Original Article

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Effect of Aerobic Exercise Program on Premenstrual Syndrome in Women of Hot and Cold Temperaments

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ABSTRACT

BACKGROUND AND OBJECTIVE: Premenstrual syndrome is one of the most common disorders in women of childbearing age, which is accompanied by periodic changes in physical, mental and behavioral condition. Exercise is one of the proposed therapies to reduce the symptoms of this syndrome. Based on principles of Traditional Persian medicine (PM), type and intensity of symptoms and effectiveness of exercise depend on patient's "temperament" (called “Mizaj” in Persian medicine). This study was carried out to determine the effect of aerobic exercise program on premenstrual syndrome in women of hot and cold temperaments.

METHODS: This randomized controlled trial (RCT) was carried out on 65 students living in dormitory of Mashhad University of Medical Sciences. Students were divided into two subgroups of hot and cold temperaments using random allocation method. Participants of intervention group (of hot and cold temperaments) did 20-minute aerobic exercise 3 times per week for 8 weeks; no intervention was attempted in control group. The required information was gathered and analyzed using standard questionnaires on determination of temperament, temporary determination of premenstrual syndrome, Beck depression, daily record of premenstrual syndrome symptoms and Borg scale (IRCT: 2015021721116N1).

FINDINGS: The two groups were homogenous in terms of physical and mental symptoms, age, diet, grade and menstrual cycle characteristics. The results have demonstrated that after 8 weeks of aerobic exercise, physical symptoms of premenstrual syndrome among participants of hot temperament decreased from 21.8±2.5 to 10.4±3.1 (p=0.001) and decreased from 20.8±3.8 to 9.5±1.7 (p=0.001) among participants of cold temperament. Similarly, mental symptoms among participants of hot temperament decreased from 12.4±1.2 to 5.8±1.5 (p=0.001) and decreased from 11.9±1.9 to 5.3±1.2 (p=0.001) among participants of cold temperament and these changes were considered significant.

CONCLUSION: Results of the study revealed that doing aerobic exercise reduces the physical and mental symptoms of premenstrual syndrome among people of cold and hot temperament and highest level of symptom reduction was observed in participants of cold temperament.

KEY WORDS: *Aerobic exercise, Premenstrual syndrome, Temperament (Mizaj).*

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Introduction

Premenstrual syndrome is one of the most common disorders in women of childbearing age which is accompanied by periodic changes in physical, mental and behavioral condition (1). These symptoms start 6 to 12 days before menstrual bleeding and stop 2 days (4 days max) after bleeding (2). The symptoms are either physical or mental (1, 2) and include anxiety, irritability, depression, anger, aggression, breast pain, headache, fatigue, joint pain, flatulence and appetite changes (3, 4). These patients require outpatient care and higher health care expenditures (5, 6). The major causes of this syndrome include hormone imbalance, endocrine disorders, psychological causes, endorphin decline, prostaglandins imbalance and lifestyle (7, 8). No certain cure has been offered for premenstrual syndrome and symptomatic treatment is the only method available so far (1).

Chemical medicines, herbal medicines, surgical treatment, exercise and lifestyle modifications are some of the recommended treatments (9-11). Due to complications of medical and surgical treatments, exercise and nonmedical treatments are more popular (12, 13). Health professionals and experts have prescribed physical exercises and activities to women since 19th century (14, 15). Light exercise balances physical activities and reduces pressures that cause premenstrual problems. Women with more physical activity complain less about symptoms of premenstrual syndrome (12).

Aerobic exercises increase the level of circulating endorphins for a short period, act as nonspecific painkiller and decrease symptoms of depression and psychological problems (12, 14, 15). Study of Azhary et al. has demonstrated that doing aerobic exercises for 8 weeks decreases symptoms of premenstrual syndrome (2). According to the study of Dehghan Manshadi et al., although symptoms decreased in each group, this decline were not significant; only cutaneous, neurovegetative and electrolytic symptoms decreased significantly (16). Personal characteristics also influence the intensity of symptoms of premenstrual syndrome. Therefore, nervous and irritable people experience these symptoms with higher intensity (17).

