

Effectiveness of Barre Exercise with Aerobic Exercise Among College Going Girls with Premenstrual Syndrome – A Comparative Study

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ABSTRACT

Background of the Study: Premenstrual Syndrome (PMS) is a combination of physical, psychological or behavioral changes in the late secretory phase of menstrual cycle which interferes with interpersonal relationship or activities. Over 40 million women in the world suffer from the symptoms of this syndrome and are seeking for medical treatment.

Objective of the Study: To find out the Effectiveness of Barre exercise with Aerobic exercise on reducing physical symptoms among college going girls with PMS. And To find out the Effectiveness of Barre exercise with Aerobic exercise on reducing the psychological symptoms among college going girls with PMS.

Methodology: A comparative study of 30 college girls (18-25 years) with PMS were selected based on PMS scale. They were randomly allocated into two groups; GROUP A was given Barre exercise and GROUP B was given Aerobic exercise for weekly 3 sessions. And both groups were measured before and after the treatment, using PMS scale.

Results: The participants who were supervised to attend all the sessions were shown a difference in their PMSS of mean \pm standard deviation of group A pre-test is 118.0667 ± 22.15035 , post-test is 115.2000 ± 21.87366 and group B pre-test is 124.0000 ± 10.77696 , post-test is 122.0667 ± 10.89211 .

Conclusion: Both the groups were effective in reducing the symptoms of PMS but group A showed slighter more difference on reducing the symptoms of PMS.

Keywords: Premenstrual syndrome, College girls, Barre exercise, Aerobic exercise.

INTRODUCTION

Premenstrual Syndrome (PMS) is a generic term which includes a broad group of emotional, behavioral and physical symptoms that occur for several days to several weeks before menses and subside following the menstrual period^[1]. Premenstrual dysphoric disorder (PMDD) is a severe form of PMS and recurs at least two menstrual cycles^[2]. This was first described by Frank and Horney in 1931^[2].

Prevalence and Factors Influencing Pms:

40 Million women worldwide experience symptoms of sickness and over 5 million of them seek medical attention for the mental and behavioral abnormalities brought on by this illness^[3]. The reported prevalence estimates of Premenstrual Syndrome in India have ranged from 14.3% to 74.4%. Similarly, the reported prevalence of PMDD in India has been varied widely between 3.7% to 65.7%^[5]. The prevalence of PMS has been reported in 20 to 32% of Premenopausal and 30 to 40% of the reproductive female population^[4].

It has been reported that etiology of Premenstrual Syndrome is multifactorial. Several factors are suggested to be associated with PMS including social factors (ethnicity and culture), socioeconomic status, dietary habits, stress, exercise, smoking, alcohol consumption and menstrual factors (age at menarche, duration since menarche, menstrual pattern). One of the common etiologies which are suggested about PMS is endocrinal cause. An abnormal function at any level of hypothalamo-pituitary- adrenal axis may lead to PMS. Environmental factors, malnutrition and defective adrenal hormone secretion lead to the development of PMS. Prolong stress exposure can lead to malfunctions of neuroendocrine system and could flare PMS^[6].

Few literatures suggest that young women, black women, women with longer cycles are more prone to develop PMS. Genetics plays an important role. Women with a history of PMS in mothers are more likely to report Premenstrual Syndrome (70%) in comparison to women with negative family history (37%). Moreover, reporting of PMS in monozygotic twins is 93% while in dizygotic twins is 44%. Literatures have shown that women experiencing domestic violence are more likely to report PMS^[6].

Problems in Premenstrual Syndrome inIcf View:

Body Functional Changes-Musculoskeletal system, gastrointestinal system (physical symptoms); endocrine system (hormonal changes), mental functions (psychological changes).

Activity Limitation- Academic performance, physical activity, hindrance in day to day activities (self care).

Participation Restriction-social domains, occupational domains, leisure and recreational activities.

Environmental Factors-work place, social support, health care services.

Personal Factors-Age (adolescents, young adults), health status (depression, Anxiety, social isolation, aggression, mood swings), coping mechanism ⁽²⁸⁾.

