

Acupuncture: A novel remedial contrivance for obesity

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Abstract

Obesity is one of the metabolic syndromes involving vital systems. The global approach towards obesity also includes acupuncture- a Chinese medicinal therapy. Though acupuncture is being implicated for obesity management, it hasn't been fully appraised. This review paper was aimed to evaluate the description and studies on acupuncture usage in obesity and critical analysis of the same. To achieve this aim, literature search was used as the methodology of the review. Acupuncture acts by releasing serotonin, beta-endorphin and enkaphaline. Studies showed that acupuncture was effective in treating obesity and induce weight loss. However, acupuncture was not used alone as a treatment arm in studies, showing its effectiveness as adjunctive therapy. Some studies revealed no significant difference in using acupuncture or diet and exercise. The available studies were also of poor quality; this actually opens debate on effectiveness of acupuncture. In future well-planned clinical trial for efficacy of acupuncture in obesity is a pressing need.

Key words: Acupuncture, obesity, traditional medicine

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วิธีการใหม่ในการรักษาโรคอ้วนด้วยวิธีฝังเข็ม

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บทคัดย่อ

โรคอ้วนเป็นหนึ่งในกลุ่มอาการของโรคที่เกี่ยวข้องกับระบบการเผาผลาญอาหารที่สำคัญ วิธีการรักษาโรคอ้วนรวมทั้งการรักษาด้วยการแพทย์แผนจีน เช่น ฝังเข็ม แม้ว่าการฝังเข็มจะถูกนำมาใช้ในการรักษาโรคอ้วน แต่ก็ไม่ได้ได้รับการประเมินอย่างเต็มที่ บททบทวนวรรณกรรมนี้มีวัตถุประสงค์เพื่อประเมินผลและวิเคราะห์การศึกษาเกี่ยวกับการใช้การฝังเข็มในการรักษาโรคอ้วน พบว่าผลของการรักษาโดยการฝังเข็มจะมีผลโดยออกฤทธิ์ผ่านการหลั่ง serotonin, β -endorphin และ enkaphaline จากการศึกษาต่างๆพบว่า การฝังเข็มมีผลในการรักษาโรคอ้วนและทำให้น้ำหนักลด แต่การฝังเข็มมักไม่ได้ใช้เป็นวิธีการรักษาเพียงวิธีการเดียวในการลดน้ำหนัก แต่มักใช้ร่วมกับการรักษาโดยวิธีการอื่น บางการศึกษาพบว่าไม่แตกต่างกันอย่างมีนัยสำคัญในการใช้การฝังเข็มหรือการควบคุมอาหารและการออกกำลังกาย อย่างไรก็ตามการศึกษามีอยู่บ้างมีปัญหาคงคุณภาพของวิธีการศึกษาทำให้เกิดข้อถกเถียงเกี่ยวกับประสิทธิภาพที่แท้จริงของการฝังเข็มในการลดความอ้วน การทดลองทางคลินิกที่มีการวางแผนไว้อย่างดีจึงมีความจำเป็นสำหรับการศึกษาประสิทธิภาพของการฝังเข็มในการรักษาโรคอ้วน

Introduction

Framingham Heart Study, a well-known cohort study on heart disease and its complication established that increased risk of cardiovascular complication and hence the death increases 1% on increase in every pound of weight between the ages of 30 and 42 years and same risk will be doubled if weight increases between ages of 50 and 60 years¹. This is known as proof of concept, as recent decade's buzz word is metabolic syndrome starting from stress, obesity leading to death. Obesity has encroached in pathology with the name of unknown danger, which has grown as pandemic. As per the WHO prevalence of overweight individual in the world has headed with the score of 1.6 billion¹. Among them 500 million has cornered their area as obese ones, having BMI more than 35¹. This number is temporary one as this is ever-increasing. Developed country has more number of obesity prevalence than developing, with the root cause buried in food habit, life style and stresses sedentary life. Only in US, obesity prevalence has increased 50% of past two decades and that too at the cost of US finance making obesity as a burden¹.

