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Efficacy of Chair Aerobics and Progressive Muscle Relaxation in Primary Dysmenorrhea

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Key words
Chair aerobics, Primary dysmenorrhea, Relaxation

Abstract
Primary dysmenorrhea has affected a large number of population over the globe, with the prevalence of 70.2% in Indian women. The pain usually initiates in the lower abdomen and may radiate to the lower back and thighs. Pain killers are a common choice of treatment in case of pain secondary to menstrual cramps but, it has a lot of side effects and it can only provide symptomatic relief. As a precaution to prevent this pain there are lot of exercise regime. As we know that cramp increases muscle tension, so it is necessary to focus on some relaxation along with the exercises. This study will basically prove the effect of relaxation along with exercises. Based on the inclusion and exclusion criteria 40 subjects were divided into 2 groups. In one group the subjects were given combination of progressive muscle relaxation along with chair aerobic exercises and in the other subjects were given chair aerobic exercises only. The interpretation of the study was done based on comparison of the pre-test and post-test assessment of Numerical Pain Rating Scale(NPRS) and Verbal Multidimensional Scoring System (VMSS). Comparison results from within the group (intra) showed that NPRS and VMSS scale were significant in both the groups ($p<0.0001$). Comparison results of both the groups (inter) showed that combination of both relaxation and exercises was statistically significant in reducing NPRS score ($p=0.5725$) and VMSS score ($p=0.0009$) than chair aerobics individually in females having primary dysmenorrhoea. The combination of progressive muscle relaxation along with chair aerobic exercises was significantly effective in reducing the intensity of pain in females suffering from primary dysmenorrhea.

1. Introduction

Menstruation is a process of the body in which blood and associated matter are released through the vagina from the uterus. It is a part of the menstrual cycle that begins from menarche (onset of menstruation i.e. first menstrual period) lasting up to the menopause (cessation of menstruation i.e. last menstrual period). A normal menstrual cycle is of 21 to 45 days with blood flow of 3 to 5days. The estimated blood loss is around 50 to 200ml.[1] It lasts for about 32 years. There are four phases of menstrual cycle i.e. menstrual phase, proliferative phase, ovulatory phase and secretary phase.[1] Menstruation plays a major role in the physical, mental, developmental and reproductive growth of a woman. Drastic changes occur both physically and mentally in women during the menstruation phase. Menstruation also has a major role in pregnancy and child birth.

Dysmenorrhea is defined as the cramping pain experienced during menstruation. It is a common monthly problem that affect majority of women with a prevalence of 70.2% in Indian women and 71.7% in women overall the globe.[2] At some moment of life approximately 50% to 70% women show symptoms of dysmenorrhea, which makes it difficult to perform their daily activities.[3] Dysmenorrhea is divided into two types i.e. Primary dysmenorrhea and Secondary dysmenorrhea. In primary dysmenorrhea the pain is usually predominant in lower abdomen and lower back that may radiate to the thighs. Other symptoms include bloating, fatigue, nausea, mood swings. It affects more than 50% women in age group on 18 to 25 years.[3] Musculoskeletal pain is one of the common symptoms experienced by females during menstruation. Secondary dysmenorrhea is associated with an underlying menstrual condition or pathology such as endometriosis, adenomyosis and PID.[1] There are three varieties of dysmenorrhea i.e. spasmodic dysmenorrhea, congestive dysmenorrhea and membranous dysmenorrhea. Among all three, spasmodic dysmenorrhea is the most prevalent as cramping pain.[1]

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Due to increased release of prostaglandins, endoperoxides and metabolite with menstrual flow there is an increase in the myometrial contractions. The uterine contractions cause spasm of the muscles as the blood flow is reduced resulting into ischemia. The sensitization of nerve terminals to prostaglandins and endoperoxides leads to generation of cramping pain.[1] Cramping pain in lower abdomen is considered as most common symptoms of primary dysmenorrhea. Because of cramping pain day to-day routine and quality of life is hampered. Menstrual pain is a form of dull pain which is non-localized and it is often hard to describe the pain site.[4] Such pain might be felt in BONES, muscles, and skin around organs.[4] Menstrual pain is a common problem among females and it is the main cause for them to be absent from college and job or workplace. Thus it may affect their overall achievements and grades.[5]

