

# Aerobic Exercise versus Yoga on Pre-Menstrual Symptoms and Primary Dysmenorrhea Among Adult Girls - A Comparative Interventional Study

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DOI: <https://doi.org/10.52403/ijshr.20230415>

## ABSTRACT

**Introduction:** Primary dysmenorrhea refers to painful cramps experienced in the lower abdomen just before or during menstruation, without any underlying medical conditions. It affects up to 50% of females who menstruate. Women with Primary Dysmenorrhea experience a range of symptoms, including premenstrual symptoms. PMS symptoms are physical, psychological, and behavioral discomfort before periods.

Women's quality of life, economic performance, and social interactions are impacted by PMS and primary dysmenorrhea.

Aerobic Exercise and Yoga are beneficial in PMS & primary dysmenorrhea.

**Method:** As per the Eligibility criteria, the Screening of 118 subjects was done by using the WaLIDD Score and PMS Scale. 52 participants were included in the study, 26 in the Aerobic Exercise group (A) and 26 in the Yoga group(B). Baseline data and pre-data were noted in both groups. Participants in both Groups were given the decided protocol for one consecutive menstrual cycle. Post data was noted. Data analysis was done by applying paired t-test within the group and unpaired t-tests was applied between the group using SPSS version 16.

**Result:** In both groups, the within-group analysis showed statistically significant results in WaLIDD Score and PMSS ( $p < 0.05$ ). For WaLIDD Score, between Group analysis showed no statistically significant difference ( $p > 0.05$ ). For the PMS Scale Score, Group

analysis showed a statistically significant difference between both groups ( $p < 0.05$ ).

**Conclusion:** Aerobic Exercise and Yoga are both effective in treating PMS and Primary Dysmenorrhea, but Aerobic Exercise is more beneficial in treating PMS Symptoms.

**Keywords:** PMS, Aerobic Exercise, Yoga primary dysmenorrhea

## INTRODUCTION

The term dysmenorrhea, derived from the Greek terms dys (difficult), mens (month), and rhoia (flow), means difficult menstrual flow. It is defined as painful menstruation and was classified in 1992 by the World Health Organization within the 10th revision of the International Statistical Classification of Diseases and Related Health Problems as primary, secondary, and nonspecific(1).

Within this classification, the most common is primary dysmenorrhea, which is defined as menstrual pain in the lower abdominal area before or during menstruation, without signs of pelvic pathology, and it can remain until 40 years of age, even continuing during menopause(2).

Dysmenorrhea is a health problem with a high impact on health and society, resulting in a high economic cost and causing absenteeism from work(3).

Dysmenorrhea is one of the most prevalent female ailments that can lower quality of

life. Primary dysmenorrhea's etiology is not fully understood, but several factors, including an increase in prostaglandin F2 synthesis and secretion, an increase in vasopressin and oxytocin, which in turn enhance prostaglandin secretion and stimulation of type C pain fibers, are postulated to be the contributing factors. Different negative repercussions of dysmenorrhea affect both individuals and the community.

For instance, a higher prevalence and degree of dysmenorrhea are positively correlated with absenteeism from work and school, interference with daily activities, social isolation, and higher sedative prescription use(4).

Sagumar et al. in their study of 654 respondents in India, discovered that 42% self-medicated and that 35% utilized unsuitable medications, including mefenamic acid as an NSAID to ease the pain of dysmenorrhea. The U.S. Food and Drug Administration (FDA) has pharmaceutical guidelines that state long-term use of NSAIDs can raise the risk of bleeding, stomach ulcers, and heart attacks or strokes. In addition, major adverse effects of NSAIDs include kidney, liver, and heart failure, anemia, asthma episodes in persons with asthma, and allergic responses. Additionally, NSAID use's mild to moderate side effects include nausea, vomiting, dizziness, heartburn, diarrhea, and constipation(1).

There is one more problem causing disruptions in women's lives associated with Primary Dysmenorrhea the Umbrella of Symptoms known as premenstrual symptoms.

According to many definitions, PMS is a psycho-neuroendocrinal condition with a variety of physical and mental symptoms that have no recognized cause. It is a group of symptoms that limit a woman's ability to function and lead a normal life, appearing 7-10 days before menstruation. Within four days following the start of menstruation, the symptoms subside, and they don't return until the next cycle(5).

PMS has been observed to affect 30 to 40% of reproductive females. PMS has been linked to several different symptoms. The symptoms come and go in cycles. Throughout various cycles, the severity and intensity of the symptoms can alter(6).

Various aetiologies for PMS have been proposed. The main causes of PMS are nutritional deficiencies, environmental stressors, and aberrant hypothalamic-pituitary-adrenal axis (HPA) function, which results in a malfunction in the secretion of the adrenal hormones. One theory for illuminating the physiopathological process of PMS involves the endocrine system(7).

Women's quality of life, economic performance, and social interactions are impacted by PMS. According to another study, between 23 and 31% of women of reproductive age have PMS to an extent that it interferes with their everyday lives. Mood disorders and their repercussions might result from PMS. As a result, over the past 20 years, numerous investigations on various PMS therapy methods have been carried out(8).

