



COMBINATION OF ELECTROACUPUNCTURE THERAPY WITH HERBAL ROSEMARY (*ROSEMARINUS OFFICINALIS L.*) IN CASE OF OBESITY

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Abstrak

Obesitas atau kegemukan adalah keadaan yang terjadi jika kuantitas jaringan lemak tubuh dibandingkan dengan berat badan total lebih besar dari keadaan normalnya. Faktor yang dapat mempengaruhi obesitas yaitu, pola makan, aktivitas fisik, faktor psikologi, genetik, hormon dan efek samping penggunaan obat-obatan. Pada studi kasus ini, pasien mengalami sindrom panas pada lambung. Pasien mendapatkan terapi akupunktur yang dilakukan sebanyak 12 kali dengan jeda terapi 2 hari sekali selama 15 menit setiap terapi pada titik Fenglong (ST40), Neiting (ST44), Sanyinjiao (SP6), Quchi (LI11) dengan menggunakan elektrostimulator serta pemberian herbal rosemary (*Rosemarinus officinalis L.*) diberikan selama 28 hari, diminum 2 kali sehari. Kandungan asam carnosik pada rosemary berfungsi menurunkan berat badan dengan menghambat lipase pankreas, mengaktifkan PPAR-g dan mencegah diferensiasi pra-adiposit menjadi adiposit. Asam carnosik juga meningkatkan ekskresi lemak melalui feses. Hasil dari studi kasus, pasien mengalami penurunan berat badan dari 77,6 kg menjadi 73,9 kg sehingga dapat disimpulkan bahwa setelah dilakukan kombinasi terapi akupunktur pada titik Fenglong (ST40), Neiting (ST44), Sanyinjiao (SP6), Quchi (LI11) dengan menggunakan elektrostimulator serta pemberian herbal rosemary dapat menurunkan berat badan sebanyak 3,7 kg selama 28 hari.

Kata Kunci: menurunkan berat badan, obesitas, elektrostimulator, rosemary

Abstract

Obesity or overweight is a condition that occurs when the quantity of body fat tissue compared to total body weight is greater than the normal state. Diet, exercise, psychological factors, heredity, hormones, and drug side effects are a few of the factors that might cause obesity. Gastric heat syndrome was present in the patient in this case study. The patients received electrostimulator-assisted acupuncture treatment 12 times for a total of 15 minutes at the following points: Fenglong (ST40), Neiting (ST44), Sanyinjiao (SP6), and Quchi (LI11), and was also given the herbal remedy rosemary (*Rosmarinus officinalis L.*) for 28 days, taken twice daily. Through the activation of PPAR-g, inhibition of pancreatic lipase, and inhibition of pre-adipocyte development into adipocytes, carnosic acid, a component of rosemary, helps people lose weight. Additionally, carnosic acid stimulates the excretion of fat in feces. According to the case study results, the patient's body weight dropped from 77.6 kg to 73.9 kg. This indicates that acupuncture treatments at the points Fenglong (ST40), Neiting (ST44), Sanyinjiao (SP6), and Quchi (LI11) together with the administration of rosemary herbs can result in weight loss of up to 3.7 kg over the course of 28 days.

Keyword: weight loss, obesity, electrostimulator, rosemary



1. INTRODUCTION

Due to unbalanced lifestyle changes, the community is suffering from obesity and overweight, which is a health issue. Obesity is described as an abnormal or excessive fat accumulation that endangers one's health. A person with a Body Mass Index (BMI) of 30 or more is typically considered obese (WHO, 2015). This calculation is done by dividing a person's weight in kilograms by the square of his height in meters (meter / (kg/m²)).

According to Basic Health Research data from 2007, the national obesity prevalence based on BMI in the ≥15-year-old age group was 10.3%. This frequency increased by 11.7% among ≥15-year-olds in 2010. Meanwhile, the national obesity prevalence in the ≥15-year-old age group grew by 13.2% in 2013. (Rustika, 2014).

According to WHO 2015, obesity increases the risk of developing non-communicable diseases such cancer, diabetes, coronary heart disease, and stroke (endometrium, breast, and colon). Diet, exercise, medications, surgery, and therapy are all effective ways to treat obesity. Acupuncture and herbal therapy are two therapies that are used to treat obesity (Prabawati, 2020).