Obesity increases morbidity and terminally shows mortality. It is known as life-style disorder as it is always associated

with diabetes, hyperlipidemia, hypertension, cardiovascular disease and arthritis. Hence, burden imposed by obesity is multi-darting by involving cardiac complication and vital organ disorder. It is estimated as US \$ 45.8 billion budget goes behind obesity and related cardiovascular complication¹. Hence preventing obesity has become utmost priority for world. Managing obesity starts with knowing its etiopathogenesis to cure. As of today, curing obesity is an achievable by doctors on the cost of patient's health deterioration by adversity imposed through medications. Moreover, treating obesity doesn't mean it's a win, maintaining of homeostasis is more challenging.

Therefore, need of alternative and less-toxic adverse events therapy is much needed. Treating obesity by its root cause of stress is an approach of well-known Chinese medicinal therapy called "Acupuncture". It acts by goal setting on balancing body energy to purge stress and reducing extra adipose tissues of the body. This review is heading for creating proven space for acupuncture in treating obesity and ultimately reducing health burden on the world.

Aim of the review

To evaluate the description and studies on acupuncture usage in obesity and critical analysis of the same.

Overview of acupuncture and its mechanism of action

It is an ancient Chinese tactics or therapeutic measures where electrical impulses are core outcome measures to act on disorder. Acupuncture is based on five elements of universe and their action on body energy balance. The whole concept of acupuncture is based on hot and cold energy wave named as yin and yang in Chinese respectively². Acupuncturist does energy balance by inserting needle on specific points to induce energy or reduce energy on specific pathway. Those pathways are known as meridians and energy flowing in the meridians is known as Qi (Chi)². There are total 14 meridians and more than hundred points traverse from head to toe and act as relay centers on different electrical pathways³. As per the anatomical location of points and their channel to the organ helps in management of disorder. The meridian system is no brevier than circulatory or defense system of the body. By incremental evidences in acupuncture meridian system has got popularity. Beneficiary effects of acupuncture through effective point stimulation is used as disease modifying therapy in chronic diseases, post-operative pain, nausea, psychotic symptoms, stress related disorders and degenerative disorders⁴.

Diagnosis and clinical examination of patients

Multi-pathognomonic and complex characteristics are possessed by obesity. It has contributed to the larger number of morbidities. Acupuncturists basically goes retrospectively to find out the cause of obesity and treatment was planned on the basis of root cause, hence acupuncture is known as curative therapy⁵. There are many causes of obesity which makes it complex to treat. Such as incorrect food habits, high-caloric and low-hygienic food, soft-drinks, sedentary life style, low physical activity and high facility, stressful living etc. This has become more concerned as if cause is known then treatment can be availed early. Obese child has 44 times more predominance to get cardiovascular complications and among them 45% will be having diabetes mellitus as co-morbid conditions. In addition, 75% of obese children end up being an obese adult⁶. Acupuncture elaborates root cause and acts directly on it. Acupuncturists opine that one should change their mental and emotional habit which has made them to gain weight. It is a spiritual and scientific concept of inclusive appearance change by acting on mental status to change physical abnormality. Therapists elaborate habits as the resistance which has blocked to bring changes in lifestyle. Acupuncture relaxes individuals, helping to break the habit

and by which acts on body to accomplish goal².

Diagnosis of actual root cause and pattern of obesity needs to be checked first to plan treatment as which points should be explored. Particular pattern of overeating also needs to be checked as this will help for accessing psychological points and digestive difficulties. Acupuncture is based on body energy balance, hence this diagnosis and consultation helps in deciding stomach energy⁷. Acupuncturists specifically focus on pulse, general energy status and stomach energy in particular and tongue to check cracks, peeling or puffiness, coating. Tongue is very important in diagnosis as it has stomach area just posterior to circumvallate papillae or on posterior one-third of the tongue. White or yellow-coating on that area suggests energy imbalance at stomach⁷.

Theories of acupuncture

There are many explanations and proposed theory for acupuncture but most widely accepted one is neurohormonal mechanism. This

is known as induction or inhibition of neural pathway as per the need of the organ and that resulted in release or auto-uptake of hormonal transmitters, chemokines or neurotransmitters. It modulates the feedback pathways from the brain and acts on receptors present on body or gland to exert own effect⁸.