The diagnosis of Primary dysmenorrhea and Pre-menstrual Symptoms is clinical. For Primary Dysmenorrhea, some investigations identify cases using numerical scales of pain, which at the same time serve to classify intensity; others include characteristics such as intensity of pain, limitation to perform daily activities, or the requirement of analgesic management (local or systemic) among others(9). For Pre-menstrual Symptoms, scales consist of physiological, psychological, and behavioral symptoms(10).

In the present study, Aerobic Exercise and Yoga are used as Treatment in case of Pre-menstrual symptoms and Primary dysmenorrhea.

Girls who exercise frequently show reduced levels of physical symptoms throughout the menstrual cycle, according to the evidence, which implies that aerobic exercise lowers physical symptoms and enhances mood and behavior. Dysmenorrhea and Pre-menstrual

symptoms may be made worse by emotional and behavioral issues. Health-related quality of life may be compromised in adult girls because of the detrimental effects of dysmenorrhea and premenstrual symptoms(3).

For many Girls today, exercise is an essential component of daily life. Aerobic exercise enhances cardiovascular health and reduces Pre-menstrual symptoms and dysmenorrhea(11).

Yoga is composed of physical (Asana), breathing (Pranayama), and mental (Pratt Hara) practices, resulting in health, relaxation, and positive awareness. Yoga practices with deep breathing and meditation strengthen muscles and protect the spine and joints of the body(12).

Evidence indicated that the physical and mental health benefits of yoga occur through negative moderation of the hypothalamic-pituitary-adrenal axis in association with the sympathetic nervous system (SNS). Yoga, negatively, via vagal nerves, regulates the secretion of hormones (cortisol, glucose, plasma's renin, epinephrine, and norepinephrine) into the bloodstream which is responsible for body functions. Yoga reduces the negative effects of induced stress on the immune system by regulating positively the adjustment of immunoglobulin A(7).

#### **Aim:**

The Aim is to compare the efficacy of Aerobic exercise and Yoga in the management of adult girls with Premenstrual symptoms and Primary Dysmenorrhea.

#### **Objectives:**

- 1) To find out the Effect of Aerobic Exercise on Premenstrual symptoms by using PMS Scale.
- 2) To find out the Effect of Aerobic Exercise on Primary Dysmenorrhea by using the WaLIDD score.
- 3) To find out the Effect of Yoga on Premenstrual symptoms by using the PMS Scale.

- 4) To find out the Effect of Yoga on Primary Dysmenorrhea by using the WaLIDD score.
- 5) To Compare the Effect of Aerobic Exercise and Yoga on pre-menstrual symptoms by using the PMS Scale.
- 6) To Compare the Effect of Aerobic Exercise and Yoga on Primary dysmenorrhea by using the WaLIDD score.

#### **MATERIALS & METHODS**

The Present Comparative interventional study was conducted at fitness room of Government Spine institute and Physiotherapy college, Civil Hospital Ahmedabad.

In this comparative Interventional study, adult girls between 18 to 25 years of age and Unmarried who had any complaints of Menstrual Pain and Menstrual Symptoms were Screened. Before the study, approval was obtained from the Ethics committee. [Ref. No. GSIHESC/46/22] After the approval was given by the ethical committee. 118 Subjects were Screened with the help of the WaLIDD Score and PMSS Scale.

Both the WaLIDD Score and PMSS Scale were filled by the Subjects themselves in their Preferred languages (English & Gujarati).

Subjects having willingness to Participate, normal menstruation cycle were included in the study. Subjects having any red flags for Aerobic exercise or yoga were excluded from the study. Subjects Showing moderate or above scores in both Scales were included in the Study. A total of 66 patients were excluded – 17 Failure to meet the eligibility criteria & 49 were out-aged.

All Participants were Explained about the purpose and procedure of the study. All the recruited Participants signed an informed consent form before enrolling in the study. The consent form was given in the preferred language of the subjects (English & Gujarati). 52 Participants who met the eligibility criteria were allocated to either

the Aerobic Exercise group or Yoga group by using the Chit method.

The detailed anamnesis of the Participants was obtained, and their demographic characteristics were recorded. The assessment form was filled out. WaLIDD Score and PMSS Score were noted before the intervention. Analysis of both the WaLIDD Score and PMSS Score was done for baseline data. Age and BMI of both groups were checked for Normality.

All the Participants of the study were advised to continue their normal routine activities but they should not take any pharmacological agents or other form of treatment other than the designed protocol, during the period of study.

### **Group A**

Participants of this group received 20 sessions of aerobic exercise for one complete menstrual cycle.

#### **In Aerobic Exercise,**

Blood pressure and Pulse rate will be monitored before and after Aerobic Exercise.

**Warm-up:** 5 min stretching of large group muscles

**Frequency:** 20 sessions (5 days /week) for One complete Menstrual cycle (1 month)

**Intensity:** Moderate (RPE between 4-6 or 40% - 59% heart rate reserve)

**Type:** Brisk walking(9)

**Time:** 30 mins

**Cool down:** 5 min slow walking(13)

**Procedure:** Blood Pressure and Pulse rate were Monitored before the start of the session. if the Participant is showing any abnormality in blood pressure or pulse then she was excluded from the session.

The session starts with a warm-up which includes stretching of large group muscles like hamstring, triceps, trunk rotators, etc.

