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"EFFECTS OF STRETCHING EXERCISE ON PRIMARY DYSMENORRHOEA IN ADOLESCENT GIRLS"

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ABSTRACT

Background: Primary Dysmenorrhoea is a difficult menstrual flow in the absence of any pelvic pathology where pain is spasmodic in character and felt mainly in the lower abdomen. Women that participated in sports experienced fewer occurrences of symptoms of dysmenorrhea.

Aim: To assess the effect of one term of stretching exercise on primary dysmenorrhea in adolescent girls.

Materials and Methods: 30 girls aged between 18-28 years with mild to severe primary dysmenorrhea were selected; the girls were non-athletes and volunteered for the study. The participants were randomly divided into 2 groups: an exercise group (n=15) and a control group (n=15). In the intervention group, the subjects were requested to complete an active stretching for 12 weeks (4 days per week, 1 time per day, 10 minutes, and post test was examined 12 weeks later.

Results: After the intervention, however, a significant difference was found between the two groups regarding the mean intensity of dysmenorrhea in the first and second menstrual cycles. Also, a significant difference was observed between the stretching group and the control group. However, no such difference was observed in control group.

Conclusions: Stretching exercises are effective in reducing pain intensity, pain duration, and the amount of absenteeism in schools and colleges due to having pain during menstruation.

Key Words: Dysmenorrhoea, Adolescent girls, Stretching, Exercise, Physiotherapy

INTRODUCTION

Dysmenorrhea literally means painful menstruation but more realistic and practical definition includes cases of painful menstruation of sufficient magnitude so as to incapacitate day to day activities. [1]

It is commonly classified into primary dysmenorrhea when there is no co- existent pathology and secondary dysmenorrhea where there is an identifiable pathological condition. About 40-70% of women of reproductive age suffer with dysmenorrhoea. [2]

Primary dysmenorrhea begins when young girls first experience the ovulatory cycles and its prevalence increases during adolescence (15-17) years and decreases progressively then after. In dysmenorrhea pain begins few hours before or after the onset of menstruation and lasts for 24-48 hours. The pain is more in the first day and rarely continues to next day. [3]

Primary dysmenorrhea is commonly seen only in ovulatory cycles, usually developing within 6 to 12 months of menarche and is characterized by lower abdominal sharp pain that may radiate to the back and upper thighs. The pain of primary dysmenorrhea starts with the onset of menstrual flow or a few hours after the onset and may last for a few hours up to 2 days. The pain of secondary dysmenorrhea usually begins few days before the start of menstrual flow and may be present during much of the menstrual cycle. Pain that occurs with the first menses or after the age of 25 or is associated with an ovulatory cycles is more likely to be secondary dysmenorrhea. [4]

It is characterized by lower abdominal pain that potentially could radiate to the back and thigh regions. The pain may be associated with headache, fatigue, nervousness, nausea, vomiting, mood swings.

Primary dysmenorrhea most likely caused by increased prostaglandin production within the uterus and associated uterine hyper- contractility. [5]

In primary dysmenorrhea pain is spasmodic in character and felt mainly in the lower abdomen, but it may radiate to the back and along the thighs. There may be associated systemic symptoms like nausea, vomiting, diarrhea, and headache. [6]

Despite the widespread use of stretch in physical rehabilitation, considerable uncertainty remains surrounding its lasting effects. There is little doubt that stretch induces immediate increases in muscle extensibility due to the viscoelastic nature of soft tissues. [8] However, these effects are transient and quickly dissipate. The lasting effects of stretch are more controversial but arguably of more importance, particularly for individuals with chronic pain.

