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Original Article

Effect of Yogasanas and Pranayama on Pain, Severity and Quality of Life in Primary Dysmennorhea

Amita Aggarwal*, Tejashree Rao, Tushar Palekar, Purva Paranjape, Gurjit Singh

ABSTRACT

Introduction: Primary dysmennorhea is the commonest problem experienced by adolescent girls. Pain begins just prior to or with the onset of menstrual flow and resolves with end of menstruation. The pain may be experienced in the pelvis, abdomen and lower back or upper legs. Yoga provides benefits that prove extremely useful for people to lead a healthy life. Anulomaviloma is one of the pranayama which balances both the sides of the brain. This study is undertaken to find the effect of three yoga asanas (the cat, fish and cobra pose) and anulomaviloma in primary dysmennorhea on pain, severity and quality of life. **Methods:** The subjects were assigned to three groups by randomized controlled sampling Group A (*n*=10) who performed the three yogasanas Bhujangasana, Marjarasana and Matsyasana and Group B (*n*=10) who performed the anulom vilom pranayam technique and Group C (*n*=10) combination of these two intervention protocols. The subjects were assessed at the baseline and after 4 weeks which included the subjects having presence of dysmennorhea of Grade 2 and Grade 3 Severity on the Verbal Multidimensional Scoring system for Dysmennorhea Scale and Pain on the Numerical Pain Rating Scale and quality of life was assessed by using Short Form-12 questionnaire. The intervention consisted for a period of 4 weeks. **Results:** The study concluded that there is statistically significant difference in all the three groups. **Conclusion:** Yogasanas along with pranayama technique are more effective than using a single intervention protocol either of yogasanas or pranayama in primary dysmennorhea.

Key words: Anulom Vilom Pranayama, Bhujangasana, Marjarasana, Matsyasana, Menstruation.

INTRODUCTION

Shedding of endometrium is called as menstrual periods or "menstruation". It is caused due to the interplay of hormones occurring in hypothalamus pituitary ovarian axis. The age group of 11-15 years marks the beginning of menstruation and the average age is considered as 15 years. Menstrual cycle is called as the period starting from the beginning of one menstrual cycle to other menstrual cycle. It is often considered as a painful syndrome.[1] This syndrome is called as Dysmennorhea. It is the commonest problem experienced by adolescent girls. Pain begins just prior to or with the onset of menstrual flow and resolves with menstruation. The pain may be experienced in the pelvis, lower back or upper legs. Dysmennorhea is of two types. They are primary and secondary dysmennorhea.

Primary dysmennorhea is noted by abdominal pain and cramps and pain in the pelvic region. Dysmennorhea occurring without any identified pelvic pathology is called as primary dysmennorhea. It is also called as spasmodic dysmennorhea.[1] Yoga the word is derived from the word "yuj" which means to join. They provide benefits that prove extremely useful for people to lead a healthy life. Though yoga is not originally meant for treatment of diseases experiments and efficacy shows or have the efficiency to cure many diseases like hypertension, high cholesterol, migraine headaches, asthama, backaches, Diabetes and menopause. Yoga has been found to be an alternative medicine with low cost and little risk and thus it is worth considering in the management of primary dysmennorhea.[2]

There are lot of evidences supporting the beliefs that yoga causes physical as well as mental benefits. It causes the regulation of the hypothalamopictuitary adrenal axis. Menstrual problems are managedsafely and cost effectively. Several treatment modalities like medications and home remedies being used by primary dysmennorhics are either not effective or produce side effects for long term. Simple lifestyle modifications such as yoga anulom vilom may help in alleviating pain during menstruation.[2]

Anulomaviloma is one of the eight varieties of pranayama. Anuloma means Cyclic and Viloma means Anticyclic. AnulomaViloma balances both the sides of the brain. It has EEG evidences supporting it calmness and alertness are achieved through this pranayama.[3]

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It is proven that yoga produces calmness which may alleviate the irritation and helps carry out the daily activities comparatively easy. There are studies proving efficacy of physical activities having conflicting efforts. There are less studies carried out in the fields of yogasanas and Pranayama especially of Anulom Vilom Pranayam which is the simplest among all others. Hence this study is undertaken to find the effect of three yoga asanas (the cat, fish and cobra pose) and anuloma viloma in primary dysmennorhea on pain, severity and quality of life.

