

Original Article

Music and art therapy combined with cognitive behavioral therapy to treat adolescent anorexia patients

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Abstract: Objective: To investigate the efficacy and feasibility of music and art therapy combined with cognitive behavioral therapy (CBT) in the treatment of adolescent patients with anorexia. Methods: A total of 77 patients admitted to our hospital from August 2018 to October 2019 were recruited as the study cohort, but 11 patients who dropped out of the study were excluded. The data from the 66 patients were collected for a statistical analysis. There were 31 patients in the control group and 35 patients in the treatment group. After the intervention, the body weight, cognitive and behavioral ability, emotional reaction, and treatment satisfaction changes were compared and analyzed in the two groups. Results: The treatment group had a significantly lower dropout rate and higher overall treatment satisfaction than the control group. After the intervention, the body weights, body mass indexes (BMI), and abdominal subcutaneous fat thicknesses were increased in the two groups, and the increase in the treatment group was significantly higher than it was in the control group ($P < 0.05$). After the intervention, the Eating Disorder Examination Questionnaire 6.0 (EDE-Q-6.0), the Beck Anxiety Inventory (BAI), and the Beck Depression Inventory (BDI) scores were significantly lower than they were before the intervention, and the scores in the treatment group were significantly lower than they were in the control group ($P < 0.05$). Conclusion: Music and art therapy combined with CBT can effectively improve patients' recognition and acceptance of the treatment, the therapeutic effects, and the adverse emotional reactions (e.g., depression and anxiety), and help patients establish the correct cognition regarding food, body shape, and weight.

Keywords: Anorexia, music and art therapy, cognitive behavioral therapy

Introduction

Anorexia nervosa (AN), often referred to simply as anorexia, is a psychiatric disorder characterized by weight loss and impaired body function due to abnormal eating behaviors. Anorexia is difficult to treat and can easily recur [1]. The patients' abnormal eating behaviors can be attributed to an incorrect understanding and evaluation of their weight [2]. Patients express a strong fear of gaining weight and fat, and they often intentionally lose significant amounts of weight through dieting, vomiting, excessive exercise, and even taking diet pills. In addition to abnormal eating behaviors, patients with AN are usually comorbid with psychological and physiological dysfunction, making AN the psychiatric disorder with the highest mortality rate [3, 4].

Recently, the "perfect figure" has been extensively advocated in advertisements, Sina Weibo, TikTok, and other mass media. In the context of the prevailing concept of "Thin is beautiful", the incidence rate of AN in adolescents, especially in female adolescents, is increasing yearly [5, 6]. A study suggests that the average course of AN is 4-6 years. After eight years of follow-up, the patient rate is only 38.6%-45.6%. AN adds a huge psychological and physiological burden to the lives of patients and their families [7].

Music-and-art therapy is a systematic intervention that focuses on patients' physiological and psychological experiences in the treatment and uses music experiences to help patients stabilize and relieve their conditions [8, 9]. Cognitive behavioral therapy (CBT) focuses on

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the role of cognitive activities in psychology and behavior, aiming to eliminate adverse emotional reactions [10] by improving incorrect recognition. This method has been extensively used for the treatment of mild to moderate depression [11].

The objective of this study is to conduct interventions on adolescent patients with anorexia using music and art therapy combined with CBT, and to analyze the feasibility of this intervention method by evaluating the patients' weight, eating disorders, adverse emotional reactions, dropout rates and treatment satisfaction.

Materials and methods

General data

Patients with anorexia admitted to the Department of Neuropsychology in our hospital (Affiliated Hospital of Jinggangshan University) from August 2018 to October 2019, volunteered to participate in this study, and each patient's family provided a written informed consent. A total of 77 patients meeting the inclusion criteria were randomly divided into the control group (n=40) and the treatment group (n=37) using the random number table method, and 11 patients who dropped out of the experiment were excluded. Finally, the data from the 66 patients were included in the study results for a statistical analysis. There were 31 patients in the control group and 35 patients in the treatment group.

Inclusion criteria: patients (1) who were in line with the diagnostic criteria for anorexia in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) [12], (2) patients 14-19 years old [13], (3) patients who had completed junior high school or higher, (4) patients who had not undergone systematic nutritional or individual psychotherapy, (5) patients who were not taking psychotropic drugs or who discontinued their use of psychotropic drugs more than three months prior to their enrollment in this study.