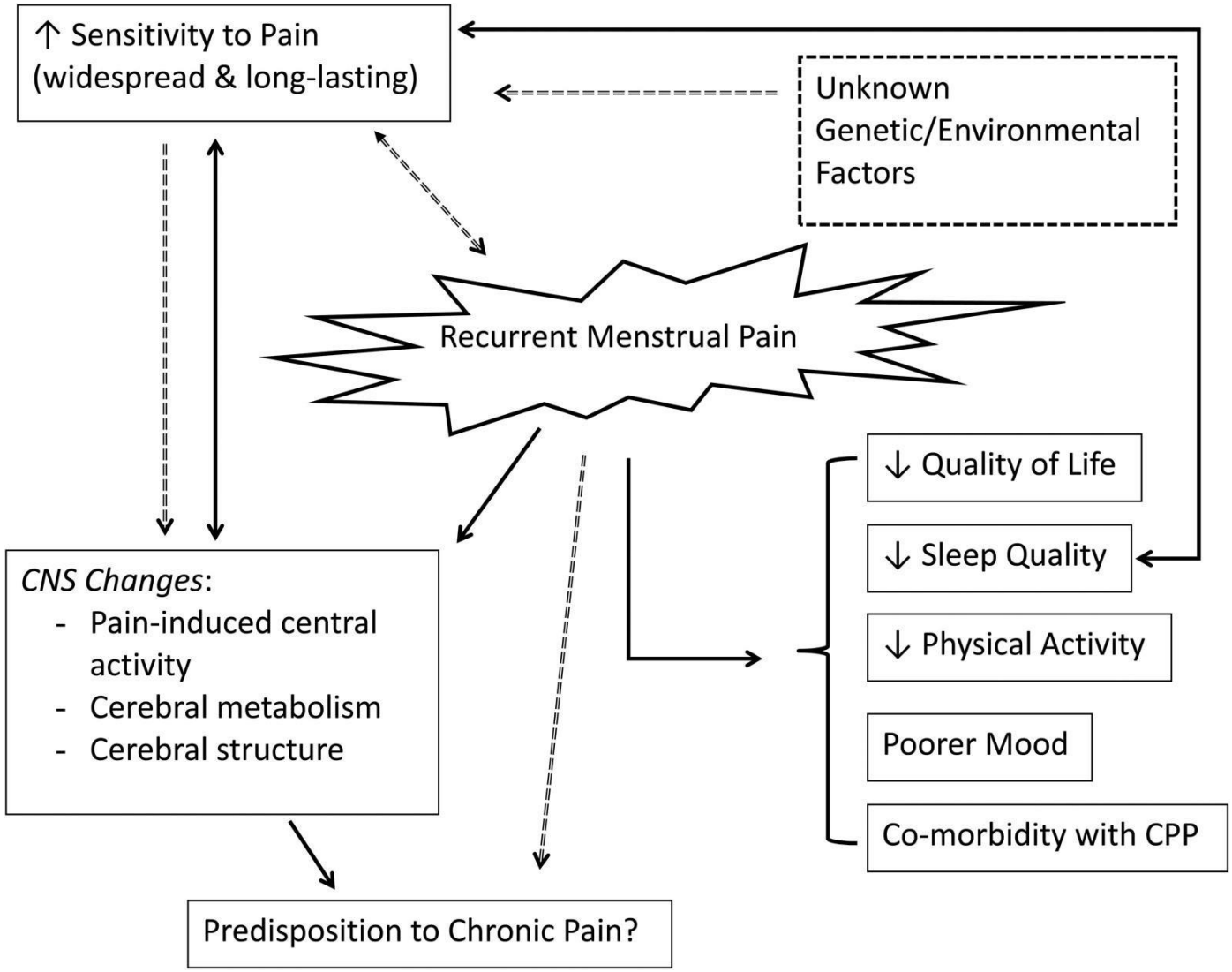


Figure.1 A schematic representation of the proposed (dotted lines) and known (solid lines) effects of recurrent dysmenorrheal pain [7]

The controversy arises from the discrepancy between strong anecdotal evidence and evidence from studies of animals [9] supporting the effectiveness of stretch and high-quality randomized controlled trials indicating otherwise. Studies of animals showed that soft tissues are adaptable and undergo structural remodelling in response to stretch. On the other hand, results of studies of humans are less consistent. In this article, improvements in extensibility refer to an increase in joint ROM when repeat measurements are taken with the same testing torque (torque is the product of applied force and moment arm or the tendency of a force to cause rotation).

Some investigators contend that what appear to be lasting changes in extensibility are in fact changes in people's willingness to tolerate the discomfort associated with stretch over time. For example, following a hamstring muscle stretch program, an individual may touch his or her toes more easily. This patient outcome may not be due to any underlying change in muscle extensibility, but may instead be due to the direct relationship between applied stretch torque and resultant joint ROM. That is, the harder an individual

leans forward (ie, the stretch torque), the further he or she can reach down toward the toes (ie, the joint ROM). The ability to reach further is due to altered perceptions and increased willingness to tolerate the discomfort associated with stretch [10]

The causes of primary dysmenorrhea are still unclear, but one of the most accepted explanations is increased synthesis of prostaglandins, of which types E2 and F2α play a significant role in the development of ischemia and hypoxia, resulting in dysrhythmia uterine contractions and decreased blood flow. [11]

Drug therapies and complementary medicine are often used to treat dysmenorrhea. [12] According to the literature, NSAIDs and OCPs rank among the most frequently used medications. These drugs reduce pain by inhibiting the production and release of prostaglandins. However, long-term use of NSAIDs has been associated with side effects such as headache, dizziness, drowsiness, loss of appetite, nausea, vomiting, gastrointestinal bleeding, increased acute asthma, dysuria, and acne. [13]

OCPs inhibit ovulation, reduce endometrial proliferation, and create an endocrine environment that mimics the early stages of the proliferative phase of the menstrual cycle, in which prostaglandin levels are at theirlowest. Lower prostaglandin levels lead to fewer uterine cramps. In the realm of complementary medicine, methods resorting to herbs, yoga, relaxation, psychotherapy, massage, hypnosis, vitamins (E, B, C), and supplements (calcium and magnesium) as well as acupressure and acupuncture have been used. The herbs used more commonly to treat dysmenorrhea are chamomile, ginger, fennel, cinnamon, and aloe Vera. [14] Common treatments for dysmenorrhea are extensive and in some cases subject to restrictions. For example, NSAIDs are contraindicated for patients with digestive problems, while medicinal plants are not always readily available. This research aimed to investigate the effects of a set of stretching exercises on reducing the pain of dysmenorrhea.

