



Muscle Relaxation Strategies on Dysmenorrhea: An Interventional Study

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Background: The chief complaints of menstruating females can impact their life with several physical and psycho-social wellbeing. Menstrual pain could be due to primary or secondary dysmenorrhea. There has been a lack of ongoing studies to demonstrate the association of crucial variables with day-to-day activities during the cycle.

Aim: Study adopted to explore the effectiveness of pelvic rocking exercises and home workouts among adolescents.

Methods: A case-control randomized design was adopted among the adolescents' community where the pre-post test was carried out, and the selected variables have been statistically analyzed.

Results: In total, 180 adolescents participated in our study. Overweight has been well documented as one of the variables to experience pain, and the intensity of the pain minimized after performing a couple of interventions.

Moreover, few findings appeared that exercises and home workouts reduce the pain level (scores) ($p < 0.05$) and documented fewer dysmenorrhea symptoms in the following cycle.

Conclusion: The study reports muscle relaxation strategies to help in the relief of menstrual pain. The authors recommend performing ongoing research with a larger sample size to interpret the findings with cautions to associate cause-effect relationships.

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1. INTRODUCTION

Dysmenorrhea is classified into two major types as primary and secondary, with the primary clinical features of lower back pain and upper thigh. It can also be manifested with nausea, vomiting, fatigue, laziness, and sometimes diarrhea [1]. There are no recognizable pelvic disorders (endometriosis) since menarche for twelve months in primary type. On the contrary, secondary dysmenorrhea has the nature of the pelvic illness. Of note, there is no proven treatment for endometriosis. Consequently, women undergo anatomic pelvic abnormalities, including fallopian tubes [2].

Difficulties defining the criteria with the subjective symptoms make the healthcare providers diagnose the hormonal-related menstrual pain. However, recent literature works across the globe revealed the substantial nature of despair among a broader range of women. In a developing country, the investigation by Sadana in the year 2019 [3] reported in a review of literature described the clinical signs and symptoms, risk factors, evaluation, and treatment options. Published studies explored that secondary dysmenorrhea could be prevalent in over 60% of the women of adolescents, and 70% of the girls with chronic pain are unable to respond to any medical interventions. Both types are common disorders progressing to deep endometriosis. Globally the prevalence of dysmenorrhea among adolescents ranges from 15.8% to 89.5% [4].

Exercises have a positive contribution and play a vital role in minimizing dysmenorrhea's pain. Appropriate activities help increase vasodilation and suppress the relevant hormones [1]. One of the physiological causes of dysmenorrhea is the excessive production of prostaglandins [5]. Besides, over-abundance of vasopressin is also a hormone responsible for uterine contraction [6]. Hence, the substantial remedy to alleviate pain, fatigue, weakness, and nausea needs focused awareness and proper educational intervention through public health programs to bring awareness programs to motivate women to exercise. The non-pharmacological intervention of performing exercises proposes understanding which advocates a method of relief [7,8]. Though there is a lack of evidence for instigating and practicing such alternative therapies, lifestyle

modification could significantly act as a first-line suggestion for all women [9]. A recent study documented that a healthy lifestyle, including exercise, could lead a better life, particularly dysmenorrhea, and it will decrease stress-related mental pressures [10,11]. Therefore, the authors decided to examine the relationship between progressive relaxation techniques and primary dysmenorrhea in adolescents to facilitate lifestyle-improving interventions among young women.

2. METHODS AND MATERIALS

The adopted research design was a two group true experimental case-control study. A random sampling technique was used to assign the participants to two experimental groups and one control group with the age group 15-20 years. The southern region of the Indian rural community was chosen as the population. Before identifying the sample, researchers surveyed the region to forecast the number of adolescents residing in that community.

