Can Acupuncture Change anthropometric measures: a study in Obese Egyptian Population.

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Abstract: Obesity is a public health problem, reaching epidemic proportions, with an increasing worldwide prevalence. Acupuncture is one of the traditional modalities that has proved to help in weight Loss. Acupuncture needles can be used either at body acupoints or as ear acupunture.

Aim of the Study: to investigate the effect of acupuncture in obesity treatment by monitoring: obesity indices and lipid profile. Methodology: 80 cases were enrolled in a randomised controlled clinical trial, after approval of the Ethical Committee, at the National Research Centre ,Egypt. It followed STRICTA guidelines. Both body and ear acupunture were applied to each patient, sessions being done twice weekly for 8 weeks, by a single practitioner.Blood samples were collected and analysed for the lipid profile, pre and post the trial. Anthropometric measures were also recorded pre and post the trial. Results: Anthropometric measures showed a significant decrease after the acupuncturing procedure. Also, there was a significant reduction in cholesterol and triglycerides measured before and after the study, which was not recorded neither for HDL nor LDL.

Discussion & Conclusion: Acupuncture can be considered as a cost effective tool for weight reduction, being able to reduce anthropometric measures and reduce body fats.

Keywords: acupuncture, obesity, anthropometric measures, ear acupuncture.

[1]**Introduction**:Obesity is a public health problem that has reached epidemic proportions with an increasing worldwide prevalence. The global emergence of obesity increases the risk of developing chronic metabolic disorders. Thus, it is an economic issue that increased the costs of the co morbidities associated.(1)
In Egypt the prevalence of overweight (BMI = 25- 29.99 kg /m²) was 36.3% in 1994, 39.6% in 1998-1999 among urban women, and 45.3% among urban men in 1998- 1999. The prevalence of obesity (BMI = 30- 39.99 kg /m²) was 36.7% in 1994, 40.6% in 1998- 1999 for urban women, and 20.0% among urban men in 1998- 1999. Among rural women the prevalence of overweight was 38.7% in 1994, 36.5% in 1998-1999, and 28.1% for rural men, but the prevalence of obesity was 24.1% and 19.4% for rural women and 6.0% for rural men (2).

The WHO defines obesity as a condition of excessive fat accumulation to the extent that health and well-being are affected. The cut-off points for obesity for men and women correspond to PBF of 25% and 35%, respectively (3). Acupuncture originated in China more than 2,000 years ago, and is one of the oldest medical procedures in the world. It involves the insertion of very fine, sterile needles at specific body points or "energy pathways." The inserted needles act to stimulate the release of endorphins, the body's natural "feel good" hormones. This can create a calming, relaxing effect, which counteracts the need for

excessive eating brought about by increased stress, frustration or anxiety. In this respect, acupuncture can calm those so afflicted and help them lose weight without resorting to drugs.(4)

Several studies have shown that when acupuncture is combined with traditional methods of weight loss, patients lose more weight (5)
The spleen and thyroid gland are also targeted to effect sugar and hormonal rebalancing. Finally, the adrenal and ovary glands are included to treat weight gain due to menopause or premenstrual syndrome (PMS) (6).

Another Chinese acupuncture practice for losing weight is ear stapling. For the best results, these treatments should be combined with a reduced calorie diet and appropriate physical exercise. (7) It is believed that acupuncture works to alter central nervous system neurotransmitter levels by stimulating peripheral nerves at acupoints. These stimulated nerves then carry the signals centrally, including to the spinal cord, pituitary, and midbrain. Activated centres can then release petrochemicals: endorphins, monoamines, and cortisol.(4)
By increasing the release of neurotransmitters, acupuncture may improve mood, which, in turn, might lead to improved regulation of food intake. Alternatively, acupuncture may suppress appetite by endorphin-induced decreases in stress and depression. (8) and (9).

Aim of the Study: To investigate the effect of acupuncture in obesity treatment, before and after the study, by monitoring:
- Obesity indices: BMI,Body weight (BW), Fat Percent (FP),Fat mass (FM), Visceral Fat Rating(VFR)
-Lipid Profile: Cholesterol (Chol), HDL, LDL.
Methodology: After approval of the ethical committee, National Research Centre, a randomized controlled clinical trial started at February 2010 with 80 cases. An informed consent was prepared to be signed by every patient. They were divided into 3 groups according to their body mass index (BMI).

Overweight was defined as a body mass index (BMI) of 25 to < 30 and a BMI of ≥30 were defined as obesity. They neither had received any other weight control measures nor had any medical and/or drug history within the last 3 months before their participation in the study. For all patients, body weight (BW), BMI, and body fat mass were measured by body composition analyzer BC-418 (TANITA, Japan according to a standard protocol. Height and body weight were measured with the subjects dressed in light clothing after a 12 – hours fasting period. The body weight of each subject was measured with a standard scale to an accuracy of ± 0.1 kg, and height was measured to an accuracy of ± 0.1 cm , by a single practitioner.

