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Original Article

Intervention Effect of Solution-Focused Brief Therapy Based on Empowerment Theory on Loneliness in Obese Children

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Abstract

Background: Obesity, one of the independent risk factors affecting children's physical and mental health, has become a serious public health problem in the 21st century. Given physical anxiety and other psychological factors, obese children experience negative impact on their mental health and intellectual development from their loneliness, unwillingness to communicate with others, and lack of peer interaction. Therefore, exploring an effective psychological intervention model that can relieve loneliness in obese children is necessary.

Methods: From February to October 2022, a quasi-experimental study was conducted on obese children recruited from communities in Harbin, China. The children recruited were evaluated with the UCLA Loneliness Scale. According to the evaluation results, one hundred and five children were selected and randomly divided into experiment group (52) and control group (53). The experiment group was given an eight-week solution-focused brief therapy (SFBT) intervention based on empowerment theory. The control and experiment groups were measured and compared before and after the intervention.

Results: The loneliness score of the experiment group was significantly lower than that of the control group (P<0.001). The self-efficacy score of the experiment group was significantly higher than that of the control group (P<0.001). The subjective well-being score of the experiment group was significantly higher than that of the control group (P<0.001).

Conclusion: SFBT intervention based on empowerment theory has an effective intervention effect on loneliness in obese children and can improve their subjective well-being and self-efficacy. The results of this study provide a new perspective for the intervention on psychological problems in obese children.

Keywords: Empowerment theory; Solution-focused brief therapy; Obese children; Loneliness

Introduction

Obesity is a chronic metabolic disease caused by multiple factors. Genetic and environmental factors play an important role in the occurrence and development of obesity. Obesity can be categorized as simple or pathological obesity according to its causes. Most affected children exhibit simple obesity. With the development of social economy and the evolution of people's dietary structure and lifestyle, childhood corpulence and obesity are increasingly prevalent, becoming one of the independent risk factors affecting children's physical and mental health (1). According

to the "Report on Childhood Obesity in China" from the Danone Institute of China Center for Disease Control and Prevention in 2019, the rate of being overweight and of obesity among children aged 7 and above is estimated to reach 28% by 2030 (2). Clearly, childhood corpulence and obesity have become severe public health problems.

Given the prejudice of society against the obese group and the low self-rating by obese children themselves, obesity may have a negative impact on children's mental health. Obese children often feel lonely and inferior and are unwilling to communicate with others because of their bloated body and clumsy movements. For children, well-established peer relations can promote mental health and intellectual development (3,4). The lack of communication with peers among obese children results in a weak sense of connection with the surrounding social relations, and their craving for interpersonal communication in this situation leads to a strong sense of loneliness, accompanied by negative emotions such as loneliness (5, 6). Therefore, attention should be paid to loneliness in obese children.

Empowerment education model which focuses on patients and seeks to arouse their enthusiasm and autonomy to participate in the management of their own diseases (7, 8). At present, this education model has been widely used in various clinical treatments. The use of empowerment in psychological intervention had a significant effect on children with pneumonia, especially embodied in accelerating the elimination of their symptoms, enhancing pulmonary function, relieving negative emotions, and improving quality of life (9). This education model is also currently widely used in the field of mental health. Zhang et al (10) conducted a six-month empowerment health education intervention on patients with depression and found significant improvement in the self-efficacy, depression level, and medication compliance.

Solution-focused brief therapy (SFBT) is problem-solving oriented approach that believes in the client's ability to solve problems, respects and perceives the client's positive side, explores resources, and helps the client build problem-solving ideas (11). Proposed in the context of positive psychology, SFBT has been widely used in various fields of psychological counseling and group counseling. SFBT has been widely used in school psychological counseling in Taiwan, mainly to solve family and interpersonal issues and addiction problems (11).