REVIEW OF LITERATURE

1. **An epidemiological study of young women with dysmenorrhoea[15] : B Andersch et al. (1982)**

   The study was conducted in 1982**,** The prevalence of dysmenorrhoea was studied in a random sample of 19 year old women from an Urban-Swedish population, dysmenorrhoea was reported by 72% of the women 15% suffered from dysmenorrhoea which limited daily activity and was unimproved by analgesics.

2. **Prevalence of dysmenorrhea and its effects on quality of life among a group of female university students.[16] : A Unsal et al. (2009)**

   This cross-sectional study was conducted between 15 march and 15 April 2009. The study group included 623 female students. The severity of dysmenorrhea was determined with 10-point visual analog scale. The average age of the study groups was 17-30 years. They concluded that prevalence of dysmenorrhea was found to be 72.7% and it was significantly higher in coffee consumers, females with

menstrual bleeding duration 7 days, and those who had a positive history of dysmenorrhea when compared to the others.

3. **Association of psychologic and nonpsychologic factor with primary dysmenorrhea.[17] : M Faramarzi et al. (2014)**

   This study was conducted in Aug 2014, in this study 180 females with dysmenorrhea and 180 females without dysmenorrhea were enrolled. Psychological risk factors were evaluated in four domains including affects, social support, personality, and alexithymia. The data was collected by using questionnaires and they concluded and high caffeine diet are important risk factors risk factors for women with primary dysmenorrhea.

4. **Comparing the effects of aerobic and stretching exercises on the intensity of primary dysmenorrhea in the students of universities of busher[18]: F Vaziri et al. (2015)**

   The study was conducted in March, 2015. This randomized clinical trial was conducted on 105 females who were suffering from primary dysmenorrhea. The participants were divided into aerobic, stretching and control groups. The 2 groups performed exercise three times a week for 8 weeks. Then after the intensity of dysmenorrhea was determined using several modified questionnaires that assessed several symptoms of dysmenorrhea. After all, the data was compared between and within groups through analysis of variance. They concluded the aerobic and stretching exercises are effective in reducing Severity of dysmenorrhea.

5. **Primary dysmenorrhea and its effects on quality of life in young girls.[19]: T Joshi et al. (2015)**

   The study was conducted in March 2015, A cross sectional study and data were collected among 310 young girls on presence and absence of dysmenorrhea, premenstrual symptoms, dietary habits using questionnaire and they concluded that concluded that dysmenorrhea is a leading causes of a absenteeism in colleges and has an adverse effects on the quality of young girls.

6. **Effects of different exercise techniques on primary dysmenorrhea among higher secondary school girls. [20]: D Khare et al. (2016)**

   The study was conducted in 2016, to study the effectiveness of isometric exercises and variousstretching techniques used as a treatment protocol for primary dysmenorrhea. The students were divided into control and experimental groups, both groups performed set protocol from fourth day of menstrual cycle. They concluded that isometric and stretching both exercise has a positive effects on treatments of primary dysmenorrhea in school girls.

7. **Effects of exercises on primary dysmenorrhea in young females.[21]S Shah et al. (2016)**

This study was conducted in year 2016, A convenient sample was taken of 40 participants, randomly and equally divided into 2 groups. Groups A received stretching exercises and group B was control groups. Participants in group A completed an active stretching exercise program for 6 active stretching exercises in the abdominal, pelvic and groin regions for 8 weeks, group B was control group. All the participants were examined for pain intensity with VAS and VMSS. After the research they concluded that stretching exercises are effective in reducing pain in young females with primary dysmenorrhea.

8. **Effects of selected muscle stretching exercise on primary dysmenorrhea among studentnurses.[22]: B Gomathi et al. (2017)**

This study was conducted in July 2017, To assess the effectiveness of selected muscle stretching exercise on primary dysmenorrhea. 67 student nurses with primary dysmenorrhea were selected from college by using non probability purposive sampling technique and they were randomly assigned into experimental group and control group. Muscle stretching exercise taught to the experimental group and practiced for 8 weeks. Pain intensity was assisted by using numerical pain rating scale and they concluded that selective muscle stretching exercise are effective in reducing pain in dysmenorrhea.

9. **What we know about primary dysmenorrhea today: a critical review[23]S Lacovides et al. (2015)**

Comprehensive literature searches on primary dysmenorrhea were performed using the electronic databases PubMed, Google Scholar and the Cochrane Library. Full-text manuscripts published between the years 1944 and 2015 were reviewed for relevancy and reference lists were cross-checked for additional relevant studies. In combination with the word „dysmenorrhea" one or more of the following search terms were used to obtain articles published in peer-reviewed journals only: pain, risk factors, etiology, experimental pain, clinical pain, adenomyosis, chronic pain, women, menstrual cycle, hyperalgesia, pain threshold, pain tolerance, pain sensitivity, pain reactivity, pain perception, central sensitization, quality of life, sleep, treatment, non-steroidal anti-inflammatory drugs.