After Warm up, participants start walking on the Treadmill at the speed of 3.5 – 4.5 mph (brisk walking) for 30 mins. All Participants were guided about the RPE scale and they were asked to maintain a brisk walk between 4 to 6 RPE.

Session Ends with a **cool down** period which includes slow and normal walking for 5 to 10 mins. Blood pressure and pulse were taken again after the cool-down period.

### **Group B**

Participants of these groups received 20 sessions of Yoga for one complete menstrual cycle.

In the **Yoga group,**

**Kapalabhati Pranayam** :10 min

**Yoga poses** Cat-Cow pose, Camel pose, Cobra Pose, Child's pose for 20 min(14)

**Savasana:** 10 min

**Frequency:** 20 sessions (5 times a week) for One Complete Menstrual cycle (1 month)

**Procedure:** Yoga session starts with **Kapalabhati pranayama** for 10 min(15) followed by yoga poses

**Cat-Cow Pose** repeat the pose 10-12 times (14).

**Camel Pose** repeat the pose for 10-12 times(12).

**Cobra Pose** repeat the pose for 10-12 times(14).

**Child Pose** repeat the pose for 10-12 times(12)

Eventually reconnecting with the steady inhales and exhales of breath.

For the cool- down **Savasana**(15) was done.

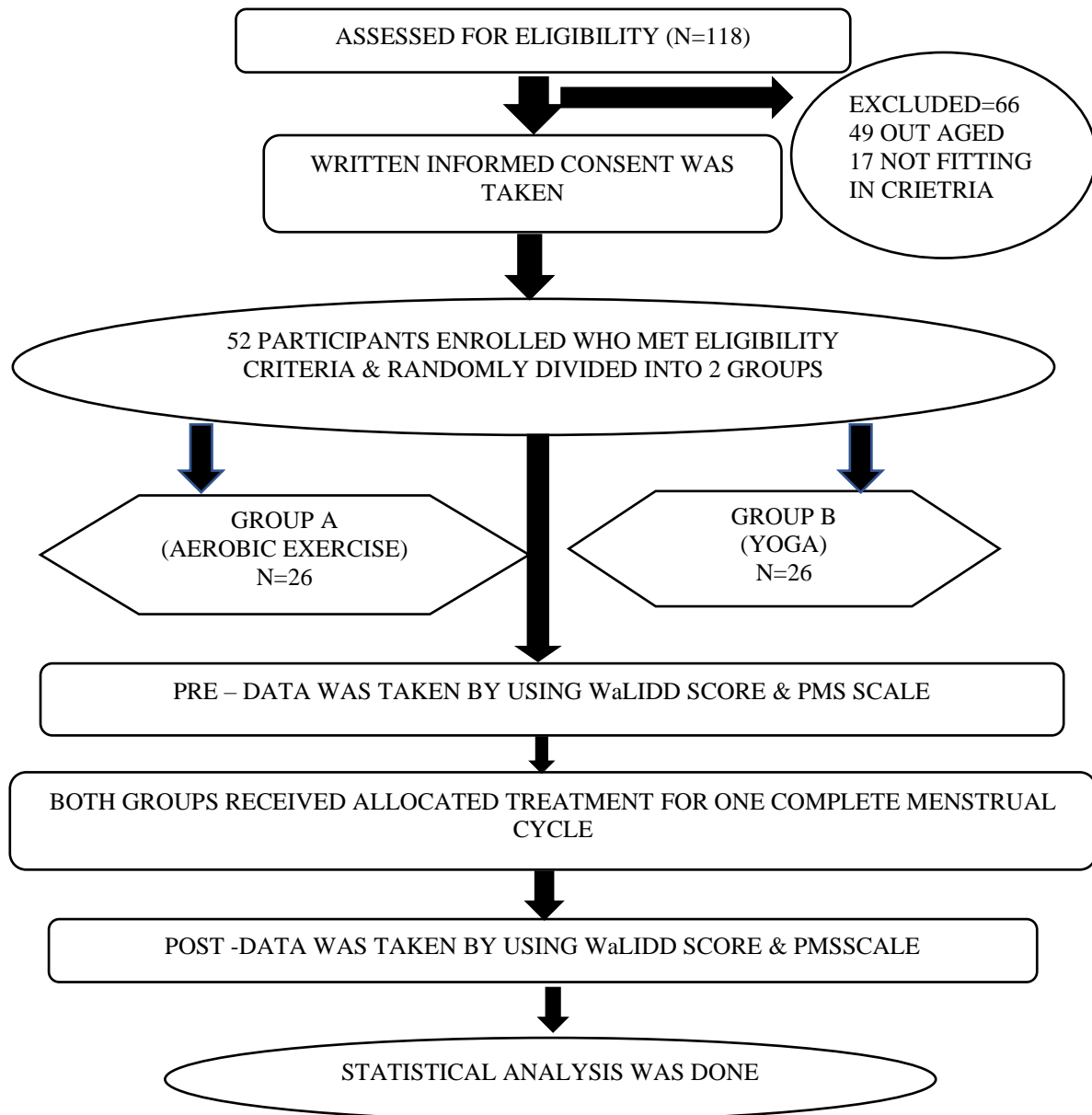


**Figure 1: Participant walking on Treadmill under observation**



**Figure 2: Participant performing Yoga under observation**

## FLOW CHART OF THE STUDY



### STATISTICAL ANALYSIS

The present study was done to determine the effect of Aerobic exercise and Yoga on Premenstrual symptoms and Primary Dysmenorrhea among young adult girls.

