

Acupuncture for the Treatment of Eating Disorders: A Systematic Review

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Abstract: Eating disorders are mental health disorders which involve severe problems with thoughts about food and eating behaviors. Acupuncture, an intangible cultural heritage of China, is well known for its ability to release stress and pain. Previous studies suggest that acupuncture has positive effects on treating eating disorders though its effectiveness remains uncertain. A systematic review which illustrated the effects of acupuncture in comparison of other medications was conducted. This review focuses on ten clinical trials published between 2010 and 2020 in Google Scholar and two Chinese databases (i.e. WANGFANG DATA and ZHIWANG). The results have confirmed that acupuncture plays an important role in treating Anorexia, including improvement in patients' Quality of Life and anxiety relief. Evidence has also confirmed the positive effects of pricking Sifeng acupuncture point on treating Infantile Anorexia. In sum, acupuncture is a promising complementary therapy for treating eating disorders. However, further high-quality randomized controlled trials (RCT) with standardized acupuncture protocols are required for each specific eating disorder to validate the treatment effect.

1. Introduction

Eating disorders are mental illnesses related to a series of completely abnormal eating habits and many negative results, including the destruction of cognitive, emotional and social functions [1]. High level of concern and distress about body shape and weight impairs physical or psychological functioning and has caused a great burden on public health. According to previous survey, eating disorder is nowadays a global issue found in both developed and developing countries [2]. Therefore, an intense requirement for treating eating disorder urgently calls for public health professionals to take action [3]. More efforts are needed due to the increasing prevalence rate among adults and teenagers [4, 5] and high treatment costs [6].

Eating disorders can be categorized into four main types: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge Eating Disorder (BED), Eating Disorder Not Otherwise Specified (ED-NOS). Menstrual irregularities, syncope, palpitations, cold intolerance, fatigue, mood changes, constipation, or abdominal pain are likely to be found in patients with eating disorders. According to previous research [7], a crude mortality rate of eating disorders was found to be 5% in 4-10 year of follow-up and 9% at follow-up after 10 years. Besides, roughly 13% of teenagers suffered from at least one

eating disorder by age 20 [8], and it is summarized [9] that many teenagers struggled with eating disorders [10].

In recent years, there has been an increasing interest in study on Infantile Anorexia (IA). The diagnostic criteria, which are defined by the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood Revise (Zero To Three, 2005), focus on the child who (1) refuses to take in sufficient food for at least one month, (2) does not speak about the feeling of hunger and lacks interest in food, and (3) whose refusal of food does not follow a traumatic event and is not due to a potential medical illness.

Base on previous reports [11], the treatment interventions for both AN and IA focus on nutritional normalization and recovery of normal eating patterns. Besides, it is extremely important to add in individual and family psychotherapy as soon as patients are out of starvation mode. Outpatient treatment may be a time-saving and effective way to process therapy, but outpatient treatment fails to monitor weight fluctuation of patients, which leads to the failure in suggesting patients with more efficient and ideal treatment. Moreover, it is also a challenge for doctors to convince patients who show hostility towards therapy [12]. This reality causes researchers to find alternative treatments for eating disorders [13].

Acupuncture is frequently used as complementary and alternative therapy (CAM) as it is proven to pose positive effects on treating depression, anxiety, insomnia and headache [13]. Besides, it is also indicated that acupuncture tends to be more tolerant and money-saving for patients compared to other medical cares [14]. Turning to the effectiveness of acupuncture on eating disorder treatment, an example can be given that Apostolos and Miliadiades, through a limited research, has found evidence to support the hypothesis that acupuncture (auricular acupuncture) is instrumental in treating BN [15]. Aside from this, acupuncture shows great effectiveness on treating functional gastrointestinal disorders caused by depression [16]. It is proven that through the combination of traditional Chinese medicine and Western medicine, IA can be better treated [17].

Base on the fact that not many reports seem to provide strong relation of acupuncture on treating eating disorders, it is undoubtedly worth paying more attention and efforts to research the treatments of mental diseases via the appropriate use of acupuncture. The aim of this review is to find out and summarize previous works that have investigated the role of acupuncture in treating eating disorders (focusing on AN and IA).