Although previous studies confirmed that the two intervention models above can help children cope with their own psychological problems, only few investigations report on their application in the intervention on loneliness on obese children. Therefore, an innovative attempt was made in this study to integrate these two intervention models, wherein an SFBT intervention program based on empowerment theory was implemented to examine the intervention effect on loneliness in obese children. The results of this work provide a scientific basis for the timely prevention of and intervention on obesity and psychological problems among children.

Materials and Methods

From February to October 2022, obese children were recruited as volunteers from five communities selected by convenience sampling in Harbin, Heilongjiang Province. A total of 110 obese children who met the diagnostic criteria and were rated to have "high-level loneliness" by the UCLA Loneliness Scale were identified and investigated. Consequently 110 copies of the questionnaire were collected. According to the standard that a copy with 20% missing content was regarded as invalid, 105 copies were valid, with an effective rate of 95.4%. Finally, 105 obese children who agreed to participate and signed written informed consent were selected as the study participants. These participants were randomly divided into the experiment group and control groups. There were 52 members (27 males and 25 females) in the experiment group, and 53 (32 males and 21 females) in the control group (Fig.1). Consent was obtained from the volunteers. This research was approved by the local Ethics Committee.

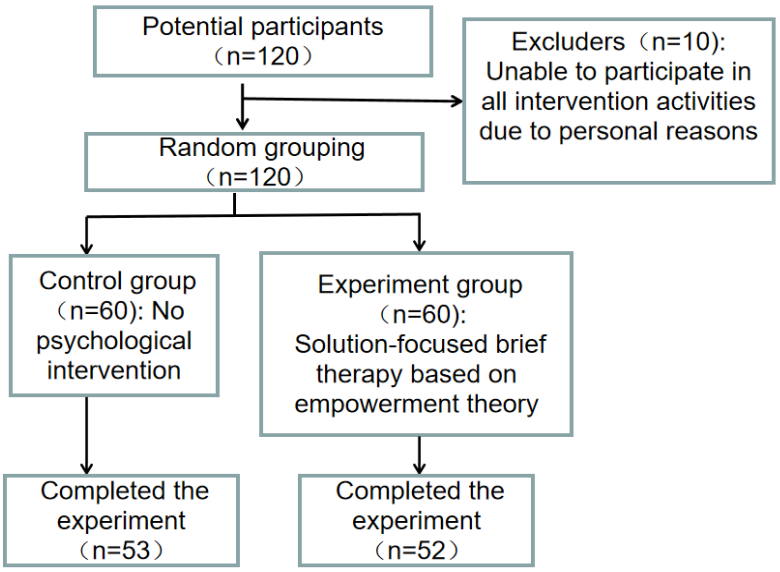

Fig.1: Shows the workflow of this study

Research tools

UCLA Loneliness Scale (12): The loneliness of obese children was measured by the UCLA Loneliness Scale (12). The scale contains 20 items, including 9 reverse scoring items. Each item is scored using a Likert four-point scoring method, with the score ranging from 1 point for "never" to 4 points for "always." The total scale is 20–80 points and indicates a higher level of loneliness in the individual when the value is higher. Scores are categorized as follows: below 28 points, "low-level loneliness"; 28–33 points, "lower-than-average loneliness"; 33–39 points, "middle-level loneliness"; 39–44 points, "higher-than-average loneliness"; and above 44 points, "high-level loneliness". In this study, the internal consistency coefficient of this scale is 0.906.

General Self-Efficacy Scale (13): the Chinese version of the General Self-Efficacy Scale compiled by Schwarzer et al and translated by Wang et al (13) was used in this study. This scale contains 10 items. Each item is scored using a four-point scoring method, with 1 point for "completely incorrect" and 4 points for "completely correct." A lower score indicates a lower level of self-efficacy. The internal consistency coefficient of this scale is 0.87, the retest reliability is 0.83, and the split-half reliability is 0.82. In this study, the consistency coefficient of this scale is 0.92.