It seems that tendency to do physical activities is a behavior closely related to an individual's temperament (Mizaj) (18). There seems to be a relationship between psychological factors (such as attitude and mood), which according to theories of traditional medicine depend on individual's temperament, and level of physical activity (18-20). Results of several studies have introduced various causes as barriers to physical activity, none of which have considered temperament as one of the probable factors (18). Traditional Persian medicine (PM) is a complementary health approach in Iran. Effectiveness of the methods of this medicine along with its minimum side effects has been proved several times (21, 22).

According to theories of traditional medicine, an individual's temperament can determine his physical, psychological and emotional characteristics. Among individuals' temperament-related attitudes and moods, symptoms of depression, life satisfaction and quality of life improvement are reported to be related to physical activity (18, 22). Many healthcare and treatment directives in PM are temperament-specific.

Avicenna believes that exercise can prevent or cure a disease in people of certain temperaments, whereas in other temperaments, exercise not only does not help to improve one's health, but also exacerbates a disease (22-24). In PM, temperament is categorized into nine groups: hot, cold, wet, dry (singular temperaments), cold and wet, cold and dry, hot and wet, hot and dry (combined temperaments) and moderate (19, 23, 24). Among factors that identify one's temperament, primary natures such as coldness and hotness have been more significant than secondary natures. From this perspective, people can be divided into two groups of cold and hot temperament (19). Exercise is the basis of a healthy life from the viewpoint of PM and it is one of the six essential components of health maintenance. In his book, "the Canon of medicine", Avicenna mentions exercise as an important factor for preventing temperamental diseases (22). Considering the results of multiple studies on the effect of exercise on relieving the symptoms of premenstrual syndrome and specific perspective of PM on different effects of exercise on various temperaments, it seems that we can study the effect of exercise on premenstrual syndrome more accurately if we consider the effect of temperament on intensity of this syndrome. Therefore, this study was carried out to identify the effect of an 8-week aerobic exercise program on premenstrual syndrome in women of hot and cold temperaments.

Methods

This randomized controlled trial was carried out in 2015 for 4 months on two groups of students (hot and

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cold temperaments) living in dormitory of Mashhad University of Medical Sciences who suffered from premenstrual syndrome (IRCT registration code: 2015021721116N1). The number of samples in a pilot study on 20 students (α=0.05 and β=0.2) was considered 30 in each group or 35, considering the possibility of loss (totally 70 students).

20 to 40 year old students with regular cycles of 21 to 35 days and bleeding period of 3 to 10 days who suffered from premenstrual syndrome entered the study. In cases of pregnancy, cardiac, kidney and respiratory diseases, diabetes, blood pressure, asthma, headache, migraine, thyroid, anemia, mental disorders, participating in other exercise programs, having moderate temperament, continuous use of antihypertensives, antidepressants, antihistamines, anticholinergics and hormonal drugs, experiencing a misadventure over the last 3 months, using traditional medicine methods to reduce symptoms and participating in physical education courses, students were excluded from the study.

Even during the study, unwillingness to continue participation, pregnancy during the research, irregular menstrual cycles, not filling out daily record questionnaire (3 consecutive days or 5 nonconsecutive days), not doing the exercises for 3 consecutive sessions or 4 alternating sessions and experiencing a misadventure were the reasons to remove some students from the project. The required information was gathered using questionnaire about general characteristics of the participants, demographic and obstetric characteristics (face validity and content validity were confirmed and due to objectivity of questionnaire a final review was not necessary), determination of premenstrual syndrome condition (validity was confirmed by Jafarnejad et al. (1).

Test-retest reliability with a Spearman-Brown correlation coefficient of 0.79 was confirmed), Beck depression (it was valid and reliable according to the study of Jafarnejad et al.), daily record of symptoms of premenstrual syndrome (validity was confirmed by Jafarnejad et al. (1).

Reliability was calculated using internal consistency according to Cronbach's alpha with reliability coefficient of 0.77), determination of temperament (validity was confirmed by Mojahedi et al. (24)) and Borg scale (validity and reliability was confirmed by Azhari et al. (2)). After obtaining prior written consent and filling out the questionnaire about general characteristics of the participants and their demographic and obstetric characteristics, students with inclusion criteria filled out the questionnaires of temporary determination of premenstrual syndrome and Beck depression one week after menstrual bleeding.

Those with depression score below 40 or with 5 symptoms out of the 11 symptoms in questionnaire of temporary determination of premenstrual syndrome (one of them was among the first 4 symptoms) and those with hot or cold temperament (based on questionnaire of determination of temperament) entered the study.

