thyroxine (T4), and free T4, as well as the total cholesterol levels.

A multidisciplinary online intervention protocol was developed to treat the binge eating behaviors and improve the mental health status of the patient. The online intervention, which consists of drug prescription, psychological intervention, and nutritional instruction, was carried out once a week during a nine-weeks intervention period. Each intervention lasted for about 30 minutes. During the intervention period, the patient was given fluoxetine (40 mg/day) and aripiprazole (2.5 mg/day, take at night) for two months, then the dose of aripiprazole was elevated to 5 mg/day. An online psychotherapy was implemented once a week by the psychotherapist while the nutritional instruction was provided by a dietitian.

The above protocol was effective in improving most of the above measures of the patient. First, the patient's binge eating behaviors were significantly relieved as evidenced by decreases in frequency and duration of binge eating episode. Her binge eating duration decreased to 1-2 h/day from 14-16 h/day, frequency decreased to 3-4 episodes/week from daily binge eating. The total score of EDE-Q6.0 decreased to 2.1 from 3.75. The BMI-SMT scale, however, did not reach the expected goal (17 vs 13). Second, the food and energy intake by the patient decreased by 87.5% after completing the intervention protocol. Third, the mental health status and sleep quality of the patient were improved significantly indicated by the PHQ-9 score decrease from 19 to 8, GAD-7 score from 15 to 7, and AIS score from 11 to 4. Fourth, the C-PROM score of the patient showed a progressive increase from 11.5 at pre-intervention, through 17 at week 4, to 21.9 at week 8. More importantly, the patient kept online study scheduled by the school and recovered her social functions as reported by her family members. Interestingly, the patient's BMI kept at comparable levels at the starting and ending points of the intervention period (24.04 vs 25). Moreover, the patient still possessed the same cognition regarding weight, shape and body image.

Of the laboratory tests, progesterone level increased from 0.95 nM/L to 15.56 nM/L, although it was still much lower than the reference range (122-1094 nM/L). In contrast, plasma prolactin level decreased from a normal pre-intervention value of 124.5 IU/L (reference 97.7 - 651.7) to a lower value of 74.9 IU/L in week 8. The

luteinizing hormone remained at higher levels of 26.27 and 20.84 IU/L (reference 2.4-12.6) in weeks 0 and 8, respectively. Similarly, the total cholesterol levels remained at slightly higher levels of 5.81 and 5.97 mM/L (reference 3.38 - 5.20) at pre-intervention and post-intervention, respectively. Both thyroxine (T4) and free T4 remained invariant from pre-intervention (T4, 62.89; free T4, 11.94) to post-intervention (T4, 64.91; free T4, 11.95) and were near lower limits of the reference ranges (T4: 66-181 nM/L; free T4: 12.0-22.0 pM/L).

3. Discussion

This patient was diagnosed as AN in early 2019 and treated effectively. Starting from January 2021, she presented overt binge eating behaviors along with compensating behavior of over exercising, instead of purging. These changes of the patient's eating behavior demonstrate a diagnosis mutation from AN to non-purging BN (BN-NP), instead of BED. In support of this diagnosis mutation, a previous study showed that binge eating was preceded by dieting and weight loss in most of the BN-NP patients (89%), whereas the pathway to binge eating is more variable among BED patients. And previous episode of AN is more frequent in BN-NP than among BED patients [5]. Also, this case is in line with recent longitudinal follow-up studies with AN patient showing that a significant proportion of subjects change diagnostic status to another eating disorder [6-8].

The online multidisciplinary intervention significantly decreased the frequency and duration of the patient's binge eating episode. In the meantime, it improved the mental health status and sleep quality of the patient. She has been doing well so far on her school-work and social functions without relapse of binge eating while keeping a stable BMI (24.02-25) in the normal range. Although the underlying mechanism for the therapeutic effects of the program on the patient remains unknown, the advantages of the multidisciplinary intervention are impressive and persistent as mentioned above. Specifically, psychotherapy and nutritional instruction may work on the patient's binge eating behaviors while fluoxetine and aripiprazole may help improve her mental health status. In line with this speculation, loss of control and binge eating were associated with the highest levels of negative affect and the greatest likelihood of engaging in compensatory behaviors [9]. The possible insomnia side effect of the two drugs might be ameliorated due to the combined psychotherapy and nutritional instruction.

In addition to the high level of total cholesterol common in patients with AN, the patient showed abnormal plasma levels of progesterone, prolactin, and luteinizing hormone, indicating the presence of hypothalamic dysfunction responsible for the reported amenorrhea. Unfortunately, her menstrual cycle did not recover after 9 weeks of online intervention, nor did the aforementioned hormones recover. These results are in line with a previous study, in which 14% of 250 female outpatients with amenorrhea did not

recover their menstrual cycle after stable weight recovery [10]. However, promising changes did happen after the online intervention as evidenced by significant increase of progesterone level from 0.95 nM/L to 15.56 nM/L and decrease in luteinizing hormone from 26.27 to 20.84 IU/L. It is expected that the endocrine dysfunction of the patient will gradually recover to normal levels during her adulthood.

4. Conclusion

This case report added evidence that restrictive AN in adolescents may mutate into BN-NP. It also demonstrated that the efficacy of online multidisciplinary intervention in treating binge eating behaviors in BN-NP and improving the patient's mental health status and sleep quality.

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