NEED OF STUDY

Dysmenorrhea pain is associated with restriction of activities and it is considered as the leading cause of absenteeism from work place and colleges in young girls. Dysmenorrhea is the most commonly relieved by medication ranging for commercially available formulas to contraceptive. The side effects from such medication are well known (nausea, breast tenderness, and drowsiness, hearing and visual disturbances).
Despite the widespread belief that exercise can reduce dysmenorrhea, evidence based studies are limited. Several observational studies reported that physical exercise was associated with reduce prevalence of dysmenorrhea, although numerous other studies found no significant association between outcomesevidence

from controlled trials suggests that exercises can reduce dysmenorrhea and associated symptoms. Hence this study is designed to determine the value of stretching exercise weather it is helpful in reducingthe symptoms of primary dysmenorrhea or not.

OBJECTIVE OF THE STUDY

1) **Aims:** To check the effects of stretching exercises on reducing the symptoms of primary dysmenorrhea in adolescent girls.
2) **Objectives of the studies:** To find out effects of stretching exercise on primary dysmenorrhea in adolescent girls.

HYPOTHESIS

1) **NULL HYPOTHESIS**

   There will be no significant effects of stretching exercise on reducing the symptoms of primary dysmenorrhea in adolescent girls.

2) **EXPERIMENTAL HYPOTHESIS**

   There will be significant effects of stretching exercise on reducing the symptoms of primary dysmenorrhea in adolescent girls

METHODOLOGY

Materials and Methods:

- **Study design:** Randomized control trial
- **Source of data:** Nearby colleges and working girls through online question forms
- **Population:** All subjects are adolescent girls that are having symptoms of primary dysmenorrhea
- **Sampling method:** Purposive sampling
- **Sample size:** 30 subjects
- **Duration of study:** 3 months

All the data were collected by general assessment form, questionnaires regarding menstrual characteristics and dysmenorrhea, Numerical rating scale and verbal rating were used for assessment of intensity of pain. The general assessment form and questionnaires were distributed to all the girls who agreed to participatein

the study.

Then participants were explained the procedure and purpose of the study and consent was taken in an understandable language.

Then after participants was randomly divided into 2 groups, Group A: Stretching exercise group, Group B: Control group. Severity of the pain was measured by using Numerical rating scale and Verbal pain rating scale for pretreatment and post treatment.

Group A participants was asked to perform 5 self- stretching exercises in the back, thigh and pelvic regions for 8 weeks (4 days per week). Also they were asked to avoid performing stretching exercise during the menstrual cycle and group B participants were asked not to perform any kind of exercise on daily basis.

The exercises are as follows:

1. **Double Knee Chest**

First you have to lie down on a mat then bring one knee towards the chest then the other one, clasp the hands around the thighs and pull them to the chest, elevating the lower back part off the mat, you should not grasp over the knee part but end area of the thigh. Do it for 20 seconds and 5 times.[This exercise will stretch the lumbar spine muscle and tissues posterior to the spine]

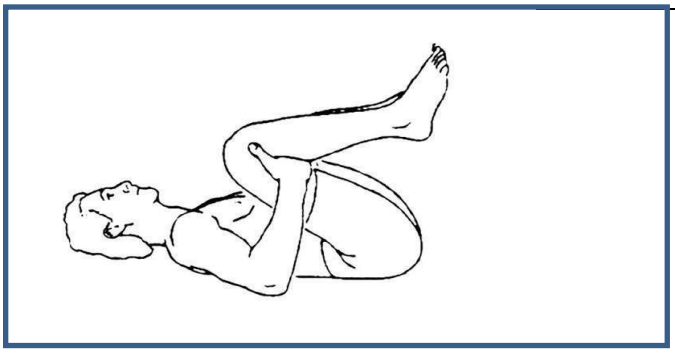


Figure.2 Double knee chest

2. **Gluteal Muscle Stretch**

Knee to chest: Pull your left knee towards your chest while lying on the ground , focus on placing your lower back flat on the ground while breathing long and deep, hold the stretch for 20 seconds and 5 times. Then perform this same on the right side of knee for 20 seconds 5 times.[This exercise will stretch the gluteal muscles , hamstrings and lower back muscles]

Figure.3 Gluteal muscle stretch

3. Child's Pose

Go on all 4 limbs and with both arms reach as far as possible with your elbows locked and your arms straight. Then lean back with your shoulders relaxed.

The stretch should be felt in the lower back and shoulders. Focus on breathing deeply with your long breaths (20 seconds 5 times) [This exercise will stretch the lumbar spine muscle , gluteal Maximus , quadriceps femoris and shoulderextensor muscle].

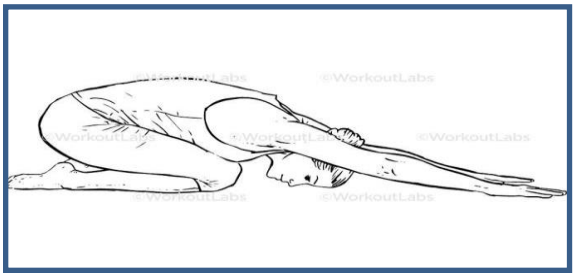


Figure.4 Childs pose

4. Cobra Pose

Lay down on your stomach then place your hands by your sides at chest level and push up while leaving your waist on the floor. Try to relax your back and waist and allow the stretch in your stomach and lower back. Focus on breathing deeply and increase movement in the spine.(20 seconds 5 times) [This exercise will stretch the soft tissues anterior to the lumbar spine and hip joints].