In majority of cases, pharmacological methods i.e. analgesics or NSAIDs (Non-Steroidal Anti Inflammatory Drugs) are used to relieve the cramping pain caused by the hyperactivity of the uterine muscles.[3]

Exercises play a major role in improving the quality of life of a person. A good exercise programme considering patient's conditions, pathologies, deformities can have a dynamic effect even beyond the course of medicine. It has been shown that women who perform regular exercises had less pain and behavioural changes than the women who do not perform any kind of exercises.[6] Aerobic exercises are usually moderate to high intensity whereas chair aerobics are low to moderate intensity exercises. Moderate and high intensity exercises may have adverse effects on pain if discontinued. Chair aerobic exercise is a physical activity which is performed while sitting on a chair and it depends primarily on the aerobic energy generating process.[7] Therefore, inclusion of chair aerobics in the protocol may ensure avoiding adverse effects. Also, chair aerobics can be a good option for beginner to begin with low intensity exercises. Aerobic exercises help to increase blood circulation and metabolism that leads to decrease in cramps.[8]

Along with exercise, relaxation is equally important and beneficial in terms of development of mental stability, lower blood pressure, decrease muscle tension, reduce anxiety and stress and decrease fatigue.[9] Thus it helps in reducing the body's need for oxygen. Progressive muscle relaxation, also known as Jacobson's relaxation technique is a form of therapy that involves tightening and relaxing the muscle groups, one at a time, in a specific pattern. It was first identified by Jacobson in 1934 as tensing and releasing of 16 muscle groups.[10] The goal is to release tension from the muscles, while helping the person recognize what that tension feels like. Also, as aerobic exercises increase blood circulation relaxation may help in normalising the increased blood circulation after a period of time. Relaxation helps in reducing stress and anxiety that boosts a feeling of wellbeing in a person which may indirectly have a positive effect on the body as well.

Although both the techniques are proven separately, this study is done to find out the effectiveness of chair aerobics and progressive muscle relaxation together as it is believed that there may be exponential improvement in the results by the combined effect of both the methods if they are performed together.

2. Methodology

Ethical clearance was taken by institutional ethical committee. Based on inclusion and exclusion criteria, sample population was selected. Subjects were informed about the study and a written consent form was signed and taken from the participants. According to inclusion and exclusion criteria 40 subjects were selected. The study was conducted on young adult females of age group between 18-28 years having regular menstrual cycle. Subjects with history of gynecological surgery, irregular menstrual cycle, polycystic ovarian disease/syndrome, receiving any hormonal therapy and/or having other menstrual disorders were excluded as these symptoms can affect the results.

The subjects were divided into two groups i.e. group A and group B. Each group contained 20 subjects. The pre-assessment was taken by using the Numerical Pain Rating Scale (NPRS) and the Verbal Multidimensional Scoring System (VMSS)[13] and the data was recorded using Microsoft Excel. The treatment was started after the end of menstrual cycle and continued up to the beginning of the next menstrual cycle. The subjects had to perform the following exercises for at least 4 days per week for about 4 weeks.

Group A subjects were given chair aerobic exercises along with progressive muscle relaxation. Group B was given only chair aerobic exercises. Chair exercises included:[7]

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1. Knee lifts
2. Diagonal toe touch
3. Lunges
4. Punches
5. Flutter kicks
6. Half jack
7. Criss-cross

After completion of 4 weeks protocol successfully, post assessment was taken using the VMSS and NPRS.[13] The data was again recorded into Microsoft Excel. Further study was then carried out based on the comparison of pre and post-assessment as well as comparing the results of both the groups.