Subjective Well-being Scale (14): Subjective Well-being Scale (14) was used in this study. This scale consists of two parts, namely, the overall emotion index scale (eight items) and the life satisfaction scale (one item). The weighted sum of these two parts, scored using seven-point scoring, is the overall well-being index. A higher score indicates a higher level of subjective well-being. In this study, the internal consistency coefficient of this scale is 0.89.

Procedure

An SFBT intervention method based on empowerment theory was used in this study to conduct an eight-week intervention on obese children in the experiment group from the third day after grouping, once a week, 60 minutes each time, for a total of eight times. A pre-designed intervention program was adopted for the participants in the experiment group. With the focus on the participants, a good cooperative relationship of respect and acceptance was established between the researchers and the participants. Through semi-structured interviews, the participants were guided to express emotions, focus on and clarify problems, determine the goals and plans of prob-

lem solving, and seek information and support. The intervention theme each time went through the five steps of empowerment, namely identifying problems, expressing emotions, setting goals, formulating plans, and evaluating effects. The specific intervention themes include group establishment in the initial stage; respect and trust in the formation stage; self-affirmation, value realization, intimate communication, coping with difficulties, and helping peers in the work stage; and common growth in the end stage. The specific scheme is shown in Table 1.

Table 1: Intervention scheme

Intervention stage	*Intervention theme*	*Intervention objective*
Initial stage	I'm a member of the group	Group establishment
Shaping stage	I've started the trip of trust	Respect and trust
Working stage	I'm in my being good for something.	Self-affirmation
	There is a return to pay	Value demonstration
	Communication heats up friendship	Intimate communication
	How to respond to conflicts	Conflict-solving
	I have companions along the path of youth	Help and companion
End stage	It's the end and also the beginning	Common growth

Statistical methods

This study was a completely randomized experiment, with pre- and post-test designs for the intervention and control groups. Repeated measures analysis of variance was used to measure the loneliness of the intervention and control groups before and after the intervention. All data were statistically analyzed using SPSS 22.0, with the difference being statistically significant when $P<0.05$.

Results

A total of 105 obese children participated in this study, including 52 in the experiment group and 53 in the control group. As shown in Table 1, there were no statistically significant differences between the two groups of obese children in age, gender, height, weight, BMI, and waist circumference ($P>0.05$). The specific data is shown in Table 2.

Table 2: Comparison of indicators between the two groups of children with simple obesity

Demographic data		*Experiment group (n=52)*	*Control group (n=53)*	*X^2/t*	*P*
Gender	Male	28	28	0.892	>0.05
	Female	24	25		
Age (years)		11.32±2.34	11.48±2.26	1.091	>0.05
Physical indicators (M±SD)	Height (cm)	145.6±5.7	144.8±6.5	1.639	>0.05
	Weight (kg)	49.2±7.1	49.4±7.2	1.427	>0.05
	BMI (kg/m2)	23.2±2.3	23.5±2.2	1.235	>0.05
	Waist circumference (cm)	81.4±6.2	81.6±6.3	1.118	>0.05

As shown in Table 3, repeated measures analysis of variance was carried out with being before and after the intervention as the intra-group variable, namely the repeated measures variable, and the control group and the experiment group as the inter-group variable. The results show a significant interaction between the group and the time. Further simple effect analysis reveals that for the experiment group, the loneliness score after the intervention was significantly lower than that before the intervention; but for the control group, no significant difference was observed in the

loneliness score of obese children before and after the intervention. After the intervention, the loneliness score of the experiment group was significantly lower than that of the control group.

Table 3: Analysis of the loneliness scores of the intervention and control groups before and after the intervention

Variable	*Before intervention*	*After intervention*	*t*	*P*
Experiment group (n=52)	70.13±2.05	41.60±2.94	-20.19	0.001
Control group (n=53)	69.83±2.10	68.47±2.65	0.97	0.87
t/*P*	0.89/0.78	-19.38/0.001		

As can be seen from Table 4, repeated measures analysis of variance was carried out with being before and after the intervention as the intra-group variable, namely the repeated measures variable, and the control group and the experiment group as the inter-group variable. The results show a significant interaction between the group and the time. Further simple effect analysis indicate that for the experiment group, the self-efficacy score after the intervention was significantly higher than that before the intervention; for the control group, the self-efficacy score of obese children after the intervention was also significantly higher than that before the intervention. After the intervention, the self-efficacy score of the experiment group was significantly higher than that of the control group.