Participants gave their consent to contribute to this study. As a first step, the intensity of primary dysmenorrhea was surveyed in their first menstrual cycle—the random allocation of the experimental group (EG) participants and the control group (CG). (even and odd number method). After a survey, they were intervened with progressive relaxation techniques (pelvic rocking) and home workouts (mild aerobic exercise) respectively for groups one and two (experimental group participants). Later post-test was conducted to respond to the questionnaire related to pain during menstruation. This questionnaire was filled up by the participants in the first three days of each cycle for three consecutive months of pre and post-intervention. However, the control group did not receive any intervention; they completed the questions for three menstrual cycles in the first three days of menstruation. Telephone follow up was performed (twice a week) and in-person (once every two weeks).

The total sample size was calculated using similar previous projects on the same concept and appropriate with 180. The data collection tool has two-part. The first part comprised demographics, and the second tool has a numerical pain rating scale. The researcher prepared the pain scale that varies from 0-10.

Pain score was interpreted as 0- No pain, 1- 3 indicates mild pain, 4-6 moderate pain, and 7-10 severe pain. The required content validity got done by the experts in the field of an alternative yoga therapist. The pilot study was performed among the 10 % of the population adhered to inclusion criteria. Those sets of the sample in the pilot study were excluded from the leading research. The computed validity and reliability of the data collection tool were confirmed with 97% Pearson correlation coefficient and a value of 76% with Cronbach's alpha.

A structured program on pelvic rocking exercise and hot application method was taught to the adolescents by the health center-appointed education provider. The steps of pelvic rocking exercise include Participants Instructions as follows:

1. Lie down on your back, supporting the head with a pillow.
2. Bend the knees
3. Keep the foot flat on the floor.
4. Place one hand under the curve of the back.
5. Place another hand on top of the abdomen.
6. Tighten the buttocks and abdominal muscles simultaneously, inhale and hold (1-2-3-4).
7. Exhale 4-3-2-1 and relax the muscles and feel your back flat on the underneath hand.
8. Repeated the last two steps about ten times (twice a day for three weeks).

Experimental group 1 received pelvic rocking exercise; group two had used their known

exercises (home workouts) for 45 minutes at home with hot water application.

The research questions are as follows:

- a. Is there a difference between pre-and post-pain level scores after pelvic rocking exercise and home workouts combined with a hot application?
- b. Is there a statistical association of post-interventional level of dysmenorrhea with the selected variables?

At the end of 12 weeks (three cycles of menstruation), all collated data were analyzed using SPSS (Version 23) software (IBM). Descriptive statistics mean, median, mode, and the inferential statistics of paired and unpaired t-test, chi-square (post-test score with selected demographic variables) was implemented to interpret the collated data.

3. RESULTS

The study was conducted among 180 female adolescents. According to the results, the two experimental groups were not significantly different in terms of their primary demographic characteristics. Still, there was an association in terms of overweight between both experimental and control groups ($p=0.001$).

