

# Effect of Aerobic Exercise Circuit Training Programme on Primary Dysmenorrhea in Adolescent Girls

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**ABSTRACT--** Difficult menstrual flow or pain associated with menstruation is dysmenorrhea. It can be divided into two- primary Dysmenorrhea and secondary Dysmenorrhea. Of two, primary dysmenorrhea is the most common cause of abdominal pain and increased blood pressure. For almost half a century, physical exercise has been taught to help in relieving symptoms of pain induced dysmenorrhea, and in recent years researches regarding the inter-connection between aerobic exercise and dysmenorrhea have significantly increased due to its positive outcome. Hence, the purpose of this study is to determine the effectiveness of circuit training programme on pain and blood pressure on people with dysmenorrhea. 44 girls aged 18-26 years, who complained of pain during their menstruation, were recruited. Their pain level was assessed with numerical pain rating scale (NPRS) along with their systolic and diastolic blood pressures using sphygmomanometer. Secondary dysmenorrhea cases, people involved in gym and other physical activities and irregular menstrual cycle cases were excluded. People were trained with Aerobic circuit training programme. Circuit consisted of walking (10 min), jogging (10 min) and cycling (10 min) for 8 weeks, 4days/week. Pain (NPRS) and BP were measured pre-and post-intervention. There is a marked decrease in NPRS and blood pressure following circuit training programme which consisted of walking, jogging and running. There is a significant decrease in the symptoms associated with Dysmenorrhea on young girls who were following Circuit Training Programme.

**KEYWORD--** Primary Dysmenorrhea, Pain, Blood Pressure, Aerobic Exercise, Circuit Training

## I. INTRODUCTION

Common problem associated with gynaecological condition faced by adolescent girls is dysmenorrhea, a difficult menstrual flow or painful menstruation. It is of two types- primary and secondary. Primary dysmenorrhea refers to a condition where there is a moderate to severe abdominal pain or abdominal cramps without any pathology involving pelvis. This pain may also radiate to upper thighs. Secondary dysmenorrhea refers to abdominal pain because of any identifiable pathological disease. Other disturbing symptoms are nausea, vomiting, difficulty in concentrating in social activities and sports, headache, depression, body ache. Studies reported that primary dysmenorrhea permanently stops after 1-3years, although it may last until childbirth<sup>1</sup>. Studies suggest that, pain during primary dysmenorrhea usually last for 24-48 hours, before or after menstruation<sup>2</sup>. Primary dysmenorrhea is sometimes referred to as 'labour like' pain that begins before or during menstruation period, and lasting for 24-48 hours<sup>3</sup>.

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In young girls and women, primary dysmenorrhea is one of the leading causes for absenteeism in school and in workplace<sup>4,5</sup>. Studies reported that college absenteeism because of primary dysmenorrhea is 34% - 50%<sup>6,7</sup>. Primary dysmenorrhea can affect the quality of life of female, and sometimes may lead to disability and other minor, yet disturbing complication<sup>8,9</sup>. Psychological problems may also follow menstrual pain. As this condition has major impact on quality of life of women, several researchers from this area is seen concentrating on finding solution for this issue.

Increase in concentration of prostaglandins, which results in ischemia and uterine contraction is said to be the root cause for the symptoms during menstruation. Based on the findings and reports from number of studies it is said that primary dysmenorrhea affects 50-90% of general population, and should be given more importance as it is the most important health issue among women and young girls<sup>10,11</sup>. The management also depends on individual woman's response towards the symptoms

Considering its impact on quality of life of young girls, various non-pharmacological and pharmacological treatments such as non-steroidal anti-inflammatory drugs(NSAIDs), ultrasonic therapy(USD) for radiating pains, acupuncture therapy, herbal therapy, yoga therapy and etc have been used since several years for reducing the symptoms associated with primary dysmenorrhea. Although, there is a reduction in discomfort following these treatments, it is to be noted that some other form of physical exercises is also needed to increase the social participation of these young girls. Studies conducted by Savadi et al (2009) found that, though there is no positive effect on amount of bleeding, there is a reduction in pain following 8 weeks of isometric exercise on primary dysmenorrhea, and, the number of drugs taken in also reduced to half. Studies reported that other exercises such as stretching exercise also show positive effect on primary dysmenorrhea.

