

EFFECT OF SHIATSU THERAPY IN FEMALES WITH PRIMARY DYSMENORRHEA: AN EXPERIMENTAL STUDY

Physiotherapy

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ABSTRACT

Background and Objective: The word 'Dysmenorrhea' comes from the Greek word 'Dys' which means 'difficulty' painful abnormal Meno [Month] rhea [flow]. The prevalence estimated range from 25 to 90 percent among women adolescents studies India reported the prevalence range between 50 to 87.8 percent. Primary dysmenorrhea is defined as cramping pain in the lower abdomen occurring just before or during the menstruation period in the absence of pelvic pathology showing signs and symptoms of nausea, vomiting, mood swings, headache, lethargy and diarrhea which all are common complaints associated with dyspareunia, infertility and menstrual disorder. SHIATSU is a Japanese word that means fingers pressure which is a type of massage treatment that uses gentle manipulations, stretches and pressure methods on fingers, thumb, elbows, knees and feets to promote the body's natural ability to recover. Hot pack for cramps are also used by women to treat their montly discomfort. Heat is a common method for coping with dysmenorrhea which causes lowers muscle tension and stress can also improve pelvic blood circulation. The objective of this study was to analyze the effect of shiatsu massage therapy and hot pack therapy on the severity of pain among female population having primary dysmenorrhea. **Methods:** An experimental study was concluded among young women. The patients were screened for inclusion and exclusion criteria according to diagnostic criteria. The sample size consisted of 68 women which were divided into two groups for the intervention: Conventional group (n=34) and Experimental group (n=34). Pre and post treatment score was assessed using Menstrual Health Questionnaire (MHQ) and Numerical Pain Rating Scale (NPRS). **Results:** The Study revealed that there was significant improvement in experimental group where Shiatsu massage was given along with conventional group (hot pack therapy) and improvement was seen in the term of reducing pain in females with primary dysmenorrhea. **Conclusion:** Based on the findings of the present study, it was concluded that the shiatsu group had a significant reduction in the severity of primary dysmenorrhea pain compared to hot pack therapy.

KEYWORDS

Primary Dysmenorrhea, WALIDD Score, NPRS Scale, Menstrual Health Questionnaire, Shiatsu massage, Hot pack therapy.

INTRODUCTION

The word 'Dysmenorrhea' comes from the Greek word 'Dys' which means 'difficulty' painful abnormal Meno [Month] rhea [flow] dysmenorrhea not only affects women's quality of life, but it's also the leading cause of distraction, resulting in lost work hours and financial loss.¹ The prevalence estimated range from 25 to 90 % among women adolescents studies from India reported the prevalence range between 50 to 87.8.² Primary and secondary dysmenorrhea are two different types of dysmenorrhea. Primary dysmenorrhea is defined as cramping pain in the lower abdomen occurring just before or during the menstruation period in the absence of pelvic pathology.³ Primary dysmenorrhea develops when young girls from first experience the ovulatory cycles and its prevalence rises during (15-17) peaks in 20-40 years and then gradually declines and decreases progressively thereafter. In primary dysmenorrhea pain begins a few hours before or after menstruation and lasts for 24-48 hours. The pain is worse on the first day and rarely lasts until the second day.⁴

The signs and symptoms of primary dysmenorrhea nausea, vomiting, mood swings, headache, lethargy and diarrhea are all common complaints associated with lower abdomen pain, which can migrate to the thigh and lower back. Excessive myometrial contractions, ischemia, excess prostaglandin production are the main causes of primary dysmenorrhea. Secondary dysmenorrhea is characterized by variable dull ache which is associated with dyspareunia, infertility and menstrual disorder. Causes PID, adenomyosis, fibroids.¹

Although the cause of primary dysmenorrhea is unknown most symptoms can be explained by the action of uterine prostaglandin mainly PGF2. PGF2 promotes myometrial contractions, ischemia and nerve end sensitization. These rises especially of PGF2 are caused by falling progesterone levels during the luteal phase. Prostaglandin synthesis inhibitors help to alleviate the unpleasant feelings that come with menstrual discharge. The amount of PGF2 secreted is directly linked to the severity of menstrual cramps and dysmenorrhea symptoms.⁴