Obesity is traditionally associated with the *Fei Pang* (overweight) or *Tan Yin* (*Tan Yin*) categories. Disorders of the spleen and stomach, which are characterized by *qi* insufficiency, are the cause of obesity. Additionally, there is fat and hazy phlegm retention along with moisture, blood stasis, and *qi* stagnation (Yanfu, 2000).

Herbal therapy methods known to reduce weight include *Camella sinensis* tea, roselle (*Hibiscus Sabdariffa*), rosemary (*Rosmarinus officinalis L.*), lemon (*Citrus lemon L.*). Rosemary containing carnosic acid which has a bitter taste can eliminate heat and excrete fat through feces (Gonzalez, 2015).

2. LITERATURE REVIEW

2.1 Conventional Theory

Obesity, often known as overweight, is a condition in which the amount of body fat tissue in relation to total body weight is larger than the normal level. Overnutrition or being overweight is a condition in which a person's weight exceeds their normal weight (Sandjaja and Sudikno, 2005).

Excessive eating patterns, a lack of physical activity, psychological problems, genetics (family history), bodily hormones, and drug side effects are all factors that contribute to obesity.

Obesity can be diagnosed by calculating the Body Mass Index (BMI).

$$BMI = \frac{weight(kg)}{height(m) \times height(m)} \quad (1)$$

Then the results of the calculation of BMI can be adjusted to the BMI classification in the following table:

Table 1. BMI classification.

BMI Classification	
Under Weight	< 18.5
Normal Weight	18.5 – 24.9
Over Weight	≥ 25.0
Preobese	25.0 – 29.9
Obese	≥ 30.0
Obese Class I	30.0 – 34.9
Obese Class II	35.0 – 39.9
Obese Class III	≥ 40.0

Obesity can also be diagnosed using anthropometric measures, which include body measurements such as height, weight, waist circumference, and upper arm circumference, which characterize the growth and development of muscle tissue and body fat (Eschleman, 1991).

Obesity is treated with a low-calorie diet that provides appropriate nutrition, frequent exercise, medicines such as orlistat and sibutramine, and surgery.

2.2 Traditional Theory

2.2.1 Yin-Yang Theory

Everything in the universe is created, born, moved, and develops due to the encouragement or guidance of two opposing aspects, called the *Yin* and *Yang* aspects. The *Yin* and *Yang* theory for the principle of therapy supplied in accordance with the patient's physical condition, which can be by *Sie* (weakening) and *Pu* (strengthening), which attempts to balance *Yin Yang* (Jie, 1997).

2.2.2 Wu-Xing Theory

According to *Wu-Xing* theory, it can be utilized to analyze the link between humans and the universe environment, which is generated by the movement of the five elements, which are wood, fire, earth, metal, and water. Overall, the five *Wu-Xing* elements share similar characteristics with the universe and the human body.

2.2.3 Zhang-Fu Organ Theory

Zhang-Fu organs are distinguished in *Zhang* and *Fu*. The organs of *Zhang* include the heart, liver, lungs, spleen, and kidneys. The five *Zhang's* organs function is to generate, transform, and store *Jing*, *Qi*, *Xie* (blood), and *Jin Ye* (body fluids). *Fu's* organs are the gallbladder, stomach, bladder, big intestine, small intestine, and *Sanjiao*. The six *Fu's* organs' functions are to accommodate, digest, transport, and dispose of food waste (Jie, 1997).

2.3 Electrostimulator

An electrostimulator is an electronic device that generates electrical waves with a certain waveform, strength, and frequency

(Hutomo, 2019). The size of each variable is determined by the needs and type of therapy used. Electrostimulators are frequently employed in the medical field to determine the response of nerve and muscle cells to electrical signals, particularly to get better understanding of the mechanism of action potentials in specific cells (Welina, 2012).

Electrostimulators are widely used in acupuncture treatment, specifically to give electrical energy stimulation at acupuncture points via needles inserted at that spot (Suhariningsih, 2020). The provision of this electrical energy assists to maintain energy balance in the body, to smooth the flow of *Qi* so that the transformation and transportation of *Jing* can go smoothly, and to smooth the flow of blood *Xie* (Welina, 2012).