52 participants were divided into 2 groups, 26 in each group.

Group A was the Aerobic Exercise group and Group B was the Yoga group.

Pre and post-test scores of the PMS Scale and WaLIDD score were taken.

Group A performed Aerobic Exercise whereas Group B did Yoga for One complete menstrual cycle. Post data was

taken after completion of one menstrual cycle (4 weeks).

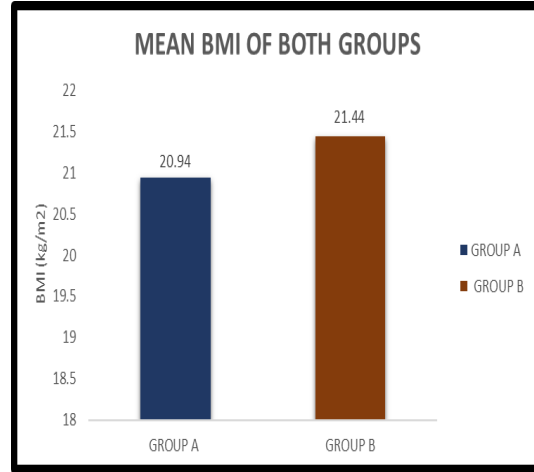
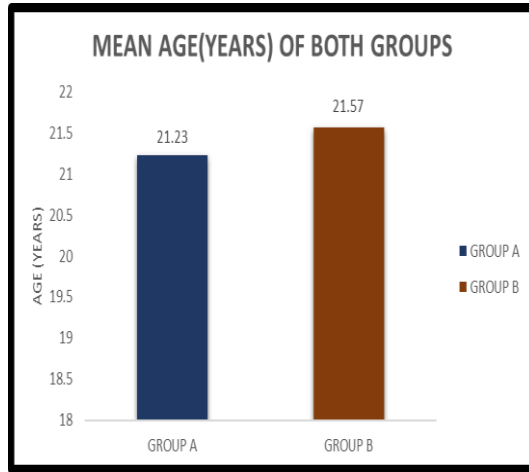
Statistical analysis was done using SPSS version 16. Before analysis, normal distribution and baseline differences were screened. Within-group analysis was done using baseline outcome measures taken before and after 4 weeks.

The level of significance was at 5% with a confidence interval at 95%.

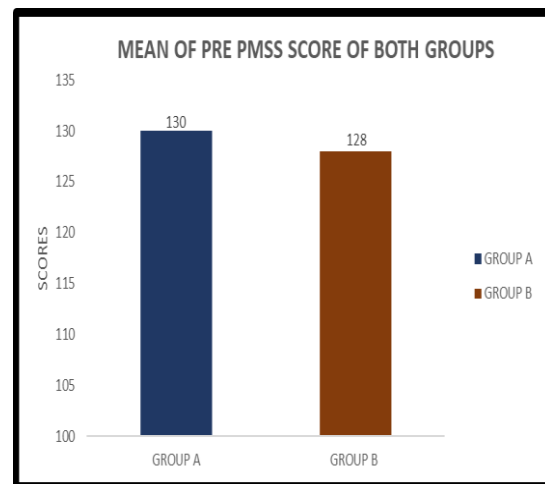
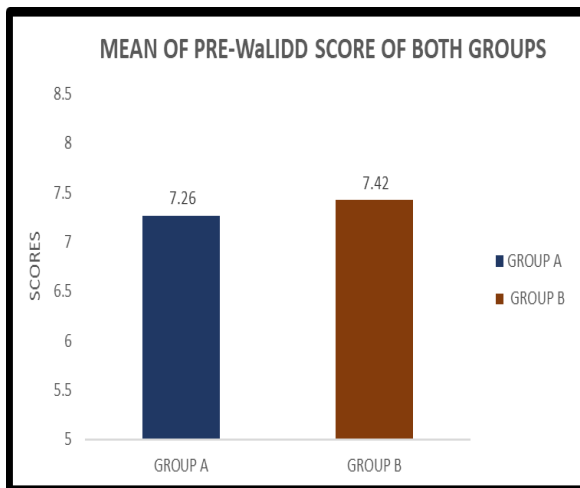
**Normality statistics**

To check whether the data follows normal distribution or not, the **Shapiro-Wilk test** was applied at a 95% confidence interval.

The p-value of the baseline Characters is > **0.05**, hence, it shows that the Normal distribution of Baseline data is found between variables of both groups.



Graph 1&2: The graph on the left showing the normal distribution between the mean ages of both groups and the graph on the Right showing the normal distribution between the Mean BMI of both groups



Graphs 3 &4: graph showing normal distribution between the Mean of the WaLIDD Score and graph on the Right side showing the mean of the PMSS Score of both groups before the Intervention

To analyze the differences in WaLIDD Score & PMSS Score before intervention **Baseline independent t-test** was used as data was normally distributed.