In women with severe primary dysmenorrhea, prostaglandin F2alpha

levels are especially high during the first two days of menstruation. The amount of vasopressin and leukocyte-triene were also found to be higher in women with severe menstrual pains than in women with mild or no menstrual pain. In primary dysmenorrhea, the posterior pituitary hormone vasopressin may be involved in myometrial hypersensitivity, diminished uterine blood flow and discomfort. Vasopressin may play a function in prostaglandin synthesis and release in the endometrium.⁵

The pelvic floor is known to be affected by primary dysmenorrhea and to be a source of hyperactivity in this musculature. In patients with primary dysmenorrhea, pain thresholds for pressure, heat and electricity are lowered in the abdomen, para vertebral and limb regions during the menstrual phase. The transfer of nociceptive sensations through the facilitation of the CNS, which created tension and hyperactivity in the pelvic floor muscles, may be connected with discomfort in the pelvic floor of women with primary dysmenorrhea. When these pelvic structures are harmed, they can use cognitive, sexual, behavioral and emotional problems. Furthermore, this disability could lead to uterine incontinence in the future.⁶ There are physiotherapeutic resources to decrease severity of primary dysmenorrhea symptoms or even to eliminate pain among them there are Thermotherapy, Cryotherapy, kinesiotherapy, connective tissue massage (CTM), Interferential current, TENS, Acupuncture, Pilates. We sought to compare the effect of shiatsu massage and conventional therapy on women with primary dysmenorrhea.⁴

Tokujiro Namiskoshi developed SHIATSU it is a Japanese bodywork, in the 1920s. Shiatsu activates the body's innate healing force by pressing shiatsu spots with the thumbs and palms on the entire body, according to eastern medical beliefs.⁷ SHIATSU is a Japanese word that means finger pressure. It is a type of massage treatment that uses gentle manipulations, stretches and pressure methods on the fingers, thumbs, elbows, knees, and feets to promote the body's natural ability to recover.⁸ Shiatsu is an oriented medicine which has its roots in Chinese medicine and may even have predated acupuncture. It embraces the philosophy of Yin and Yang, the energy meridians the five elements and the concept of ki, or energy. Practitioners use points

on the meridians to re balance the body's energy. These pressure points are known as "tsubos" in Japanese and are points that allow the therapist to act on the energy meridians.⁸ Its promotes self-healing and holistic healing. Studies have shown the Shiatsu therapy uses acupressure, applied by hand to key area of the body, to release discomfort, pain, bloating and tension.⁹

The "Sea of Energy Point" is one of the most essential sites for treating dysmenorrhea. Stimulation of this point aids in the treatment of dysmenorrhea and related symptoms. As a result, shiatsu therapy can help with primary dysmenorrhea management. Shiatsu seeks to avoid stress build up by balancing, restoring and maintaining the body's equilibrium. It is a wonderfully calming experience that is used to cure a wide range of illnesses, from specific injuries to moving general symptoms of bad health. Common cold, difficulties respiratory sickness, including asthma and are some of the most prevalent disorders that may be responsiveness to shiatsu treatment.⁸

Although there is limited research that shows shiatsu therapy can help with menstrual cramps and symptoms, it is widely utilized in Europe to alleviate health issues. Quality, quantity and reporting of study evidence have all improved, but more research is still needed, especially in the case of shiatsu. The goal of this study was to see how effective shiatsu therapy was at treating a variety of diseases.⁹

Alternative therapies, such as heating pads for cramps, are also used by women to treat their monthly discomfort. Surface temperature of 40-45°C. Heat is a common (36.5 to 50 percent) method for coping with dysmenorrhea, according to studies. Treat the application site to a depth of about 1 cm. The application of local heat treatments to women with dysmenorrhea lowers muscle tension and stress. Heat can also improve pelvic blood circulation, allowing for a reduction in discomfort caused by nerve compression by removing local blood and blood fluid retention, as well as reducing congestion and swelling.¹⁰

2. METHODS

2.1 Study Design

A comparative randomized clinical trial was used to find out effect of shiatsu therapy in females with primary dysmenorrhea.