Electroacupuncture stimulates the release of beta endorphins in the serum and the central nervous system, increasing lipolytic action. Electroacupuncture at a modest current frequency (2 Hz) can raise endomorphine, enkephalin, and beta endorphin concentrations. Meanwhile, high current frequencies (100 Hz) can enhance dynorphin concentrations in the central nervous system (Cbyoglu et al, 2005).

According to Chen et al's 1981 and 1983 studies (in Ying et al, 2010), the use of electrostimulators in therapy can expedite the conduct of electricity that impacts the endocrine system by boosting plasma levels of beta endorphins, hence increasing lipolytic activity. This activity also has an effect on fat mass reduction and weight loss.

Acupuncture therapy using electrostimulators is performed by inserting two electrodes into needles at acupuncture locations on the patient's body. As an electric current source, the electrostimulator sends electricity from the positive electrode (red color) to the negative electrode (black color). The flow of electric current should be in the same direction as the flow of energy in the meridians, with the positive electrode on the small number and the negative electrode on the large number (Welina, 2012).

After inserting the needle into a specific acupuncture point and feeling a needling sensation, the initial potential output of the stimulator is zero, then connect the two output wires with two needles, the positive electrode (red) is installed according to the smallest meridian groove and the negative electrode (black) is installed according to the Great meridian groove. Then, choose the appropriate wave and frequency, and gradually increase the amplitude to the patient's tolerance. One to two minutes later, the body will have adapted to the stimulus and will sense that it is weakening. Stimulation should last 10-20 minutes, depending on the patient's pathology (Yanfu, 2002).

Cardiopathy patients should avoid areas of current flow through the heart. It is not advisable to use a strong current to avoid fainting in physically weak patients. In this case, it is best to use a needle that can be heated because the needle surface can get oxidized and no longer carry electricity (Yanfu, 2002).

An electroacupuncture effect in which an electrical stimulus is delivered to the body via acupuncture needles put into the skin at exact points (Arifianto, 2021). Electroacupuncture can help with pain and paralysis.

Electroacupuncture has also been demonstrated to lower plasma cortisol levels, implying that pain relief results in lower stress levels (Cameron, 2013). Sinus arrhythmias, pacemaker use, pregnancy, cancer, tumors near the vagus nerve, and epilepsy are all contraindications to using electroacupuncture (Diamond, 2001).

2.4 Obesity Research Using an Electrostimulator and a Manual

Cabyoglu and Ergene (2005) used body and ear acupuncture every day for 20 days on 22 obese women with BMIs ranging from 30 to 40. The points used were the hunger point and *Shenmen* ear point and

Hegu (LI4), *Quchi* (LI11), *Tianshu* (ST25), *Zusanli* (ST36), *Neiting* (ST44), and *Taichong* (LV3) were able to lose 4.8% of body weight with the application of electroacupuncture.

Sun and Xu (1993) treated 110 obese patients with ear and body acupuncture in their study. Ear and body acupuncture was used to prick the *Tianshu* (ST25), *Zusanli* (ST36), *Sanyinjiao* (SP6), *Neiguan* (PC6), and *Fenglong* (ST40) sites. The stabbing is done for 15 minutes every 3-5 days for more than 3 months, with the result that it can lose up to 5 kg.

In Huang et al's 1996 study, treatment was carried out for 8 weeks in 8 males with BMI values larger than 30 and 37 women with BMI values greater than 30 using ear acupuncture, diet, and exercises. *Shen men*, stomach, *Sanjiao*, and hunger points are used in the application of ear acupuncture. Treatment is done 3 to 5 times per week and can result in a weight loss of 4.4 kg.

2.5 Rosemary Herbal Therapy

Rosemary is an aromatic shrub that grows freely on the European continent and in Mediterranean nations, reaching a height of 1-2 meters. Rosemary has an upright stem with short branches and dark green leaves on the top and bottom. Small blue flowers adorn her smooth white hair. Rosemary is classified scientifically as follows:

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Rosmarinus</i>
Species	: <i>Rosmarinus officinalis</i> L.

The rosemary portions used are herbs, or plant parts that grow above ground. Rosemary has a main chemical content of 2.5%, camphor 5-21%, 1.8-cineole 15-55%, a-pinene 9-26%, borneol 1.5-5%, camphene 2.5-12%, b-pinene 2-9%, and limonene 1.5-



5% (which includes monoterpenoids), flavonoid phenolic compounds, phenolic acids (primarily rosmarinic, chlorogenic, and caffeic acids), and tricyclic diterpenes (rosmaridiphenol, carnosol, carnosic acid, and rosmanol) (WHO, 2009).