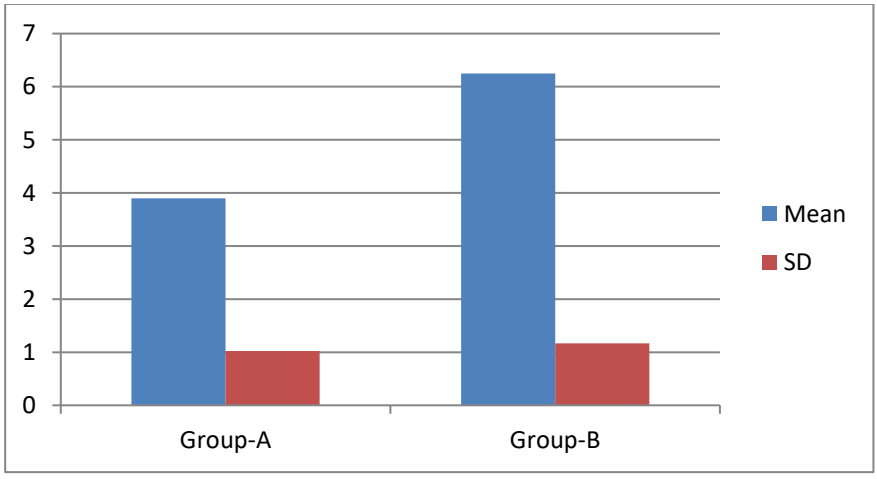
Statistical analysis was done with the help of Microsoft Excel for initial process (to calculate Mean, SD). For further calculations, statistics software INSTAT was used. The analysis was done using assumption test carried out by the Kolmogorov and Smirnov method. The data was following Gaussian Distribution. To compare the pre and post values of NPRS and VMSS from within the group the paired t test was used, whereas to compare the values between both the groups (pre-pre and post-post) unpaired t test was used.

3. Results

Table 1: NPRS

	NPRS				P value (pre/post)	Inference
	Pre-test		Post-test			
	Mean	SD	Mean	SD		
Group A	7.5	1.051	3.9	1.021	0.0001	Extremely significant
Group B	7.55	1.146	6.25	1.164	0.0001	Extremely significant

The above table interprets that the NPRS score was significant in both the groups with P value <0.0001. Comparison of the of the pre and post assessment showed that score of post assessment (P value 0.7110) was extremely significant in both the groups than the pre-assessment (P value 0.5725).



Graph 1: NPRS (Post-test)

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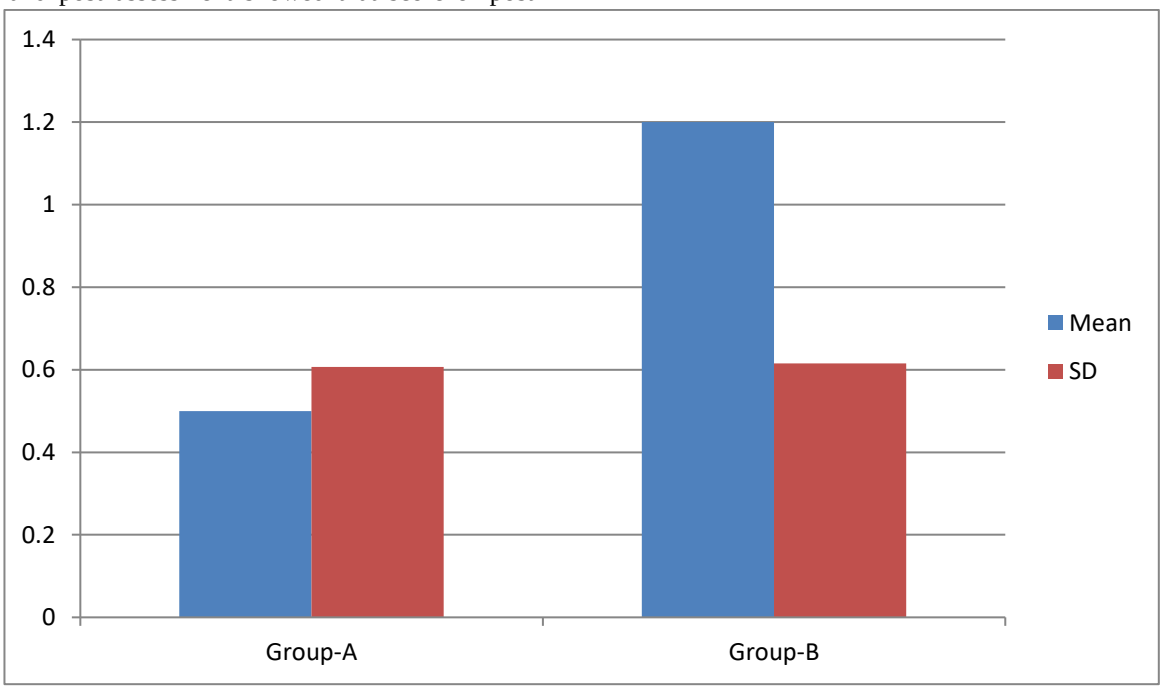
Table 2: VMSS