Exclusion criteria: patients (1) with organic lesions in the digestive system, (2) patients who were unable to complete the psychological tests, (3) patients who previously received other treatment (e.g., foot treatment), and (4) patients who were treated with psychotropic

drugs within three months prior to the start of this study were excluded.

This study project was approved by the Hospital Ethics Committee (Affiliated Hospital of Jinggangshan University).

Intervention methods

The control group underwent conventional outpatient treatment once a week, and each treatment lasted for 30 min.

Conventional outpatient treatment in the psychiatry department

After an understanding of the changes in the patients' weights and mental states, the patients with severe insomnia or emotional problems were treated with low-dose antipsychotic drugs.

Outpatient treatment in the nutritional department

According to the changes in each patient's weight, the diet plans were adjusted, and each patient's daily calorie intake was increased in stages based on the balanced nutrition standards.

Psychological education and treatment

Active guidance was carried out to improve the patients' inherent thinking and emotional resistance and to encourage them to insist on receiving treatment.

The treatment group was additionally treated with music therapy combined with CBT in addition to the treatment administered in the control group.

Based on the therapeutic method of combining Chinese and Western music, the therapists collected and sorted out five elements of music related to health promotion (e.g., Mu Music, Shui Music, and Huo Music), and the patients were asked to listen to music related to health promotion in their daily life, in order to relax their spirits and nourish their hearts [14, 15].

Based on the CBT manual for anorexia prepared by Dalle et al. [16] and the actual characteristics and feasibility for the Chinese personnel, the CBT program was prepared.

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Regarding CBT, there were four stages when the treatment was performed for 12 times. Every weekend, a designated person was responsible for implementing the intervention, and each intervention lasted for 120 minutes, and the patients were asked to take a break every 40 minutes.

Interviews before the treatment

Before the implementation of the CBT, we spoke with the patients to introduce them to the basic processes, times, and places of the treatment, and to learn about their conditions and current food intake. A preliminary therapeutic relationship with the patients was established through communication to boost their confidence in the treatment [17].

Initial stage of treatment

The therapists introduced the therapeutic content and process and offered health education about anorexia, so that the patients could understand the basic characteristics of anorexia and its influence on their bodies and minds. The patients were taught the methods for regular dieting and self-control. The communication with the patients made them realize the issues in their own eating behaviors and to think deeply about the causes of anorexia. The therapists provided the necessary explanations and promoted education throughout the communication. At this stage, the therapists established a sound relationship with the patients and enhanced their initiative to engage in the treatment.

Main stage of the treatment

The therapists and the patients discussed the dietary patterns during the treatment. The therapists shared their opinions on satiety, vomiting, and excessive exercise, promptly corrected the patients' distorted cognitive thoughts, informed the patients of any potential obstacles that might occur during the treatment, and encouraged them to strengthen their confidence in the treatment. At this stage, patients' adverse eating behaviors and cognitive habits were improved, and the patients maintained a regular diet.

End of treatment

The therapists asked the patients to conduct self-evaluations and to summarize the thera-

peutic process, and they eliminated the patients' concerns after treatment. Additionally, the therapists formulated personalized long-term maintenance plans for the patients, and told them to regularly conduct reexaminations after the treatment and to perform self-monitoring and weight measurements, so as to reduce the risk of recurrence.

Observational indices and assessment criteria

Standard body weight and body mass index:

The body mass index (BMI) is a common international tool used to estimate the degree of obesity and health. The BMI is a measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

The patients' weights and BMIs were recorded before and after the intervention. A higher increase in the standard weights and BMIs indicates more significant therapeutic effects.

Abdominal subcutaneous fat thickness:

The thumb and forefinger were used to pinch the skin on the paraumbilical papillary line on each patient's abdomen, with the interval between the two fingers being 3 cm. The abdominal subcutaneous fat thickness was measured with a caliper.

The abdominal subcutaneous fat thicknesses were recorded before and after the intervention. A thicker abdominal subcutaneous fat measurement indicates a more significant therapeutic effect.