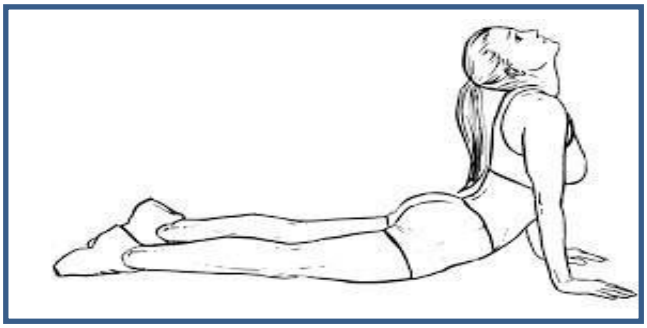


Figure.5 Cobra pose

5. Quadratus Lumborum Stretch

Lay down the ground and pull the left leg over the right side, try to leave the same side of shoulder on thefloor while you are holding the stretch. To increase the intensity of stretch extend your leg and pull the leg closer to your chest, keep inmind that do not stretch beyond your limits. (20 seconds 5times) [This exercise will stretch the quadratus lumborum muscle]

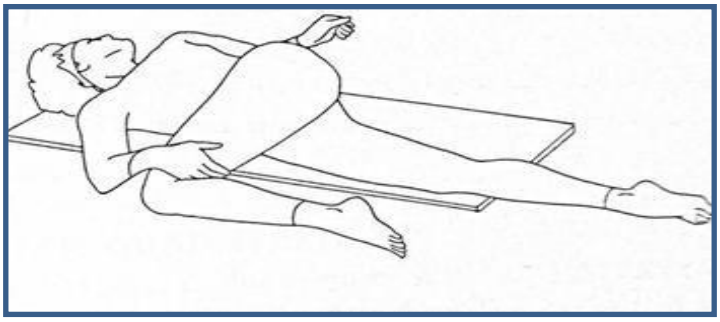


Figure.6 QL stretch

- Then same perform to the right side (20 seconds 5 times)
- Group B will be Control Group and will be asked not to perform any type of exercise during this time of study. Again data will be collected, that includes their menstrual pain before study and menstrual pain after 8 weeks, from both the group. Data will be compared and conclusion will be made on results

- Scales that were used for pain assessment of girls are as follow

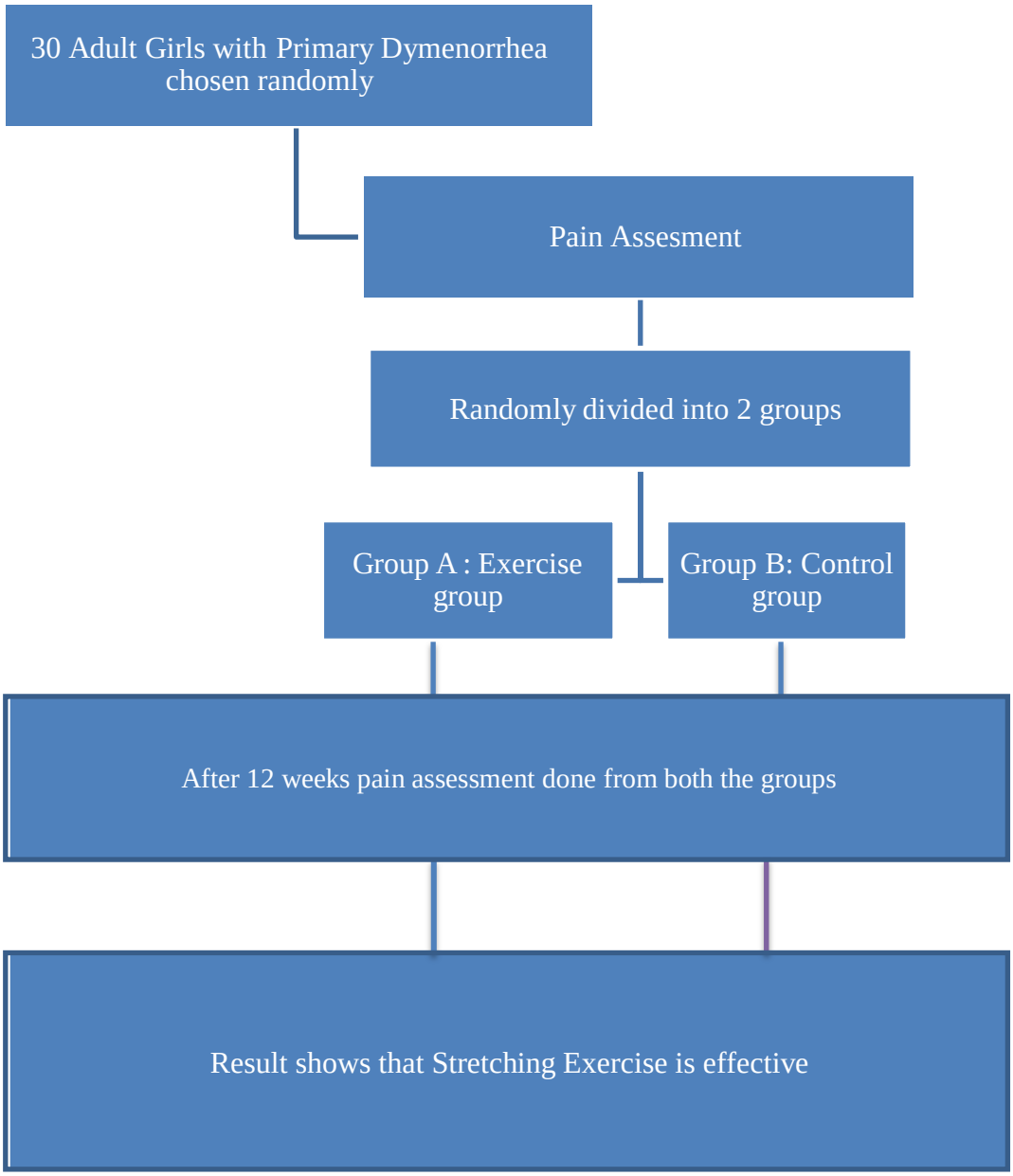
1) Numerical pain rating scale
2) Verbal pain rating scale