**WaLIDD Score**

| Variable     | Group A mean±SD | Group B mean±SD | t-value | P value (<0.05) |
|--------------|-----------------|-----------------|---------|-----------------|
| WaLIDD Score | 7.26±1.61       | 7.42±1.7        | 0.33    | 0.73            |

Table 1: Showing No significant difference in WaLIDD Score of both groups before the intervention

**PMSS Score**

| Variable   | Group A mean±SD | Group B mean±SD | t-value | P value (>0.05) |
|------------|-----------------|-----------------|---------|-----------------|
| PMSS Score | 130±17.9        | 128±15.8        | 0.51    | 0.62            |

Table 2: Showing no significant difference in PMSS Score of both groups before the intervention

Analysis showed statistically **No significant** difference in PMSS Score between the groups ( $p > 0.05$ ).

**The test used in both Groups for each outcome measures: -**

| ANALYSIS       | WaLIDD SCORE    | PMSS SCORE      |
|----------------|-----------------|-----------------|
| WITHIN GROUP A | Paired t-test   | Paired t-test   |
| WITHIN GROUP B | Paired t-test   | Paired t-test   |
| BETWEEN-GROUP  | Unpaired t-test | Unpaired t-test |

Table 3: Tests used in statistical analysis for within & between groups

**WITHIN-GROUP ANALYSIS  
GROUP A (AEROBIC EXERCISE)**

To analyze the differences in WaLIDD scores after 4 weeks (20 sessions) of intervention in group A, the **Paired-t test** was used as data was normally distributed. To analyze the difference in PMSS Score after 4 weeks (20 sessions) of intervention in group A, a **paired t-test** was used as data was normally distributed.

**GROUP B (YOGA)**

To analyze the differences in WaLIDD scores after 4 weeks (20 sessions) of intervention in group B, a **paired t-test** was used as data was normally distributed. To analyze the differences in PMSS Score after 4 weeks (20 sessions) of intervention

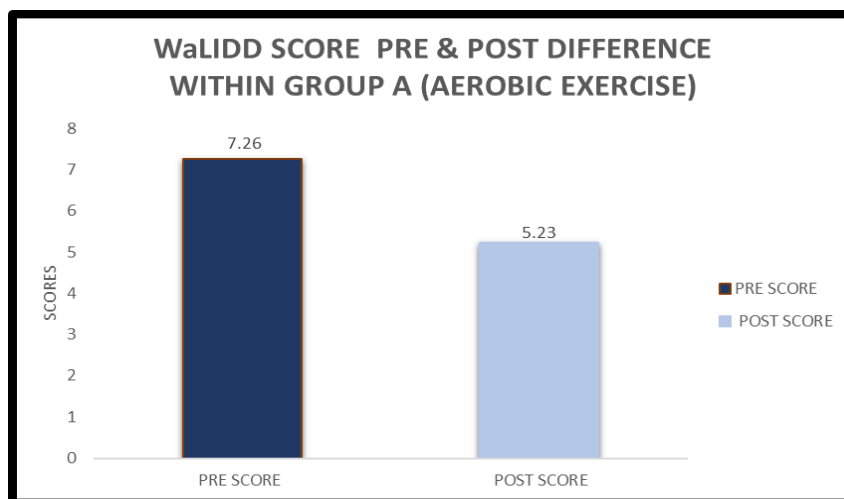
in group B, a **paired t-test** was used as data was normally distributed.

**BETWEEN-GROUP ANALYSIS**

For between-group analysis of both outcome measures, an unpaired t-test was used as the data was normally distributed. Differences between each group were calculated & mean of those differences was calculated. An **unpaired t-test** was applied to the differences of each group.

**RESULT**

**WITHIN-GROUP ANALYSIS  
FOR GROUP A  
WaLIDD Score**

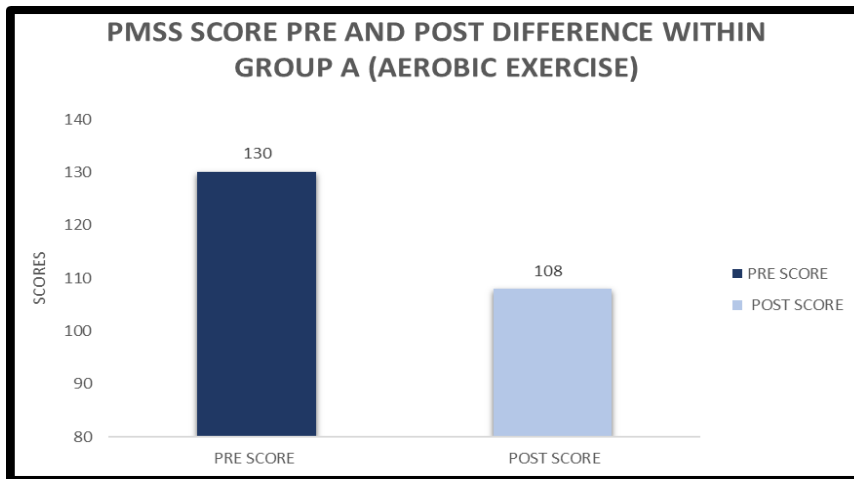


Analysis showed a significant statistical difference in WaLIDD score within this group ( $p < 0.05$ ). Thus, the Null hypothesis is rejected here and we can say that there is

a significant effect of Aerobic exercise on Primary dysmenorrhea.