Table 4: Analysis of self-efficacy scores of the intervention and control groups before and after the intervention (n=105)

Variable	*Before intervention*	*After intervention*	*t*	*P*
Experiment group (n=52)	20.01±2.54	34.78±2.94	-20.19	0.001
Control group (n=53)	19.86±2.33	21.33±4.96	1.98	0.04
t/*P*	0.81/0.83	21.02/0.001		

As can be seen from Table 5, repeated measures analysis of variance was carried out with being before and after the intervention as the intra-group variable, namely the repeated measures variable, and the control group and the experiment group as the inter-group variable. The results show a significant interaction between the group and the time. Further simple effect analysis reveals that for the experiment group, the subjective well-being score after the intervention was significantly higher than that before intervention; for the control group, the subjective well-being score of obese children after the intervention was higher that before the intervention but did not reach a significant level. After the intervention, the subjective well-being score of the experiment group was significantly higher than that of the control group.

Table 5: Analysis of subjective well-being scores of the intervention and control groups before and after the intervention

Variable	*Before intervention*	*After intervention*	*t*	*P*
Experiment group	19.36±3.44	32.13±3.68	-18.99	0.001
Control group	20.39±2.81	21.73±5.03	1.22	0.056
t/*P*	0.79/0.73	17.23/0.001		

Discussion

Intervention effect of solution-focused brief therapy based on empowerment theory on loneliness in obese children

Repeated measures analysis of variance shows that after eight times of SFBT intervention, the loneliness of obese children was significantly reduced and became lower than that of obese children without intervention. Moreover, no significant change was noted in the loneliness of obese children without intervention but a significant interaction occurred between the group and the time. This result shows that SFBT based on empowerment theory has an obvious intervention effect on loneliness in obese children. This finding is consistent with previous research results. Liu (15) found a significant intervention effect of SFBT on students' loneliness and friendship quality and a significant negative correlation between overall friendship quality and total loneliness. Thus, loneliness in individuals can be effectively reduced by improving their interpersonal skills and allowing them to fully perceive the positive experience generated by friendship.

The intervention program adopted in this study involved solution-focused group counseling based on empowerment theory. It had been confirmed that SFBT can provide individuals with opportunities for interpersonal learning and emotional catharsis, promote the development of their social skills, and enable them to receive corrective attention in the early family life experience (16, 17). These curative factors of SFBT play an effective role in the intervention on obese children with a high level of loneliness. During the intervention in the current study, the participants were allowed to fully express their feelings, problems, and desire for interpersonal communication, as well as the obstacles to their interpersonal communication; on the basis of such information, they could establish individual interpersonal communication promotion goals and group intervention goals. An atmosphere of safety, respect, and trust was created at the stage of group establishment, so that all the participants were fully respected, guided to experience the feeling of being respected and trusted, and encouraged to give full play to their personal advantages, make full use of communication skills, and improve their ability to cope with and solve conflicts. The intervention program provided the participants with a safe atmosphere, communication skills, mutual support and full encouragement, motivated them to improve their interpersonal skills in all aspects, and allowed them to obtain a positive experience. Therefore, the loneliness of the participants was significantly reduced.

