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Effect of Suryanamskar v/s Gym Ball Exercises with K-Taping on Pain & Symptoms in Primary Dysmennorrhea: A Comparative Study

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Abstract: ***Background: Primary Dysmenorrhea (PD) is a common gynaecological condition which causes abdominal discomfort and pain during or/and before starting menstrual cycle. The pain and discomfort in PD causes uterine contractions and pain. Suryanamskar and swiss ball exercises along with K-tape given in two groups. (n=32) in each group respectively. As there are less evidences based on gym ball exercises and suryanamskar combined with Kinesio Tape so, need of study arises. Methods: A comparative study was done in which 64 samples were randomly selected with moderate to severe Primary Dysmenorrhea. Group A (n=32) was given Suryanamskar along with K tape and group B (n=32) was given Swiss ball exercises along with K tape. For both groups intervention was given for 45 min including warm-up followed by exercises and stretching. Intervention was given for two months thrice in a week. Pain related to PD was measured through McGill pain questionnaire and Symptoms were measured through Menstrual Symptoms Questionnaire. Result: Study shows reduction in pain in both groups (Group A- P<0.0001; Group B- p<0.0001) immediately post the application of K tape on NPRS. There was significant reduction in pain as well as improvement in symptoms related to PD in both the groups: after the 1st and 2nd cycle and also showed carry over effect. After comparison between Group A and Group B, both the groups showed similar effect on pain and symptoms. Conclusion: Study shows significant reduction in pain and improvement in symptoms in primary dysmenorrhea post cycle 1, post cycle2, and also in carryover effect.***

Keywords: Primary dysmenorrhea, Suryanamskar, Swiss ball exercises, carry over effect

1. Introduction

Primary Dysmenorrhea is a common gynaecological condition which causes abdominal discomfort and pain during or/and before starting menstrual cycle. The pain and discomfort in PD causes uterine contractions and pain. High levels of prostaglandins can cause contractions of myometrium resulting in reduced uterine blood flow as well as myocardial ischemia of the uterus. There are four types of primary dysmenorrhea in which spasmodic and congestive dysmenorrhea are common in reproductive females. Medical line of treatment in PD is analgesics or NSAIDs as it blocks the activity of Prostaglandins and Vasopressin and reduces the symptoms. Recently, Physiotherapy techniques are also used as an alternative therapies such as TENS, or Kinesio Taping for pain relief. This study is about the immediate effect of Kinesio tape for pain in PD along with Suryanamskar in group A and Swiss ball exercises in group B. whereas Kinesio tape was common in both the groups.

2. Procedure

Study has been started from 25/05/2021 till 29/09/2021.Institutional ethical clearance was taken from Dr. D. Y. Patil College of Physiotherapy ethical committee (DYPCPT/IEC/14/2021 dated 18/05/2021). Sample size were selected based on prevalence rate of primary dysmenorrhea. Whereas Confidence level= 95% and Absolute Precision = E= 14% by using formula; n= E^2/Z^2V Then samples were randomly screened according to inclusion and exclusion criteria. After written informed consent was taken, Samples were randomly allocated to Group A (n=32, Suryanamaskar + K Tape) and Group B (n=32, Swiss Ball Exercises + K Tape) by chit method. The baseline measurements of pain on Mc Gill Pain Scale & symptoms on Menstrual Symptom Questionnaire (MSQ) was taken on day 1, pre-treatment. Protocols were followed thrice in a week for two menstrual cycles in both the groups[2, 4, 5, 6, 10, 14, 16, 17, 18, 21, 24, 28] and in next consecutive cycle carryover effect of given intervention was observed where no treatment was given to either of the groups.

K-Tape was applied on the first day of menstrual cycle (within 12 hours). K-tape is applied on lower abdomen and lower back. K- Tape was applied on lower abdomen with 25% stretch. Two strips of K-Tape were applied one vertical and one horizontal. Same method is used for lower back between both PSIS.

From the 4th day of the cycle, the treatment protocol was started, depending on the group allocation. For Group A, Suryanamskar was given for 40 min thrice in a week for two months once in day. In initial 10 min warm up exercises such as shoulder rotations, neck rotations, wrist rotations for 10 repetitions each was given for upper limb. For lower limb hip flexion, abduction, adduction, this warm up exercises was given at 10 repetitions each. After this, 12 steps (As mentioned above) of suryanamskar were performed by participants: on first day 5 repetitions of one cycle was given which was progressed by adding one repetition of 12 steps in each session till one month. In next month there was no progression in repetitions and subjects continued with 16 repetitions of suryanamskar.