Several studies suggest that physical exercise, to be more specific aerobics exercises can help decreasing the menstrual pain. Aerobic exercise utilizes oxygen. It depends primarily on generating process of aerobic energy, and may range from low to high intensity, (i.e.) sub maximal to maximal. Sub maximal exercises can be performed in two ways, that is Short term, light to moderate sub maximal aerobic exercise and Long term, moderate to heavy sub maximal aerobic exercise. Short term, light to moderate sub maximal aerobic exercise is rhythmical, continuous and performed at a constant workload for 10- 15 minutes, while the long-term moderate to heavy sub maximal is performed at a constant workload between duration of 30 minutes and 4 hours.

The other important relationship between physical exercise and dysmenorrhea is the involvement of stress. A few studies have shown a correlation between stress and premenstrual syndrome. As a mean of moderating stress and immune's biochemical change, exercise is widely accepted. Decreasing the sympathetic activity is the mechanism by which aerobic exercise may decrease the symptoms of stress in dysmenorrhea. It is also reported that, there is an increase in endorphins level in women who exercise regularly, and this hormonal change can produce a positive effect on menstrual pain. Thus, there is a raise in pain threshold.

Studies have shown that, the cardiac autonomic activity alters during menstrual cycle<sup>12</sup>. Changes in sympathetic and parasympathetic tone lead to varying blood pressure and heart rate during menstrual cycle. There is also increase in resting blood pressure and heart rate due to vasoconstriction that is caused by increased prostaglandin levels during menstrual cycle. It is reported that, upon following aerobic exercise there is a reduction in resting blood pressure and heart rate, thus reducing the symptoms of dysmenorrhea associated stress<sup>13</sup>.

The idea of circuit training on girls with primary dysmenorrhea has not been commonly reported. The primary goal of our study is to find out the effectiveness of circuit training programme on pain and blood pressure on dysmenorrhea on young college girls. Advantage of this programme is that, it is very simple and can be done by anyone irrespective of their age and weight provided; they haven't had any history of cardiovascular issues. There are many equipment such as Treadmill, spin bike and others available for exercise training. It allows the subjects to walk, jog and run at measured speed, and desired intensity. Thereby, the study is proposed to determine the effectiveness of aerobic circuit training programme on pain and blood pressure in adolescent girls.

## II. MATERIALS AND METHODS

A Quasi experimental study was conducted at Saveetha Medical College Hospital. The details and purpose of the study was explained to all the students by providing information sheet, and written consent form was obtained. Students were selected based on the inclusion and exclusion criteria. Study included 44 students from Saveetha College of Physiotherapy, aged between 18 and 26 years, who have completed their menstruation of that month. All 44 were referred to Physiotherapy department by the department of Gynaecology. All subjects had regular menstruation and severe primary dysmenorrhea. Study excluded those with secondary dysmenorrhea, irregular menstruation, students under special drugs, other cardiovascular or any medical condition, neurological condition, subjects with regular exercise history (regular exercise- 3days/ week & a daily average of 30-40 minutes), those students who are not willing for 8 weeks follow up programme, and subjects with pain intensity less than 4. Outcome measures included Pain and Blood pressure. In the present study numerical pain rating scale (NPRS) measured the severity of pain, and Sphygmomanometer for Blood Pressure. Pain and blood pressure (systolic and diastolic) were measured before and after intervention. The study's duration is for 2 months and the participants had menstrual period ranging from 3-7 days. In the first month of study, the pain during dysmenorrhea is recorded with the NPRS scale and the participants were given Aerobic Circuit Training following the end of the menstrual cycle for 4 weeks. Exercises were not prescribed during the menstrual cycle as it may lead to increased flow. The same procedure was repeated for the second month of the study. At the end of second month post test pain scores and blood pressure values were recorded.

Circuit training programme consisted of three exercises –walking, jogging and cycling (10 minutes each). Students were asked to warm up for 5 minutes before, and cool down 5 minutes after the programme. On the whole circuit training programme was conducted for 40 minutes/day for 8 weeks duration on alternate days (40 minutes, one time per day, four days a week for 8 weeks). Circuit training programme is started with simple warm up exercises which is done for 5 minutes. The subjects are then asked to walk for the first 10 minutes followed by jogging (10 minutes) and cycling (10 minutes). No beverages were given in the middle of the programme to avoid alteration in exercise intensity. After 30 minutes of walking followed by jogging and cycling, cool down exercises were given for 5 minutes. The subjects were asked to report every alternate day for 8 weeks.