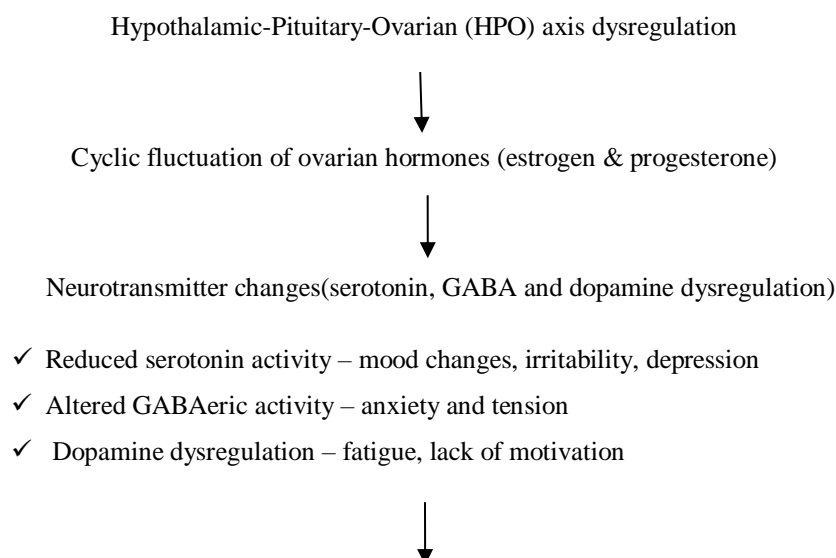
Physical and Psychological Symptoms of Premenstrual Syndrome:

The symptoms of Premenstrual Syndrome include lethargy, bloating, irritability, depression, anxiety. Other signs and symptoms include tenseness, mood swings, difficulty concentrating, changes in appetite, insomnia, swelling, fatigue and vertigo. They also include changes in sexual interest and food cravings. Physical signs include nausea, muscle and joint discomfort, weight gain, swelling of the limbs, back pain, abdominal pain, tenderness and swelling of the breasts^[3].

Premenstrual syndrome may cause capacity loss in females (physical, psychological, emotional, cognitive capacities), due to psychological symptoms like irritability, anger, sadness, confusion, forgetfulness, restlessness, decreased self-esteem and suicidal thoughts, which lowers the quality of life in terms of health^[3]. These symptoms are cyclic and recurrent. The symptoms can change in extent and strength during different cycles ^[4].

Hormonal Changes in Pms:

Premenstrual Syndrome is a group of recurring symptoms that start at the end of the menstrual cycle's secretory phase (5-7 days before menstruation) and stop during the follicular phase (2-4 days following menstruation) ^[3]. A women's bodily tissues grow more sensitive to changing hormone levels throughout the menstrual cycle. Serotonin, a brain chemical that regulates mood, in particular, may vary as a result of changes in hormones levels (oestrogen and progesterone). According to studies, these symptoms are triggered by fluctuating oestrogen and progesterone levels ^[3].



Increased sensitivity to hormonal changes



Symptoms manifestation (physical, emotional, behavioral) ⁽³⁰⁾

Changes in mood may be caused by the cyclic influence of oestrogen and progesterone on serotonin – aminobutyric acid and dopamine systems ^[3]. The Renin – angiotensin- aldosterone (RAS) pathway can be altered by these mechanisms, which may explain PMS symptoms as bloating, cramps, swelling and weight gain ^[3]. A study shown that circulating leptin concentration in women with PMS is significantly higher than in women without Premenstrual Syndrome and high hormone levels may be associated with psychological symptoms of Premenstrual Syndrome ^[13]. However, studies have shown that people with PMS do not have a higher amount of oestrogen and progesterone than other women, leaving it unclear why some women get Premenstrual Syndrome and others do not ^[3]. Women with Premenstrual Syndrome are more sensitive to typical changes in hormone levels during the menstrual cycle ^[3].

Physical Activity and Premenstrual Syndrome:

Acsm Prescription for Aerobic Exercise:

Frequency– 3 to 5 days per week (combination of vigorous and moderate exercise).

Intensity – moderate to vigorous intensity.

Time (Duration) – 20 to 60 minutes per day (combination of moderate and vigorous exercise).

TYPE: regular, purposeful exercise that involves major muscle groups and is continuous and rhythmic in nature ^[29].

Aerobic Exercise:

Studies have reported that regular aerobic exercise reduces Premenstrual Syndrome symptoms and its severity, and could be used as a treatment method ^[14]. Some studies showed that regular aerobic exercise has many benefits, including increased power for women's heart vascular activity, increasing the bone density and reducing the stress ^[13]. Increased level of prolactin in the late luteal phase is one of the causes of breast pain and swelling and possibly aerobic exercise in non-athletes reduces the level of this hormone, and thus may reduce the symptoms ^[13]. Aerobic exercise created the balance of estrogen and progesterone levels in women, reducing the symptoms ^[13].