For Group B, Exercises on swiss ball were given. Initially warm up exercises for 10 min was performed as mentioned for group A followed by Hamstring curls, Knee Tucks and Back extension exercises which were done on Swiss Ball. Each exercise was initially given for 10 sec hold for 10 times with 3 sets of repetitions for 3 days in one week for 4 weeks. In another month hold time of each exercise was increased to improve strength of muscles[24, 26, 28].

Figure 1: Subject Performing Suryanamskar

Figure 2: Subject Performing Swiss Ball Exercises

Data Analysis

All tests were performed in Statistical Package for Social Sciences, version 21. The data was found to be normally distributed by using histogram. Paired T test was used for within group analysis of pre-post cycle 1, post cycle 2 and carry over effect difference for Group A and B while between group analysis was done for the same for Group A and Group B.

3. Result

Table 1: Depicts the within group analysis of Group A for Difference inSymptoms post Suryanamskar.

	Pre	Post Cycle 1 (Po1)	Post Cycle 2 (Po2)	Carry over
Mean+/- SD	89.53+/ -11.44	77.59+/ -9.38	63.93+/- 10.94	53.21+/ -10.81
SEM	2.02	1.65	1.93	1.91
p value	<0.000*1	<0.0001*	<0.0001*	<0.0001*
T		7.927	13.376	17.297
95% CI		8.86600	21.69130	32.02945
		15.00900	29.49611	40.59555

***p value significant**

The pre post analysis for Group A shows a significant reduction in Menstrual related symptoms during the 1st, 2nd cycle. Even after the cessation of therapy, carry over effect of Suryanamskar still shows significant improvement.

Table 2: Depict the within group analysis of Group A for Difference in Pain preand post Suryanamskar

Pain	Pre	Post Cycle 2 (Po2)	Carry over (CaO)
Mean+/- SD	59.21+/ -9.15	44.68+/ -10.71	29.31+/ -10.01
SEM	1.61	1.89	1.77
p value	<0.0001*	<0.0001*	<0.0001*
t		15.394	23.142
95% CI		12.60599	16.45651
		27.27056	32.54194

***p value is significant**

The pre post analysis for Group A shows a significant reduction in Pain during the 1st, 2nd cycle. Even after the cessation of therapy, carry over effect of Suryanamskar still shows significant improvement.

Table 3: Depicts the within group analysis of Group A for Kinesio tape

NPRS (K-Tape)	Mean+/- SD	SEM	Mean+/-SD	SEM	p value	t	95% CI	
	Day 1		Day 3					
	7.18+/-1.09	0.19	2.18+/-0.78	0.13	<0.0001*	28.752	4.64532	5.35468

***p value is significant.**

The pre post analysis for Group A shows a significant reduction in Pain on third day of menstrual cycle.

Table 4: Depicts the within group analysis of Group B for Difference in Symptoms post Swiss Ball exercises.

Symptoms	Pre	Post Cycle 1 (Po1)	Post Cycle 2 (Po2)	Carry over (CaO)
Mean+/- SD	87.21+/ -11.27	74.06+/ - 10.47	61.96+/ - 10.89	51.43+/ - 9.2
SEM		1.99	1.92	1.62
p value		<0.0001*	<0.0001*	<0.0001*
t		17.262	21.741	32.66127
95% CI		11.60184	22.88136	32.66127
		14.71066	27.61864	38.90123

***p value is significant.**

The pre post analysis for Group B shows a significant reduction in Menstrual related symptoms during the 1st, 2nd cycle. Even after the cessation of therapy, carry over effect of Swiss Ball exercises still shows significant improvement.

Table 5: Depicts the within group analysis of Group B for Difference in painpost Swiss Ball exercises

Pain	Pre	Post Cycle 2 (Po2)	Carry over (CaO)
Mean+/- SD	60.78+/-8.6	47.62+/-10.01	32.56+/-9.88
SEM	1.52	1.76	1.74
p value	<0.0001*	<0.0001*	<0.0001*
t		22.279	18.581
95% CI		11.20691	16.10559
		13.40920	16.71580

***p value is significant.**

The pre post analysis for Group B shows a significant reduction in Pain in pre and post 2nd. Even after the cessation of therapy, carry over effect of Swiss Ball exercises still shows significant improvement.