The aerobic exercise protocol was given based on the FITT principle:

Frequency: 4 days/ week

Intensity: 12-14 somewhat hard in breathing based on Borg scale

Time: 40minutes

### III. RESULT

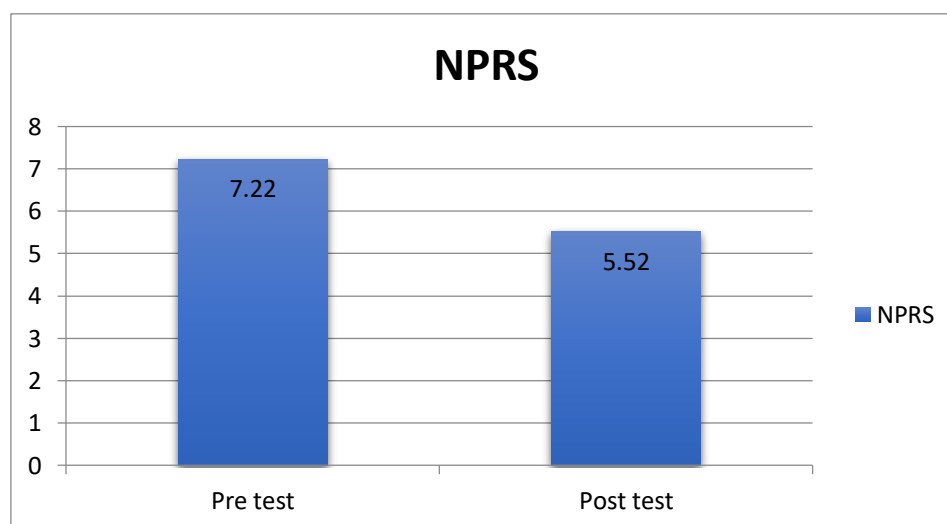
The study was performed among 44 students. Pain and blood pressure data were collected and analysed using descriptive and inferential statistics. Difference between pre-test and post-test measurements were analysed with paired t- test. Statistical analysis of quantitative data shows a significant difference between the pre-test and post-test outcomes, and the difference has been tabulated. Table-2 shows that, the pre-test mean values of NPRS is 7.225(SD 1.097) and post-test mean values of NPRS is 5.520(SD 1.177), with the P value 0.001(statistically significant).

**Table 1:** Demographic data

Mean Age	Mean Body Mass Index
21.36	22.07

**Table 2:** Comparison of pre-test and post-test values of numerical pain rating scale(NPRS)

Test	Mean	Standard deviation	Standard error of mean	t value	p value
Pre-test	7.225	1.097	0.165	12.6414	0.0001
Post-test	5.520	1.177	0.177		



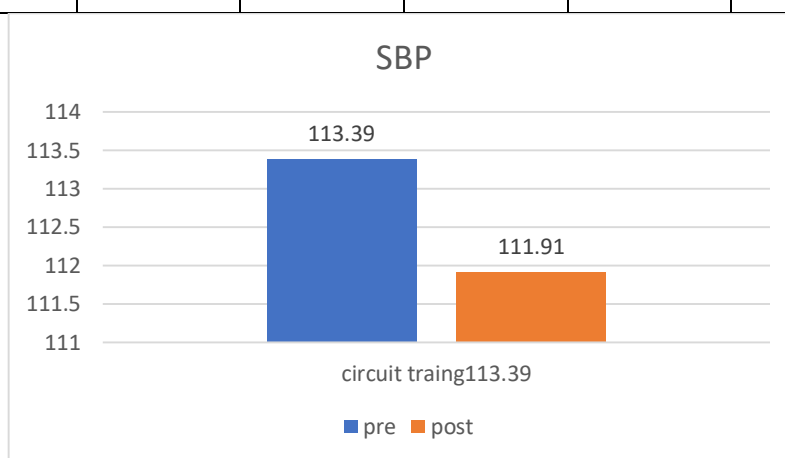
**Figure 1:** Comparison of pre-test and post-test mean score of numerical pain rating scale

Table-3 shows that, the pre-test mean value of systolic blood pressure is 113.39(SD 8.57) and the post-test mean value of systolic blood pressure is 111.91(SD 7.22), with the p value 0.0015, which is statistically very significant. In table-4 the difference between the pre-test and post-test values of diastolic blood pressure(DBP) is

recorded. The pre-test mean value of DBP is 72.98(SD 5.92) and post test mean value is 71.59(SD 4.92) with significant difference in p value (0.0006)