In vitro studies show that carnosic acid in rosemary can inhibit pancreatic lipase, activate PPAR-g, and block the differentiation of pre-adipocytes into adipocytes. Carnosic acid treatment resulted in considerable weight loss and decreased visceral adiposity in experimental rats. Furthermore, it can lower serum triglycerides and cholesterol levels. Carnosic acid has an effect on the liver by lowering triglyceride concentration and thus serum SGPT levels. Carnosic acid in rosemary also stimulates fat excretion via feces (Ibarra, 2011).

3. RESEARCH METHOD

This study takes the form of a case study of being overweight, beginning with an examination prior to treatment, followed by therapy as a treatment and a discussion of the results of therapy using acupuncture at the points of *Fenglong* (ST 40), *Neiting* (ST 44), *Sanyinjiao* (SP 6), *Quchi* (LI 11), and administration of rosemary (*Rosmarinus officinalis L*) herbal therapy.

This case study's treatment lasted 28 days, with 12 times of acupuncture therapy with a 2-day interval between treatment phases and 2x1 day of herb administration. The treatment is administered at Faculty of Science and Technology Universitas Airlangga in Surabaya.

The patient is a 22-year-old woman from Surabaya who performs as an Airlangga University student. The patient was aware at the time of observation, with a fatigued facial expression and a slightly curved face. The patient's body type is short and chubby. The patient moves slowly, her skin is tanned and dry, her eyes are symmetrical, wears spectacles, and her mouth is symmetrical with dark and dry lips. The tongue of the patient is

thickly muscled with pink, wet, and tooth poultice. The tongue membrane is thick and white, with the base of the tongue yellowish and moist.

According to smell and hearing observations, the patient has odorless sweat (body odor) and a loud voice. The patient's feces were not analyzed in this case study.

The patient's main complaint was that he had been overweight since entering first grade at elementary school and had weighed 60 kg when she was 12 years old. When the patient started university in 2012, her weight was 70kg and her height was 150cm. In her current condition, the patient continues to gain weight, reaching 77.6 kg due to an inconsistent eating habit. The patient has never attempted to shed weight by dieting or the use of slimming medicines.

Based on patient's measurement, the patient's weight was 76.5 kg, height was 151 cm, waist circumference was 107 cm, thigh circumference was 66 cm, and arm circumference was 36 cm. Based on the BMI classification from WHO at 2004, the patient had a BMI value of 33.55 kg/m² which was characterized as obese. The patient's blood pressure was also measured and classified as normal at 110/80 mmHg.

The following table shows the results of touching the patient's Shu and Mu points:

Table 2. The results of touching the patient's Shu and Mu points.

Organ	Back <i>Shu</i>	Front <i>Mu</i>
Lungs	No complaints	No complaints
Colon	No complaints	No complaints
Stomach	Pain pressed	Pain pressed
Spleen	Pain pressed	Pain pressed



Heart	No complaints	No complaints
Small intestine	No complaints	No complaints
Bladder	No complaints	No complaints
Kidney	No complaints	No complaints
Pericardium	No complaints	No complaints
Sanjiao	No complaints	No complaints
Gall bladder	No complaints	No complaints
Heart	No complaints	No complaints

The absence of complaints in the patient indicates that the patient's organs are in good working order. Meanwhile, when pressed, there is discomfort, which indicates that the patient's organs are overloaded.

A palpation examination of the patient's pulse yielded the following data:

Table 3. The results of patient's pulse.

Pulse	Right Pulse	Left Pulse
<i>Chun</i>	Deep, fast	Deep, fast
<i>Guan</i>	Deep, fast	Shallow, weak
<i>Che</i>	Deep, weak	Deep, weak

Shallow pulses are felt on the surface, indicating that the sickness has not reached the organs. Deep pulses are felt with deep finger pressure and signal disease in the patient's organs. A faint pulse implies *Qi* weakness and a lack of blood (Permadi and Djuhartha, 1982). A rapid pulse is defined as a pulse that occurs more than 90 times each

minute or more than five times per respiration (Jie, 1997).