Acupuncture is mainly effective for chronic illness and for symptomatic relief. It is well-known treatment measure for pain, post-operative pain, nausea, arthritis, osteoarthritis, fibromyalgia, depression, psychotic illness, stress induced ulcer etc. Its application in obesity is still not accepted at wider ground. Hence it is an effort of this review to spread the mechanism and awareness by which acupuncture works to reduce the weight⁹.

Acupuncturists employ various body meridians and acupoints as per the patient's current condition and patient correlated factors (e.g. age, gender, concurrent medical conditions) to treat obese ones (Table 1).

Table 1 Meridians and acupoints used in different conditions

Meridians	Significance
Cardiovascular (Shenmen point)	which helps in calming anxiety, anger, frustration and insecurity
Endocrine system and kidneys	to treat water retention a source of some weight regain as well as stimulate nerve and hormonal rebalance
Spleen and thyroid gland	for sugar and hormonal rebalancing
Adrenal and ovary glands	to treat weight gain due to menopause or post menopausal syndrome (PMS)

According to the traditional Chinese medicine (TCM) theory, the etiologies of obesity are divided in two states so called “excess and deficiency states”. The causes of the excess-type obesity are due to over intake of high fat diet or high alcohol consumption results into excessive phlegm and dampness. The causes of deficiency-type obesity may be due to spleen Qi deficiency, or kidney Qi deficiency which leads to excessive Yin. The deficiency-type obesity is further divided in primary Qi obesity and secondary Qi obesity (spleen deficiency and excessive dampness). Selection of acupoints and treatment strategy depend on type of obesity.

The treatment principles for the deficiency syndromes are invigorating spleen and nourishing the kidney by inserting needle on related points. Resolving dampness and stagnation are the principles of acupuncture for the excess type of obesity. Generally, main acupoints are stimulated and as per the patient’s discrimination pattern auxiliary points are added¹⁰.

Some of the acupuncturist use auricular (Ear) acupuncture for obesity treatment¹¹. They act on points placed on external ear. The common auricular acupoints which used by acupuncturist are showed in table 2.

Table 2 Auricular acupuncture points for the obesity treatment⁸

Points	Significance
Mouth	for the impulsive eater who may also smoke a lot and talk a lot
Stomach	for the person who eats even after they’re full or who’s constantly nibbling
Hungry	for general appetite control
Lung	for food addicts, and people who love chocolate, sweets
Shenmen	a calming point, for the psychology overlay for anxiety, anger, frustration, insecurity
Endocrine	for water retention that’s esponsible for some of the weight gain
Kidney	for water retention, and nervous system and hormonal imbalances
Thyroid	for slow metabolism
Spleen	for sugar imbalances and hormonal disturbances

Mechanism to treat obesity

Acupuncture acts by stimulating or inhibiting appropriate meridians to induce weight loss by three known mechanisms¹².

1. Serotonin release

Acupuncture is seen to induce serotonin level in the central nervous system by stimulating auricular branch of the vagus nerve. Serotonin is known to act on appetite centre and satiety centre of hypothalamus. This acts on eating behavior, reduces appetite and acts on satiety centre making patients feel better with satisfaction of eating. Serotonin also acts on smooth muscles of GIT and reduces their movement and hence, emptying will be slower, reduces food urging.

2. Beta-endorphin level increase

Beta-endorphin is very well known endogenous opioid. This gets released when electro-acupuncture is implicated¹³. It has action of lipolytic activity. It is seen that endorphin release increases free fatty acid and glycerol level in the blood. This lipolytic activity reduces fat accumulation and removes excess fat from the body.

3. Enkephaline level increase

Enkephaline is also an endogenous opioid protein product. This also acts by the same way as beta-endorphin acts. Beta-endorphin and enkephaline gets released together as well, and

both acts by lipolytic activity¹⁴.

