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Original article

Physical and physiological effectiveness of an overall health care program for middle-aged Japanese women with mild obesity: A pilot study

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ABSTRACT

This study aimed to verify the effectiveness of an overall health care program (OHCP) for middle-aged Japanese women through assessing physical and physiological changes. The OHCP consisted of diet modification with natural alternative foods, walking and stretching exercises, and body massage and cupping treatments. Sixty-seven participants were assigned to one of three groups during a 3-year study period (2011–2013). The OHCP was performed for 3 months in each year. After the OHCP, most participants had significant decreases in the blood levels of triglycerides, low-density lipoprotein cholesterol, total cholesterol, alkaline phosphatase, γ-glutamyl transferase, and cholinesterase; body weight; body fat percentage; and body-mass index. The oxidative stress markers varied among the study years; however, a significant decrease in blood reactive oxygen-derived metabolites and a significant increase in the relative antioxidative potential were observed in 2013. In 2013, participants who were randomly selected for autonomic nervous activity measurements immediately before and after body massage and cupping treatments showed a significant predominance in parasympathetic nervous activity after the treatments. These results indicate that the OHCP in the present study is an effective and prompt method as a complementary treatment to improve the pre-obese or mild obese status without any noticeable physiological stress in most middle-aged women. However, because of the limitations of this study, the findings of this study need to be confirmed.
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1. Introduction

In general, many middle-aged women tend to have lifestyle-related diseases (e.g., hyperlipidemia, diabetes, and obesity) with contributing factors such as insufficient exercise, poor quality of food intake, psychogenic stress, and endocrine system dysfunction or imbalance. Changes in the body shape and psychophysiological state that are accompanied by obesity lead to a loss of self-confidence and in decreased motivation to enjoy family life and social activities. Such undesirable changes in lifestyle lead to aging-related changes and poor health. Improving body weight, body-mass index (BMI), and body fat percentage (BFP) are important measures for promoting health care in middle-aged overweight women. However, an inappropriate health care program can lead to unfavorable changes in the physiological conditions of individuals or patients.[1] Therefore, a careful program design is warranted. It is important to develop an ideal health care program with less physiological stress and to verify its effectiveness in middle-aged women at the “pre-obese” or “mild obese” stage before they become severely obese.

Many reports have been published on the effects of various health care programs or lifestyle in middle-aged women, and include physical exercise and dietary or nutritional conditions.[2–8]

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Various methods for improving overweight-related health conditions have been proposed, although optimal health promotion should combine several types of treatments rather than focus only on one type of treatment. Including stress-reducing body treatments is also important for holistic health. Our OHCP is an integrated and complementary therapy for middle-aged women that has been performed every year for 10 years. The objective of an OHCP is weight control and promoting healthy condition inside the whole body. For this objective, the OHCP consisted of body treatments with cupping and massage, walking and stretching exercises, and diet treatments with special meals. To examine functional changes inside the body, we measured physiological parameters such as blood biochemical profiles and body composition in the study participants from 2011 to 2013. We performed the present study to clarify whether the proposed OHCP is a prompt and ideal method as a treatment in middle-aged Japanese women at the pre-obese or mild obese stage.

2. Materials and methods

2.1. Participants

Sixty-seven middle-aged women participated in the 3-year study (2011–2013). All participants arbitrarily applied to the overall health care program (OHCP), provided by Slim Beauty House Company (Shibuya Ward, Tokyo, Japan). Before the study, each participant provided informed, written consent. The OHCP included cupping treatments of the body surface, body massage, walking exercise, stretching, and dietary supplements that were based in Chinese herbal medicine. Of the 67 women, 17 women, 20 women, and 30 women participated in 2011, 2012, and 2013, respectively. Seventeen participants through the 3-year study were categorized as "obese" with a BMI >25 (range, 25.2–29.5). The BMI was calculated by the following equation: BMI = body weight (kg)/height^2 (m^2).

To avoid accidental health risks during OHCP, only participants who did not have underlying diseases such as allergies, serious inflammation or injury, scoliosis, low back pain, and hernia were allowed into the study. For this reason, all participants were required to provide a health certificate and receive interviews about their health conditions before undergoing the OHCP.