	VMSS				P value (pre/post)	Inference
	Pre-test		Post-test			
	Mean	SD	Mean	SD		
Group A	2.1	0.7182	0.5	0.6070	0.0024	Extremely significant
Group B	2.25	0.6387	1.2	0.6156	0.0006	Extremely significant

The above table interprets that the VMSS score was significant in both the groups with P value 0.0024 (Group A) and 0.0006 (Group B). Comparison of the of the pre and post assessment showed that score of post assessment (P value 0.0009) was extremely significant in both the groups than the pre-assessment (P value 0.6141).



Graph 1: VMSS (Post-test)

4. Discussion

Dysmenorrhea is characterized by cramping pain that predominantly initiates in the lower abdomen and may radiate to the low back and thighs. The intensity of pain worsens the dysmenorrhea making it a more stressful and annoying factors for majority of females. This in general hampers the daily activities of women where some remain completely at bed rest while some are able to perform their daily routine but with support of analgesics.[7,12]

Aerobic exercises increase the release of endorphins by the brain which leads to rise in the pain threshold.[14] Thus the exercise has an analgesic effect against pain by increasing the blood circulation leading to pain reduction in primary dysmenorrhoea.[6] Chair aerobics are low to moderate intensity exercises that increases the blood circulation the helps in reducing the intensity of cramps[8].

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But, in order to normalise the blood circulation relaxation is equally important to cool down the adverse effects and decrease the muscle tension resulting in complete relief of pain. [9]

The present study ' Efficacy of chair aerobics and progressive muscle relaxation in primary dysmenorrhea' was conducted to check the combined effect of exercises (chair aerobics) and relaxation (PMR) on reducing pain in primary dysmenorrhea and to compare it with the individual exercise protocol (chair aerobics only).

The objectives of the study were to determine the effect of chair aerobic exercises in primary dysmenorrhea, to determine the effect of progressive muscle relaxation in primary dysmenorrhea and to compare the effect of chair aerobics with and without progressive muscle relaxation

The study was conducted on 40 subjects who were selected based on the inclusion and exclusion criteria. The subjects were divided into two groups. One group was given chair aerobic exercises alongwith progressive muscle relaxation whereas the other group was given chair aerobic exercises only. The study was interpreted based on comparing the pre and post assessment using the NPRS and VMSS scores.[13] The data of both pre and post assessment was recorded using Microsoft Excel.

The analysis was done using assumption test carried out by the Kolmogorov and Smirnov method. Paired t test was used to compare the intra group values of NPRS and VMSS. Results showed that NPRS and VMSS scale were significant in both the groups ($p<0.0001$).Unpaired t test was used to compare the inter group values of NPRS and VMSS. The results showed that combination of both relaxation and exercises was statistically significant in reducing NPRS score ($p=0.5725$) and VMSS score ($p=0.0009$) than chair aerobics individually in females having primary dysmenorrhoea.

5. Conclusion

The above study showed that the use of both chair aerobic exercises and progressive muscle relaxation were effective in reducing the NPRS and VMSS scores in subjects. Also, the results support that among both the groups, the group that performed combination of chair aerobic exercises and progressive muscle relaxation showed significant effect in reduction of pain in females with primary dysmenorrhea than the group that performed only chair aerobic exercises. Hence it is preferable to use progressive muscle relaxation along with chair aerobic exercises as it is shown to be more effective for reducing intensity of pain and improving the quality of life of the females suffering with primary dysmenorrhea.

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