The repetitive contraction in the aerobic exercise helps venous blood return, resulting in the increase of prostaglandins and other substances which help prevent and reduce back pain and

discomfort in the pelvis and the abdomen ^[13]. Pablo (2011) considered 8 weeks of aerobic exercise as a treatment for reducing symptoms in patients with moderate depression ^[13]. Aerobic exercise can reduce the physical and psychological symptoms of Premenstrual Syndrome ^[13].

The changes in estrogen and progesterone levels in late luteal phase leading to insomnia will be compensated by exercise ^[15]. Overall, the aerobic exercise training to patients suffering from Premenstrual Syndrome can reduce the symptoms, resulting in better job and social performance ^[13].

Acsm Prescription For Barre Exercise:

Frequency – 2 to 3 days per week.

Intensity - <50% 1- RM (light to moderate intensity) improve endurance, 60 to 70% 1- RM (moderate to vigorous intensity) improve strength.

Time (Duration): 30 to 60 minutes.

Type: Resisted exercise, endurance, balance and flexibility training.

Repetitions: 8 to 12 repetitions to improve strength and power, 15 to 20 repetitions to improve muscular endurance ⁽²⁹⁾.

Barre Exercise:

Barre is derived from the Lotte Berk method, which was created in London in 1959 ^[3]. The barre method is a famous exercise regimen that is fast gaining popularity and followers ^[3]. It is a system of physical exercises based on a combination of ballet exercises, functional strength training, pilates and yoga ^[16]. The loads, which include a combination of different amplitudes of movements and long-term retention of a certain posture, that contribute to the development of endurance, relief and muscle strength and have no less intense effect on the body than classical aerobic training ^[16].

Barre class will involve a lot of reps of small, pulsing movements (lifting and lowering limbs a mere inch or two) at the barre, with a heavy focus on the legs, glutes and core and emphasis on form and alignment ^[17]. Barre exercise help you build and strengthen your muscles, as well as enhance your posture and core strength. In contrast to yoga and pilates, where obvious improvements can take weeks or even months to appear, barre participants begin to see results after as little as eight exercises ^[3]. A further advantage of the barre approach is the joyful tone and sense of community and camaraderie that are inherent to the barre environment.

So this study intends to reduce the physical and psychological symptoms and improving the physical activity level among college girls with Premenstrual Syndrome by identifying the effectiveness of aerobic and barre exercise.

Materials and Methodology

A comparative study which consist of 30 female participants with premenstrual syndrome age between 18 to 25 years,were taken based on selection criteria. Females aged between 18-25 years with regular menstrual cycles ,participants with 80 points or above (mild to severe range) in Premenstrual syndrome scale^[3].Females with irregular cycle, female elite athletes, those who are under go any gynaecological surgery, females who are not able to tolerate physical exercise, females with chronic disease, medications taking for menstruation problems were excluded ^[3]. The study was done at Department of Obstetrics and Gynaecology, Adhiparasakthi Hospitals & Research Institute, Melmaruvathur. Then participants were randomly divided into two groups: group A and group B. the group A(15) received Barre exercise and group B(15) received Aerobic exercise. The participants received intervention for the duration of 6 weeks. Initially Informed consent form were given to all subjects. Further Demographic details & the condition related details were received from the participants. Complete baseline assessment including pretest and posttest were collected using the following outcome measures.

Outcome measures and Tools:

Premenstrual Syndrome Scale

The premenstrual syndrome scale has three subscales (physiological, psychological, emotional symptoms) totalling 40 questions : physical, psychological, behavioural. 40 items make up this 5-point Likert-type-scale. The following scoring system is used to determine the measurements on the scale: Never received a score of “1”, Rarely receives a score of “2”, Sometimes received a score of “3”, Very often received a score of “4”, Always received a score of “5”. The Premenstrual Syndrome Scale (PMSS) total score was generated using the combined score from the sub-scales. The lowest score on the scale is 40, and the highest score is 200. This indicates the presence of PMS if the scale’s overall score was 80 or higher. As the scores rise, the severity of PMS also rises.VALIDITY and RELIABILITY: Inter-rater reliability: 0.81 and 0.97, Sensitivity: 83% - 100%, Specificity: 64% - 90%^[18].