MATERIALS AND METHODS

After the institutional ethical committee approval an experimental pilot study was conducted from March 2018 to December 2018. To draw a calculated sample size of 36, subjects were assessed for eligibility from Dr. D. Y Patil College of Physiotherapy and Pimpri Chinchwad Municipal Corporation area. After the written informed consent subjects were selected according to inclusion criteria (pain during menstruation, age group 18-22 years, unmarried and nulliparous females, females having regular menstrual cycles and having no history of any pelvic pathology such as Poly Cystic Ovarian Disease (PCOD). The subjects having irregular cycles, they were taking any kind of hormonal medication and performing any physical activity were excluded. The participants were randomly assigned into three groups. Group A (*n*=12) consisted of three yogasanas which were Bhujanagasana, Marjarasana, Matsyasana and Group B (*n*=12) anulom vilom pranayama technique and Group C (*n*=12) which performed all three asanas along with the pranayama. Every participant was assessed at the baseline for pain using Numerical Pain Rating Scale (NPRS)[4-6] Severity using Verbal Multidimensional Scoring System(VMSS) for Dysmennorhea[7] and Quality of life using SF-12[8] questionnaire at the end of four weeks from one menstrual cycle to other menstrual cycle.

Procedure

The participants did the yogasanas (Group A *n*=12) for 15 sec of hold and 15 seconds of relaxation and a five minute break was kept in between these three asanas which were Bhujanagasana, Marjarasana and Matsyasana an intervention protocol with a duration of 25 min. The pranayama session (Group B *n*=12) which was held i.e Anulom Vilom Pranayama included the participants performing the pranayama session lasted for a duration of 15 min. The pranayama session (alternate nostril breathing) consisting of puraka (inspiration) Rechaka (expiration) at a ratio of four seconds of inspirations with four seconds of expiration for the first three days. On the 4th and 5th day the Puraka (inspiration) and Rechaka (expiration) were in the ratio of 8:8 i.e 8 sec of inspiration with 8 sec of expiration. On the sixth and seventh day the pranayama technique was further progressed to 16 sec of inspiration and 16 sec of expiration. In the second week the technique of anulom vilom was further progressed to a ratio of 1:2. 16 sec of inspiration and 32 sec of expiration. In the third and fourth week the inhalation for 4 counts via the left nostril, retention for 16 counts by closing both nostrils and exhalation for 8 counts via right nostril by removing the thumb was performed. Again inhalation for 4 counts via the right nostril, retention for 16 counts and exhalation for 8 counts via the left nostril was performed Figure 1. Group C (*n*=12) performed a combination of these two interventions.

Statistical Analysis

The data was collected, analyzed and was entered in Excel sheet and statistical analysis was done using Winpepisoftware (Version 11.65) and Primer software (Version 7.0). Data was not normally distributed as indicated by ShapiroWilk test between the groups so within the groups Wilcoxon signed ranked test and between the groups Kruskall Wallis test was used. The Orthotool kit software was used for the calculation of physical and mental Component of the Quality of Life Scale i.e (SF-12 Questionnaire).

Data analysis

Table 1: Comparison of Pre post differences in pain (NPRS) and severity of dysmenorrhea (VMSS) within groups.

Groups	Variable		Mean±SD	Median	*p* value
Group A(Yoga) n=10	NPRS	Pre	6.9±1.28	7	0.003
		Post	4.9±1.37	5	
Group B(Pranayama) n=10		Pre	6.9±0.73	7	0.005
		Post	4.9±0.73	5	
Group C(Yoga+Pranayama) n=10		Pre	6.6±1.26	6.5	0.005
		Post	3.4±0.96	3.5	
Group A(Yoga) n=10	VMSS	Pre	2.2±0.42	2	0.016
		Post	1.5±0.52	1.5	
Group B(Pranayama) n=10		Pre	2.2±0.42	2	0.024
		Post	1.4±0.51	1	
Group C(Yoga+Pranayama) n=10		Pre	2.2±0.42	2	0.024
		Post	1±0.81	1	

Table 2: Comparision of prepost differences of Physical Component Scoring (PCS) and Mental component scoring (MCS) of Quality of Life within the groups.