Eating disorder examination questionnaire:

The Eating Disorder Examination Questionnaire 6.0 (EDE-Q-6.0) comprises four dimensions: food restriction (F1), attention to eating (F2), attention to body shape (F3), and attention to weight (F4). The EDE-Q-6.0 was used to evaluate the patients' behaviors and psychological characteristics and to determine the severity of AN by measuring the frequency and intensity of the anorexia [18, 19]. A lower score indicates more significant therapeutic effects.

Scales for adverse emotional responses:

The Beck Anxiety Scale (BAI) and the Beck Depression Scale (BDI) were used to evaluate the patients' anxiety and depression [20]. Each of the two scales comprises 21 self-evaluation items scored using a scoring system of 1-4

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Table 1. A comparison of the general clinical data in the two groups ($\bar{x} \pm s$)/[n (%)]

General clinical data		Control group (n=31)	Treatment group (n=35)	t/X ²	P
Gender	Male	2	3	0.106	0.745
	Female	29	32		
Average age (years)		16.34±2.10	16.72±1.85	-0.432	0.665
Duration of education (years)		9.39±2.36	9.43±2.17	-0.880	0.379
Weight (kg)		40.36±5.27	41.68±6.61	-1.498	0.134
BMI (kg/m ²)		14.85±2.37	15.42±1.75	-1.838	0.066

point(s). A higher score indicates more serious anxiety and depression, suggesting that the therapeutic method was not effective.

Investigation of the treatment satisfaction levels: The patients were evaluated using an in-house questionnaire to measure the treatment satisfaction in our hospital. The questionnaire covered the patients' acceptance of the treatment, their feelings during the treatment, and their satisfaction with the service attitude. A higher score indicates a higher satisfaction with the treatment.

Dropout rates: Throughout the study, occasionally a patient who signed the informed consent form and was enrolled was unable to complete the study for various reasons, which was regarded as a dropout. A high dropout rate affected the accuracy of the clinical trial results [21]. The dropout rates in the two groups were recorded during this study. A higher dropout rate indicates a lower feasibility of the regimen.

Statistical analysis

Statistic Package for Social Science (SPSS) 22.0 was used for the statistical analysis. The measurement data were expressed using ($\bar{x} \pm s$). The comparisons between groups were analyzed using independent sample T tests, and the comparisons within groups were analyzed using paired sample T tests. The statistical graphs were drawn using GraphPad Prism 8. $P < 0.05$ indicated a statistically significant difference.

Results

Comparison of the general clinical indices between the two groups

The comparison of the two groups indicated that there were no significant differences in the

general clinical data (e.g., gender, educational level, weight, and BMI) between the control group and the treatment group ($P > 0.05$), so the two groups were comparable (**Table 1**).

Comparative analysis of the patients' standard body weights and BMIs before and after the intervention

After the intervention, the standard weights and BMI in the two groups were higher than they were before the intervention, and the standard weight and BIM values in the treatment group were significantly higher than they were in the control group ($P < 0.05$) (**Figure 1**). This signaled that music and art therapy combined with CBT can help patients with anorexia gain weight.

Analysis of abdominal subcutaneous fat thicknesses in the two groups before and after the intervention

After the intervention, the abdominal subcutaneous fat thicknesses in the two groups were thicker than they were before the intervention, and the abdominal subcutaneous fat in the treatment group was significantly thicker than it was in the control group ($P < 0.05$) (**Figure 2**). This showed that music and art therapy combined with CBT can help patients with anorexia gain fat, and that this intervention method is more effective at treating anorexia.

Analysis of the eating disorder questionnaire scores in the two groups before and after the intervention

The food restriction (F1), attention to eating (F2), attention to body shape (F3), attention to weight (F4) and the other items were scored using EDE-Q 6.0. After the intervention, the scores of all the items in the two groups were lower than they were before the intervention,