**Table 3:** Comparison of pre-test and post-test values of Systolic blood pressure(SBP)

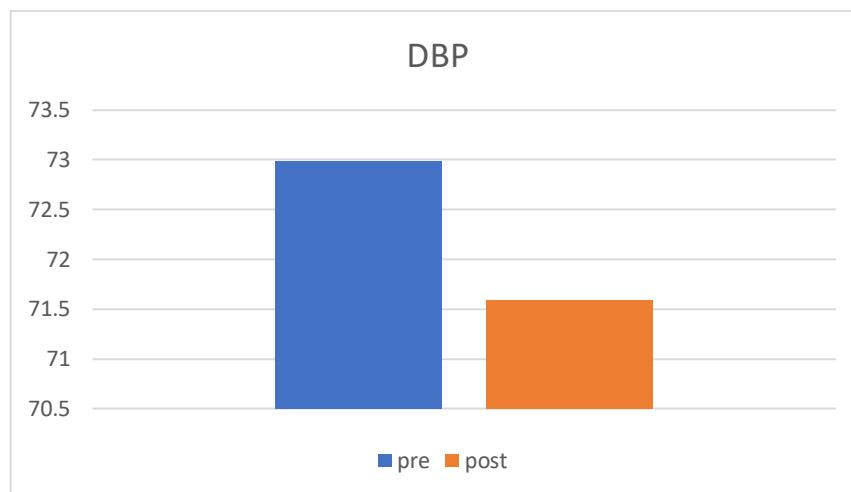
Test	Mean	Standard deviation	Standard error of mean	t value	p value
Pre-test	113.39	8.57	1.29	3.4010	0.0015
Post-test	111.91	7.22	1.09		



**Figure 2:** Comparison of pre-test and post-test values of Systolic blood pressure(SBP)

**Table 4:** comparison of pre-test and post-test values of diastolic blood pressure(DBP)

Test	Mean	Standard deviation	Standard error of mean	t value	p value
Pre-test	72.98	5.92	0.89	3.7084	0.0006
Post-test	71.59	4.92	0.74		



**Figure 3:** comparison of pre-test and post-test values of diastolic blood pressure(DBP)

#### IV. DISCUSSION

Primary dysmenorrhea is one of disturbing pain that have a major impact on daily life activities of women. Due to its major impact on women's health, it has gained attention by many researchers in this field, and paved the way for improvement in various advanced treatment approaches. Although, dysmenorrhea lasts only for around 24- 48 hours, it is one of the leading causes for women to avoid or hesitate social and sport activities.

Studies reported that primary dysmenorrhea affects almost 50-90% of general population. During menstrual flow, active participation in social and other activities are reduced. This reduction is caused mainly because of its primary symptoms such as pain, stress and weakness. Results of several studies suggest that there is a co-relation between physical exercise activities with reduction in pain level in dysmenorrhea (1).

Based on the scientific data, aerobic exercise is found to have a positive impact on pain and menstrual flow (bleeding) during primary dysmenorrhea. It is said that, aerobic exercise produces an increased level of endorphins, which helps in suppressing the pain associated with dysmenorrhea.

Functional improvement, active participation and physical activity play a key role in women's health. Hence, to provide a better care we proposed this study to determine the effects of circuit training programme that consisted of three aerobic exercises among young girls in a college setup. This study includes 44 students who finished their menstruation flow period of that month. All were taught to perform circuit training programme exercises i.e. walking, jogging and cycling (10 minutes each) for duration of 8 weeks.

Exercise intervention for dysmenorrhea aimed at improving the pain and BP level, which helps in controlling the stress level. Positive emotions, pain reduction, improving symptoms are some of the advantages of physical rehabilitation.

In this study, the programme involved 5 minutes of warm up before intervention, and 5 minutes of cool down after intervention. Subjects were allowed to walk for the first 10 minutes, followed by jogging for 10 minutes. Last exercise was cycling on Spin bike for 10 minutes followed by cooling down. Subjects were asked to report every alternate day for the intervention. At the end of 8-week treatment with circuit training programme exercise, it is noted that there is a significant reduction in the pain level and blood pressure, and had a noteworthy improvement

in the physical activity, pain level and blood pressure of young girls. However, further research is needed in this field with different age groups and with different variables.

Summarizing the findings, this study suggests that there is a positive impact on symptoms of dysmenorrhea such as pain, increased blood pressure.

## V. CONCLUSION

Circuit training programme with aerobic exercise was conducted on young college students with primary dysmenorrhea, and is found to have a significant reduction in pain and blood pressure.

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