All participants filled out the daily record questionnaire for 2 consecutive months. At the end of the second month, students with medium and high intensity (30-59%) of premenstrual syndrome were divided into two groups of intervention and control with two subgroups of hot and cold temperaments. Then, Quinn step test was carried out on all subjects. Aerobic exercises were taught to the participants in a single session and they were provided with aerobic videos and posters.

Participants of intervention group did 20-minute aerobic exercise 3 times per week for 8 weeks. Each step included 5 minute warm-up exercise (head movements, stretching and rotating shoulders and balance) 5 minute cool down (lying and sitting movements for recovery) and aerobic exercises between these two steps (kinetic movements including stretching and rotating arms, upper body rotation, movements in situ and butterfly move).

Participants of each of the four groups filled out daily record questionnaire. After each workout, participants of intervention group specified the intensity of their workout according to Borg scale. Necessary follow-up procedures were also performed; in-person visit, once every two weeks and phone call, twice a week. Quinn step test was carried out again at the end of the 8th week. Gathered information was analyzed using SPSS 22 software and Mann-Whitney and Friedman tests and $p<0.05$ was considered significant.

Results

At the beginning of the study, the two groups (intervention and control) were homogenous in terms of age, marital status, history of therapeutic measures, effectiveness of therapeutic measures, bleeding period and menstrual intervals (table 1 & 2).

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Table 1 Qualitative variables of demographic indices of participants

Variable	Intervention N(%)	Control N(%)	P-value
History of work absence	13(37.1)	9(30)	0.54
History of therapeutic measures before the study	16(45.7)	10(33.3)	0.31
History of effective treatment before the study	11(31.4)	8(26.7)	0.49
Marital status			
Single	27(77.1)	18(60)	0.13
Married	8(22.9)	12(40)	

Table 2 Qualitative variables of demographic indices of participants

Variable	Intervention Mean±SD	Control Mean±SD	P-value
Age	4.41±25.22	4.71±24.06	0.2
Menstrual intervals	3.69±28.34	3.39±27.63	0.42
Bleeding period	1.41±6.6	1.34±7.33	0.37
Severity of dysmenorrheal	3.52±4.02	2.85±3.8	0.77
Depression Rating Scale	3.51±5.68	2.72±6.73	0.19

The mean values of physical symptoms of premenstrual syndrome among women of cold temperament in intervention group decreased from 20.8±3.8 to 9.5±1.7 after 8 weeks of aerobic exercise (p=0.001). Moreover, the mean values of physical symptoms of premenstrual syndrome among women of hot temperament in intervention group decreased from 21.8±3.8 to 10.4±3.1 after 8 weeks of aerobic exercise (p=0.001) (table 3). The mean values of mental and physical symptoms of premenstrual syndrome among women of hot and cold temperaments in control group did not change significantly throughout the study (table 3).

The mean values of mental symptoms of premenstrual syndrome among women of cold temperament in intervention group decreased from 11.9±1.9 to 5.3±1.2 after 8 weeks of aerobic exercise (p=0.001). Moreover, the mean values of mental symptoms of premenstrual syndrome among women of hot temperament in intervention group decreased from 12.4±1.2 to 5.8±1.5 after 8 weeks of aerobic exercise (p=0.001) (table 4).

Table 3 Mental and physical symptoms of premenstrual syndrome among women of hot and cold temperament in intervention and control groups

Temperamental Group / Time	Control Hot Mean±SD	Control Cold Mean±SD	Intervention Hot Mean±SD	Intervention Cold Mean±SD	P-value
First month before intervention	21.8±3.1	21.8±3.9	21.8±2.5	20.8±3.8	0.56
Second month before intervention	21.8±2.8	21.4±4.1	20.9±3.6	20.4±3.9	0.2
First month after intervention	22±2.9	21.4±3.9	10.4±1.3	10.2±1.9	<0.001
Second month after intervention	21.6±0.3	20.7±0.4	10.4±3.1	9.51±1.7	<0.001
P-value in Friedman test – Intergroup comparison (each type of temperament at the beginning and at the end of the study)	0.45**	0.12*	P<0.001**	P<0.001*	
P value in Friedman test – Intergroup comparison (intervention and control at the beginning and at the end of the study)	0.08***		<0.001***		

Table 4 Mental symptoms of premenstrual syndrome among women of hot and cold temperament in intervention and control groups