Treatment Procedure:

In this study, the treatment procedure involved two different exercise interventions: Barre exercise and Aerobic exercise. Phases of exercise: warm up exercise (5 to 10 minutes), exercise intervention (30 to 60 minutes) each exercise was given 10 to 15 repetitions and finally cool down exercise (5 to 10 minutes).

Group A -BARRE EXERCISE	Group B- AEROBIC EXERCISE
1.Allongee propellers 2.Arabesque lunges 3.Allongee swivelling 4.Ballerina squats 5.Barre assembly 6.Standing oblique crunch 7.Side leg lift 8.Calf raise	1.Jumping jacks 2.High knees 3.Jump squats 4.Glute kicks 5.Jump rope 6.Bear crawls 7.Lateral plank walk 8.skaters

Data Analysis

Statistical analysis and result:

The study was conducted on 30 females diagnosed with Premenstrual syndrome. To find the effectiveness of barre exercise and aerobic exercise program. SPSS software 29th Edition was used to analyze the data. The mean and standard deviation was calculated using the below formula and effectiveness between and with the group was identified using paired sample test and independent 't' test.

Table 1.1.Group A PMSS- Paired Samples Statistics

PMSS - Group-A	N	Mean	Std. Deviation	Std. Error Mean
Age	15	19.933	1.279	-
Pretest	15	118.066	22.150	5.719
Posttest	15	115.200	21.873	5.647

Table1.2.Group A PMSS - Paired Samples Test

PMSS - Group-A		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	2.866	0.833	0.215	2.404	3.328	13.315	14	.000