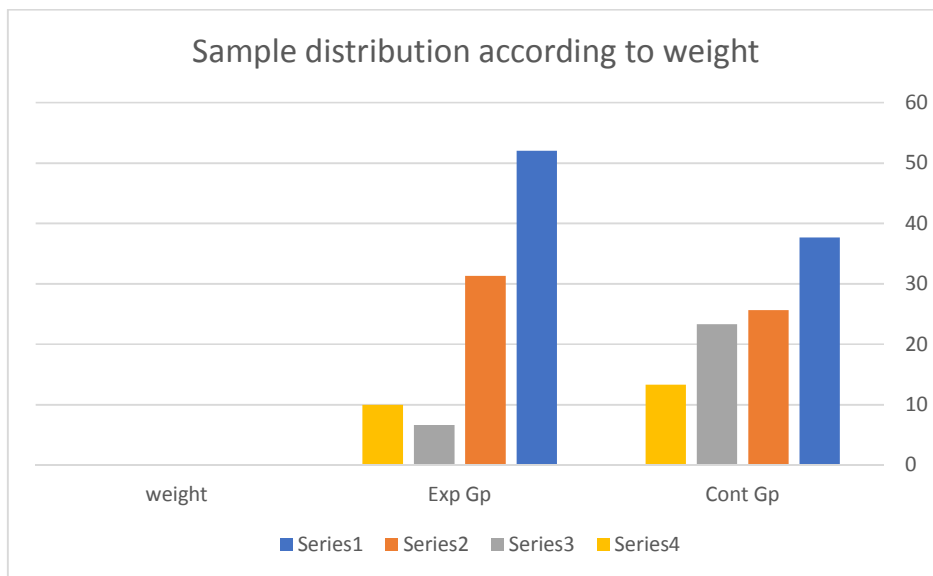


Fig. 1. Sample distribution according to weight
 Series1: 35-40 kg, Series 2: 41-45 KG, Series 3: 46-50 kg, Series 4: Above 50 kg

Table 1. Frequency and percentage distribution of adolescent with primary dysmenorrhea

Demographic data	Experimental group 1		Experimental group 2		Control group	
	Age (Mean ±SD)					
13-14	22	36.66%	40	66.66%	16	26.66%
15-16	30	50%	10	16.66%	18	30%
17-18	8	13.33%	10	16.66%	26	43.33%
Age at menarche						
Above 10						
10-13	45	75%	28	46.67%	52	86.66%
14-17	15	25%	32	53.33%	6	13.44%
-	-	-	-	-	-	-
Duration of the menstrual cycle						
26	10	16.66%	10	16.66%	12	20%
28	28	46.66%	20	33.33%	28	46.66%
30	22	36.66%	30	50%	20	33.33%
Duration of pain						
Two days	38	63.33%	40	66.67%	36	60%
3-4 days	14	23.33%	12	20%	22	36.66%
Above four days	8	13.33%	8	13.33%	2	3.33%

(Age mean±SD;15.03±1.26 Group 1); (Age mean±SD;14.83±1.47 Group 2); (Age mean±SD;16±1.7 Control Group)

Table 2. Pre-post test pain scores on dysmenorrhoea

Intervention		Experimental group 1			Experimental Group 2		
		Mean	SD	t- value	Mean	SD	t-value
Phase 1	Pre-test	8.13	0.730		8.3	0.70	
	Post-test	6.7	1.08	2.754	6.83	0.69	2.808
Phase 2	Pre-test	4.73	1.112		5.7	0.65	
	Post-test	3.6	1.003	1.026	4.7	0.65	1.5
Phase 3	Pre-test	1.73	0.944		3.3	0.61	
	Post-test	0.6	0.723	0.43	0.26	0.44	0.648

The Fig. 1 depicts the distribution of participants' weight, and it shows that there are significant associations that could be assumed that overweight will contribute to menstrual pain.

The Table 2 depicts the effectiveness of pelvic rocking and exercises at home in reducing pain for dysmenorrhea. It shows that there are no statistically significant differences in adopting either pelvic rocking or workouts at home.

4. DISCUSSION

The study findings revealed the effectiveness of alternative therapies taught in three phases with two different interventions. One hundred and eighty adolescent girls (N=120) participated and were assigned to two groups randomly. Group one and two followed pelvic rocking as a relaxation mode and home workouts, respectively, as defined in the methodology. A pre-validated structured questionnaire was adopted to collect the demographics. The

numerical pain scale was used to assess their pain level before and after an intervention in the gap of one week to complete three phases in the three consecutive menstrual cycles. In several ways, physical exercises are considered a potential treatment for the early prevention and treatment of dysmenorrhea for more than many decades [12]. Our study confirmed the role of routines exercises as an alternative therapy as well as a preventive strategy. The crucial reason for primary dysmenorrhea is less blood supply that could also be due to a high level of prostaglandins and uterine contractions. The other hormonal (progesterone, estrogen, and vasopressin) causes are the secretion of prostaglandins and other mediators in the uterus [13]. Our study findings are parallel with the study by Brown J [7] where the researchers suggested that women adopt physical exercises as a non-medical remedy. The study determining aerobic exercise's effect on some of the menstrual symptoms of students who are not athletes revealed doing the regular practices of

activities aerobic exercise can control early menstrual dysmenorrhea and severe menstrual bleeding [14]. Three different research pieces aimed to study the relationship between primary dysmenorrhea and aerobic exercise among female students; there were no significant differences [15,16,17].