2. Method

2.1. Searching strategy

This review searched papers published between 2010 and 2020, and three electronic databases were used, including Google scholar and Chinese databases (WANGFANG DATA, ZHIWANG). The key terms include: 'eating disorders OR Anorexia OR Bulimia OR mental disease and 'acupuncture OR electroacupuncture OR moxibustion'. Chinese was used while searching on Chinese databases. The research was limited to English and Chinese.

2.2. Inclusion criteria

The following criteria for studies were involved: (1) randomization or interview or experimental observation adopted double-blinding or single-blinding, (2) Sample size involved the number of patients more than 8, and (3) patients were in all ages and were diagnosed with eating disorders (AN, BN, BED, ED-NOS, IA) under the standard of Mental Disorders (DSM) or clinical assessment by psychologists or textbook of TCM. (4) Acupuncture types include ancient Chinese type (TCM) or shamanic acupuncture or abdominal acupuncture or manual acupuncture (MA) or electroacupuncture (EA) or ear acupuncture or auricular acupuncture or acupressure. (5) The comparison of effects on

medication and acupuncture treatment or analysis of interviews or conclusion of experimental observation were made through the research. The following vital messages were selected from each study report: first author, publication year, type of study, statistical information of patients (number of patients and age), types of acupuncture adopted, outcome data and results analysis.

3. Result

This systematic review retrieved 390 relevant research papers. After screening the titles, abstracts and conclusions, 327 articles were excluded for reasons of irrelevance. 63 clinical trials assessing the application of acupuncture for eating disorders were selected for further assessment. Among these 63 trials, 17 studies were excluded due to diagnosis of eating disorders induced by other mental diseases (i.e. depression, anxiety, bipolar affective disorder and obsessive-compulsive disorder), case studies (22), other focus (i.e. obesity, 14). In total, 10 studies were included in this review. All selected analysis satisfied the inclusion criteria and searching method.

Four randomized clinical trials were published in English-language journals [13, 18, 19, 20] and six were published in Chinese-language [21, 22, 23, 24, 25, 26]. 7 involved randomized controlled group design [13, 18, 20, 21, 23, 25, 16], 1 involved semi-structured interviews [19], while the remaining 2 adopted the observation of therapeutic effect [22, 24].

The study sample size ranged from 9 to 110, with a total of 647 subjects (participants who dropped out of the studies were excluded). 2 of the studies used DSM-IV criteria for eating disorders, while 3 used clinical assessment by senior psychologist or outpatient service, 3 used Textbook of Pediatrics Zhu Futang (7th/8th edition) and 2 used diagnostic Standards of Western Medicine or TCM for diagnosis of IA.

The following discussion of four studies focused on treating AN [13, 18, 19, 20]. All four studies revealed positive effects of acupuncture in treating eating disorders, including improving quality of life, decreasing stress, anxiety and eating concerns. More specifically, the study [13] performed a randomized cross-over study involving 9 consenting women with AN or BN. Researchers looked at validated 91-item in Eating Disorder Inventory (EDI-3) as the primary outcome measure, and items in Becks Depression Inventory (BDI-2), the State-Trait Anxiety Inventory (STAI) and the Eating Disorder Quality of Life Scale (EDQoL) as secondary outcome measures. They found that only the EDI-3 perfection measure showed weakly significant improvement ($p = 0.0597$) after receiving acupuncture treatment compared to the standard treatment. There were no significant differences in other EDI-3 measures, such as interpersonal alienation ($p = 0.893$) and affective problems composite ($p = 0.933$). In contrast, acupuncture treatment showed strongly significant improvement in several secondary measures, including physical-cognitive domain ($p = 0.0009$) and psychological domain ($p = 0.0557$) of the EDQoL scale and STAI-State ($p = 0.0172$) showed significant improvement while STAI-Trait ($p = 0.00920$) showed weakly improvement. Another study focused on randomized controlled trial of intervention of acupuncture involving 26 inpatients with AN was conducted in 2013 [18]. A CARE scale comparison between acupuncture group [50 (SD 0.0)] and the acupressure group [49.5 (SD 0.8)] led to the result that acupuncture or acupressure intervention behaved as an adjunct therapy for the treatment of AN as these interventions helped improve the therapeutic relationship and empathy between patients and practitioners. A qualitative interview study including 25 female patients which was carried out in Sweden [19] emphasized the effectiveness of acupuncture (ear acupuncture) in relieving anxiety and somatic symptoms of patients suffering from AN through a theme (in total three themes), "Acupuncture adds a value". In 2014, a study used a semi-structured interview on 26 patients with AN examined a pilot randomized controlled trial [20] was made for analyzing the feasibility of acupuncture. Body-Mass Index (BMI) and eating disorder psychopathology acted as the main outcome measurements. It is found that patients in the control group demonstrated reduced eating concerns as well as gained a sense of calmness and relaxation.

