

# Immediate Effect of Physiotherapy Intervention in Subjects with primary dysmenorrhea: A Quasi-Experimental Study

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## Abstract

**Background and objective-** Primary dysmenorrhea (PD) is common among females, it is associated with menstrual pain with absence of an identifiable cause. Physiotherapy is beneficial to improve symptoms in females but there is limited evidence based on immediate effect of Physiotherapy interventions for the treatment of PD. Therefore, the present study was conducted to evaluate the immediate effect of physiotherapy interventions in subjects with PD.

**Methods-** Sample size for this study was n=26 as it was based on previous studies. A single group experimental study was conducted among 26 healthy females with age between 18-25 years. The students were screened on the basis of inclusion and exclusion criteria. In order to assess the menstrual pain quality short-form McGill pain questionnaire was used.

**Results-** Results revealed significantly reduction in the menstrual pain and symptoms after the intervention with p-value of 0.00 and 95% of confidence interval. The physiotherapy intervention was beneficial in reduction of pain and symptoms of primary dysmenorrhea among physiotherapy students.

**Conclusion-** The results showed that physiotherapy intervention has highly significant for reducing the pain intensity and the symptoms in subjects with primary dysmenorrhea.

**Keywords:** Primary dysmenorrhea, Physiotherapy students, menstrual pain, Physiotherapy.

## 1. Introduction:

Dysmenorrhea is a menstrual disorder characterized by painful cramps from uterine origin that occur during menstruation<sup>(1,2,3)</sup>. Dysmenorrhea is classified into primary and secondary category based on its pathophysiology. Primary dysmenorrhea (PD), is associated with unidentifiable pelvic pathology. It is most commonly seen in adolescents and young adults.<sup>(4,5)</sup> and in Secondary dysmenorrhea, there is identifiable pelvic pathology will be present.<sup>(4,6,7)</sup>

The International Federation of gynecology and obstetrics defines Primary dysmenorrhea (PD) as "Painful cramps in the absence of any visible pelvic pathology". It usually appears within 2 years of menarche<sup>(1)</sup>. Classic symptoms of PD include pain starting right before menstruation or at onset of menstruation; severity of pain usually lasts for few hours, may extend to 24 hours but seldom persists beyond 48 hours; pain is spasmodic in nature and confined to lower abdomen may radiate to the back and medial aspect of thighs<sup>(1,6,8)</sup>. Additional symptoms are nausea, vomiting, fatigue, headaches,

dizziness, and sleep disturbances<sup>(2,3,5,6)</sup>. It may be accompanied by vasomotor changes causing pallor, cold sweats and occasional fainting.<sup>(1,5,7)</sup>

The etiology of primary dysmenorrhea is not clearly understood but PD symptoms can be caused by increase in release of uterine prostaglandin (PGF2 ALPHA, PGE2) levels during menstruation<sup>(8,9,10)</sup>. Prostaglandins are released with maximum production during shedding of the endometrium and PGF2-alpha is a strong vasoconstrictor, which causes ischemia of the myometrium<sup>(1,5,6,8)</sup> and it will lead to increased myometrial contraction. And associated with menstrual cramps and other symptoms of primary dysmenorrhea.<sup>(5,6,8)</sup>

Various methods, including medical and surgical treatment or physical therapies have been used in the treatment of dysmenorrhea<sup>(1,6,11)</sup>. Considering the side-effects of drug treatments and surgery, non-pharmacological treatments particularly physical activity, has attracted the attention of professionals and women. The idea that exercise can help to alleviate menstrual symptoms. Billig was one of the first advocates of exercise for dysmenorrhea<sup>(1,2,11,12)</sup>. He proposed theory that dysmenorrheal women had contracted ligamentous bands in the abdomen and he developed a series of stretching exercises for which he achieved a high-rate symptom relief with reduce the intensity and duration of PD<sup>(1,2,11,12)</sup>.