Today, different treatment methods for dysmenorrhea have become prevalent, and alternative therapies found a unique strategy. This study's findings demonstrated that twelve weeks of progressive muscle relaxation (pelvic rocking) and home workouts aerobic exercise significantly minimized the severity of pain in treating menstrual disturbances in the case group compared to the non-intervention group. Findings from various studies denote that exercise therapy and physical activity are correlated to minimizing pain. Sports increase premenstrual pelvic blood flow, so the onset of prostaglandin accumulation in this area delays the start of pain; evidence prevails that premenstrual activity can lead to faster transfer of wastes and prostaglandins (which is the leading cause of reducing menstrual pain) from the uterus. On the other hand, regular exercise plays (Table 2) an essential role in reducing stress, improving blood circulation, and increasing endorphins and nerve transducers. Inhibition of anxiety and related disorders is linked to one of the most common causes of the relationship between exercise and menstruation [18]. Shavandi et al. al; examined the effect of eight weeks of isometric exercises on primary dysmenorrhea in female students. They concluded that performing isometric exercises (including abdominal, pelvic, and groin enhancement exercises) reduces the severity and duration of pain, and less medication use rate is adequate [19]. Chantler et al. revealed that exercising due to the release of endorphins, relaxation, stress relief, and improved blood flow can reduce dysmenorrhea's severity (Table 2) and duration [20]. Examining the effect of aerobic exercise on some menstrual symptoms of nonathletic students concluded that regular and continuous aerobic exercises could control initial dysmenorrhea and severe menstrual bleeding [21]; the study results are consistent with the present study. Aganoff and Boyle's study, aimed at aerobic training on menstrual cycle symptoms and women's psychological state, showed that regular aerobic exercise could increase relaxation in the mood and body [22]. In the present study, the hypothetical statements proved that aerobic exercise on dysmenorrhea.

Improve the flow of blood, and improved mental and physical relaxation are among the reasons for relieving pain during menstruation.

Harlow and Park, Blakey et al. explored no association between exercise and primary dysmenorrhea [13]. Similarly, the alternative therapies among reducing menstrual pain between Athletic and non-athlete groups demonstrated no significant association with the level of physical activity and the severity of dysmenorrhea [15].

Exercise is widely used to decrease daily stress and regulate biochemical alteration in the immune system. The controversial outcome might be related to the type of exercise protocol and participants in the study. Exercise can reduce stress by reducing sympathetic nervous activity and increasing parasympathetic nerves' activity during rest while reducing menstruation symptoms. The degree to which peoples' perception of pain is different. This phenomenon is partly due to the brain's ability to suppress the brain's input signals by the pain control system [23]. Therefore, the findings could vary due to individual demographics of age, age at menarche, overweight, and pain duration (Table 1) in the intensity of pain [24]. Stress helps to increase the sympathetic nerves' activity and increase the uterus muscles' contraction and increase the menstrual period's pain. Exercise can reduce stress with the sympathetic nervous system's action, and as a result, the symptoms of menstruation could be reduced [14].

5. CONCLUSIONS

There has been increasing awareness among the adolescent groups in terms of understanding dysmenorrhea. In terms of managing the symptoms as a preventive measure is far from clear. Academic institutions and community health programs need to initiate a proactive approach to screening and streamlining health education to implement appropriate alternative strategies to protect the young age group.

CONSENT

The consent was obtained with clear instructions provided to all the participants.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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