This study was conducted at the Mahatma Gandhi Mission's (MGM's) Physiotherapy Rehabilitation and Fitness Center, Chhatrapati Sambhajanagar (Aurangabad). women with primary dysmenorrhea were recruited. Study procedure was initiated after the approval of MGM's Ethics Committee for research on human subjects. Consent was taken in written before commencement of the protocol.

2.2 Participants and Recruitment

The subjects included were female age group between 18-25 years having regular menstrual cycle. Convenience sampling was used to randomly assign into two groups by the principal investigator.

Sample Size Calculation

Sample Size Justification

Study Groups

68 female patients were taken and divided into two groups

Group A (Hot pack)

Group B (Shiatsu massage)

2.3 Procedure

The objective of study was established and permission for research was obtained from Ethical Committee for Research on Human subjects. MGM Medical College, Chhatrapati Sambhaji Nagar (Aurangabad).

The subjects were explained about purpose and nature of study. Informed consent was taken from the subjects before their inclusion in study. The subjects were allocated to Group A (Hot pack) and Group B (Shiatsu massage).

Initial and post training assessment was done.

2.4 Outcome Measures

Numerical Pain Rating Scale (NPRS) was used to determine the severity of primary dysmenorrhea.

Menstrual Health Questionnaire (MHQ) mainly focuses on quality of life during menstruation each symptom on the question was graded in symptom wise differentiation.

WaLIDD Score was utilized to diagnose dysmenorrhea.

2.5 Study Procedure

All the participants with the clinical diagnosis of primary dysmenorrhea were enrolled after screening as per the inclusion criteria and were requested to participate in the study. The study was conducted at MGM University, Aurangabad. All the participants were briefed properly about the purpose and nature of the study. The intervention protocol was individually explained in the language they can comprehend. They were included in the study only after obtaining a written consent form. We gave the participants an individual form to fill out their demographic data including name, age, occupation, address, contact number and email address. Outcome measures like WaLIDD score, Menstrual Health Questionnaire (MHQ) and Numerical Pain Rating Scale (NPRS) were taken to assess the pre- and post-treatment sessions for both the groups to analyse the results. The treatment session was given for three consecutive menstrual cycles, for three times daily during the first 3 days of the menstruation.

The Participants were Categorized into 2 Groups:

In Group A (Hot Pack) - The participants in this group underwent hot pack therapy i.e., placement of hot pack over the lower abdomen, lower back or thigh region for minimum duration of 20 minutes.

In Group B (Shiatsu Massage) - The participants in this group underwent basic shiatsu massage techniques to alleviate the pain for about 20-30 minute treatment period.

2.6 Intervention:

Proper sanitization was done before commencing the treatment.

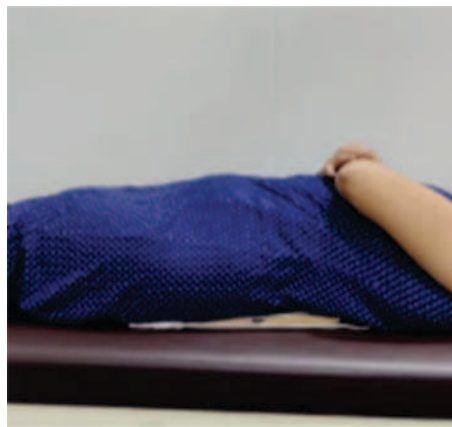
Group A: Hot Pack

Instructions:

The patient's comfort was a primary consideration. All subjects were asked to lie down in a prone or supine position with arms by side²³. The patient was and the neck was placed in the neutral position instructed that it may take few minutes for the heat to penetrate through the towel. The patient was instructed to ask for assistance if the hot pack felt too hot or caused any discomfort. The body part to be treated was asked to be exposed according to the pain confined at lower back or abdomen region. Proper size and shape of pack was chosen on the basis of area being treated. After testing the temperature of the hot pack, it was wrapped in terry cloth and applied there after ensuring that the woman is comfortable. Layering of the towel was changed as per the heat loss and tolerance of the patient. The site of application was observed about every 3-5 minutes to prevent any signs of erythema, skin discolouration or blistering²⁴.



