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Study to Determine the Effects of Surya Namaskar (SN) on Primary Dysmenorrhea

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ABSTRACT
Dysmenorrhea, or pain during menstruation, has been described as one of the most common complaints seen in female. Few studies have also examined the effect of life style modification intervention in the management of dysmenorrhea. Present study was aimed to determine the effects of Surya Namaskar practice on primary dysmenorrhea.Present study was single-center, Pre and post experimental study, conducted in adolescent females (14 to 25 years of age) with primary dysmenorrhea. Surya Namaskar according to Bihar school of yoga was given to the subjects. The assessment tools used in the study were Modified Menstrual Symptoms Questionnaire and N.P.I. scale. A total of 30 girls participated and completed the intervention in the present study. The base line N.P.I. score was 6.86 at baseline that comes to moderate intensity of pain. After the intervention of Surya Namaskar for 3 months, there was a significant ($p = 0.0001$) reduction in NPI score in primary dysmenorrhea. The NPI score in the first visit was 6.86±1.2 and it shows they had a discomfort during their menstrual period. After the Surya Namaskar intervention NPI score was significantly decreased in visit 2 (4.2±0.6), visit 3 (2.6±0.78) and visit 4 (1.7±0.54). MSQ overall score at baseline (51.8±16.5) was higher and reflecting that they had a painful menstruation. After the Surya Namaskar intervention, the overall score was significantly ($p = 0.001$) decreased in visit 2 (40.4±15.5), visit 3 (36.9 ±12.2) and visit 4 (28.16±9.56) and this shows the effect of Surya Namaskar practice in primary dysmenorrhea. The present study confirms that Surya Namaskar alone proves to be effective in the reduction of pain and symptoms with primary dysmenorrhea.

INTRODUCTION

Menstrual disorders are commonly present in late adolescence. Almost 75% of girls experience some problems associated with menstruation[1]. Dysmenorrhea, or pain during menstruation, has been described as one of the most common complaints seen in medicine. Primary dysmenorrhea is the most common gynecological disorder among female adolescents with a prevalence of 70-90% It is also a leading cause of the poor quality of life among adolescent girls[2].

Currently, standard medical treatments for dysmenorrhea includes the use of Nonsteroidal anti-inflammatory drugs (NSAIDs). This inhibits prostaglandin synthetase, oral contraceptive pills, which inhibit ovulation thus reducing myometrial activity. However, these drugs are not 100% effective and are associated with side effects[3]. Complementary and alternative medical treatments for dysmenorrhea include transcutaneous electric nerve stimulation, acupuncture, acupressure, behavioral intervention, spinal manipulation, relaxation and dietary therapies. Few studies have also examined the effect of life style modification intervention in the management of dysmenorrhea[4].

Surya Namaskar (SN) is an integral part of modern yoga training[5]. Surya Namaskar is a set of 12 asanas (postures). These alternating backward and forward bending postures flex and stretch the spinal column through maximum range therefore giving a profound stretch to the whole body[6]. Present study was aimed to determine the effects of Surya Namaskar practice on primary dysmenorrhea.

MATERIAL AND METHODS

Present study was single-center, Pre and post experimental study, conducted in department of Yoga, Government Yoga and Naturopathy Medical College and Hospital, Chennai, India. Study duration was of 1 year (July 2016-June 2017). Study approval was obtained from institutional ethical committee.

Inclusion criteria:

- Adolescent female (14-25 years of age) with primary dysmenorrhea, willing to participate in present study

Exclusion criteria:

- Subject who are differently abled
- Subject with any congenital anomalies

Study was explained to patients in local language and written consent was taken for participation and study. Thirsty subjects satisfying study criteria were considered for present study. Surya Namaskar according to Bihar school of yoga was given to the subjects. Surya Namaskar consisted of 12 postures. Each posture of Surya Namaskar was given in a slow manner with focus on breathing and chakra awareness. The Surya Namaskar practice was given in the following manner.

- Day 1 to Day 3-3 rounds
- Day 4 to Day 6-6 rounds
- Day 7 to Day 14-12 rounds
- Day 15 to End of menstrual cycle 24 rounds

During the practice of 24 rounds, 12 rounds of Surya Namaskar were followed by Shavasana for 5 min before beginning of next 12 rounds. Study was started from the sixth day of cycle. Study was conducted for 1 menstrual cycle. After the first menstrual cycle, the subjects were assessed for the intensity of pain with the help of N.P.I. scale. The following months, the subjects were asked to practice Surya Namaskar regularly for the next two months. Pain intensity was measured at the beginning of each cycle. Subjects were asked to visit hospital for assessment of N.P.I. scale.