Table 6: Depicts the within group analysis of Group B for Kinesio tape

NPRS (K-Tape)	Mean+/- SD	SEM	Mean+/- SD	SEM	p value	t	95% CI	
	Pre (Day 1)		Post (Day 3)					
	7.18+/- 1.09	0.19	1.9+/-0.89	0.15	<0.0001*	26.148	4.86931	5.69319

***p value is significant.**

The pre post analysis for Group B shows a significant reduction in Pain on third day of menstrual cycle.

Table 7: Depicts the between group analysis for Difference in Symptoms.

Symptoms	Pre (Mean difference)	Pre -Post Cycle 1	Pre – Post Cycle 2	Pre- Carry over
Group A				
Mean+/- SD	11.93+/- 8.51	13.65+/-5.36	25.59+/-10.82	36.31+/-11.87
SEM	1.5	0.94	1.91	2.1
Group B				
Mean+/- SD	13.15+/- 4.31	12.09+/-4.8	25.25+/- 6.56	35.78+/- 8.65
SEM	0.76	0.8	1.16	1.52
p value	0.4721	0.224	0.879	0.838
t	0.723	1.226	0.152	0.204
95% CI	-2.15	-4.10	-4.81	-5.72
	4.59	0.98	4.13	4.66

The pre post analysis for between group for symptoms shows that data is not statistically significant.

Table 8: Depicts the between group analysis for Difference in Pain

Pain	Pre - Post	Pre - Carry over	Post - Carry over
Group A			
Mean+/- SD	14.53+/-5.33	29.90+/-7.31	15.37+/-5.79
SEM	0.94	1.29	1.02
Group B			
Mean+/-SD	13.15+/-5.4	28.21+/-7.16	15.06+/-4.58
SEM	0.95	1.26	0.81
p Value	0.307	0.353	0.813
t	1.02	0.934	0.237
95% CI	-4.06	-5.30	-2.91
	1.30	1.92	2.29

The pre post analysis for between group shows a significant reduction in Pain in pre and post assessment and statistically data is not significant.

4. Discussion

The study was done to find out effect of Suryanamskar and Swiss Ball Exercises in Primary Dysmenorrhea where, kinesio tape was given in both groups on Day 1 of the treatment. Intervention was given for two consecutive cycles and carryover effect was checked after third menstrual cycle, during which no therapy was given to either group. This study showed reduction in pain and symptoms in both the groups as well as reduction in pain due to Kinesio Taping on 3rd Day of the menstrual cycle. However, on comparing both Suryanamskar and Swiss Ball exercises,

there was no difference seen in reduction of pain and symptoms that was significant.

One of the objectives of this study was also to evaluate the immediate effects of K Tape on menstrual related pain, which showed a significant reduction in the samples. According to **Antonio Palazón-Bru María Isabel Tomás-Rodríguez[14],** it is proven that K- tape helps to reduce pain by stimulating nociceptors. In primary dysmenorrhea K tape helps to reduce pain by producing sensory tactile pulses, which are further transmitted to higher centers of brain and thereby helps to reduce pain in primary dysmenorrhea[14]. K-Tape stimulates the nociceptors, that causes drainage and decompression of area which helps to reduce pain[14]. This also causes removal of waste products and helps in healing.Kinesio tape is applied over and around muscles for movement control and functional goals. Special design with waved structure can alternate the inputs of proprioception and somatosense. Aim of Kinesio taping method is uplifting the space under soft tissue and skin, so that the space for movement can be enlarged and there will be facilitation of circulation of lymphatic fluid and blood and healing rate of tissue can be increased[29]. In Group A suryanamskar, which is a type of Yoga was given for 12 weeks, thrice in a week. Yoga focuses on simple practices such as Asnas-postures; Pranaymas-the breathing techniques which are intend to stretch the muscles and cleanse the body[5, 9]. According to studies done by **Aggarwal A, Rao T, Palekar T, Paranjape P, Singh G. and Rakhshaee Z**, yoga causes regulation of Hypothalamo-Pitutory Adrenal axis[2, 3], which causes reduction in menstrual pain and further menstrual symptoms[3]. Yogic postures are combination of mental meditation, physical exercise and breathing techniques to relieve stress and to strengthen the muscles[2, 4]. Stimulation of pelvic pain fibers through the central nervous system are the important factors causing primary dysmenorrhea[18] & It is caused due to interplay of hormones occurring in hypothalamus pituitary axis (HPA)[1, 2, 3, 4]. Study done by **P.L. Gerbarg,**

C.C. Streeter, R. B. Saper, D.A. Ciraulo R.P. Brown[6] found that yoga therapy can be useful for the hormones released by HPA and can be a good therapy for anxiety and depression as well[6]. Yoga causes inhibition of posterior thalamus and cortisol and reducing pain in primary dysmenorrhea[27]. According to other studies yoga helps to reduce prostaglandins and homocysteine levels by the regulation of Hypothalamic-pituitary-Adrenal axis so, subjects in group A have shown reduction of pain than symptoms. In our study, a similar effect could have lessened the menstrual related pain, hypothesizing that, regular practice of Suryanamskar optimized the hormonal activity, thereby reducing the symptoms.