Evidences suggests that women who exercise regularly exhibit lower levels of negative effect and physical symptoms across the menstrual cycle<sup>(8,12)</sup>. Exercise increases the release of several neurotransmitters which includes beta endorphins, estrogen, dopamine and endogenous opiate peptides, which suppressing the release of prostaglandins and raises the estrogen- estradiol ratio which acts to decrease endometrial proliferation and shunts blood flow away from uterus, as well as work as an analgesic for non-specific pain<sup>(12,13)</sup>.

Several studies suggested that physiotherapy interventions have beneficial effect on alleviating the pain symptoms in dysmenorrhea. There are limited studies and evidences that reveal the immediate effect of physiotherapy intervention for primary dysmenorrhea. Therefore, this study aims at evaluating the immediate effect of the physiotherapy interventions on subjects with primary dysmenorrhea in order to reduce the use of NSAID's and its side-effects.

## 2. Materials and methods

### 2.1 Study design and sample size –

The Quasi-Experimental Study or single group experimental, pre-post study was aimed to evaluate the immediate effect of physiotherapy intervention in subjects with primary Primary dysmenorrhea (PD). The sample size was calculated with G power software for two tail group and with power of 80%, 0.05 % of effect size<sup>25</sup>. As the study was conducted at taluk/ small town level so sample size for present study is small. A non -probability ,convenience sampling method was used to recruit participants in the study.

### 2.2 Ethical clearance and consent

Ethical clearance was obtained from institutional ethical committee (ACP/OP/2023 OL10) of Alva's college of physiotherapy and research centre, Moodbidri, Karnataka. A prior written consent was taken from all the participants to participate in the study on the basis of inclusion and exclusion criteria of the study.

### 2.3 Selection criteria

Healthy female subjects of Alva's college of physiotherapy, aged 18-25 years with regular history of primary dysmenorrhea (NPRS >4/10), with the pain intensity > 4/10 numerical pain rating scale were eligible to participate in the study. Females with irregular menstruation; secondary dysmenorrhea; nausea and vomiting during menstruation; females using NSAID's during menstruation; females with heavy menstrual flow; comorbidities such as back pain, pelvic infection; pregnant or married women were excluded from the study.

#### 2.1.5 Data collection and analysis

Convenience sampling was used to collect the data. Subjects were screened on the basis of inclusion and exclusion criteria and complete history was taken from the participants about secondary disorders, symptoms and other associated conditions with menstruation. Written consent was taken from the participants before giving the interventions. Intervention was given during the menstrual cycle (During day 1-3 of menstrual cycle as the symptoms are common during these days)<sup>1,6,7,8</sup> to the subjects with duration of 30 min. The outcome measure short-form McGill pain questionnaire was taken before and after the interventions to evaluate the pain intensity and effectiveness of intervention.

Following interventions was given to the participants:

- Deep breathing exercise – 10 repetitions <sup>(6,7)</sup>
- Moist heat- 10 min <sup>(17)</sup>
- Sleeping in supine position, extending the feet next to each other, pressing the feet on each other, holding for 5 sec, and relaxing (pelvic floor and femoral adductor muscles) – 10rep x 1 set <sup>(8,9)</sup>  
Note: keep pillow/ towel between both the feet and press
- Crook lying with lifting head and neck up, holding for 5 sec, and relaxing – 10rep x 1 set <sup>(8,9)</sup>
- Crook lying, touching heel side to side, right followed by left – 10 reps x 1 set <sup>(8,9)</sup>
- Kegel's exercise – 10 reps x 1 set <sup>(6,7,11)</sup>
- Bridging – 10 reps x 1 set <sup>(6,11)</sup>

The outcome (short-form McGill pain questionnaire) for pain measure was taken immediately after the interventions and the data was recorded.

#### 2.1.6 Statistical Analysis

Statistical analysis was done using SPSS version 20. Categorical variables were presented by frequency and percentages and continuous variables by mean and standard deviation. All data was first entered into an excel sheet followed by SPSS 20. Version. Demographic data was explained using frequency table (table 1). To find out the effect of intervention paired t-test was used.