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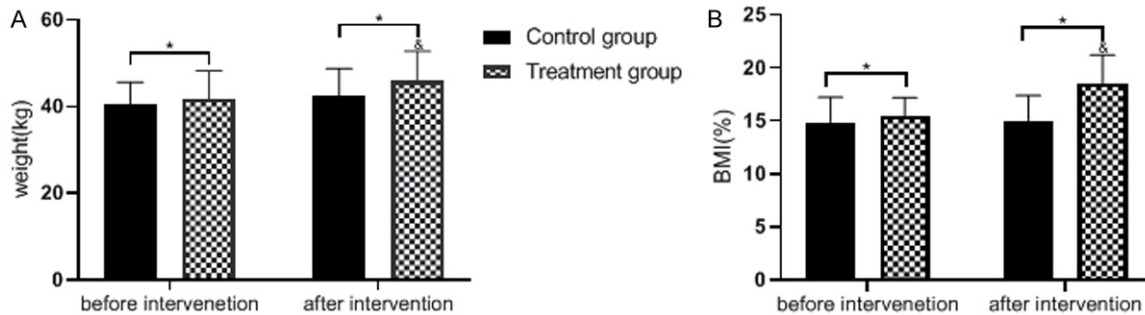


Figure 1. Changes in standard weights and BMIs in the two groups before and after the intervention. The comparative analysis shows that the body weights and BMIs in the two groups were significantly higher than they were before the intervention, and the body weights and BMIs in the treatment group were remarkably higher than they were in the control group after the intervention. * indicates a comparison with before and after the intervention, $P < 0.05$. & indicates a comparison between the groups after the intervention, $P < 0.05$.

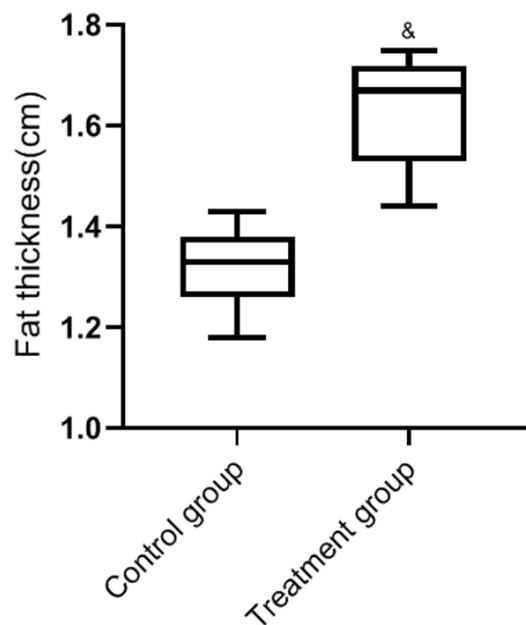


Figure 2. Changes in the abdominal subcutaneous fat thicknesses in the two groups before and after the intervention. The comparative analysis shows that the abdominal subcutaneous fat in the treatment group was markedly thicker than it was in the control group after the intervention. & indicates a comparison between groups after the intervention, $P < 0.05$.

and the scores of all items in the treatment group were significantly lower than they were in the control group ($P < 0.05$) (Figure 3). This suggested that music and art therapy combined with CBT can correct the wrong cognition in patients with anorexia regarding their eating and body shape and weight and help them maintain a regular diet, so this intervention

method was more effective at treating anorexia.

Analysis of the adverse emotional reactions in the two groups before and after the intervention

The BAI and BDI scores in the two groups after the intervention were lower than they were before the intervention, and the BAI and BDI scores in the treatment group were significantly lower than the corresponding scores in the control group after the intervention ($P < 0.05$) (Figure 4). This shows that music and art therapy combined with CBT can improve patients' adverse emotions, stabilize their emotions, and avoid the termination of treatment due to emotional fluctuations.

Analysis of the treatment satisfaction levels in the two groups after the intervention

The therapeutic process was scored using an in-house questionnaire that measured the level of satisfaction with the treatment. Regarding the patients with scores ≥ 80 points, there were 29 (82.9%) patients in the treatment group and 19 (61.2%) patients in the control group. Regarding the patients with scores of 60-79 points, there were 5 (14.3%) patients in the treatment group and 7 (22.6%) patients in the control group. Regarding the patients with scores < 60 points, there was 1 (2.8%) patient in the treatment group and there were 5 (16.2%) patients in the control group (Table 2). This showed that music and art therapy combined with CBT can improve patients' treatment satisfaction.