. Numerical pain rating scale

0 1 2 3 4 5 6 7 8 9 10

. Verbal pain rating scale

- None
- Mild
- Moderate
- Severe



RESULT

In present study 30 subjects with the age of 18-28 years were selected and divided into two groups:

- Group A – Exercise group
- Group B - Control group

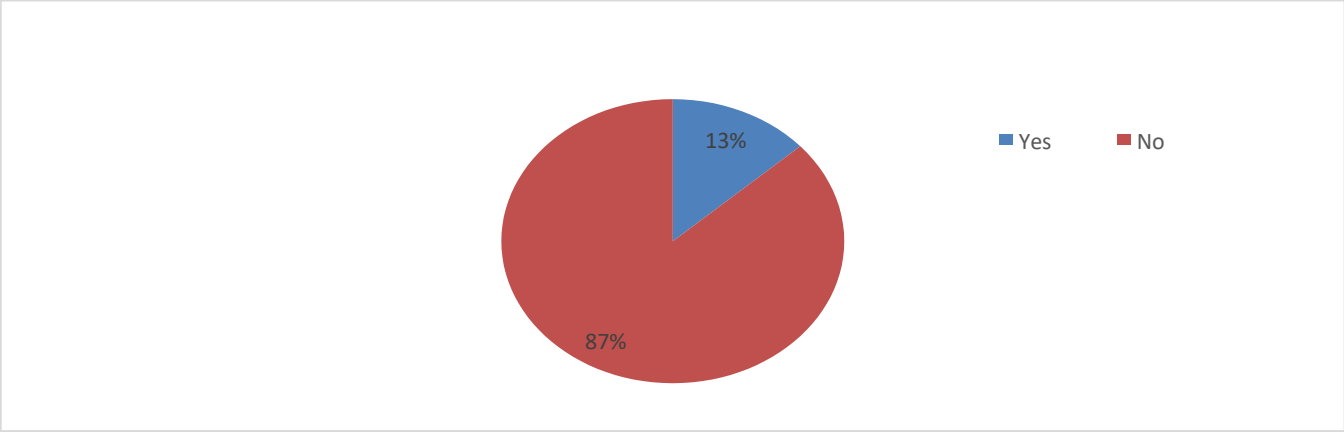
30 individuals completed the study program without any complications. The data obtained in both the groups are as follows.

Table 1 Medication taken by patients

Medicines (pain relief)	NO. of Patients
YES	4
NO	26
Total	30

Interpretation: The above table shows the no. of patients that took medication for pain relief in both the groups

Graph.1



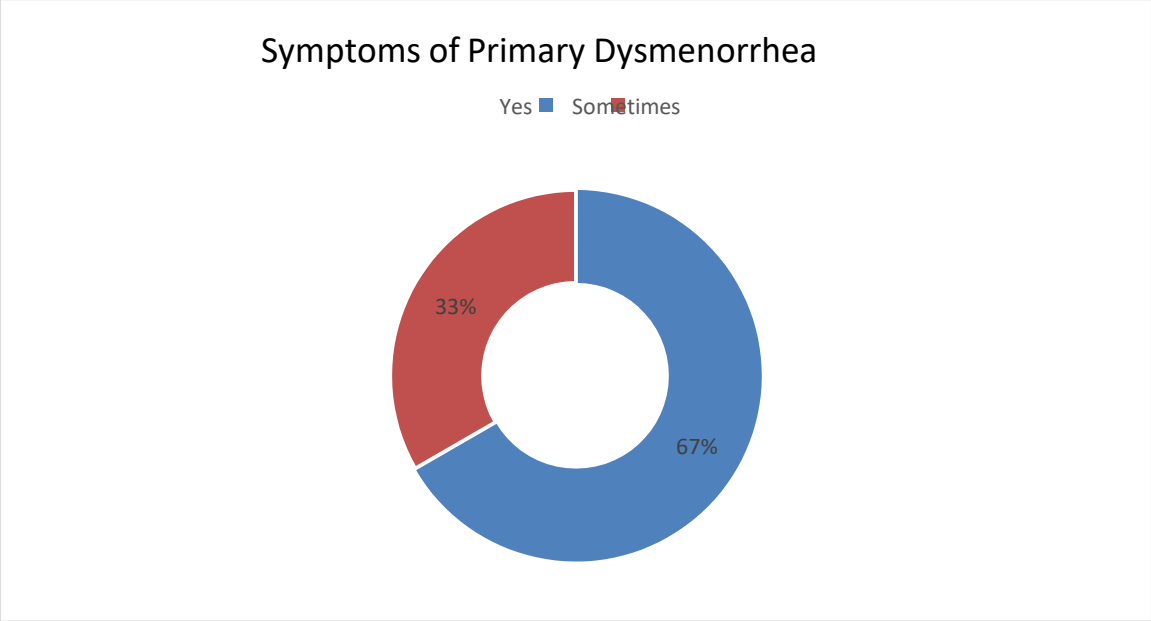
Interpretation: Above graph shows no. of patients who respond yes and no to the medication