4. RESULTS AND DISCUSSION

The following results were obtained based on the therapeutic treatment offered to obese patients:

Table 4. The result of weight measurement.

Stage	Therapy Treatment	Weight (kg)
Before Therapy	-	77,6
1	Acupuncture and Herbs	76,6
2	Acupuncture and Herbs	75,6
3	Acupuncture and Herbs	74,6
4	Acupuncture and Herbs	73,9
Therapy Final Result		73,9

Table 5. The result of thigh circumference measurement.

Stage	Therapy Treatment	Thigh Circumference (cm)
Before Therapy	-	67
1	Acupuncture and Herbs	65
2	Acupuncture and Herbs	63
3	Acupuncture and Herbs	62
4	Acupuncture and Herbs	62
Therapy Final Result		62

Table 6. The result of waist measurement.

Stage	Therapy Treatment	Waist (cm)
Before Therapy	-	108
1	Acupuncture and Herbs	107,5
2	Acupuncture and Herbs	106,5
3	Acupuncture and Herbs	105,5
4	Acupuncture and Herbs	104
Therapy Final Result		104

waist circumference of 108cm, and arm circumference of 36cm.

The graph below depicts the decline in obesity cases:

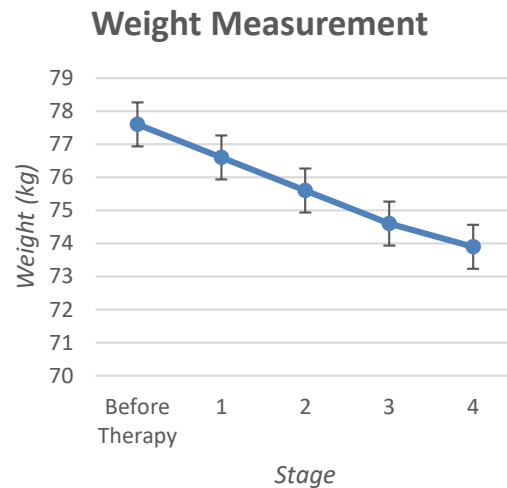


Figure 1. Result of weight measurement.

Table 7. The result of arm circumference measurement.

Stage	Therapy Treatment	Arm Circumference (cm)
Before Therapy	-	36
1	Acupuncture and Herbs	35,5
2	Acupuncture and Herbs	35
3	Acupuncture and Herbs	34,8
4	Acupuncture and Herbs	34
Therapy Final Result		34

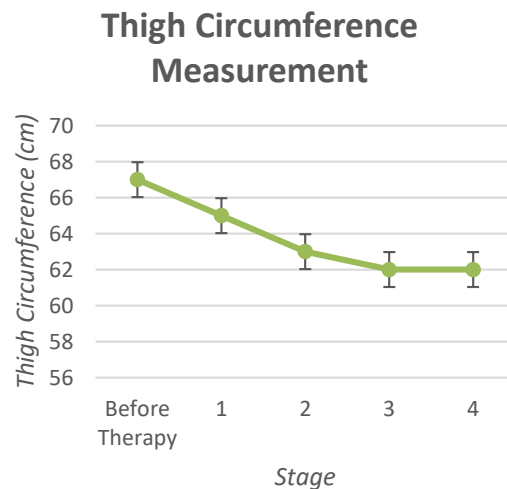


Figure 2. Result of thigh circumference measurement.

From the first to the fourth stages of therapy, there was a 3.7 kg drop in body weight, a 5 cm decrease in thigh circumference, a 2 cm decrease in arm circumference, and a 4 cm decrease in waist circumference. The patient's BMI decreased from 34.03 kg/m² before to therapy to 32.41 kg/m². Prior to therapy, the patient weighed 77.6kg and stood 151cm tall, with a BMI of 34.03 kg/m², thigh circumference of 67cm,

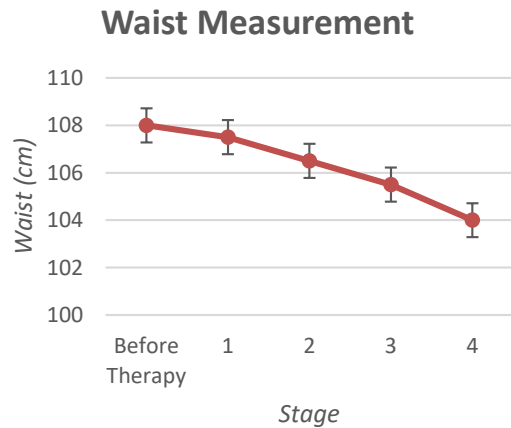


Figure 3. Result of waist measurement.