Turning to the remaining six studies focused on treating IA [21, 22, 23, 24, 25, 26]. Significant difference can be spotted ($P < 0.05$) in terms of four studies [21, 23, 25, 26]. Acupuncture of pricking Sifeng played a leading role in treating IA. Five studies indicated an average recovery rate of 68.31% and non-effectiveness rate of 2.98% (pricking Sifeng involved). Among all studies focused on the effectiveness of pricking Sifeng, the highest recovery rate of 91.25% can be spotted in terms of study in 2014 [23], while another study [24] focused on the therapeutic effect of "Dong's Kaiwei Powder" on acupoints and pricking Sifeng showed lowest recovery rate of 18.63%.

4. Discussion

The results of this review paper indicate that participants having acupuncture treatment, in combined with their existing treatment, illustrated a significant improvement for treating AN and IA. Patients involved in four studies focused on AN were mainly around 15 to 35 years old, except for the study conducted in 2020, with the age ranging from 18 to 72 years old. Reducing anxiety was a common therapeutic outcome and only the first study [13] indicated the degree of significant improvement in different scales, which clearly showed the comparative difference between treatment as usual plus acupuncture treatment, and treatment as usual. Individualized care and occupational therapy were regarded as beneficial interventions for treating eating disorders [19] as they may assist in building a healthy identity and improve self-esteem, factors that have been mentioned in the present study as well as in a meta-analysis as important for lasting recovery from eating disorders [29].

Referring to IA, all studies indicated positive effects including symptoms disappearing, diet resuming, and each nutritional index reaching the standard, appetite and food intake returning to the normal level. A total of 561 patients were involved in these six studies. Four studies were randomized controlled trials which illustrated the comparative effects of control groups (acupuncture treatment involved) and observation groups (massage therapy OR Calcium Zinc Gluconate Oral Solution; Vitamin B Complex OR Calcium Zinc Gluconate Oral Solution OR Western medicine). The study [21] indicated that light pressure, stimulation effect and electromagnetic effect can improve protein synthesis, increase the activation of enzymes and therefore achieve the balance of Qi and YinYang. A similar effect can be given by pricking Sifeng as it is illustrated [22, 23] that pricking Sifeng can increase pancreatic amylase, pancreatic lipase and trypsin in the intestine. According to [24], acupuncture and massage therapy can regulate human microcirculation as well as improve liver function. Besides, quick cupping is beneficial in boosting blood circulation, accelerating metabolism, exciting nerve and adjusting body function state [26]. Thus, the combination of quick cupping and acupuncture is also promoted in treating IA.

All in all, results show that acupuncture has a good efficacy in the treatment of AN and IA. Persons with AN experienced acupuncture to give an opportunity to relaxation and rest. Acupuncture is also involved in the long-term beneficial effect on stress and anxiety. Pricking Sifeng acupuncture point plays a significant role in treating IA. However, a deeper understanding of how acupuncture works on patients with AN and IA as an adjunct therapy is desirable and further studies are required.