Picture 1: Hot Pack for Abdominal Pain



Picture 2: Hot Pack for Low Back Pain

Group B: SHIATSU Massage

Considering the whole body, the pressure used in shiatsu was stationary and sustained. The thumb was maintained in an extended while applying pressure within the isolated area of the body.

Instructions: At the beginning of the session, the therapist evaluated the client to determine the patterns of imbalance that were present. The patient was explained about the importance to assess the "state of the Qi" in order for the therapist to give the client the most effective therapeutic session.

Some basic shiatsu massage techniques that were incorporated are:

1. Pressure with Manipulation: Patient was instructed to be in supine position. Light pressure with manipulation or light massage was applied to the "Sea of Energy" point (located in the abdominal area and is measured two fingers width below the navel) with fingers for one to two minutes while deep breathing.



Picture 03: Sea of Energy Point Located in Abdominal Area.

2. Kembiki/Canbeaky: Patient was instructed to be in prone position. It began with the therapist laying the patient on a couch with the whole body rested and relaxed comfortably. Then the therapist began to rock the patient's body gently while moving the hands or fingers from the upper back to the legs and back in a repeated motion. This helped the patient's body to relax and ease into the session.



Figure 04: Rocking with Palms (Canbeaky).



Figure 05: Rocking with Fingers (Canbeaky).

3. Pressure: Patient was instructed to be in prone position. This technique can be used with the forearm, thumbs or palms.

Pressure with Palms: In this, body weight was used to create pressure by keeping both the hands on either side of the spine and slowly leaning forward to shift your weight into the patient's tense regions of the back.



Figure 06: Pressure with Palms.

Pressure with Thumb: The thumb was used while giving shiatsu to find a pressure point and feeling for exactly where that is. The next thing with using thumbs was sending the weight into the thumbs along either side of the spine and holding points while moving all the way down to the base of the spine.



Figure 07: Pressure with Thumb.

Pressure with Forearm: Placing one still, the other one just going to flip over and then turn over along the length of the spine. Rather than pushing we can place our forearms, leaning the body weight forward, and then while rotating apply slight pressure.



Figure 08: Pressure with Forearm.

4.Stretching: Patient was instructed to be in prone position. It primarily involved sending the therapist's body weight forward into the patient's body creating a stretch along the length of the spine. We also gave a stretch by bringing in both the feet and placing our knee perpendicular to her body gave a stretch by pulling the feet in. Staying there for about five seconds or so and coming back. This gave nice stretch for the front of the hips.



Figure 09: Stretching Along the Spine.



Figure 10: Stretching for the Hips.

5. Rotation: Patient was instructed to be in prone position. The therapist used circular motions in moving the knee to relieve tension in the joints between the thighs. The rotation shiatsu massage technique worked on the ankles as well and this movement has a soothing effect on the hip.



Figure 11: Rotation of the Spine.

6. Cupping: Bringing the clasped hands together and placing them over the lumbar spine we performed a little squeezing in towards the spine. Here, making sure that the therapist kept own spine really long and in alignment as works along the spine.

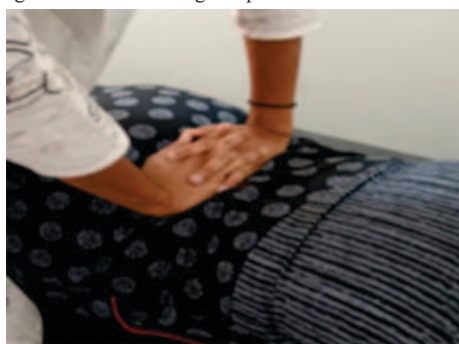


Figure 12: Cupping for the Lower Back Region.

Finishing with a little rocking motion, fingertips on either side of the spine. To end a shiatsu session, one is to place your hand on the hara, and the other behind the low back, and just to stay in stillness. This just gives the receiver a sense of the front and back of their body.^(25,26)

3. RESULTS

3.1 Participant Flow and Recruitment

Subjective Information

There were two groups Experimental group (EX) group(n=) Shiatsu Massage and Control (CON) group (n=) Hot Pack.