The trial was based on revised Reporting Interventions in Clinical trials of Acupuncture (STRICTA) guidelines (10). Details of needling technique:
Stainless steel, disposable needles size 0.20x30, 25 mm were used
Body points are: Hegu (LI4), Quchi (LI11), Liangmen (ST21), Tianshu (ST25), Zusanli (ST36), Fenglong (ST40), Neiting(ST44), Sanyinjiao(SP6), Daheng (SP15), Neiguan (PC6), Taichong (LR3), Guanyuan (CV4) and Zhongwan (CV12).
Acupuncture sessions were done twice weekly, each session was 30 minutes.
Auricular acupuncture: ear points are: Shenmen, Mouth, Stomach, Sanjiao, Liver, Spleen, Endocrine and Hunger points [10].
They are weekly applied to each ear alternatively.
Blood samples collection: 5 ml of venous blood samples were taken from each patient for analysis after a 12-hour fasting, 2 times during the study (at the beginning and 6 months later).
Blood samples were collected into vacutainer tubes and centrifuged at 4000 rpm for 10 min. Haemolysed samples were excluded.
Cholesterol, triglycerides (TG), high density lipoproteins(HDL) and Low density lipoproteins(LDL)were determined using colorimetric methods on Olympus AU 400 supplied from Olympus Life and Material Science (Europe GmbH, Wendenstraße, Hamburg, Germany).
LDL-C was calculated according to an equation developed by Friedewald et al. [11] as follows:

LDL-C= Total cholesterol –Triglycerides/5+ HDL-C.

Statistical analysis

Data was statistically described in terms of mean ± standard deviation (± SD). Comparison of numerical variables between the study groups was done using Mann Whitney U test for independent samples when comparing 2 groups and Kruskal Wallis test with Mann Whitney U test as post- hoc multiple 2-group comparisons when comparing more than 2 groups. For comparing pre and post acupuncture Sessions, Wilcoxon signed-rank test was used for continuous variables and McNemar test for two related dichotomous variables for detecting changes in responses due to intervention. P value less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

Results:

Table (1): General Characters of the Studied Groups

Characters	Total n= 80 No (%)
Sex:	
Male	6(6.5)
Female	74(93.5)
Education:	
Illiterate	4(5.0)
Prim & prep.	8(10.0)
Diploma & secondary	32(40.0)
university	36(45.0)
Work:	
Yes	25(31.3)
No	55(68.7)
Marital status:	
Single	10(12.9)
Married	65(78.8)
Divorced	3(4.7)
widow	2(3.5)
BMI:	
30-35	22(27.5)
35-40	34(42,5)
>40	24(30.0)
Wt. gain pattern:	
Steady	32(40,0)
Sudden increase	5(6.3)
Wt. gain after loss	43(53.7)

Table 2 : Mean level of weight, BMI and fat analysis pre and post acupuncture

ble	No	Acupuncture		P value
		Pre Mean ± SD	Post Mean ± SD	
ght	75	96.9 ±15.1	91.6± 14.6	0.000
I	55	38.6± 5.3	36.6± 5.0	0.000
cent	61	44.6± 52	42.2± 5.4	0.000
ass	60	44.1± 11.2	39.6± 10.5	0.000
t rating	52	11.8± 3.7	10.5± 3.7	0.000
R	61	6992.1± 926.7	6829.2 ± 836.4	0.000

Table 2 showed the changes after acupuncture in different variable related to obesity. The mean weight, BMI, Fat percent, fat mass and visceral fat rating/ BMR were highly significantly decreased after the acupuncture $P<0.0001$.

Table 3: Mean level of lipid profile analysis Pre and post acupuncture among obese

Variable	No	Acupuncture		P value
		Pre Mean ± SD	Post Mean ± SD	
HDL	38	33.8 ± 20.7	37.7 ± 21.4	0.058
LDL	38	99.7 ± 64.4	87.3 ± 56.9	0.058
TG	65	133.3 ± 80.3	103.9 ± 62.4	0.000
Cholesterol	65	186.8 ± 80.5	166.1 ± 70.4	0.000

Table 3 shows mean level of routine laboratory analysis pre and post acupuncture among obese were done in patient before and after the acupuncture. There is highly significant difference (P<0.01) in the measured lipid profile (cholesterol &TG) but no significant difference was found in HDL nor LDL (P>0.05).