5. Conclusion

This systematic review summarized and reported previous research to reveal the effectiveness of acupuncture in treating eating disorders. This review paper covers impact of various types of acupuncture to AN and IA which emphasize the benefits of applying acupuncture into the treatment of eating disorders and suggests promotive and effective treatment for eating disorders treatment. However, the study has some limitations. Firstly, research has not yet been able to clarify whether the effects of acupuncture and other usual treatment for eating disorders are complementary or independent to each other. Secondly, there is limited information to prove the effects of acupuncture

on treating other types of eating disorders in spite of AN and IA such as BN, BED and ED-NOS. Thirdly, more summaries and deep researches are needed to illustrate more complete information and possible effects of combining different acu punctures on treating eating disorders. Fourthly, more statistical and medical analyzation of these ten clinical trials is also needed to reach higher scientific standard in the future. Therefore, more research into the treatment of eating disorders is undoubtedly in high demand. The clinical promotion is worthwhile as acupuncture is simple to operate, money-saving and effective.

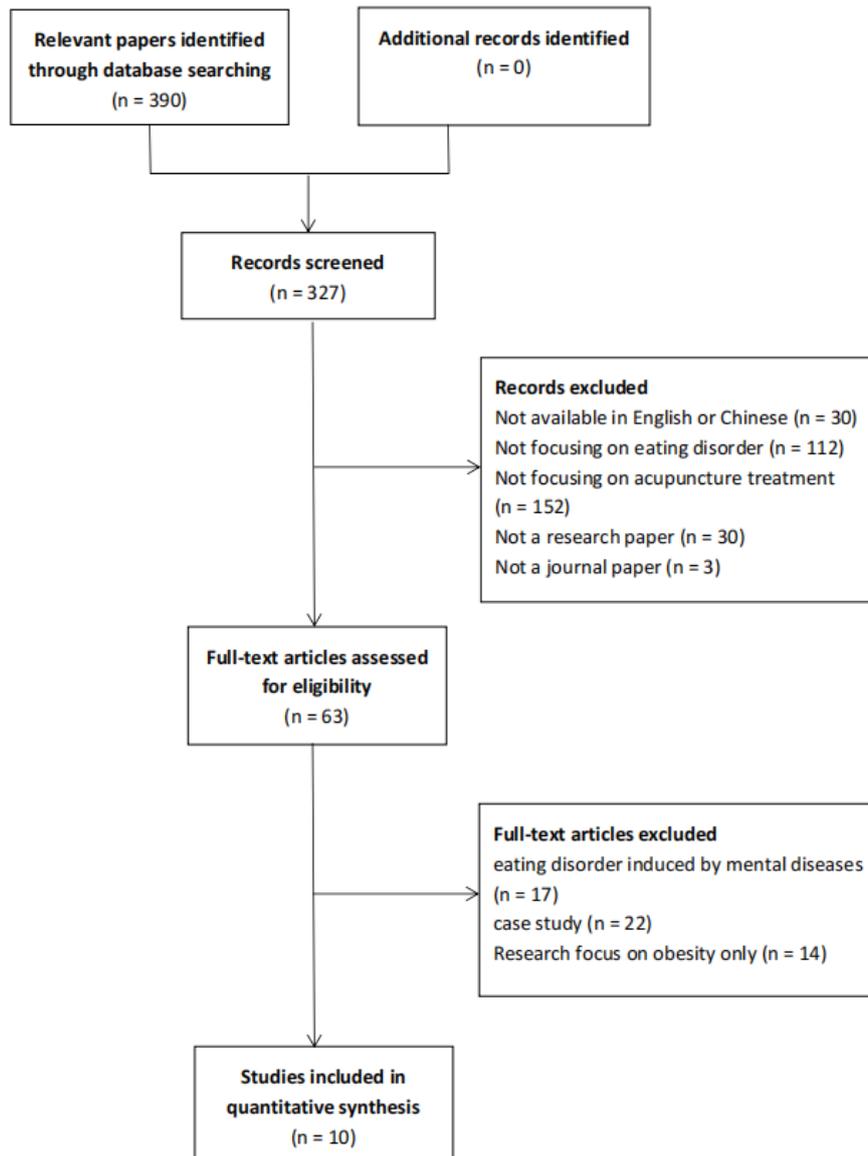


Figure 1: Selection of trials for inclusion in the review.

Table 1: Randomized controlled trials, interview and experimental observation of combined acupuncture and other forms of treatments for eating disorders.