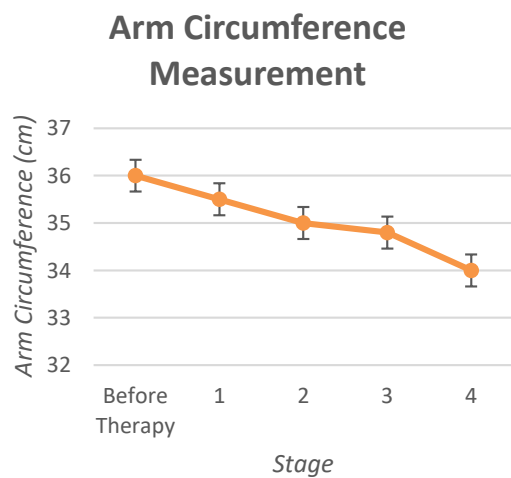


Figure 4. Result of arm circumference measurement.

The graph above shows that during acupuncture and herbal therapy, body weight decreased from 77.6kg to 73.9kg, waist circumference decreased from 108cm to 104cm, thigh circumference decreased from 67cm to 62cm, and arm circumference decreased from 36cm to 34cm.

After 28 days of taking the history again, the perceived complaints began to improve compared to before therapy, specifically pain in the middle of the abdomen that feels sore from a scale of 4 to a scale of 1, achy legs from a scale of 6 to a scale of 3, and easy fatigue from a scale of 6 to a scale of 2.

It was also seen that the patient's bodily condition improved, as evidenced by changes in the state of the patient's tongue. Prior to therapy, the patient had a pink tongue muscle that was slightly thick and had a tooth poulitice. The patient's tongue is thick white and yellowish at the base. Following therapy, the patient had a slightly thick pink tongue muscle, a slightly reduced tooth poulitice, and a thin white covering on her tongue.

Acupuncture therapy with heat syndrome for gastric uses the concepts of heat elimination, moisture breakdown, and spleen function strengthening. Weight loss in the patient demonstrated that therapy at the *Fenglong* (ST40), *Neiting* (ST44), *Sanyinjiao* (SP6), and *Quchi* (LI11) points worked to reduce gastric heat and strengthen the meridians. *Fenglong* (ST40) acupuncture therapy was used to expel dampness, *Sanyinjiao* (SP6) was used to strengthen the spleen's function in transport and transformation in the body, *Quchi* (LI11) was the He point of the Yang Ming meridian hand/large intestine, and *Neiting* (ST44) is used to control gastric Qi and eliminate heat.

Acupuncture therapy is performed by connecting a positive electrode (red wire) to a negative electrode (black wire) and changing the meridian path with an electrostimulator. A positive electrode was linked to the Fenglong point (ST40), a negative electrode to the Neiting point (ST44), a negative electrode to the Sanyinjiao point (SP6), and a positive electrode to the Quchi point (LI11) with a low frequency of 2 Hz (tonification).

The concept of sedation should have been used in this case study, but during therapy with an electrostimulator, the principle of tonification at a frequency of 2 Hz was used. In sedation therapy, it can be used to reduce heat, but in tonification therapy, it can strengthen the meridians so that it still has an effect on the patient. The intensity is adjusted based on the patient's condition.

In this case study, the patient drank rosemary tea twice a day at a dose of 5gr per

drink for 28 days. The administration of this rosemary herbal tea has been proven to assist the patient lose 3.7 kg of weight.

5. CONCLUSIONS AND SUGGESTIONS

Based on the results of the case studies, it is possible to conclude that combining electroacupuncture therapy at *Fenglong* (ST40), *Neiting* (ST44), *Sanyinjiao* (SP6), and *Quchi* (LI11) points with the administration of rosemary herbs (*Rosmarinus officinalis* L.) can reduce body weight by 3.7 kg in 28 days. We propose that practitioners extend this therapy in order to achieve the ideal body weight.

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