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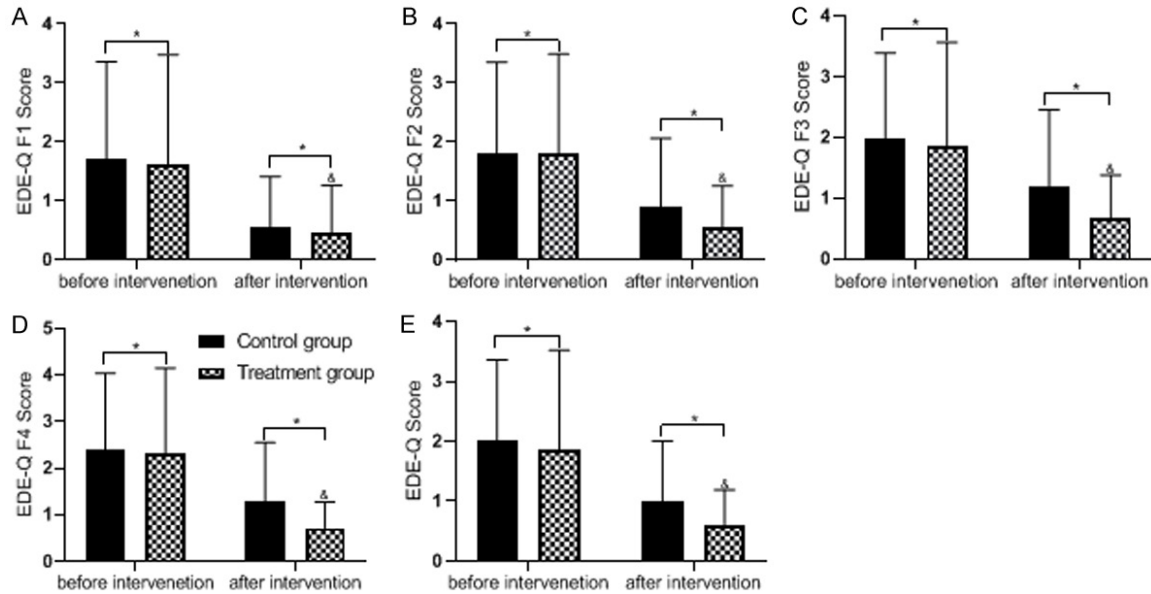


Figure 3. Changes in the eating disorder questionnaire scores in the two groups after the intervention. The comparative analysis suggests that the dimensions and total eating disorder questionnaire scores in the two groups after the intervention were significantly higher than they were before the intervention, and the dimension and total eating disorder questionnaire scores in the treatment group were notably lower than they were in the control group. * indicates a comparison before and after the intervention, $P < 0.05$. & indicates a comparison between the groups after the intervention, $P < 0.05$.

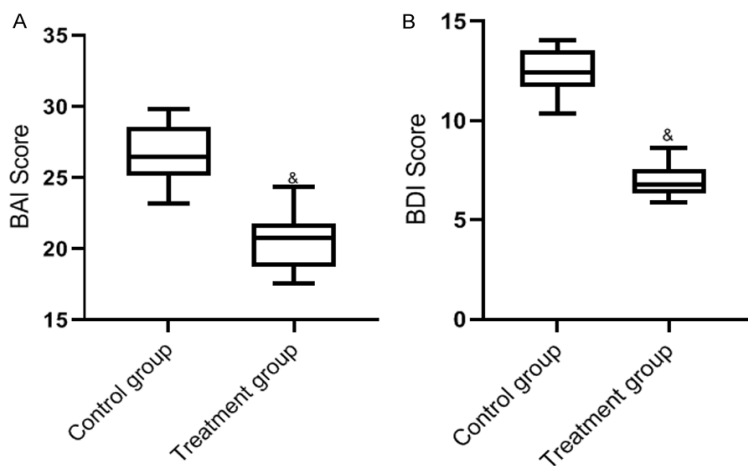


Figure 4. Changes in the adverse emotional reactions in the two groups before and after the intervention. The comparative analysis demonstrated that the BAI and BDI scores in the treatment group were significantly lower than they were in the control group. & indicates a comparison between the groups after the intervention, $P < 0.05$.