Table 1 shows that females represented 93.5% of the total Studied population (n=80). Regarding BMI, obese patients were A into three groups:
Obese I (BMI ranged 30 to 35) represented 27.5%,
Obese 2 (BMI ranged 35 to 40) represented 42.5%
Obese 3 whose BMI was > 40 which and represented 30% of the study group.

Table 2 shows the changes recorded in the obesity indices : BMI , fat percent, fat mass , visceral fat rating .. Which Showed high significant decrease after the acupuncture procedure (p<0.0001).

Table 3 shows the mean level of the monitored laboratory Lipid profile tests pre and post - acupuncture, namely: HDL, LDL, TG, and Cholesterol; there was a highly significant statistical difference recorded for cholesterol and triglycerides but not for HDL and LDL (P< 0.05).

Discussion

Our results indicated that body acupuncture, combined to auricular micro system acupuncture were effective in decreasing anthropometric measures and body fat , recorded in a weight reduction plan we conducted.
There was a significant decrease in BW, B fat,BMI, Fat %, ,VFR,FM.This was in concordance with 3 studies evaluating the effect of acupuncture on obesity and anthropometric measures Conducted by Hsu et al, Lee et al and Zhang and colleagues in 2009,,2006 and 2011 respectively.(11,12, 13)
Hsu and his colleagues demonstrated in their crossover trial in obese women the significant changes observed in their body anthropometric measures, when applying acupuncture , compared to physical activity.(14)
The same team conducted another study in 2005 ,as a pilot study , to show the same effects(15)
However, there are some studies that have reported no significant effect of acupuncture in the treatment of obesity, but it should be noted that these studies were performed applying auricular acupuncture therapy (15). In this study, a combined body- ear acupuncture plan was adopted.
It is thought that acupuncture exerts its effects on weight loss through different mechanisms. In terms of traditional medicine, it is believed that acupuncture alters levels of central nervous system by stimulating peripheral nerves at acupoints. Signals are then carried by stimulated nerve resulting in changes in satiety and mood. These mechanisms have been reviewed by Lacey et al. [4]
Acupuncture appears to be able to improve mood by increasing the release of neurotransmitters [24] and suppress appetite by the serotonin and endorphin-induced decreases in stress and depression [25, 26], whereas this effect was not seen by exercise and diet. In addition, it has been shown that application of electroacupuncture at Zusanli (ST-36) and Neiting (ST-44) of the rat caused the increase in the electrical activity of ventral-medical

hypothalamus in the obese rat, leading to activation of the satiety centre(27).

Concerning the effects on lipid profile, positive changes (increase in levels of HDL-C and decrease in other parameters including triglycerides, total-cholesterol and LDL-C) were observed. These effects on lipid metabolism could be attributed to the direct effects of acupuncture on lipid distribution and lysis of fat tissues(21).Also, the study reported a significant decrease in TFM, WC, and HC., indicating the effect of acupuncture on body fat. In a study conducted by Nayera et al, acupuncture was found to reduce significantly abdominal visceral fat content, without significant change in BW, WC, assigning it as an important modality in reducing body fat.(20)

In concordance with the study conducted by Li and Wang in 2006(23), our study reported a significant decrease in Cholesterol and triglycerides .. The same being reported in the recent work, as regards lipid and triglycerides levels, done by Nayera et al(20)

We did not report any side effects on our studied group. This makes it a suitable modality to be combined with life style changes, in an aim of weight reduction. This was also mentioned by Derbandi and his colleagues, who concluded that acupuncture as an appropriate adjunctive treatment option for obesity (21). Also, identified it as a therapeutic tool in abdominal fat mass reduction.

Still, as concluded by other studies, larger number of subjects are required (21)

However, the changes were significantly different between 2 groups being higher for acupuncture body group, indicating that whilst diet had important effects on the lipid profile; the combination of diet restriction and acupuncture therapy, leads to a further improvement in lipid profile levels. Moreover, Li and Wang [23] have reported significant changes in total and LDL cholesterol in during acupuncture therapy when compared with control subjects. In other study, it was reported that a significant decrease of triglyceride, total cholesterol, LDL-C but no changes in HDL-C in acupuncture group when compared with controls [28]. In several studies, a similar pattern of changes in triglyceride, total-cholesterol, LDL-C, and HDL-C changed has been reported as our study following acupuncture [19,,29], however, these studies did not find any changes for HDL-C [19, 29], this may be explained by application of different acupoints. It has been suggested that these changes in lipid metabolism may be caused by increase in the serum betaendendorphin level.(28)

Conclusion: though more studies are required, acupuncture is a cost effective,safe tool for weight reduction In addition to its ability to reduce anthropometric body measures and reduce body fats..

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