The subjects in Group B were given Swiss Ball exercises which have also shown significant reduction in pain and symptoms, during the 1st and 2nd cycle as well as has a carry over effect. According to **Padmanabhan, K., Sudhakar, S., Aravind, S., Kumar, C.P. and Monika, S et al** and **Koshy MM, Patil DS, Patil DC, Chotai DK** Swiss Ball (SB) exercises improves nutrient supply and blood supply to the lower abdomen and lower back(LB) region which helps to diminish menstrual cramps[24]. Back extension in Swiss ball improves strength and stability in lower back, hamstrings (Hams) and glutei muscles, Transverse Abdominis (TA), Internal Oblique(IO) and External Oblique(EO). It strengthens and stretches the core muscles by increasing the blood supply, which helps to reduce the menstrual pain and menstrual cramps[24, 28]. Core strengthening causes conditioning of small muscles around lumbar spine which causes increase in blood flow and increased in metabolism of uterus during exercises in non menstrual phase which might be helpful in reducing symptoms.

So, as per above discussion in group A yoga causes regulation of Hypothalamo- Pituitary Adrenal axis[2, 3], which causes reduction in menstrual pain and further menstrual symptoms[3] and hormones released by HPA and can be a good therapy for anxiety and depression as well[6]. Yoga focuses on simple practices such as Asnas- postures; Pranaymas-the breathing techniques which are intend to stretch the muscles and cleanse the body[5,9] that helps to reduce pain and sustaining the effects which causes reduction of pain.

In group B Swiss ball exercises mainly focuses on Strengthening of abdominal muscles which are more importantly helps to reduce symptoms such as abdominal cramps, backache before starting of menstrual cycle and abdominal bloating sensation. So during swiss ball exercises along with muscle strengthening it allows removal waste products and nourishment to the muscles. According to Swiss ball exercises it causes core strengthening is helpful in reducing sympathetic activity and relief the stress through release of endorphins, substances produced by the brain that increases pain threshold and helps in reducing symptoms. Study done by **Hend S Saleh, Hala E Mowafy and Azza A abd El Hameidhas** shown that therapeutic exercise can increase the levels of secretion of endorphins from the brain which causes increase pain threshold of human body. These might also be the reasons of Swiss Ball exercises showing a better effect on reducing symptoms as compared to Suryanamskar. While checking carryover effect Group B shows more sustained effects of exercises as Swiss ball exercises strengthens and nourishes the muscles around lumbar spine and helps to reduce symptoms. This study shows that both yoga and suryanamskar are helpful in reducing pain and symptoms in primary dysmenorrhea but Swiss Ball exercises shows more sustainable effects than Suryanamskar. Study done **Kristina S Gamit, Megha S Sheth, Neeta J Vyas[13],** also states that strengthening exercises causes release of endorphins from brain which causes increase in pain threshold of body and helps in pain reduction so, same mechanism might be helpful in reduction in pain in carryover effect also. This study also says that increased metabolism and blood flow causes reduction in symptoms due to strengthening of lumbar muscles and other muscles surrounding the uterus[13].

5. Conclusion

Study shows significant reduction in pain and improvement in symptoms in primary dysmenorrhea post cycle 1, post cycle2, and also in carryover effect. Also immediate effects of K-Tape has shown significant reduction in pain.

Appendix- 1

Consent Form

TITLE: EEFECT OF SURYANAMSKAR V/S GYM BALL EXERCISES WITH K-TAPING ON PAIN AND SYMPTOMS IN PRIMARY DYSMENNORRHEA: A COMPARATIVE STUDY

Participant:
I confirm that (investigator) has explained me the purpose of the research, the study procedure and the possible risks and benefits that the participant may experience. I have read and understood this consent and I am willing to participate as a subject in this researchproject.

Name of the Subject: Date:

Signature of Subject:

Investigator:
I have explained to_____the purpose of the research, the procedure required and the possible risks and benefits to the best of my ability. I have made every effort to make the participant understand and clear allquestions put forward.

Name of the Investigator

Signature

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