Graph. 1 PMSS group A

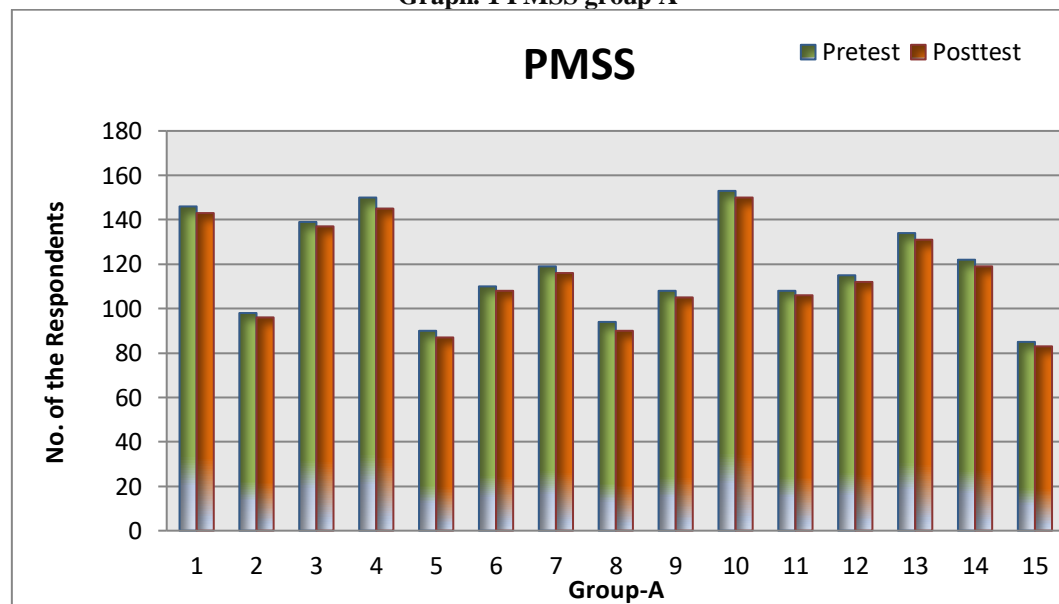


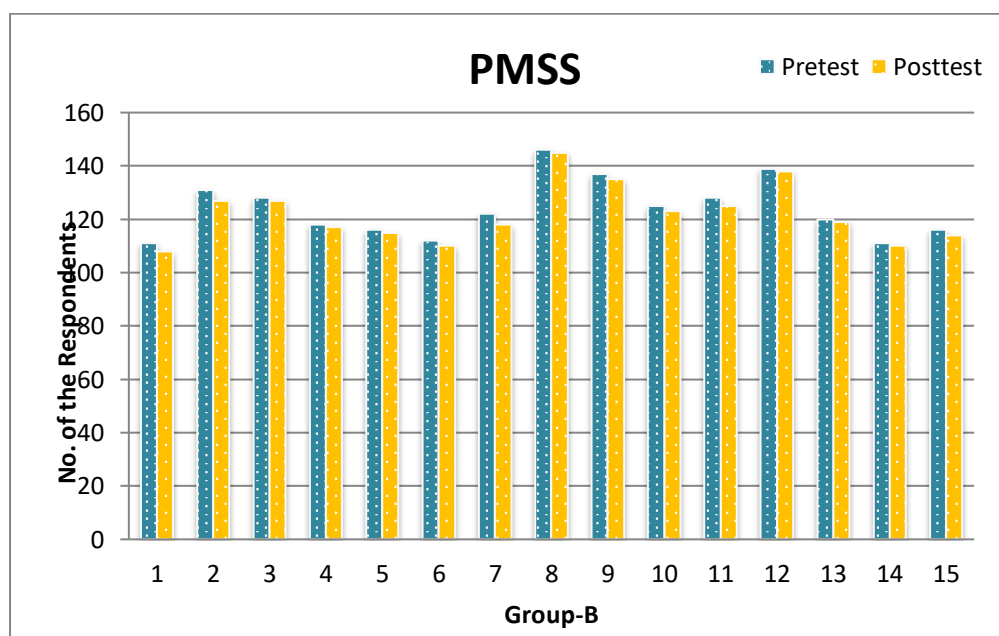
Table 2.1.Group B PMSS - Paired Samples Statistics

PMSS - Group-B	N	Mean	Std. Deviation	Std. Error Mean
Age	15	18.866	0.833	-
Pretest	15	124.000	10.776	2.782
Posttest	15	122.066	10.892	2.812

Table 2.2.Group B - Paired Samples Test

Table 22: Group-B Paired Samples Test									
PMSS - Group-B		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	1.933	1.099	0.283	1.324	2.542	6.808	14	.000

Graph 2.PMSS group B



Independent t-test for PMSS Group-A Pretest and Group-B Pretest

Table 3.1.Group Statistics

PMSS Group-A Pretest and Group-B Pretest		N	Mean	Std. Deviation	Std. Error Mean
Pretest	Group-A Pretest	15	118.0667	22.15035	5.71920
	Group-B Pretest	15	124.0000	10.77696	2.78260

Table 3.2.Independent Samples Test

PMSS Group-A Pretest and Group-B Pretest		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre test	Equal variances assumed	7.862	.009	-.933	28	.359	-5.93333	6.36019	-18.961	7.094
	Equal variances not assumed			-.933	20.27	.362	-5.93333	6.36019	-19.188	7.322

Independent t-test for PMSS Group-A Posttest and Group-B Posttest

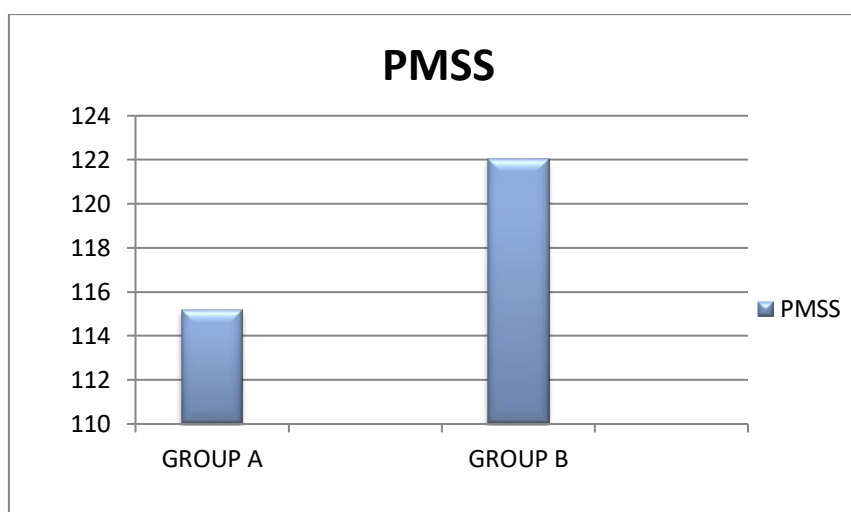
Table 4.1.Group Statistics

PMSS Group-A Posttest and Group-B Posttest		N	Mean	Std. Deviation	Std. Error Mean
Posttest	Group-A Posttest	15	115.2000	21.87366	5.64776
	Group-B Posttest	15	122.0667	10.89211	2.81233