First author (year, country)	Mean age (No. of patients)	Diagnostic system	Experimental Designs/ Type	Acupuncture treatment frequency	Main treated acupoints	Outcome measure	Results reported
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Dong (2018 China)	(1) External treatment group: 4.69±1.41 (2) Western medicine group: 5.13±1.16 (60 infantile anorexia patients, 30 per each group)	Diagnosed with Spleen weakness anorexia through Textbook of Pediatrics Zhu Futang (8th edition) and Pediatrics of TCM	Randomized controlled trial; (1) External treatment group (laser acupuncture in combining of spleen strengthen plaster) (2) Western medicine group (Bifid-triple viable capsule)	4 weeks	bilateral <i>Pishu (BL 20)</i> <i>Shenque (CV 8)</i> <i>Zhongwan (CV 20)</i> bilateral <i>Zusanli</i>	(1) Cure: Significant increase in appetite and food intake (2) Improved: Appetite improved, the amount of food slightly increased (3) Noneffective: No improvement in appetite	Significant difference between two groups (P < 0.05) (1) Recover (2) Improved External treatment group: 18 (60.00%) External treatment group: 10 (33.33%) Western medicine group: 5 (16.67%) Western medicine group: 16 (53.33%) (3) No effect External treatment group: 2 (6.67%) Western medicine group: 9 (30.00%)
Fogarty (2010 Australia)	23.7±9.6 (9 female patients, 5 with AN, 4 with BN)	Clinical assessment by senior psychologist	Open label randomized cross-over study design; Two groups: (1) Treatment as usual (TAU) (2) Treatment supplemented by acupuncture	2 sessions a week to 1 session each fortnight	Shallow and light manual stimulation	Eating Disorder Inventory (EDI-3) Becks Depression Inventory (BDI-2) State-Trait Anxiety Inventory (STAI) Eating Disorder Quality of Life Scale (EDQoL)	(1) Primary measure: EDI-3 Perfection measure show weakly significant improvement (p = 0.060) (2) Secondary measure: STAI-State measure showed strongly significant (p = 0.017); STAI-Trait measure showed weakly significant improvement (p = 0.092); Very strong significant improvement for physical-cognitive domain (p = 0.0009) and weakly significant improvement for cognitive domain (p = 0.056) of EDQoL scale

Fogarty (2013 Australia)	>15 years old (26 inpatients with AN)	DSM-IV	Randomized controlled trial of intervention of acupuncture / acupressure with light massage	Twice weekly for 3 weeks then weekly for 3 weeks	N/A	CARE scale	(1) Acupuncture group: CARE score: 50 (SD 0.0) (2) Acupressure group: CARE score: 49.5 (SD 0.8) (3) Decrease stress
Jia (2011 China)	3 months to 7 years old (93 infantile anorexia patients)	Clinical assessment through outpatient service	Observation of the therapeutic effect of Five Classics massage therapy in combining of pricking <i>Sifeng</i>	2 weeks to 5 months	Pricking <i>Sifeng</i> on index finger, middle finger, fourth finger, little finger;	(1) Cure: Significant increase in appetite and food intake (2) Improved: Appetite improved, the amount of food slightly increased (3) Noneffective: No improvement in appetite	(1) Recover: 70 (75.27%) (2) Improved: 18 (19.35%) (3) No effect: 5 (5.38%) Effectiveness rate: 94.60%
Olsson (2020 Sweden)	18-72 years old (25 female patients)	Diagnosed with anorexia, depression, anxiety and obsessive-compulsive disorder (OCD)	Qualitative interviews after experienced treatment program including semi-standardized NADA ear acupuncture associated with other treatment	1-45 times (no specific treatment duration mentioned)	(1) Ear acupuncture: <i>Hypogastric plexus</i> ; <i>Constipation</i> (2) Body acupuncture: <i>GV20</i> , <i>Sishencong</i> , <i>Yintang</i> , <i>HT9</i>	Patients' experience of receiving acupuncture (in ACU-EAT)	Decrease stress and anxiety
Smith (2014 Australia)	>15 years old (26 patients with AN)	DSM-IV	Examine a pilot randomized controlled trial by using a semi-structured interview with trial participants	Twice a week for the first 3 weeks, followed by weekly treatment for 3 weeks	<i>Hegu</i> (LI4), <i>Zusanli</i> (ST36), <i>Neiguan</i> (PC6), <i>Taichong</i> (LR3), <i>Yanglingquan</i> (GB34)	Body–Mass Index (BMI); Eating disorder psychopathology, anxiety, and depression; Semi-structured interview	Reduced eating concerns; experience of calmness and relaxation
Wang (2014 China)	(1) Control group: 4.1 ± 0.7 (2) Observation group: 4.2 ± 0.8 (110 infantile anorexia patients in total)	Textbook of Pediatrics Zhu Futang (7th edition); The Characteristics and Methodology of TCM Clinical Research	Randomized controlled trial; two groups: (1) Control group (acupuncture of pricking <i>Sifeng</i>) (2) Observation group (Calcium Zinc Gluconate Oral Solution; Vitamin B Complex)	1 month	Pricking <i>Sifeng</i> on index finger, middle finger, fourth finger, little finger;	(1) Cure: Significant increase in appetite and food intake; (2) Get better: Appetite slightly improved; (3) No effect: No improvement in appetite; (The total effective rate is the sum of cure and improvement)	Significant difference between two groups (P < 0.01) (χ ² = 17.401) (1) Recover Control group: 73 (91.25%) Observation group: 5 (16.67%) (2) Improved Control group: 5 (6.25%) Observation group: 15 (50.00%) (3) No effect Control group: 2 (2.50%) Observation group: 10 (30.33%)