Groups	Variable		Mean±SD	Median	*p* value
Group A (Yoga) *n*=10	PCS	Pre	40.04±4.14	39.76	0.005
		Post	46±3.91	46.45	
Group B (Pranayama) *n*=10		Pre	40.31±3.78	36.81	0.005
		Post	44.76±4.57	49.86	
Group C (Yoga+Pranayama) *n*=10		Pre	36.82±3.37	36.56	0.005
		Post	49.86±4.00	50.01	
Group A (Yoga) *n*=10	MCS	Pre	43.26±6.99	41.54	0.003
		Post	48.43±5.09	49.24	
Group B (Pranayama) *n*=10		Pre	36.85±5.51	38.55	0.005
		Post	45.59±5.11	46.23	
Group C (Yoga+Pranayama) *n*=10		Pre	34.83±6.2	34.06	0.005
		Post	51.05±4.41	53.63	

Table 3: Comparison of pre post differences in pain intensity and severity of dysmennorhea between the groups.

Groups (*n*=10 each)	Variable	Mean±SD	Median	*p* value	*h* Value
Group A	NPRS	2±0.44	2		
Group B		2±0.77	2	0.001	13.37
Group C		3.2±0.87	3		
Group A	VMSS	0.7±0.48	1		
Group B		0.9±0.56	1	0.02	7.54
Group C		1.4±0.51	1		

Table 4: Comparison of Pre post differences in Physical and Mental component scoring of quality of life scale between groups.

Groups (*n*=10 each)	Variable	Mean±SD	Median	*p* value	*h* Value
Group A	PCS	2±0.44	2	0.001	13.37
Group B		2±0.77	2		
Group C		3.2±0.87	3		
Group A	MCS	5.17±4.24	3.59	0.013	8.674
Group B		8.59±6.03	9.50		
Group C		16.22±8.19	19.06		

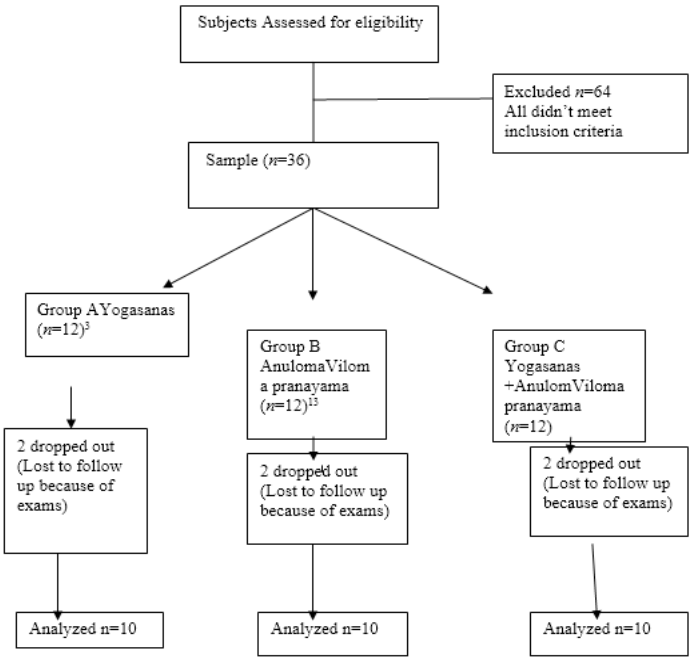

Figure 1: Consort diagram.

RESULTS

Table 1: The graph had shown the pre and post mean pain and severity of dysmennorhea values within Group A, B and C. For pain measured using Numerical Pain Rating Scale, the *p* value of all three groups were $p=0.005$. Hence there was a statistical significance of treatment in the pre and post mean values within all three groups.

