



Research paper

Preliminary evidence on the effect of Yoga on the reduction of edema in women with premenstrual syndrome



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ABSTRACT

Introduction: The study aimed to explore the effect of yoga on edema reduction, the relief of symptoms of premenstrual syndrome (PMS), and confirm the sensitivity of the bioelectrical impedance as an analytical method for measuring edema.

Methods: To confirm sensitivity of the analytical method, nine women without PMS (non-PMS group) and eleven with PMS (PMS group) were tested during their follicular and luteal phase to observe whether increased edema could be detected using this method. The degree of edema during the luteal phase was compared in the follicular phase of the PMS group, and the non-PMS group. To verify the effect of yoga, a one-group intervention pretest–posttest design had PMS group subjects attend 12 weeks of yoga classes. Short-term and long-term yoga effects on premenstrual symptoms were assessed by the edema score and Moos menstrual distress questionnaire (MDQ).

Results: A significant change in edema score was observed between follicular and luteal phases in the PMS group ($p < 0.01$), but no changes were observed in the non-PMS group, verifying the ability of the analytical method to detect minor changes in the body's water. After yoga training, immediate ($p < 0.01$) and persistent effects ($p < 0.01$) of yoga on edema reduction and on the MDQ water retention score ($p = 0.03$) in women with PMS was observed.

Conclusions: This preliminary study suggests that women with PMS could benefit from yoga in the luteal phase to quickly reduce water retention. Long-term yoga training may further improve quality of life.

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1. Introduction

Between 50 to 80% of women of reproductive age experience uncomfortable symptoms before the start of their periods, and these symptoms disappear a few days after the onset of their menstrual cycle [1]. These types of symptoms that fluctuate with the menstrual cycle are called premenstrual syndrome (PMS). PMS has a wide variety of psychological symptoms, including irritability, anxiety, tension and depression, and physical symptoms such as fluid retention, breast tenderness, headache, a bloated feeling and weight gain, swelling of the hands or feet, fatigue and skin problems [2]. If the PMS symptoms are so severe that they interfere with the quality of life, it may be necessary to seek medical treatment. Drugs such as anti-depressants or diuretics are used to treat mood disorders or to reduce fluid buildup, but these drugs

have side effects. As well as the use of drugs [3,4], vitamins supplements [5,6], diet modification [5,6], participation in physical exercise and relaxation techniques [7–9] are also commonly recommended for most women who suffer from PMS. Recently, yoga has been proposed as a method to alleviate the problems of PMS, but there have been few studies and the possible pathways by which this kind of exercise improves the quality of life are unclear.

Fluid retention is one of the symptoms of PMS. An altered renin-angiotensin-aldosterone system can impair fluid and electrolyte balance, which leads to sodium and water retention and can cause fluid retention symptoms of PMS [10]. Fluid retention causes swelling or pain in the breast and legs [11]. Previous studies have used oral drugs to reduce the symptoms of edema symptom in women with PMS [12–15]. Fruzzetti et al. [14] found that oral drugs reduce the total body water and extracellular water in women with PMS who take drugs for six menstrual cycles, but the effect of the drug does not show in the third cycle. This study illustrated that it takes more than three months to relieve the symptoms of edema using a pharmacological approach [14]. In Asia, medication or

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hospitalization for PMS is not so common. However, the use of yoga in Asian culture is popular for women. “Yoga boosts circulation, which can relieve the fluid buildup that causes bloating”. There is anecdotal evidence that the use of yoga alleviated the symptoms of PMS, such as menstrual pain. However, there is no scientific evidence that yoga exercise reduces swelling and increases circulation. It is necessary to determine whether yoga has an effect on the symptoms of PMS, to ascertain its usefulness to women with PMS.

For measurement of swelling, bioelectrical impedance analysis has been found to be sufficiently accurate in patients with edema of the upper limb after breast cancer treatment [16], in patients hospitalized due to acute heart failure [17], when measuring swelling of the lower leg to evaluate the workload in standing jobs [18], when estimating fluid volume changes as a function of the menstrual cycle [19], and so on. One study [14] has used it to evaluate fluid retention in women with PMS in comparison to women who do not experience PMS, but only during the luteal phase, not in the follicular phase. Hence, this study aimed to test whether the bioelectrical impedance analysis-derived edema score is of reasonable value in detecting the minor changes in the body's water in relation to the menstrual cycle before the formal testing. Thus, the first aim of the study was to confirm that the analytical method could actually detect the increased edema changes during the luteal phase as compared to the follicular phase in the PMS group, while detecting no change in the non-PMS group. The second aim of this pilot study was to explore the effect of yoga exercise on women with PMS, by determining whether there was an immediate change in edema symptoms after the yoga classes and whether consistent yoga exercise could affect water retention in women experiencing PMS.