Results from recent studies

Acupuncture is used by inducing or suppressing different meridians to reduce weight. In obese individual generally either faulty eating habit plays a role or faulty digestion steps forward. Acupuncture inhibits appetite centre and induces adipose tissue metabolism. Hence, it acts on turnover and storage cells to reduce fat accumulation and blocks new fat consumption and formation. There are 2461 studies ongoing regarding obesity and out of them 4 are related to acupuncture alone or with diet and other therapies¹⁵. In this review total 4 study literatures were included of recent time. Out of them one was meta-analysis of already conducted study, one is placebo controlled study, one is cohort study and the last is comparative trial.

Meta-analysis included total 29 published and unpublished randomized controlled studies of acupuncture used for obesity. Here some trials had placebo as comparator and others had control of lifestyle including diet control and/or physical exercise. Acupuncture was effective in reducing body weight of average 1.56 kg compared with placebo or life-style modification. All general outcomes were good in acupuncture treated individuals with mean difference of 1.90 kg. However, studies were of poor quality and author recommended pressing need of

well-planned randomized controlled trial¹⁶.

Randomized controlled trial on 27 obese women was randomized to three groups. One was having diet and exercise, second having diet, exercise and acupuncture and third group with no intervention. After an 8 weeks study there was no significant difference between group of acupuncture and diet and exercise alone. Body mass index and fat mass was used as a treatment measure. Study was contradictory to the meta-analysis above saying acupuncture was not effective way of treatment. Author concluded "acupuncture combined with diet and exercise does not generate larger reductions in body weight, fat mass or body mass index than diet and exercise alone."¹⁷ Observational cohort study carried out in china enrolled 39 obese patients having different degrees of obesities. They were treated with body and auricular puncture. Before treatment patients were diagnosed for different energy imbalance, including spleen vacuity with damp obstruction, spleen-kidney yang vacuity, Qi stagnation and blood stasis, stomach intestine replete heat. Acupuncture protocols consisted of both body and auricular acupuncture. The main body acupoints consisted of Sp 9, Sp 6, St 36, St 44, St 34, Sp4, St 40, St 25, CV 12, CV 6, and CV 9. The main auricular acupoints consisted of spirit gate point, endocrine point, sympathetic point, three burners, lungs and stomach points. As per

each patient's diagnosis, the auxiliary body and auricular points were assigned for treatment. The result showed that on an average 3-5 kg of body weight reduction was observed in cohort. Total reported efficacy was approximately 90%.¹⁸

Acupuncture in alternative way

One of the Turkish study envisaged electro-acupuncture (EA) on obesity. Electro-acupuncture was actually using stimulation of acupuncture points by electrical stimulation. This study was also interpreting on obesity and psychological symptoms induced by obesity. It showed acting on anxiety, depression and other obesity related symptoms. Electro-acupuncture was used in total one hundred and sixty five female volunteers. They were divided into three groups: EA, placebo EA and diet restriction. Electro-acupuncture was used on ear and body points. The result showed patients receiving EA experienced a 4.8% reduction in weight compared with a 2.7% weight reduction for placebo EA and 2.5% reduction for diet restriction. There was significant decrease in psychological symptoms were also seen.¹⁹

Comparative study on acupuncture and electro-acupuncture protocol revealed that acupuncture or electro-acupuncture could be used as combination therapy with diet and physical exercise. Total 40 females were enrolled in the study and half of them were randomized to

acupuncture and others to electro-acupuncture. Same auricular and body points were used in either of the treatment methods. The study was carried out for three sessions per week for three weeks. Other than body mass index, LDL-cholesterol, HDL-cholesterol, triglycerides and blood leptin were used as outcome measures. There was significant decrease in above measures except for HDL-cholesterol in both the groups. BMI, waist circumference, hip circumference and waist hip ratio were also decreased in both the group²⁰. Intergroup difference was significant in electro-acupuncture group. There was more decrease of outcome measures by electro-acupuncture than acupuncture alone. Finally author commented that “Physical training and dietary measures with electro-acupuncture can be used as methods of choice for management of obese females.”²¹ Apart from the traditional practice of acupuncture, the other alternated acupuncture practice like the multiple needling with shallow insertion had been proved for their efficacy in weight reduction in simple obesity women. Lipid profiles of the patients including total cholesterol, LDL-cholesterol and triglyceride were also significantly changed²⁰.