For severity measured using Verbal multidimensional scoring scale amongst these three groups the lowest value was seen in Group C i.e1. The *p* value of the groups A $p<0.016$, Group B and Group C $p<0.024$. All three values were less than the p value of $p< 0.05$. Hence the treatment given within all three groups was significant.

Table 2: The graph had shown the pre and post mean values of Physical and mental Component Score of Quality of Life within Group A, Group B, Group C.

For physical and mental component the p value was $p=0.005$ for all three groups. Hence there was statistical significance of treatment in the pre and post values within the groups.

Table 3: The graph had shown pain and the severity of dysmennorhea pre and post difference mean values between Group A, Group B and Group C. The difference means of all three groups are taken in consideration

The pain difference in Group C>Group B and also GroupC>Group A while the mean values of Group B=Group C. The *p* value of this data was 0.004 i.e. considered to be statistically significant. This had shown that the intervention in Group A i.e (Yoga) is equal to Group B (Pranayama). While the intervention of the Group C (yoga +pranayama) was greater than these two groups.

For severity of dysmennorhea mean values were Group A (0.7) Group B (0.9) and group C (1.4). This shows intervention given in Group C>Group B>Group A. The *p* value here was $p=0.023$ ($p<0.05$) and the h value was 7.540 with two degrees of freedom. There was a statistical significant difference between all three groups

Table 4: The graph had shown the pre and post difference mean values of physical and mental component score of the each of the groups Group A, Group B and Group C of Quality of life scale. The difference of the mean between the pre and post values of Group A, Group B and Group C was seen. This graph shows us that the there is a variation of post physical component scores in all the three groups. Group C>Group B>Group A. The *p* value was 0.001 Hence there was statistical significant difference in all the three groups. The *h* value here was 14.093 with 2 degrees of freedom. Also the mental component score was found to be the highest in Group C>Group B>Group A which consisted of intervention procedures Yogasanas along with Pranayama in dysmennorhea population. The *h* value was 8.674 with 2 degrees of freedom.

DISCUSSION

The results of the current study revealed that the three yogasanas and anulom vilom pranayama technique are effective in reducing pain, severity of dysmennorhea and improving both the physical and mental component scores of quality of life individually with greater improvement in group performing both techniques. The changes were statistically significant.

Dysmennorhea having negative effects on health peaks in the late adolescence. A relation has been found between early age at menarche and dysmennorhea causing greater exposure to uterus prostaglandin hormone in girls.[9] Other studies have seen condition prevails more in women with longer cycles, long bleeding durations and a positive family history.[10] In our study mean age of all three groups was 20 years and all the groups were comparable.

Menstrual pain experienced in dysmenorrhea has direct effect bearing from uterine muscle contraction. These muscles are stimulated under stress which further increase activity in sympathetic nervous system. Various authors have showed a correlation between the life stress and premenstrual syndrome.

Any activity that can have an effect on decreasing sympathetic system activity or stress can lessen the pain experienced in this condition. Exercises advocated increases endorphin secretion from brain which in turn raises pain threshold of body.[11] Also increased blood flow with higher uterus metabolism will have an impact on pain. Several conservative management techniques are regularly employed by young females to improve dysmenorrheal symptoms. Stretching exercises, pilates, yoga, meditation, relaxation therapy can be advocated

Several poses assumed in yoga can have beneficiary effect on dysmenorhea symptoms. Pain is produced by higher level of neural activity in brain. Normally, Pain is perceived when slow conducting high threshold C fibres fires along with firing of dorsal horn cells. A fibres which are fast conducting have inhibitory effect on dorsal horn cells which is mediated through substantia gelitinosa. Yogic postures have built in method that

induces inhibitory effect on dorsal horn cells. Mild pressure on muscles, focus on breathing movements and sounds, uttering mantras stimulates A fibres and so pain sensitivity is reduced.[12]