**PMSS Score**

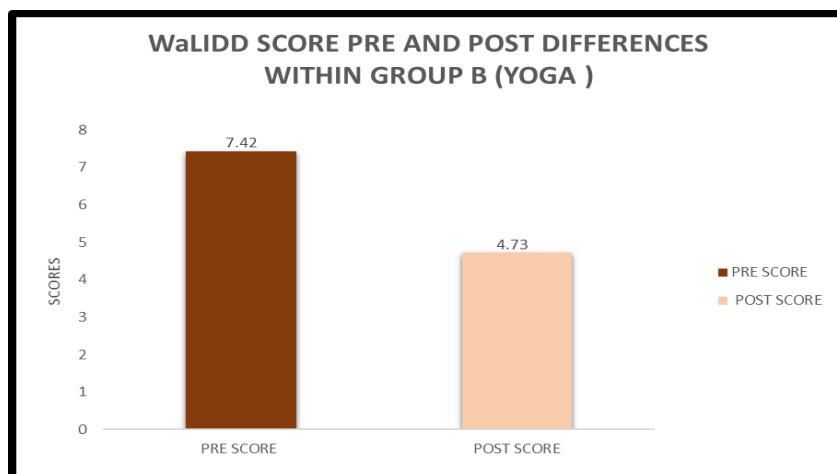




Analysis showed a significant statistical difference in PMSS Score within the group ( $p < 0.05$ ). Thus, the Null hypothesis is rejected here and we can say that there is a

significant effect of Aerobic exercise on Pre-Menstrual Symptoms.

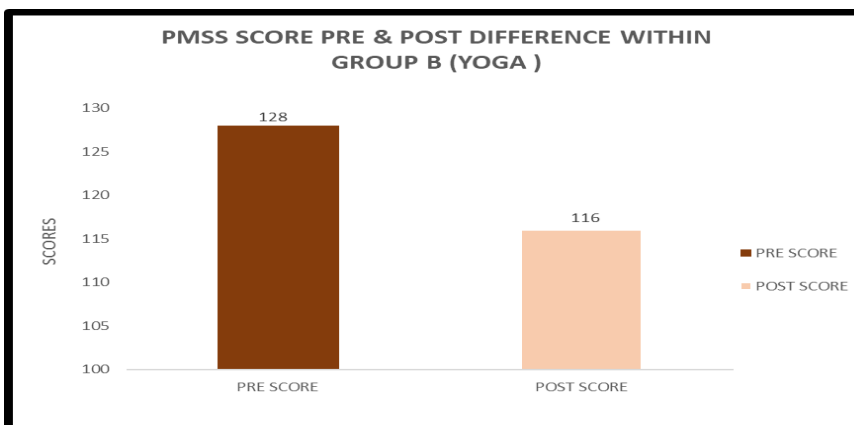
**FOR GROUP B  
WaLIDD Score**



Analysis showed a significant statistical difference in WaLIDD score within the group ( $p < 0.05$ ). Thus, the Null hypothesis is rejected here and we can say that there is

a significant effect of Yoga on Primary dysmenorrhea.

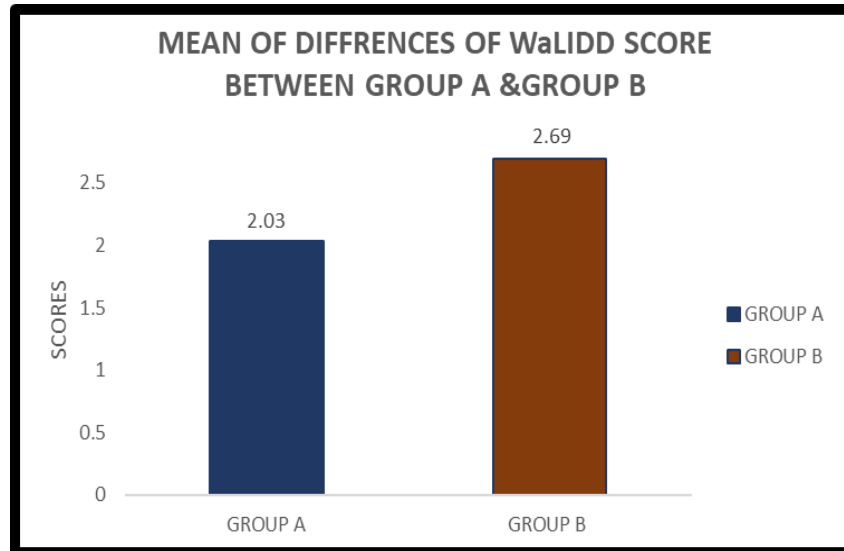
**PMSS Score**



Analysis showed a significant statistical difference in PMSS Score within the group ( $p < 0.05$ ). Thus, the Null hypothesis is rejected here and we can say that there is a

significant effect of Aerobic exercise on Pre-Menstrual Symptoms.