Analysis of the dropout rates in the two groups before and after the intervention

Regarding the 77 patients initially included in the study, 9 of the 40 patients in the control group dropped out, and 2 of the 37 patients in the treatment group dropped out (Table 3). The

Chi-square test showed that there were significant differences in the dropout rates between the two groups, and the number of patients dropping out in the treatment group was significantly lower than it was in the control group. This demonstrated that music and art therapy combined with CBT are more recognized by patients with anorexia compared with the conventional outpatient treatment, and the patients treated with music and art therapy combined with CBT are more likely to insist on receiving treatment.

Discussion

Due to the incorrect cognition of anorexia patients and the influence of weight loss on their physiological functions, determining how to improve the therapeutic effect in anorexia patients has always been a problem perplexing physicians. A study indicated that the success rate for treating AN is merely 27% [22].

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Table 2. A comparison of the treatment satisfaction in the two groups after the intervention [n (%)]

Score	Control group	Treatment group	χ^2	<i>P</i>
< 60	5 (16.1)	1 (2.9)		
60-79	7 (22.6)	5 (14.3)		
80-90	9 (29.0)	5 (14.3)		
> 90	10 (32.3)	24 (68.5)		
Total	31 (100)	35 (100)	9.701	0.021

Table 3. A comparison of the dropout rates [n (%)]

Reason for dropout	Control group	Treatment group	χ^2	<i>P</i>
Unsatisfactory grouping	2	0		
Long distance traveled	2	1		
Think ineffective	3	0		
Fear of fast weight gain	2	1		
Dropout	9	2		
Without dropout	31	35		
Total	40	37	4.587	0.032

CBT is a problem-oriented therapy. The communication between therapists and patients is conducive to exploring the hidden psychological problems of the patients, and improving their behaviors and cognitions through treatment [23, 24]. Fairburn et al. defined the cognitive model of AN and prepared the guidelines for CBT for AN. Multiple meta-analyses on the efficacy of AN reveal that CBT can improve the therapeutic effect for AN [25, 26]. However, regarding overseas studies, hospitalization is required, and weight gain may be related to diet management during the hospital stay [27].

A study indicates that outpatient treatment is more flexible and more acceptable to patients with anorexia [28]. By improving their negative thinking about food and body shape during each treatment, the patients can establish a correct mindset, thus effectively preventing the recurrence of AN [29].

Since most patients with anorexia have psychological problems, they have cognitive biases. Music and art therapy can relieve the patients' psychological burdens through their specific music behaviors, and the theory of five-tone therapy is expounded in *Huangdi Neijing*. Music therapy has been extensively implemented for the treatment of mental diseases (e.g., depression and sleep disorders) [30, 31].

In this study, music therapy and CBT were combined to treat anorexia. The results indicate that the dropout rate in the treatment group was significantly lower than it was in the control group. After the intervention, there was an increase in the patients' weights, BMIs, and abdominal subcutaneous fat thicknesses in the two groups, and the increase in the treatment group was more significant than it was in the control group. The EDE-Q 6.0 and BAI and BDI scores revealed that after the intervention, the scores of each item were decreased, and the scores of each item in the treatment group were markedly lower than the corresponding scores in the control group. After the intervention, the treatment satisfaction in the treatment group was significantly higher than it was in the control group. The study results are basically consistent with those of studies that have been performed previously at home and abroad, showing that the regimen is feasible for treating patients with anorexia.

In summary, music and art therapy combined with CBT can help patients with anorexia establish the correct cognition, improve their acceptance, improve the therapeutic effects, and promote their weight gain. Therefore, music and art therapy combined with CBT is worthy of clinical promotion.

The innovation of this study lies in its combination of music therapy and CBT for the first time, with a view to improving anorexia patients' conditions and prognosis and preventing their relapse. The deficiencies of this study include the small sample size, an insufficient duration, the emotion of resistance of most patients to psychotherapy, and the lack of long-term follow-up observations. Throughout the study, telephone follow-up was used to learn the reasons why some patients dropped out, but the relationship between the dropout and therapeutic process was not further explored. Future studies with larger cohorts should be performed to investigate the relationship between the dropout rate and the treatment and to improve the therapeutic process, thereby laying a solid foundation for providing more effective regimens for the treatment of patients with anorexia.

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Disclosure of conflict of interest

None.

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