The assessment tools used in the study were Modified Menstrual Symptoms Questionnaire and N.P.I. scale. Dysmenorrhea-related symptoms were scored using Modified Menstrual Symptoms Questionnaire which includes 24 items that are rated as 1 = “never” to 5 = “always”. Previous research has found support for 2 factor and 5 factor solutions of the items. The 2 factors each have 12 items which are summed to provide a score on Spasmodic and Congestive dysmenorrhea. Items in the Spasmodic factor generally reflect symptoms occurring during menstruation like spasms similar to labor pains while items in the Congestive Factor generally reflect symptoms or moods in the premenstrual phase. The (possible) range of scores was 12-52 for both the Spasmodic factor and the Congestive factor[7].

N.P.I. scale was used to assess pain at the beginning of each menstrual cycle during the study period. This scale is made up of a horizontal line with the beginning point marked as 0, or “no pain,” and the opposite end marked as 10, or “worst possible pain.” Patients are asked to rate their pain from 0-10. Patients choose the number that best represents the intensity of the pain that they are experiencing. Pain in 1-3 range is considered mild pain, 4-6 range indicates moderate pain and 7-10 is the range that denotes highest level, or severe level of pain.

Data expressed Mean±SD. Comparison of Mean in between the visit was analyzed by paired t test and Wilcoxon signed-rank test which is applicable. Oneway

Anova followed by posthoc Tukey HSD was used to find the inter visit variations. R statistical software version 3.1.1 was used for the analysis.

RESULTS

A total of 30 girls participated and completed the intervention in the present study. Girls were in a mean age of 18.8 years, had weight (51.06 kg) and BMI (21.19kg m^{-2}).They had a normal range of respiratory rate (16.26 cycle/min), heart rate (76.20 beat/min), SBP (116.66 mmHg), DBP (77.0 mmHg) and PP (41.26 mmHg). The base line N.P.I. score showed that the subjects suffered from moderate to high intensity pain. The mean score was 6.86 at baseline that comes to moderate intensity of pain.

After the intervention of Surya Namaskar for 3 months, there was a significant ($p = 0.0001$) reduction in NPI score in primary dysmenorrhea. The NPI score in the first visit was 6.86±1.2 and it shows they had a discomfort during their menstrual period. After the Surya Namaskar intervention NPI score was significantly decreased in visit 2 (4.2±0.6), visit 3 (2.6±0.78) and visit 4 (1.7±0.54).

MSQ overall score at baseline (51.8±16.5) was higher and reflecting that they had a painful menstruation. After the Surya Namaskar intervention, the overall score was significantly ($p = 0.001$) decreased in visit 2 (40.4±15.5), visit 3 (36.9±12.2) and visit 4 (28.16±9.56) and this shows the effect of Surya Namaskar practice in primary dysmenorrhea. Same kind of response were obtained in the MSQ congestive factor and spasmodic factor scale and showed a significant ($p = 0.001$) reduction in subsequent visits.

DISCUSSIONS

There are two types of primary dysmenorrhea, Spasmodic and congestive. The spasmodic type refers to spasms of pain that are similar to labor pains. They usually begin during the first day of menstruation. The congestive type of dysmenorrhea refers to a variation or a symptom of the premenstrual syndrome accompanied with dull, aching pain, with lethargy and depression prior to the onset of menstruation[7].

N.P.I. scale was used to measure the pain in primary dysmenorrhea and it is considered to be one of the best and appropriate method to evaluate pain in primary dysmenorrhea[8]. During the baseline measurement, before the beginning of Surya Namaskar all subject had pain ranging between moderate to high intensity as marked in NPI scale. During the first visit the intensity of pain ranged between 4 and 10 in N.P.I. with the mean of 6.86.

At the end of one menstrual cycle, the pain experienced by subjects varied with the maximum of 8 and minimum of 2. The mean is 4.2. This shows that mean value of pain reduced from 6.8666 at the baseline to 4.2 at the end of one month practice of Surya Namaskar cycle. During the subsequent cycle the maximum and minimum NPI values are 6 and 1 respectively. Thus, the mean value further reduced to 2.6. During the final visit at the end of three menstrual cycles, the maximum and minimum values of NPI are 4 and 1 with mean 1.7. The reduction of mean value of NPI from 6.86 to 1.7 during the three months trial shows that the practice of Surya Namaskar has a significant effect ($p<0.0001$) on reduction of pain in primary dysmenorrhea. This clearly confirms that Surya Namaskar has a positive effect on reducing the pain in primary dysmenorrhea which is the objective of this study.

Similar results have been obtained by Usha Nag, *et al.*[9] in their study on Medical Students and they found that the practice of Yoga has an efficient role in the management of stress that is caused by Primary Dysmenorrhea among the Medical Students. Zahra Rakhshaee *et al.*[10] stated that after the practice of three yoga poses (Cat, fish and Cobra pose), there was a significant reduction in pain intensity as well as pain duration after the practice of Yoga in primary dysmenorrhea patients.