The mean age for experimental group was 22.55 with SD of 1.61 and for control group was 22.55 with SD of 1.70.

Table 1: Occupation Wise Distribution of Patients in Two Groups.

Particular		Group		Total	p-value
		SHIATSU Grp	Hot-pack Grp		
Occupation	CS	0	1	1	0.170
	Entrepreneur	0	1	1	

	Intern	12	9	21	
	It Worker	0	2	2	
	MSC	0	1	1	
	Service	0	3	3	
	Student	22	17	39	
Total		34	34	68	

OCCUPATION* Group Cross Tabulation

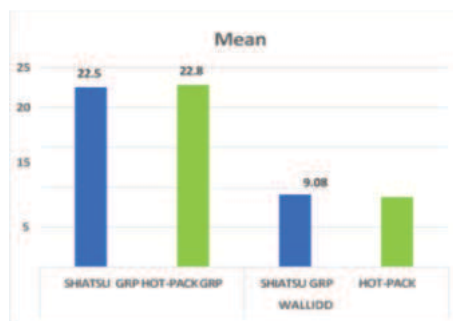


Graph 1: Occupation Wise Distribution of Participants in Two Groups

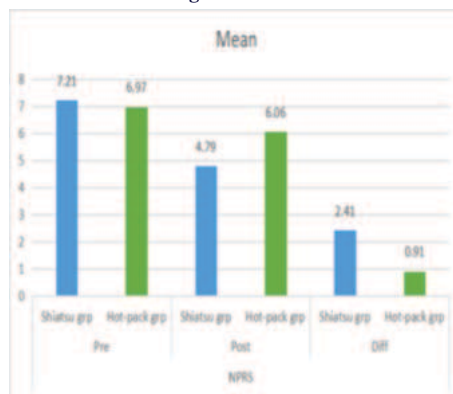
Group Statistics

Particular	Group	Mean	SD	p-value
AGE	SHIATSU GRP	22.55	1.61	0.469
	HOT-PACK GRP	22.85	1.70	
WALLIDD	SHIATSU GRP	9.08	1.13	0.298
	HOT-PACK GRP	8.79	1.17	

* Significant at 5% level



Graph 2: Mean Values for Age and WALLIDD Score



Graph 3: Pre and post Values Showing NPRS Scores for Both the Groups.

Wilcoxon match was used to analyze the effect of shiatsu massage therapy in womens with primary dysmenorrhea. And shows that there was extremely significant reduction in NPRS score ($p < 0.001$) and MHQ ($p < 0.001$).

The NPRS mean value indicated changes post treatment and lower values are recorded for post treatment outcome and also the standard deviation shows the consistency with post treatment value which is less than pre value.

The mean difference is positive indicating post treatment score has decreased after the Shiatsu massage therapy which is the desired condition for the treatment outcome.

Within Group Pre and Post Wilcoxon Test for Hot Pack Grp

Outcome Measure	Variable	Pre		Post		Diff		Effect size	Z value	P- value
		Mean	SD	Mean	SD	Mean	SD			
Pain	NPRS	7.21	1.23	4.79	1.12	2.41	0.61	3.96	23.095	0.001*
MHQ	Cramps 1- 3 days	3.06	0.89	2.18	1.11	0.88	0.69	1.29	7.500	0.001*
	Cramps 4- 7 days	2.50	0.71	1.71	0.87	0.79	0.69	1.16	6.744	0.001*
	Abdominal Pain 1-3 days	2.71	1.00	2.15	1.18	0.56	0.70	0.79	4.625	0.001*
	Abdominal Pain 4-7 days	2.47	0.86	1.47	0.66	1.00	0.78	1.28	7.490	0.001*
	Backache 1-3 days	2.82	0.83	1.71	0.94	1.12	0.69	1.63	9.500	0.001*
	Backache 4-7 days	2.29	0.80	1.35	0.65	0.94	0.74	1.28	7.455	0.001*