Temperamental Group / Time	Control Hot Mean±SD	Control Cold Mean±SD	Intervention Hot Mean±SD	Intervention Cold Mean±SD	P-value
First month before intervention	11.1±2.9	10.3±1.2	12.4±1.2	11.9±1.9	0.06
Second month before intervention	11.5±2.4	10.9±0.2	11.8±1.9	11.7±1.9	0.3
First month after intervention	11.2±2.8	10.9±2.2	5.8±0.6	5.6±1	<0.001
Second month after intervention	10.8±2.5	11.2±2.8	5.8±1.5	5.3±1.2	<0.001
P-value in Friedman test – Intergroup comparison (each type of temperament at the beginning and at the end of the study)	0.23**	0.08*	<0.001**	<0.001*	
P-value in Friedman test – Intergroup comparison (intervention and control at the beginning and at the end of the study)	0.3***		<0.001***		

comparing women of *cold temperament and ** hot temperament in intervention and control group at the beginning and the end of the study, ***comparing women in intervention and control group at the beginning and at the end of the study.

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Discussion

According to the results of the present study, doing aerobic exercise for 8 weeks decreases the symptoms of premenstrual syndrome among women of hot and cold temperaments. Although aerobic exercise had similar effect on symptoms of premenstrual syndrome among women of both hot and cold temperaments in intervention group, differences in mean values indicated that decline in symptoms of premenstrual syndrome was more significant among women of cold temperament. Due to the lack of similar articles, comparison with previous studies was done without considering the type of temperament.

Study of Azhary et al. has demonstrated that mean values of mental and physical symptoms decreased in intervention group at the end of the study, whereas no significant change has been observed in control group (2). Also, study of Mosallanejad et al. has shown that mental and physical symptoms decreased in intervention group at the end of the study (25). Moreover, study of Karimian et al. has indicated that walking decreases mental and physical symptoms of premenstrual syndrome (7). Samadi et al. in an article entitled "the effect of 8 weeks of aerobic exercise on symptoms of premenstrual syndrome among non-athletic girls" indicated that doing aerobic exercise improves mental and physical symptoms (26).

However, according to the study of Prior, no significant change has been observed in women who did running exercises for 3 months (27). Study of Streege et al. on two groups (one doing aerobic exercises and another one doing anaerobic exercises for 12 weeks) has demonstrated that symptoms decreased significantly in participants who did aerobic exercises, whereas decline in these symptoms was not significant in participants who did anaerobic exercises (6). Yekke Fallah et al. have shown that after 3 months of intervention, physical symptoms decreased in participants who did aerobic exercise and walking, whereas decline in mental symptoms in these participants was not significant (28). Study of Dehghan Manshadi et al. has shown that mental and physical symptoms did not change significantly after 3 months of regular aerobic exercise (16). Study of Moqadasi et al. has shown that physical symptoms decreased significantly in athletic girls, while mental symptoms did not reveal significant changes (29). According to the results of this study, aerobic exercise has positive effect in decreasing symptoms in both groups of hot and cold temperaments and one can consider this as a modification of hot and cold temperaments in occurrence of symptoms of premenstrual syndrome. Since references of traditional medicine recommend moderate exercise for severe temperamental dominance (abnormal temperament) and the proposed aerobic exercise in the present research was neither heavy nor prolonged, this kind of exercise is expected to modify people's temperament. Although according to the results of this study, exercise in both groups of hot and cold temperaments decreased symptoms of premenstrual syndrome, the effect of exercise was more significant in certain symptoms of hot temperament such as flushing, dysphoria, etc. or certain symptoms of cold temperament such as bloat, indigestion, etc.

A close look at temperamental symptoms of these groups shows that these differences are in accordance with theoretical principles of temperament symptoms of these two groups. It is suggested that the frequency of symptoms of premenstrual syndrome in women of hot and cold temperaments be investigated separately in future researches. Due to the limitations of this study, making decisions about difference or lack of difference in impressionability of the two temperamental groups requires more extensive researches. Lack of access to prevalence rate of different temperaments and lack of a proper report on prevalence rate of different temperaments in women with premenstrual syndrome were some of the limitations of this study. According to the results of the study, 8 weeks of regular aerobic exercise decreases the mental and physical symptoms of premenstrual syndrome in women of hot and cold temperaments.

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