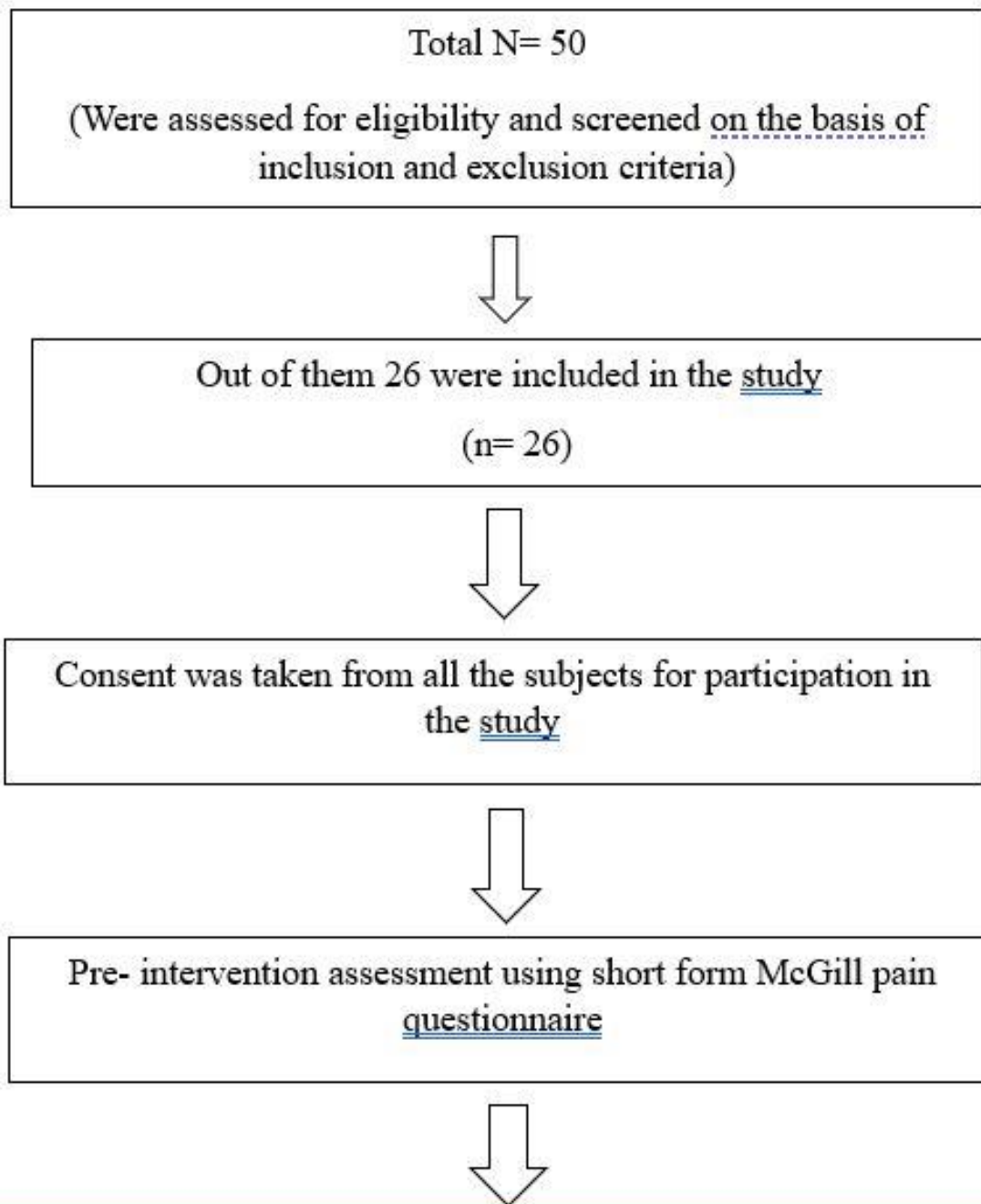
### 3. RESULTS

Total 50 participants were screened for the study out of them 26 were included in the study on basis of inclusion and exclusion criteria and convenience of the participants. The students participated in the study with the mean value of 1.00 ±0.000. Age group between 18-25 years, with the mean and SD of (22.65 ±0.485). Most of the participants were of 23 years (65.4%). There was no missing data present in the current study. As shown in table 1-

Short-form McGill pain questionnaire outcome measure was taken before and after providing the interventions from the subject. The interventions were given on the first or second day of menstruation

when the pain was present. The result showed a significant decrease in the frequency of severity of pain quality after the intervention when compared with the frequency before the intervention with p-value 0.00. The interventions provided statistically significant benefits immediately for pain intensity ( $p < 0.05$ ).