Yogic poses have specific benefits too. Bhujangasana (Cobra Pose) increases spinal muscles strength especially of extensors, increases core stability, promotes spinal flexibility. In women it tones up ovaries and uterus too.[13,14] The Marjarasana (cat pose) initiates movement from centre requires coordinated effort of abdominals with regular breathing movements.[13] The Matsyasana (Fish pose) promotes cervical flexibility, decreases neck along with shoulder stiffness.[13,14] Improvement in flexibility especially around pelvic region will have positive effect on supra pubic area pain reported by patients. Salvi shah *et al*. studied the effect of exercises on primary dysmennorhea in young females and had found that active stretching program for abdominal, pelvic and groin region reduced pain and severity of symptoms.[11] Another study suggests that along with strengthening back muscles yoga has massaging effect on organs that lie in the pelvis. This induces relaxation along with increasing blood supply which promotes oxygen supply too. This decreases cramp specific pain experienced in dysmennorhea.[15]

Further detaching mind from body consciousness during meditation like anulom vilom promotes insulation from pain sensation. Also, the awareness and concentration required for controlled breathing movement induces relief of tensionand stress, increasing pain threshold. Studies have found positive effect of pranayama on stress related conditions and in improving autonomic dysfunctions.[16-18] In our study pain was reduced with either technique with maximal improvement seen in subjects that have added benefits of yoga along with anulom vilom.

Exercises like yoga or anulom vilom promoting relaxation and reducing tension will even alleviate symptoms. A study by Dawood MY *et al*. had shown that therapeutic exercise can increase the secretion of endorphins from the brain increasing pain threshold.[9] Reduction in the pain along with reported decrease in symptoms explain reduction in severity of dysmennorhea seen in the study. Z Rakshaee *et al*. study had also found positive effects of yogic postures on pain and dysmnennorhea severity.[13]

Interventions designed to conservatively manage the dysmennorhea has an objective to improve quality of life. This condition causing absenteeism, physical and psychological symptoms affect college going along with working young females. Yoga physical and mental benefits increases vagal activity and decreases sympathetic hyperactivity. This will have complimentary results on endocrinal and immune system of the body. Some hatha yoga positions have characteristics specific to immune enhancing or restoring.[17] Yoga maintains the physiological balances in the body, modifies the mental health by promoting mind body coordination. Also, psychosocial stress experienced will be benefited. A study by Usha Nag *et al* evaluated effect of yoga on primary dysmennorhea and stress in 113 medical students and had reported significant pain and stress reduction augmenting their menstrual wellbeing.[18]

Differences in stress responses have been found in yoga performers and non-performers based on serum interleukins values. Also serum homocysteine level increases in women with primary dysmennorhea and yoga will be effective to lower down the values of same.[18] Jennifer Oates *et al*. study on the effect of yoga on menstrual disorders suggested reduced symptoms of menstrual distress following the intervention.[19]

Another study had shown more improvement in quality of life with slow compared to fast pranayama.[16] Stimulation of Beta endorphins release along with improvement in alveolar ventilation was seen with pranayamas.[15] Irregular breathing disrupts the rhythm of the brain and lead to physical, mental, emotional blocks leading to disordered lifestyle and disease. This technique helps to attain higher state of vibratory energies along with breathing control. This explains how these conservative techniques improves quality of life in patients with dysmennorhea symptoms.[15]

Management that takes into account relaxation using anulom vilom along with improving blood supply to pelvic region, better flexibility by doing yoga explains added benefits in quality of life. These results were seen in study. So conservative protocols have got their importance in primary dysmennorhea and should be advocated. The study had its limitations. Firstly the intervention was given for a period of 4 weeks only. Also the sample size was small.

CONCLUSION

The study supports that Yogasanas along with pranayama technique will be more effective than using a single intervention protocol either of yogasanas or pranayama in primary dysmennorhea.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

EEG: Electroencephalography; **PCOD:** Poly Cystic Ovarian Disease; **NPRS:** Numerical Pain Rating Scale; **VMSS:** Verbal Multidimensional Scoring System; **PCS:** Physical component scoring; **MCS:** Mental component scoring.

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