Outcome Measure	Variable	Pre		Post		Diff		Effect size	Z value	P- value
		Mean	SD	Mean	SD	Mean	SD			
Pain	NPRS	6.97	1.03	6.06	1.20	0.91	0.57	1.60	9.321	0.0001*
MHQ	Cramps 1- 3 days	3.09	0.71	2.62	1.13	0.47	0.86	0.55	3.187	0.0003*
	Cramps 4- 7 days	2.91	0.75	1.97	0.87	0.94	0.85	1.11	6.451	0.0001*
	Abdominal Pain 1-3 days	2.91	0.79	2.53	1.08	0.38	0.82	0.47	2.729	0.010*
	Abdominal Pain 4-7 days	2.88	0.88	1.97	0.67	0.91	0.67	1.36	7.956	0.001*
	Backache 1-3 days	2.50	0.75	1.85	0.78	0.65	0.69	0.94	5.459	0.001*
	Backache 4-7 days	2.18	0.63	1.47	0.51	0.71	0.68	1.04	6.093	0.001*

**Group 4: Within Group Pre and Post Wilcoxon Test for SHIATSU**

The effect size or Cohen's D indicates 3.96 value which is assumed to be very high in effect size as per the standard parameters of reference.

Based on the results of the test analysis at 5% significance level, there is a significant statistical reliable difference between the pre & post treatment values with p-value is less than the 5% significance level (i.e. $0.001 < 0.05$) in the study and therefore it justifies the improvements in health outcome post intervention.

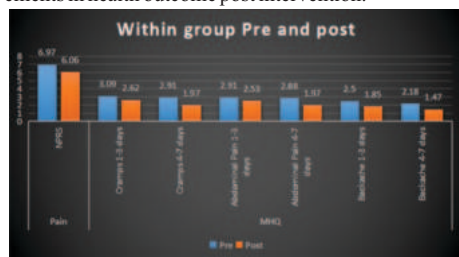
Wilcoxon matched pairs test was used to analyze the effect of hot pack therapy in females with primary dysmenorrhea. And shows that there was significant reduction in NPRS score ($p < 0.001$) and MHQ score ($p < 0.001$).

The NPRS mean value indicated changes post treatment and lower values are recorded for post treatment outcome and also the standard deviation shows the consistency with post treatment value which is less than pre value.

The mean difference is positive indicating post treatment score has decreased after the hot pack therapy which is the desired condition for the treatment outcome.

The effect size or Cohen's D indicates 1.60 value which is assumed to be very high in effect size as per the standard parameters of reference.

Based on the results of the test analysis at 5% significance level, there is a significant statistical reliable difference between the pre & post treatment values with p-value is less than the 5% significance level (i.e., $0.001 < 0.05$) in the study and therefore it justifies the improvements in health outcome post intervention.



Graph 5: Within Group Pre and Post Wilcoxon Test for Hot Pack Grp

Normality Test Using Kolmogorov-smirnova

Outcome Measure	Variable	Time Frame	SHIATSU GRP		HOT PACK GRP	
			Z-value	P-value	Z-value	P-value
Pain	NPRS	Pre	0.243	0.001	0.209	0.001
		Post	0.221	0.001	0.194	0.002
		Diff	0.304	0.001	0.356	0.001
MHQ Assessment	Cramps 1-3 days	Pre	0.238	0.001	0.255	0.001
		Post	0.210	0.001	0.221	0.001
		Diff	0.333	0.001	0.260	0.001
	Cramps 4-7 days	Pre	0.319	0.001	0.223	0.001
		Post	0.320	0.001	0.310	0.001
		Diff	0.324	0.001	0.263	0.001
	Abdominal Pain 1-3 days	Pre	0.318	0.001	0.250	0.001
		Post	0.275	0.001	0.227	0.001
		Diff	0.355	0.001	0.305	0.001
	Abdominal Pain 4-7 days	Pre	0.355	0.001	0.230	0.001
		Post	0.379	0.001	0.282	0.001
		Diff	0.295	0.001	0.280	0.001
	Backache 1-3 days	Pre	0.221	0.001	0.277	0.001
		Post	0.333	0.001	0.244	0.001
		Diff	0.327	0.001	0.342	0.001
	Backache 4-7 days	Pre	0.261	0.001	0.376	0.001
		Post	0.443	0.001	0.353	0.001
		Diff	0.343	0.001	0.315	0.001