The results revealed decrease in the intensities of pain symptoms and the quality of pain. Interventions provided showed a high benefit in alleviating the severity of menstrual symptoms and the pain intensity.



**INTERVENTIONS GIVEN:**

- Moist heat -5 mins
- Deep breathing exercise- 5 reps
- Sleeping in supine position, extending the feet next to each other, pressing the feet on each other, holding for 5 sec, and relaxing – 10 rep X 1 set
- Crook lying with lifting head and neck up, holding for 5 sec, and relaxing – 10rep x 1 set
- Crook lying, touching heel side to side, right followed by left – 10 reps x 1 set
- Kegel's exercise – 10 reps x 1 set
- Bridging(hold for 5 sec) – 10 reps x 1 set
- Deep breathing exercise – 5 reps



Post- intervention assessment using short-form McGill pain questionnaire

#### 4. DISCUSSION

This study aimed to investigate the immediate effects of physiotherapy interventions on symptoms of subjects with primary dysmenorrhea. The present study highlights the benefits of physiotherapy interventions in reducing the menstrual pain which is given during the menstruation phase of the cycle.

Mario I. Ortiz, et al. <sup>(7)</sup> conducted a study on effect of physiotherapy program in women with primary dysmenorrhea where the assessment of pain was taken with VAS during the second and third menstrual cycles demonstrated a significant reduction in the treatment group ( $p$ -value  $< 0.05$ ) whereas it didn't show any significant reduction during the first menstrual cycle. The current study shows an immediate effect of physiotherapy interventions on reducing the pain intensity and severity of pain quality (with  $p$ -value of 0.00). The current study showed reduction in pain immediately after the intervention, with  $p$ -value 0.00 which is  $< 0.05$  for almost all the components of different type of pain.

Sara Azima et al. <sup>(14)</sup> conducted a randomized controlled trial on effect of isometric exercises on primary dysmenorrhea in which the intervention group performed isometric exercises since the third day of menstrual cycles to 8 weeks and showed a decrease in pain intensity and the duration of pain ( $p < 0.001$ ). In the current study the isometric exercises were used along with the modality (hot pack), deep breathing exercise, bridging and kegel's exercises which were given during the first or second day of menstrual cycle and pain was assessed before and immediately after giving the interventions and showed the similar and better result i.e., the pain intensity and severity of pain quality is reduced with  $p$ -value of 0.00.

The study conducted by Berkiye Kirmizigil et al. <sup>6</sup> a randomized clinical trial on the effectiveness of functional exercises on pain and sleep quality in patients with primary dysmenorrhea and Nahid Lorzadeh et al. <sup>9</sup> conducted a quasi- experimental study to evaluate the effect of corrective and therapeutic exercises on severe menstrual pain in non-athletic women in both the studies interventional

group included various exercises like stretching exercises, yoga, core strengthening exercises, pelvic area exercises and kegel’s exercises, and corrective exercises which was performed for 8 weeks <sup>(6)</sup> and 12 weeks <sup>9</sup>. According to the result of these studies, a combined exercise therapy helps in relieving the symptoms of dysmenorrhea (p-value 0.05), pain (p-value < 0.05) and improves sleep quality (p-value <0.05) from the first cycle <sup>6</sup> and latter study revealed a significant decrease in the severity of menstrual pain with p-value < 0.01 <sup>9</sup>.