2.2. Contents of the OHCP

The research period of the OHCP was conducted for 3 months (from late July to early November) in each year of 2011–2013. The OHCP consisted of the health care treatments described below.

2.2.1. Cupping and vibration treatment

2.2.1.1. Cupping treatment. While the participant lay prone on a bed, 21 body surface regions were locally suctioned by a cupping cup and electrically powered suction equipment (Minipon; Origin Medical Instruments Co., Ltd., Tokyo, Japan). Cupping was performed with negative pressure of 66.5 kPa on 20 regions that were arranged symmetrically across the back midline from the upper scapular region to the lower limb and one region on the lumbar midline. A professional operator performed the cupping maneuver on each participant for approximately 15–20 minutes.

2.2.1.2. Vibration treatment. Each body portion from the shoulder to the foot of the participants was vibrated by a massage machine (Hot-viter VR-303; Meiko Tsusho, Tokyo, Japan) with an oscillation frequency of 50–60 Hz. In 2011 and 2012, participants were allowed to rent a similar type of vibration apparatus and use it in their own home whenever they wanted to use it. In 2013, the participants were not allowed to use this apparatus in their home.

2.2.2. Walking exercise

Participants were instructed to walk as daily exercise. For each study group, the total number of walking days was 78–91 days (mean, 87.0 days), 78–93 days (mean, 90.0 days) and 83–96 days (mean, 91.4 days) in 2011, 2012, and 2013, respectively. The daily average walking time was 34.4 minutes, 42.9 minutes, and 36.0 minutes in 2011, 2012, and 2013, respectively. There was no statistically significant difference ($p > 0.05$) between these walking times. In addition, there was no significant difference ($p > 0.05$) in total walking time between participants with a BMI <25 (mean, 3467 minutes; $n = 50$) and participants with BMI >25 (mean, 3149 minutes; $n = 17$).

2.2.3. Dietary supplements

Each subject was provided a special pack of alternative foods (i.e., "enzyme foods") that contained more than 50 natural food components (Table 1). In the first month, two of three daily meals (i.e., breakfast and dinner) were replaced with the enzyme foods. In the second and third months, only the dinner meal was replaced with the enzyme foods. A 40-g pack of the enzyme foods contained 148–156 kcal. The enzyme foods were mixed with water or soy milk and consumed. Participants were instructed to consume approximately 1500 kcal per day.

2.3. Observation variables

2.3.1. Measurement of body composition

Body weight (kg) and BFP (%) were measured by a bioelectric impedance analysis scale (Inner Scan BC-621; Tanita Corporation, Tokyo, Japan) . The circumference of the waist, lower limbs (i.e., thigh, calf, and ankle), arms, and lower thorax were also measured. The decrease rate (%) in body weight and BFP was determined as follows: (pre-OHCP - post-OHCP)/pre-OHCP × 100.

2.3.2. Blood biochemical examinations

Venous blood was collected from all participants before and after OHCP for biochemical examination of the plasma. The following blood levels were examined by researchers at a blood examination company (LSI Medience Corporation, Tokyo, Japan): creatine kinase (CK) and its isozymes (CK-MB and CK-MM), aspartate transaminase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), alkaline phosphatase (ALP), γ-glutamyl

Table 1
Components of natural alternative "enzyme foods".

unpolished rice (15.8)	*Plantago asiatica*	corn
alfa- corn (9.5)	new leaves of barley	parsley
dry soy milk	cabbage	new leaves of wheat
barley	coix	Japanese mugwort
wheat	unpolished sticky rice	green tea- powder
alfa- unpolished rice	pine leaves	radish
soy protein (0.5)	apple	burdock
chicory fiber	shiitake mushroom	prune
erythritol	dried seaweed	Citrus junos
xylitol	kelp	*Acanthopanax senticosus*
rice bran	pumpkin	mulberry leaves
multi- grain malt	*Spirulina*	pomegranate extract
soy	green lavar	*Garcinia cambogia*
kale	yeast	black peas
cactus	*Perilla*	black sesame
lactic	bacteria malt (5.6)	
baked salt	black soy	
Bacillus natto	*Angelica keiskei*	
persimmon leaf	chestnut	
Bifidobacterium	germinating unpolished rice	

The weight (g) for the component with a relatively large amount of content is placed within parentheses.

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