Data set for both the groups are not normally distributed as the variables have not indicated non-significant outcome in the observation. The researcher have used non- parametric test for data analysis purpose in the following sections

Between Groups Mann Whitney Test

Outcome Measure	Variable	Time Frame	Group	Mean	SD	Z-value	P-value
Pain	NPRS	Pre	Shiatsu grp	7.21	1.23	0.857	0.394
			Hot-pack grp	6.97	1.03		
		Post	Shiatsu grp	4.79	1.12	-4.479	0.000
			Hot-pack grp	6.06	1.20		
		Diff	Shiatsu grp	2.41	0.61	10.483	0.000
			Hot-pack grp	0.91	0.57		
MHQ	Cramps 1-3 days	Pre	Shiatsu grp	3.06	0.89	-151	0.881
			Hot-pack grp	3.09	0.71		
		Post	Shiatsu grp	2.18	1.11	-1.622	0.109
			Hot-pack grp	2.62	1.13		
		Diff	Shiatsu grp	0.88	0.69	2.181	0.033
			Hot-pack grp	0.47	0.86		
	Cramps 4-7 days	Pre	Shiatsu grp	2.50	0.71	-2.324	0.023
			Hot-pack grp	2.91	0.75		
		Post	Shiatsu grp	1.71	0.87	-1.254	0.214
			Hot-pack grp	1.97	0.87		
		Diff	Shiatsu grp	0.79	0.69	-0.789	0.436
			Hot-pack grp	0.94	0.85		
	Abdomin	Pre	Shiatsu grp	2.71	1.00	-0.940	0.351
			Hot-pack grp	2.53	1.08		

		Hot-pack grp	2.91	0.79		
	Post	Shiatsu grp	2.15	1.18	-1.391	0.169
		Hot-pack grp	2.53	1.08		
	Diff	Shiatsu grp	0.56	0.70	0.954	0.344
		Hot-pack grp	0.38	0.82		
Abdominal Pain 4-7 days	Pre	Shiatsu grp	2.47	0.86	-1.951	0.055
		Hot-pack grp	2.88	0.88		
	Post	Shiatsu grp	1.47	0.66	-3.087	0.003
		Hot-pack grp	1.97	0.67		
	Diff	Shiatsu grp	0.94	0.78	0.167	0.868
		Hot-pack grp	0.91	0.67		
Backache 1-3 days	Pre	Shiatsu grp	2.82	0.83	0.683	0.097
		Hot-pack grp	2.50	0.75		
	Post	Shiatsu grp	1.71	0.94	-0.701	0.486
		Hot-pack grp	1.85	0.78		
	Diff	Shiatsu grp	1.18	0.76	3.010	0.004
		Hot-pack grp	0.65	0.69		
Backache 4-7 days	Pre	Shiatsu grp	2.29	0.80	0.676	0.502
		Hot-pack grp	2.18	0.63		
	Post	Shiatsu grp	1.35	0.65	-0.836	0.406
		Hot-pack grp	1.47	0.51		
	Diff	Shiatsu grp	0.91	0.71	1.223	0.226
		Hot-pack grp	0.71	0.68		



Graph 6: Mean Values For Pre and Post Treatment of Cramps



Graph 7: Mean Values For Pre and Post Treatment For Abdominal Pain



Graph 8: Mean Values For Pre and Post Treatment For Backache

Variable	Conventional Grp Effect Size	Experimental Grp Effect Size	Remarks
NPRS	1.60	3.96	Experimental group is better
MHQ	0.91	1.23	Experimental group is better

4. Statistical Analysis

The data was represented in the form of mean, standard deviation (SD). Both these data was represented on visuals such as bar diagram.

For intra-comparison within group (pre and post values), paired t-test was performed and for intercomparison between group (post values) unpaired t-test was performed.

5. CONCLUSION

The study concluded that the shiatsu group had a significant reduction in the severity of primary dysmenorrhea pain compared to hot pack therapy.

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