So, the author was able to evaluate the immediate effect of the physiotherapy intervention in subjects with PD with the evidence-based intervention. The results showed significantly reduction in the severity of pain quality and pain intensity with p-value of 0.00. Sample size for present study is less that is the limitation of this study As the study was conducted in small town, so sample size is small for present study. Future studies can be done with larger sample size and with two groups to compare the effect of different physiotherapy interventions and with appropriate follow up. In present study only one group was included without follow up, as there was limited study to find out the immediate effect of physiotherapy intervention in subjects with primary dysmenorrhea.

**CONCLUSION**

The study concludes that the immediate physiotherapy intervention is highly effective to reduce the pain intensity in subjects with primary dysmenorrhea. The results revealed that there was high significant reduction in the pain intensity and pain quality experienced in healthy females with primary dysmenorrhea immediately after giving the physiotherapy interventions.

**Conflict of Interest**

Authors and organization are not having any kind of conflict.

**FINANCIAL DISCLOSURE**

None

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**Result tables -**

**Table 1 Demographics**

Characteristics	Level	Frequency (n)	Percentage (%)	Mean ± SD
Gender	Females	26	100	1.00 ±0.000
Age	22	9	34.6	22.65 ±0.485
	23	17	65.4	

**Table 2 Frequencies of menstrual symptoms based on short-form McGill pain questionnaire**

Pain type	Pre- values				Post-values			
	0 (none)	1 (mild)	2 (moderate)	3 (severe)	0 (none)	1 (mild)	2 (moderate)	3 (severe)
Throbbing	6	13	7	0	16	10	0	0
Shooting	9	12	5	0	21	5	0	0
Stabbing	9	8	9	0	19	5	2	0
Sharp	3	7	15	1	10	16	0	0
Cramping	0	0	13	13	0	20	5	1
Gnawing	18	8	0	0	23	3	0	0
Hot- burning	17	8	1	0	24	2	0	0
Aching	0	7	15	4	5	19	2	0
Heavy	6	10	9	1	15	9	1	1
Tender	19	6	1	0	23	3	0	0
Splitting	23	3	0	0	26	0	0	0
Tiring- exhausting	2	10	10	4	8	16	2	0
Sickening	2	14	9	1	9	16	1	0
Fearful	17	9	0	0	26	0	0	0
Punishing- cruel	23	3	0	0	26	0	0	0

**Table 3 Mean ± SD, confidence interval of 95%, standard error mean, p- values, t- values of all menstrual symptoms**

Pain type	Mean ± SD		C.I. OF 95%		Standard error mean	p-values	t-values
	Pre-	Post-	Lower-	Upper-			
Throbbing	1.04 ±0.720	0.38±0.496	0.458	0.850	0.095	0.000	6.872
Shooting	0.85±0.732	0.19±0.402	0.375	0.932	0.135	0.000	4.835
Stabbing	1.00±0.849	0.35±0.629	0.332	0.976	0.156	0.000	4.183
Sharp	1.54±0.761	0.62±0.496	0.765	1.082	0.077	0.000	12.000
Cramping	2.50±0.510	1.27±0.533	1.023	1.439	0.101	0.000	12.200
Gnawing	0.31±0.471	0.12±0.326	0.030	0.355	0.079	0.022	2.440
Hot- burning	0.38±0.571	0.08±0.272	0.118	0.498	0.092	0.003	3.333
Aching	1.88±0.653	0.88±0.516	0.802	1.198	0.096	0.000	10.408
Heavy	1.19±0.849	0.54±0.761	0.458	0.850	0.095	0.000	6.872
Tender	0.31±0.549	0.12±0.326	0.030	0.355	0.079	0.022	2.440
Splitting	0.12±0.326	0.00±0.00	-0.016	0.247	0.064	0.083	1.806
Tiring- exhausting	1.62±0.852	0.77±0.587	0.599	1.094	0.120	0.000	7.042
Sickening	1.35±0.689	0.69±0.549	0.427	0.881	0.110	0.000	5.937
Fearful	0.35±0.485	0.00±0.00	0.150	0.542	0.095	0.001	3.638
Punishing- cruel	0.12±0.326	0.00±0.000	-0.016	0.247	0.064	0.083	1.806
PPI	2.62±0.697	1.23±0.514	1.184	1.585	0.097	0.000	14.230



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