Table 2: Pain and any other symptoms

Pain and symptoms	No. of patients
Yes	20
Sometimes	10
Total	30

Interpretation: The above table shows the no. of patients having pain or any other symptoms

Graph.2



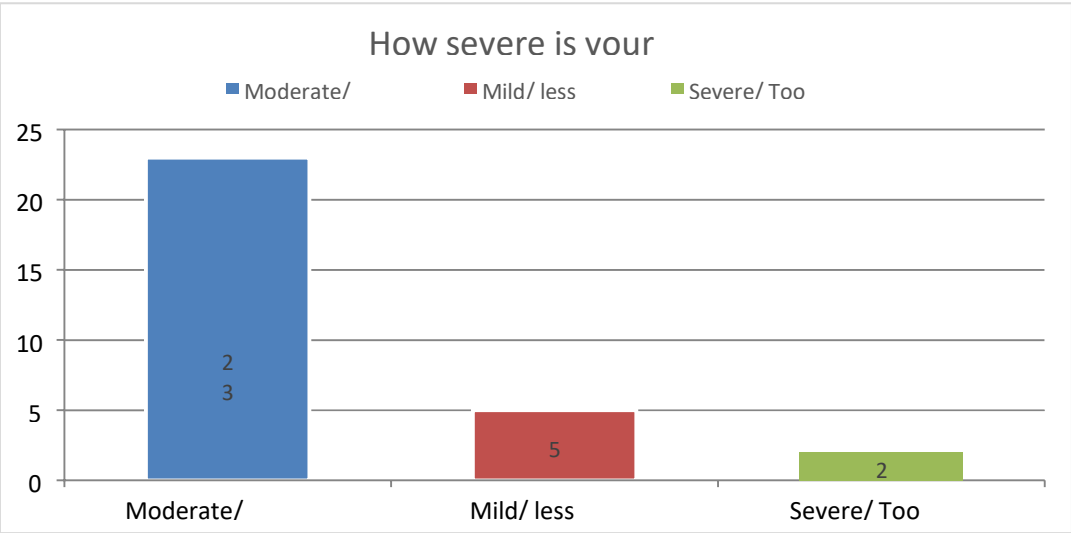
Interpretation: Above graph gives information about having pain and other symptoms in both the groups

Table 3: Severity of Pain

Severity	No. of patients
MILD	5
MODERATE	23
SEVERE	2
Total	30

Interpretation: The above table shows the severity of pain in both the groups before treatment.

Graph.3



Interpretation: Majority of girls were having Moderate pain and few girls were having severe pain during menstruation

Table 4: Mean and SD of Pain Intensity Group A

	Mean	N	Std. Deviation	d. Error Mean
VRS PRE	3.40	15	.632	.163
VRS PRE	.60	15	.737	.190
NPRS PRE	7.40	15	1.242	.321
NPRS POST	1.33	15	1.113	.287

Table.5 Paired Sample T Test of Pain Intensity of Group A

	N	Correlation	Sig.
VRS PRE & VRS POST	15	.368	.177
NPRSPRE &NPRS POST	15	-.775	.001

Paired Sample T Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig.(2-tailed)
Pair 1	VRS PRE-VRS POST	2.800	.775	.200	2.371	3.229	14.000	14	.000
Pair 2	NPRS PRE NPRS POST	6.067	2.219	.573	4.838	7.295	10.589	14	.000

Table 6: Mean and SD of Pain Intensity of Group B

	Mean	N	Std. Deviation	d. Error Mean
VRS PRE	3.13	15	.743	.192
VRS PRE	2.80	15	.676	.175
NPRS PRE	7.13	15	1.767	.456
NPRS POST	6.60	15	1.639	.423

Table 7: Paired Sample T Test of Pain Intensity of Group B

	N	Correlation	Sig.
VRS PRE & VRS POST	15	.768	.001
NPRS PRE &NPRS POST	15	.932	.000

Paired Sample Test									
				Paired Difference					
					95% Confidence interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig(2-tailed)
Pair 1	VRSPRE-VRSPOST	333	.488	126	.063	.604	2.646	14	.019
Pair 2	NPRSPRE-NPRSPOST	533	.640	165	.179	.888	3.228	14	.006

Table 8: Unpaired t test between group A and group B of pain measurement scale

Group Statistics					
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
NPRS	A	15	1.33	1.113	287
	B	15	6.60	1.639	423

Independent Samples Test										
		Levene"s test for Equality of vanances								
							or Equality ofMeans		95 % Confidence interval of the Difference	
		F	Sig.	T	df	Sig(2-tailed)	Mean Differences	Std. Error Difference	Lower	Upper
NPRS	Equal variances assumed	5.009	0.33	-10.297	28	000	-5.267	.511	-5.314	-4.219
	Equal variances not assumed			-10.297	24.645	000	-5.267	.511	-6.321	-4.213

DISCUSSION

The present study was conducted to see the effect of stretching exercises on the pain intensity of primary dysmenorrhea. In present study, pain has reduced in primary dysmenorrhea more in stretching exercise group than in control group.