Intervention effect of solution-focused brief therapy based on empowerment theory on self-efficacy in obese children

The self-efficacy of obese children was significantly improved after eight times of SFBT intervention and was higher than that of obese children without intervention. No significant change was noted in the self-efficacy of obese children without intervention but a significant interaction occurred between the group and the time. This outcome shows that SFBT based on empowerment theory also has an obvious intervention effect on self-efficacy in obese children. Wang et al (18) examined the impact of solution-focused group therapy on the quality of life and self-efficacy of patients with depression and found a significantly greater impact of focus group therapy combined with escitalopram than single-drug therapy on the quality of life and self-efficacy of patients with depression. Zhang et al (19) conducted a study on the impact of solution-focused counseling on primary school students' academic self-efficacy and verified that this approach has certain sustainability in improving primary school students' academic self-efficacy and is conducive to cultivating their positive emotions. Researchers confirmed that SFBT is universal because the sense of homogeneity between individuals enhances the sense of belonging among members (20, 21). The intervention program adopted in this study also included the intervention content with the theme of self-affirmation. During the intervention, the participants were guided to en-

gage in full self-exploration, explore their own strengths and potentials, and promote their self-acceptance. The orientation of respecting and paying attention to positive resources in individuals could enable them to have a positive experience and improve their self-efficacy.

Intervention effect of solution-focused brief therapy based on empowerment theory on subjective well-being in obese children

The subjective well-being of obese children was significantly improved after eight times of SFBT intervention and was higher than that of obese children without intervention. No significant change was observed in the subjective well-being of obese children without intervention but a significant interaction occurred between the group and the time. This result shows that SFBT based on empowerment theory also has an obvious intervention effect on subjective well-being in obese children. Wang (22) conducted solution-focused brief psychological intervention on cataract surgery patients, finding a significant reduction in the anxiety and depression of patients and significant improvement in their subjective well-being and quality of life. Qin et al (23) used the solution-focused model to carry out an intervention on operating room nurses and verified that the solution-focused model can effectively reduce the job burnout of operating room nurses and enhance their self-efficacy and subjective well-being. Zhang (24) explored the effect of SFBT combined with paroxetine on patients with obsessive-compulsive disorder. He found that after three months of intervention, the subjective well-being score of the experiment group was significantly higher than that of the control group, accompanied by significant improvement in the level of mental health.

Liu (25) studied the relationship between loneliness and subjective well-being in the elderly, as well as the moderating role of self-efficacy in this relationship. They found that self-efficacy is significantly positively correlated with subjective well-being, significantly negatively correlated with loneliness, and works as a moderating variable for the impact of loneliness on subjective well-being. Researchers verified that loneliness can indirectly affect subjective well-being in the elderly (26, 27). Zhang et al (28) examined the relationship between and intervention on college students' perceived social support and subjective well-being and established that perceived social support is an important factor affecting the level of subjective well-being and plays a partial mediating role between the Big Five personality dimensions and subjective well-being. Moreover, the group intervention program focusing on perceived social support has a sustained effect in significantly improving junior high school students' ability to perceive social support and thus improving their subjective well-being.

The results above show that subjective well-being is negatively correlated with loneliness in individuals, but positively correlated with self-efficacy. A weaker sense of loneliness indicates a stronger sense of self-efficacy and a higher level of subjective well-being in individuals. This conclusion was verified by this study again, given that the subjective well-being of obese children with high-level loneliness was improved through SFBT intervention. Solution-focused brief group therapy can infuse hope into the participants, provide them with group support and opportunities to help others, allow them to better solve interpersonal conflicts and problems through group empowerment, and assist them to obtain social support, thus improving the subjective well-being of obese children (16, 29).

Conclusion

SFBT intervention based on empowerment theory has a significant effect on loneliness in obese children. Specifically, the intervention can reduce loneliness in obese children and improve their subjective well-being and self-efficacy. This intervention program has great implications in providing empirical support and practical guidance for the mental health work and intervention methods targeting obese children. The major limitation of this study lies in the use of a subjective questionnaire, which would inevitably result in deviation

among responses. Some physiological measurement indicators related to obesity should be incorporated in future research for comparison before and after the intervention, so as to carry out a more comprehensive and objective investigation on the effect of this intervention program.

Journalism Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Conflict of interest

The authors declare that there is no conflict of interests.

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