Xia (2010 China)	3-12 years old (102 infantile anorexia patients)	Diagnostic Standards of Western Medicine and TCM	To observe the therapeutic effect of "Dong's Kaiwei Powder" on acupoints and pricking <i>Sifeng</i> (EX-UE 10)	Once or twice weekly for 4 weeks	Dong's Kaiwei Powder" on acupoints and pricking <i>Sifeng</i> (EX-UE 10)	Refer to standard mentioned in Wang (2014 China)	(1) Recover 19 (18.63%) (2) Improved 81 (79.41%) (3) No effect 2 (1.96%)
Yu (2020 China)	(1) Control group: 4.2± 0.4 (2) Observation group: 4.4±0.7 (100 infantile anorexia patients in total)	Clinical assessment by senior psychologist	Randomized controlled trial; Two groups: (1) Control group (routine treatment and acupuncture) (2) Observation group (massage)	3 times weekly for 2 weeks	<i>Pricking Sifeng</i> on index finger, middle finger, fourth finger, little finger; <i>pricking three- edged needle</i>	(1) Cured: clinical symptoms disappeared, diet resumed, and each nutritional index reaches the standard; (2) Effective showed improvement of various nutritional indicators but not fully reaching the standard; (3) Noneffective showed failure to comply with the above description;	Significant difference between two groups (P < 0.05); (1) Weight gain: Control group (4.52±1.43) Observation group (2.13± 0.73) (2) Increase of height: Control group (2.11±0.52) Observation group (0.99± 0.24) (3) Effective rate: Control group (96.00%) Observation group (82.00%)
Zhou (2018 China)	(1) Control group: 5.17±2.86 (2) Observation group: 4.85±2.84 (96 infantile anorexia patients, 48 per each group)	Textbook of Pediatrics Zhu Futang (7th edition)	Randomized controlled trial; Two groups: (1) Control group (acupuncture in combining of quick cupping) (2) Observation group (Calcium Zinc Gluconate Oral Solution)	(1) Control group: 5 times weekly (2) Observation group: 3 times daily for 2 weeks	<i>Pricking Sifeng</i> on index finger, middle finger, fourth finger, little finger;	Refer to standard mentioned in Wang (2014 China)	Significant difference between two groups (P < 0.05) (χ 2=11.118) (1) Recover Control group: 29 (60.42%) Observation group: 18 (37.50%) (2) Improved Control group: 14 (29.17%) Observation group: 10 (20.83%) (3) No effect Control group: 1 (2.08%) Observation group: 13 (27.08%)

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