Current trends and future research

Till date all the researches regarding acupuncture and obesity were driven to act on beta-endorphin, enkaphaline and serotonin level

by which it acted on lipotic activities. But it could not act on co-morbid conditions or created by obesity like atherosclerosis, hyperlipidemia, and diabetes and to be specific insulin resistance²² and cardio-vascular risk enhances. Hence, today most of the researches are directed towards acting on leptin and other receptors.

Intense acupuncture is seen effective in treating diabetes, lipid profile, insulin resistance and ultimately acting on leptin receptor to inhibit appetite and induce apoptosis²³.

Significant gaps

Acupuncture has been emerging as a promising therapy for obesity. However, it is surrounded by some of the uncertainties and queries. Spread of infection by needle usage is one of them, which is very well scrutinized by using disposable needles. Still the debate is carried forward by westernizing of acupuncture. The biggest and pressing need of acupuncture is a well-planned randomized controlled study which proves efficacy of acupuncture. Unfortunately there were less scientific trials with less robustness and absence of statistical score with less sample size existing¹⁶. Hence, the prevalent controversy is on its effectiveness. Most of the study has shown that there was no difference in groups treated by acupuncture or diet and exercise alone. Traditional Chinese Medicines are used as a part of effective combination therapy

with diet and exercise¹⁶. The sensitive issue revolving around acupuncture is the same action as placebo. Major number of researchers was in the psyche of sham usage. After receiving clinical trial and globalization of acupuncture usage, this has turned off up to some extent. Still concrete results are needed. One trial was conducted to review the difference between placebo effect and acupuncture action. It was inconclusive with the endnote as there are differences between acupuncture and placebo shown on brain imaging but exact mechanism was not known and the outcome of was same having brain activity²⁴. One more controversy was related to Chinese literature, there are very less acupuncture literature available in world journal in English. But most of the articles are in Chinese, which limits review and ascertainment of this therapy.

Recent research and directive future

Recent preclinical study on rats was carried on Bcl-2 gene expression which is generally seen in obese individuals and on apoptosis of adipocytes. By using pathogenesis of obesity through Bcl-2 gene, it was aimed to know the effects of acupuncture in simple obesity rats. The outcome measure was Bcl-2 gene expression determined with SP immunohistochemistry technique. The adipocytes apoptosis was determined with terminal

deoxynucleotidyl transferase-mediated dUTP nick end labeling technique. The results had shown that Bcl-2 gene expression was reduced in acupuncture treated rats. The apoptosis was greatly increased in this group. The study results were statistically significant with p value of 0.01. It was commented "During the acupuncture on the simple obesity rats, the levels of expression of Bcl-2 in adipocytes tissue decreased and adipocytes apoptosis increased, which may be cellular and molecular mechanisms of acupuncture for anti-obesity." This result can be furthered as Bcl-2 expression reduction acts on insulin resistance and insulinitis. If acupuncture was seen effective on Bcl-2 in clinical phase then it can be breakthrough for those individuals having devastating insulinitis which has made their diabetes uncontrolled²⁵.

Conclusion

Acupuncture has its appreciative role as a therapy in obesity. It is shown to be effective by releasing beta-endorphin, enkaphaline and serotonin in hypothalamus. This potentiates its scientific application on lipid metabolism. It also controls psychological symptoms and stress associated with obesity as endorphin and serotonin are well-known anti-depressants. By this it is known to be effective on appetite centre and reduces appetite; moreover, it induces appetite satisfaction as acupuncture stimulates satiety

centre of hypothalamus as well. Acupuncture is shown very effective in studies as an adjunct therapy or as a part of combination therapy with diet and exercise. There is scarcity of studies showing potential of acupuncture as monotherapy in this instance; the present studies were having poor quality to make their result generalized. It has become the prime need of acupuncture fraternity to plan supreme quality clinical trial to show its effectiveness in humans.

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