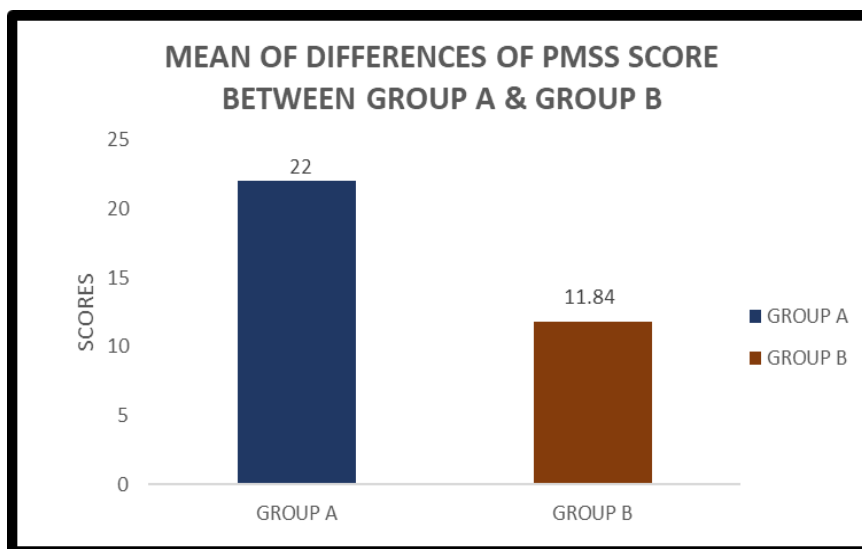
### BETWEEN-GROUP ANALYSIS WaLIDD Score



As the p-value is  $>0.05$  for this outcome measure, the null hypothesis is accepted which states that there is no significant

change in the effect of Aerobic Exercise and Yoga on Primary Dysmenorrhea.

### PMSS Score



As the **Mean Difference between the Aerobic Exercise group is higher than the Yoga Group**, Aerobic Exercise has a more significant effect on PMS as Compared to the Yoga Group. thus, **Aerobic Exercise is more effective in reducing the symptoms of PMS.**

### EFFECT SIZE

Effect size was calculated to determine the clinical significance of the intervention. According to the cohen, if the cohen's d value varies around 0.1, the effect size is low, if it varies around 0.3, the effect size is

medium and if it varies around 0.5, the effect size is large.

The Effect size in the Aerobic Exercise group and yoga group with both outcome measures (WaLIDD Score & PMS Scale) is presented in the table below;

| OUTCOME MEASURE | EFFECT SIZE |
|-----------------|-------------|
| WaLIDD SCORE    | 0.45        |
| PMSS SCALE      | 0.98        |

Table 4: Effect Size

In the present study, Cohen's d value of both outcome measures varies around 0.5 so it depicts;

The effect size is large.

**WaLIDD Score** shows, there is No statistically significant difference between groups A & B (p=1.11 with unpaired t-test). Cohen's d value (d=0.45) of the mean difference between the groups Show 66 percentile of difference of mean is noted in WaLIDD Score suggesting

**Group B has a clinical advantage over Group A in terms of the reduction of Primary Dysmenorrhea.**

**PMSS Score** shows, that there is a statistically significant difference existing between the groups where p=0.001. Cohen's d value (d=0.98) of the mean of the difference between the groups shows that there is a 79-percentile difference of mean in effect size noted in the PMSS Score. It suggests that **Group A has a clinical advantage over Group B in terms of reduction in symptoms of PMS.**

The **RESULT** of this study shows that: There is a **statistically significant** effect of Aerobic Exercise on Pre-Menstrual symptoms.

There is a **statistically significant** effect of Aerobic Exercise on Primary Dysmenorrhea.

There is a **statistically significant** effect of Yoga on Premenstrual symptoms.

There is a **statistically significant** effect of Yoga on Primary Dysmenorrhea. There is a

statistically significant change between the effect of Aerobic Exercise and yoga on PRE-

## MENSTRUAL SYMPTOMS.

There is no statistically significant change between the effect of Aerobic Exercise and yoga on PRIMARY DYSMENORRHEA.

## DISCUSSION

Today, different methods of treatment for primary dysmenorrhea and PMS Symptoms have become prevalent, and uncomplicated treatments have found a special place in the treatment of dysmenorrhea and PMS.

The present study was conducted to see the effect of aerobic exercise and yoga on Pre-menstrual symptoms and Primary Dysmenorrhea. This was an Interventional study Conducted on 52 young adult girls. The Participants were divided into two groups.

Group A was an aerobic exercise group and Group B was a Yoga group.

All the participants were advised to continue the given treatment for recommended sessions.

The findings of this study reveal a positive effect of Aerobic exercise and Yoga on Primary dysmenorrhea as well as Symptoms of PMS, which is consistent with the studies showing that aerobic activity and Yoga are effective.

The results of the current study showed that aerobic exercises and Yoga both affected dysmenorrhea which decreased the pain intensity. However, none of them proved to be superior to each other in terms of reducing the total score of the WaLIDD Score.

In the Present Study, Participants enrolled in the Aerobic Exercise Group and Yoga Group Both showed a positive effect on the PMS it decreased the Physiological symptoms, psychological symptoms as well as Behavioural symptoms. However, Participants enrolled in **Aerobic Exercise had more reduction in symptoms compared to Yoga** in terms of reducing the total score of the PMS Scale.