2. Methods

2.1. Experimental design

Phase 1: To assess the sensitivity of the bioelectrical impedance analytical method prior to commencing the formal testing, a PMS group and a non-PMS group were studied during the luteal and follicular phases of one cycle. Our hypothesis was that no changes in edema score would be detected during the follicular and luteal phases in the non-PMS group, while the increased edema score during the luteal phase would be detected in the PMS group. Phase 2: To verify these changes, a one-group intervention pretest–posttest design was used to determine the short- and long-term effect of yoga on premenstrual symptoms in women with PMS. Our hypothesis was that yoga would improve their edema symptoms.

2.2. Participants

The volunteers were recruited from a college campus. The inclusion criteria for the study were: women aged between 20 and 30 years old, having regular menstrual cycles of 25–45 days, having no previous yoga experience, and having a sedentary lifestyle for the past three months. The exclusion criteria were: engaged in regular physical activity for 3 months prior to starting the study and/or during the study; history of diseases such as asthma, diabetes, renal, any cardiovascular disease or other chronic disease, or being on a special diet. A translated version of Premenstrual Assessment Form (PAF) [20] was used to determine whether the participant could be classified as having PMS. The mean scores for the PAF were calculated using 18 subscales. The volunteers with scores ≥ 3 points in any one of the subscales complaints of having these discomforts or symptoms in the past three cycles were included into the PMS group. The other volunteers, whose scores on the PAF < 3 points in any subscale formed the non-PMS group.

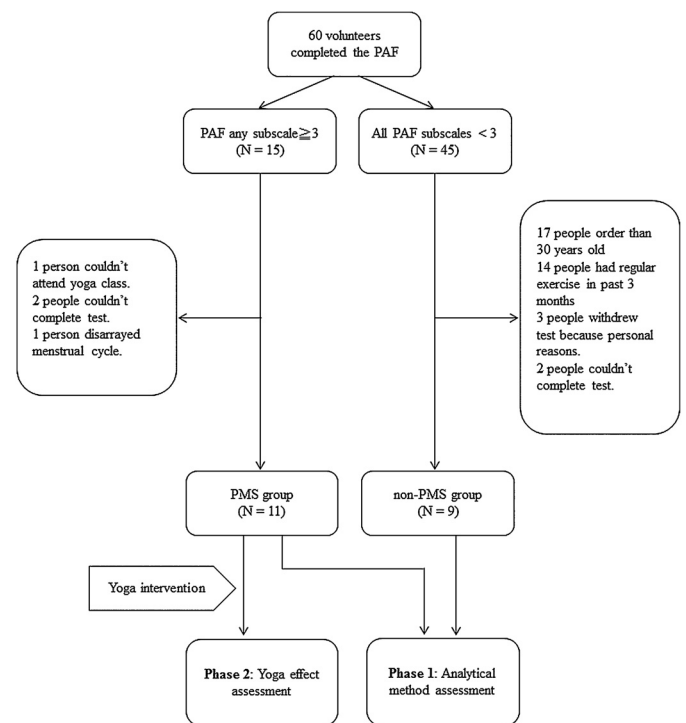


Fig. 1. The flow chart of subject recruitment.

The flow chart of subject recruitment from screening through completion of the study protocol is shown in Fig. 1. A total of 60 volunteers completed the PAF. A total of 17 people withdrew from the test because they were not in the age range, 14 because they had taken part in regular exercise in the past 3 months, 9 because of personal reasons or unpredictable menstrual cycles. Finally, 11 participants were recruited to the PMS group and attended the yoga classes for 12 weeks, and 9 participants were recruited into the non-PMS group and asked to maintain their regular life style during this period. An independent sample *t*-test showed that there were no significant differences in all baseline characteristics between the two groups (Table 1). The present study was approved by the Institutional Review Board of Kaohsiung Medical University Chung-Ho Memorial Hospital (KMUH-IRB-20140051) and written informed consent was obtained from all participants before initiation of the experiment.

2.3. Yoga class

In the present study, the design of the yoga classes for the PMS group was conducted in accordance with previous study [21]. The yoga postures included the typical torso movements (such as Round Back, Scissors and Side Plank, Side Lean and Forward Bend, and Side Lean and Rotate, etc.), abdominal exercises (such as Bridge Pose, Roll down/Roll Up, and Locust pose, etc.), and yoga poses for legs (such as Tree Pose, Chair Pose, and Standing Forward Bend). The yoga classes were led by a trained and qualified yoga teacher to

Table 1

The baseline characteristics for the PMS and non-PMS groups.

	PMS (n = 11)	Non-PMS (n = 9)
Age (y)	21.08 (1.24)	22.50 (4.27)
Menstrual cycle (day)	30.77 (4.51)	30.44 (2.15)
Weight (kg)	56.9 (6.84)	60.64 (14.62)
Height (cm)	161.73 (4.32)	160.33 (3.57)
BMI (kg/m ²)	21.71 (2.42)	23.63 (5.70)

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