Table 4.2.Independent Samples Test

PMSS Group-A Posttest and Group-B Posttest		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2- tailed)	Mean Differe nce	Std. Error Differe nce	95% Confidence Interval of the Difference	
									Lower	Upper
Post test	Equal variances assumed	7.474	.011	-1.08	28	.286	-6.866	6.309	-19.790	6.057
	Equal variances not assumed			-1.08	20.54	.289	-6.866	6.309	-20.005	6.271

Paired sample test between Post test of Group A and Group B
Graph. 3



RESULTS

30 College going girls who have Premenstrual syndrome were included in this study to identify the effectiveness of barre exercise and aerobic exercise in reducing the premenstrual syndrome symptoms. They were divided into two groups, GROUP A – Barre exercise and GROUP B – Aerobic exercise. For outcomes, Premenstrual Syndrome Scale was used, showing the following results.

Changes in Premenstrual Syndrome Scale (PMSS) of the participants

The mean \pm standard deviation of group A (barre exercise) in pre-test is 118.0667 ± 22.15035 , in post-test is 115.2000 ± 21.87366 .

The mean \pm standard deviation of group B (aerobic exercise) in pre-test is 124.0000 ± 10.77696 , in post-test is 122.0667 ± 10.89211 .

The mean and standard deviation of group A and group B pre-test in independent t- test is 118.0667 ± 22.15035 and 124.0000 ± 10.77696 , then post-test is 115.2000 ± 21.87366 and 122.0667 ± 10.89211 .

PMSS group A and group B pre-test, t value: $-.933$ and p value: $.009$.

PMSS group A and group B post-test, t-value: -1.08 and p value: $.011$.

DISCUSSION

In this present study, 30 PMS samples were included. The purpose of the study is to analyze the effects of barre exercise and aerobic exercise to reduce the symptoms of Premenstrual syndrome among college going girls. This study has done the exercise program for 6 weeks. 30 samples were divided into 2 groups of 15 participants. In group A, 6 subjects were severe (score 121–160), 9 subjects were moderate (score 81–120). In group B, 8 subjects were severe (score 121–160), 7 subjects were moderate (score 81–120). The mean \pm standard deviation of age in group A is 19.933 ± 1.279 , in group B is 18.866 ± 0.833 .

This study had no restriction to the diet of the participants. The independent variables in this study are barre exercise and aerobic exercise. The dependent variables in this study are premenstrual syndrome scale.

Premenstrual syndrome scale (PMSS) is widely used outcome measure to assess the severity and frequency of premenstrual syndrome symptoms. When comparing the interventions (barreVs aerobic exercise).

A healthy lifestyle, including proper nutrition, hydration and exercise is still required to effectively manage the PMS symptoms. Premenstrual syndrome is one of the prevalent disorders of women, which can interfere with regular life in women such as quality of life (social, psychological, physical aspects of life).

International public health guidelines for adults recommend 150 min of moderate-intensity Physical Activity (PA) per week, equivalent to 600 MET-minute/weeks. A scoping review of physical activity among college students reported that 58.7% of students met physical activity recommendations

equivalent of ≥ 600 MET-minutes/week, but physical activity levels in college students were said that remains low ^[20].

This study shows that there was significant difference in both the groups on reducing the physical and emotional symptoms of PMS. Group A- barre exercise which is a combination of ballet, yoga, pilates movements showed significant improvement in alleviating physical symptoms(fatigue, bloating) and also emphasis on flexibility, core strengthening and muscle relaxation & reduce muscle tension by improving blood flow. Additionally, mind-body focus on barre exercise contributes to reduce stress, positively impacting emotional symptoms (mood swings). Group B- aerobic exercise have the cardiovascular benefits that help in regulating the hormonal imbalances associated with PMS. It also alleviates the emotional and psychological symptoms by releasing the endorphins.

CONCLUSION

From this study it was concluded that both the barre exercise and aerobic exercise were effectively reduced the physical and psychological symptoms of the participants with premenstrual syndrome. But when compared group A (barre exercise) showed much difference than group B (aerobic exercise) in reducing the physical and psychological symptoms of Premenstrual syndrome.

LIMITATION AND RECOMMENDATIONS

- Long term effects of the treatment were not assessed due to short duration and small sample size. so, we recommend exploring the long term effects on similar population in further research.
- The absence of control group could be considered as limitation in this study so further randomized control study could be implicated on the same treatment technique.

CLINICAL IMPLICATIONS

From the quantitative data of this study, both the aerobic and barre exercise were benefited for females with PMS. So we encourage the application of these form of exercises to be inculcated in the regular routine protocol for the same population.

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