**Aerobic exercise** decreases the level of serum aldosterone by reducing the level of renin and increasing estrogen and progesterone and thus decreases and improves physical symptoms.

Aerobic Exercise also affects the mechanisms of brain endorphins and improves mood symptoms(4).

During menstrual pain, exercising results in a faster transfer of wastes and prostaglandins from the uterus, which is the main cause of menstrual pain, from the uterus(3).

**Cobra** pose improves spinal flexibility and strengthens the muscles in the back, the **Cat** pose initiates movement from the center and coordinates movement and breath,

**Child pose** allows back muscles to stretch and also helps the body to relax and the **Camel pose** causes stretching of the abdominal region the pull in the stomach signals uterine muscles and brings to contraction, thus easing the menstrual cramps(15). The possible mechanism explained was based on the level of serum interleukin 6 (IL-6). It has been found that yoga performers produce less IL-6 in response to stressors compared to nonyoga performers. Yoga postures are also considered to be immune-enhancing and restorative.

**Kapalbhathi breathing** techniques have a positive influence on the central nervous system to increase pain control and pain tolerance. Pain modifies the pattern of respiration. This modification is secondary to an emotional component and muscle guarding. Deep breathing, which includes prolonged expiration, tends to relax skeletal muscles and reduce pain(12).

Scully (1998) showed that 12 weeks of exercise (aerobic and nonaerobic) is effective in reducing PMS, but aerobic activity can reduce depression more(16).

The study of Aganoff and Boyle, aimed at the effect of aerobic training on menstrual cycle symptoms and women's psychological state, showed that regular aerobic exercise can increase relaxation in the mood and body.

Mahin Kamalifard et al did a study on the effect of yoga on PMS and they found that yoga significantly relieves the PMS symptoms and can be prescribed for the treatment of PMS(7).

Vishnu Priya and Rajarajeswaram studied the effectiveness of aerobic exercise at different intensities in the management of PMS and concluded that moderate-intensity aerobic exercise should be encouraged as a potential measure for PMS(17) and Present the study supports the Conclusion.

Chantler et al. showed that exercising due to the release of endorphins, relaxation, stress relief and improved blood flow can reduce the severity and duration of dysmenorrhea(18).

Previous studies revealed that exercise therapy and physical activity are correlated with reducing the pain of dysmenorrhea. The elevated premenstrual pelvic blood flow along with exercising delayed the onset of pain. During menstrual pain, exercising can result in faster transfer of wastes and prostaglandins from the uterus, which are the main cause of menstrual pain, from the uterus(19).

Harlow and Park, Blakey et al. reported that there was no relationship between exercise and primary dysmenorrhea(20).

Davaneghi et al. also concluded that there was no relationship between the level of physical activity and the severity of dysmenorrhea(21), this discrepancy between the studies with this study is likely to be due to differences in the type of exercise protocol and participants in the study.

A review and comparison between yoga and physical exercise were conducted by Govindarajan et al. concluded that yoga interventions are equal and/or superior to physical exercises in most outcomes. Though we got different results in the Present study we do not completely agree with this.

The efficacy of yoga on menstrual pain and stress has been studied by Nag and Kodali among medical students and concluded that yogic exercises help to control menstrual pain and reduces the stress level(22).

Priya Kanan et al (2013) showed that physiotherapy protocol has been shown to increase local blood supply, which favors more rapid elimination of prostaglandins. The treatment was paired with the k-taping technique, which will help in lifting the skin decrease the pressure, and increase lymphatic drainage which helps in the reduction of swelling. Inculcating physical exercises and yogic practice might help in the reduction of the symptoms of dysmenorrhea (23).

The results of a study by Nirav Vaghela et al showed that 1 month of regular aerobic exercise

and yoga movements, both reduced pain intensity and symptoms of PMS in females with PMS(6).

It seems that the improvement of the flow of blood and increased mental and physical relaxation is one of the reasons for the effect of aerobic exercise and yoga on dysmenorrhea and PMS.

The release of beta-endorphins due to Aerobic exercise would be the reason behind the superiority of Aerobic Exercise over Yoga.

## CONCLUSION

The Present Study on 52 Adult girls having Pre-Menstrual symptoms and Primary Dysmenorrhea, it can be concluded that;

- Aerobic Exercise and Yoga were both found statistically significant with equal effect in the treatment of Primary Dysmenorrhea.
- Aerobic exercise is statistically proven better in reducing the symptoms of PMS compared to Yoga.

## Clinical implication:

Aerobic Exercise and Yoga both be included in the daily life of girls suffering from PMS And Primary Dysmenorrhea for eliminating and reducing the absenteeism and disruption in quality of life. Adult girls must be aware to manage their menstrual pain and premenstrual symptoms. Aerobic Exercise can be included in the treatment

Protocol for females suffering from premenstrual symptoms.

## Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgment:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Nisha Chaturbhuj Pathak, Yagna Unmesh Shukla. Aerobic exercise versus yoga on pre-menstrual symptoms and primary dysmenorrhea among adult girls - a comparative interventional study. *International Journal of Science & Healthcare Research.* 2023; 8(4): 105-118. DOI: <https://doi.org/10.52403/ijshr.20230415>

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