This improvement may be due to the increase in the blood flow and metabolism of the uterus during exercise which may be effective in the reduction of dysmenorrheal symptoms. A study done by Izzo and Labriola (1991) [26] has shown that improved metabolism is a factor in the reduction of symptoms. It is also suggested that increased menstrual pain by uterine muscle contraction is derived from a nervous system that is innervated by the sympathetic nerve hence; stress through hyperactivity of sympathetic nerve system via the increase contractibility of uterine muscles may lead to menstruation symptoms. A study done by Dawood MY (2006) [27] has shown that therapeutic exercise can increase the secretion of endorphins from the brain, and these materials in turn raise the pain threshold of the body. Daley AJ (2009) [28] believed that contracted ligamentous bands in the abdominal region were the causative factor for physical compression of nerve pathways and their irritation, so the proposed series of stretching exercise was considered very effective.

Pain in general has disabling nature and makes dysmenorrhea stressful and it can become important irritating factor in the life of lots of women, particularly who are self-financing. Some women are completely prostrated and cramped to bed, whereas others are able to remain in the works with the support of analgesics. So, many studies were done to replace medication by physical exercises in management of primary. The present study was conducted to see effect of stretching exercises in relieving pain of primary dysmenorrhea. In this study, treated females reported a significant reduction in menstrual pain within an average of 8 weeks of exercises (Group A).

Since time ago, Israel et al. [29] found that after 12 weeks of aerobic training, the intensity of symptoms decreased and Golub et al. [30]expressed that dysmenorrhea in high school girls who were involved in sports and physical activities were less than non-exercise group. In present study, pain of primary dysmenorrhea has reduced in exercise group than in control group as regard intensity and duration. These findings are similar to those of lots of authors who studied the effects of exercises on primary dysmenorrhea. Abbaspour et al. [31] and Shahr-jerdy et al. [32] proved that stretching exercises are effective in reducing pain intensity, pain duration, and the amount of painkillers used by girls with primary dysmenorrhea. Onur et al. [33] studied the impact of home-based exercise on quality of life of women with primary dysmenorrhea and concluded that there is evidence that exercise has a positive effect in the treatment of dysmenorrhea.This improvement may be due to the increase in the blood flow and metabolism of the uterus during exercise which may be effective in the reduction of dysmenorrheal symptoms. Stress tends to enhance sympathetic activity and may increase menstrual pain by exacerbating uterine contraction. Exercise may decrease this sympathetic activity and relief the stress through release of endorphins, substances produced by the brain that raise the pain threshold, so reducing symptoms. [34] Dawood [35] has shown that therapeutic exercise can increase the secretion of endorphins from the

brain, and these materials in turn raise the pain threshold of the body. Daley [36] believed that contracted ligamentous bands in the abdominal region were the causative factor for physical compression of nerve pathways and their irritation, so the proposed series of stretching exercise was considered very effective. Golomb et al. [37] concluded that exercise is widely accepted as a mean of moderating stress and biochemical changes in the immune system. A mechanism by which exercise may improve the symptoms of dysmenorrhea (reducing stress) has been articulated so, findings of different studies have shown that therapeutic exercise and physical activity was related with reduced incidence of dysmenorrhea**.**

CONCLUSION:

Stretching exercises are effective in reducing pain intensity and improve the quality of life and also it helps in reducing the amount of pain killers taken by young girls which might have bad long term effects on their health and it is also shown that the productivity has also increased for those days as having less pain among the girls with primary dysmenorrhea.

SUMMARY:

The study was conducted to find out the effects of stretching exercise in reducing pain symptoms among the adult girls that were having primary dysmenorrhea. 30 girls are voluntarily participated in the study, after that pain assessment and data was collected through assessment form and girls were randomly divided into two groups (A: exercise group, B: control group). After that exercise groups was given a set of exercises to practice for 12 weeks (4 days per week) meanwhile control group was asked not to perform any exercise on daily basis. After the study duration pain assessment was taken from both the groups and compared to find out the effects. Results are seen that stretching exercises are effective in reducing pain in the girls of group A while girls of group B did not felt any change in their pain after 12 weeks.

LIMITATIONS:

There are some drawbacks of this study, such as

This study was conducted through online modes so there are some chances of faulty postures of candidates while doing the exercises which can affect the final results of the exercises.

FUTURE RECOMMENDATIONS;

- Study can be done among various other types of exercise forms which could be effective in reducingthe pain intensity of primary dysmenorrhea.

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