MSQ is a psychometric capable of differentiating between the two types of primary dysmenorrhea. It suggests that spasmodic dysmenorrhea is caused by an excess of progesterone compared to estrogen, while congestive dysmenorrhea is caused by an excess of estrogen compared to progesterone. The menstrual symptom questionnaire was calculated using the two-factor analysis. The congestive factors of the subjects were analyzed and the mean of the baseline score was 26.6±8.3. After 3 months of Surya Namaskar practice the score reduced to 15.76±3.87 which show a significant reduction ($p<0.001$) of congestive symptoms. The spasmodic factors of the subjects were analyzed and the mean of the baseline score was 29.8±8.7. After 3 months of Surya Namaskar practice the score reduced to 17.5±4.86 which show a

Tsable 1: Anthropometric parameters of the study participants (n = 30)

Variable	Mean±SD
Age (year)	18.8±1.6
Height (cm)	155.2±6.26
Weight (kg)	51.06±9.08
BMI (kg m^{-2})	21.19±3.29
Respiratory rate	16.26±0.90
Pulse Rate (bpm)	76.2±3.29
SBP (mmHg)	116.66±4.79
DBP(mmHg)	77.0±4.66
PP (mmHg)	41.26±4.90

Table 2: Baseline NPI score (n = 30)

NPI Score	Freq.	Percentage
4	4	13.33
5	6	20.00
6	4	13.33
7	4	13.33
8	3	10.00
9	6	20.00
10	3	10.00

Table 3: Effect of surya namaskar on NPI score in primary dysmenorrhea (n = 30)

Visit	Mean	SD	Min	Max	p-value
Baseline	6.86	1.2	4	10	0.0001
Visit 2	4.2	0.6	2	8	
Visit 3	2.6	0.78	1	6	0.0001
Visit 4	1.7	0.54	1	4	

Table 4: Effect of surya namaskar on MSQ scale in primary dysmenorrhea (n = 30)

MSQ score	Visit 1	Visit 2	Visit 3	Visit 4	p-value
MSQ-Sum (24 items)	51.8±16.5	40.4±15.5	36.9±12.2	28.16±9.56	0.001
MSQ -C (12 items)	26.6±8.3	20.4±7.3	17.3±8.0	15.76±3.87	0.001
MSQ-S (12 items)	29.8±8.7	21.5±8.1	20.5±8.2	17.54±4.86	0.001

Menstrual Symptom Questionnaire (MSQ); Congestive (C); Spasmodic (S).

significant reduction ($p<0.001$) of spasmodic symptoms. Since both the spasmodic and congestive factors have reduced the overall score has also dropped down from the baseline mean of 51.8 to 28.16 over a period of 3 months of the practice which shows a significant reduction of symptoms. The analysis of MSQ shows that Surya Namaskar not only reduces pain in dysmenorrhea but also helps to reduce the menstrual symptoms experienced by the subjects. Growing body of evidence supports the belief that yoga benefits physical and mental health through down-regulation of the hypothalamic pituitary-adrenal axis and sympathetic nervous system[11]. Yoga may be a safe and cost-effective intervention for the management of menstrual problems. Yoga plays an important role in reducing stress and activity of sympathetic nervous system, increasing parasympathetic activity, improving quality of life, and reducing psychological symptoms levels[12].

Surya Namaskar is a procedure in which 90-95% of muscles are stretched and activated. This series gives a profound stretch to the body that it is considered to be a complete yoga practice by itself. Therefore, Surya Namaskar has been rightly called “Sarvang Sunder Vyayam” or the best all round exercise[13].

Treatment should be given according to the cause of disease but there is no exact pathology in primary dysmenorrhea. There are two main factors, sedentary life style and family history of dysmenorrhea which are responsible for the changes occurring in the body. Yoga plays an important role in the management of these type of disorders. It is also being stated that physical activity helps to lower inflammatory biomarkers which are found to be high in primary dysmenorrhea. Thus, Yoga plays an important role in the management of Primary dysmenorrhea[14].Yoga is now recommended as a noninvasive treatment and easily accessible intervention for pain relief. It is safe and cost-effective intervention with minimal or no side effects.

Limitations of present study were, study was a pilot study with minimum number of subjects, outcome variable (Pain scale) used in the study was subjective and randomization was not done. The same study can be conducted on a larger population with suitable study design and some objective kind of outcome variables could be included to validate the current results. Other studies can be conducted on subjects with secondary dysmenorrhea and observed if the pathologies reduce.

CONCLUSION

The present study confirms that Surya Namaskar alone proves to be effective in the reduction of pain and symptoms with primary dysmenorrhea. With many physiological benefits it can also be suggested that Surya Namaskar be included in curriculum in schools and colleges.

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