

EFFECT OF YOGA NIDRA ON PHYSIOLOGICAL VARIABLES IN PATIENTS OF MENSTRUAL DISTURBANCES OF REPRODUCTIVE AGE GROUP

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Abstract : Aim of this study was to see any effect on autonomic functions in menstrual disturbances patients after Yoga Nidra practice. The subjects for the study were 150 females with menstrual irregularities, 28.08±7.43 years of mean age, referred from department of Obstetrics and Gynecology CSMMU, UP, Lucknow. Subjects were divided randomly in to two groups' intervention and in control groups -seventy five (75) in each group. Out of these, one hundred twenty six (126) completed the study protocol. The yogic intervention consisted of 35-40 minutes/day, five days in a week till six months. An autonomic function testing was done in both the groups at zero time and after six months. A significant positive effect was observed when yoga therapy was used as an adjunct in the patients of menstrual disturbances. There were significant improvements in the blood pressure, postural hypotension and sustained hand grip, heart rate expiration inspiration ratio and 30:15 beat ratios of the subjects after yogic practice.

Key words : yoga nidra
sympathetic

menstruation
parasympathetic

INTRODUCTION

The human body is a self-regulating mechanism that is constantly adjusting itself in tune with its own needs and capacities (1) The menstrual cycle is a sequence of events that occurs once in a month in a sexually mature female (2). Menstrual disorders have become widespread over the last few generations so that menstrual difficulties cause, as much

wretchedness as the common cold and medical insight into this problem is equally limited. The menstrual disorders are known to have cause-effect relationship with hormonal and pathophysiological status of body. As part of many adolescence changes, experiences and challenges, menstruation onset, menarche, is a very significant event. Dysmenorrhea, or menstrual pain, is defined as chronic pelvic pain that occurs in about 15% to 70% of young women (3-4). Wood et

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al. (5) found that dysmenorrhea is most common between the ages of 15 and 19 and that 82% of the women in this age group experience such pain. This pain gradually increases from the age of 15 and then begins to decline by the age of 20 and following parity (6, 7).

This study was designed to verify if the yoga nidra intervention is helpful in providing balance between sympathetic and parasympathetic nervous system in the patients of menstrual disorders. The nervous system is the cornerstone ability to perceive, to adapt, and to interact with the world around. It is the means by which persons receive, process and then respond to messages from the environment and from inside their body. Sympathetic and parasympathetic divisions work in synergy and complement each other better when yogic practices are used. Elevated resting heart rate is a risk factor for sudden cardiac death, even in the general population (8-10).

METHODS

Subjects with menstrual irregularities visiting the Department of Gynecology, CSMMU were included in the study. A senior gynecologist referred them after being examined for their physical health and medication status. Medication (tranexemic acid, ethamsylate, madroxy progesterone, norethisterone Ethinyl estradiol, Levonorgestrel) was provided to both the groups. The institutional Research Ethics-Committee approved this study. After signed informed consent by the subjects anthropometrics measurements were taken. Each subject was randomly assigned to one of the two groups: (i) Medication + yoga Nidra, (ii) Medication,

using a random number generator such that equal numbers were recruited into each group. A statistician not associated with this study generated the randomization scheme with block of size four for up to 196 patients. These numbers were pasted on identical opaque envelopes containing yoga and non-yoga. The numbers were noted for group 1 (yoga Nidra) and group 2 (non yoga) and sealed in a big envelope. After randomization patients in Intervention and control groups were (n=75). Yoga Nidra sessions were guided by well-educated and trained yoga instructors selected by an expert committee. Most of the participants were from local population. Yoga Nidra sessions were free of cost and all the necessary facilities were provided to the participants like airy room, yoga mats etc. Subjects were regularly motivated for Yoga Nidra practice. Therefore the flow of patients was continued during study. Patients, who dropped the study, also did not differ significantly in terms of age. Before study all the subjects were asked to maintain their routine activities and not initiate any new physical activities for that duration. Autonomic function testing was done with the help of Cardiac Neuropathy Analyzer (CANwin) and Variowin, Bangloru in both the groups at the beginning and after six month of the study.

Autonomic functions tests

A battery of six standard tests was used to assess the integrity of autonomic function status of the subjects (11). These tests were helpful in assessment of reactivity of divisions of ANS, the sympathetic and parasympathetic. Autonomic function tests that were performed for parasympathetic and sympathetic functions. Tests for sympathetic

reactivity - Blood pressure Response to lying to standing test and handgrip Test (HGT) (12, 13).

Heart rate response to standing from the supine posture (30:15 ratio)

$$30^{\text{th}} : 15^{\text{th}} \text{ ratio} = \frac{\text{Maximum R - R interval around } 30^{\text{th}} \text{ beat}}{\text{Minimum R - R interval around } 15^{\text{th}} \text{ beat}}$$

Slow deep breathing test :

$$E : I \text{ ratio} = \frac{\text{Average maximum R - R interval during expiration}}{\text{Average minimum R - R interval during inspiration}}$$

Valsalva maneuver (14) :

$$\text{Valsalva ratio} = \frac{\text{Longest R - R interval after maneuver (phase IV)}}{\text{Shortest R - R interval during maneuver (phase II)}}$$

Heart Rate Variability (HRV)

Heart rate variability (HRV) is one of the most widely used methods for measuring cardiac autonomic activity in humans (15). HRV reflects the balance between the sympathetic and parasympathetic regulatory control of the heartbeat; low HRV suggests excessive cardiac sympathetic modulation, inadequate cardiac parasympathetic modulation, or both (15).

Sample size for this study was 120, when type I error 0.05 and power was 80%, expected difference in population means was 0.71, standard deviation within group 1.95 and ratio between intervention and control group was 1, calculated with the help of Power and sample size calculator, Version 2.1.30 (William 2003). After six months 126 subjects completed study protocol, intervention group (n=65) and control group (n=61). Patients, who dropped the study, also did not differ significantly in terms of age.

The patients of menstrual disorders were diagnosed by the following diagnostic criteria after taking detailed clinical history – Amenorrhea, dysmenorrhea, Oligomenorrhea, Polymenorrhea, Menorrhagia, Metrorrhagia, Menometrorrhagia and Hypomenorrhoea were included for the study and women having known gynecological neoplastic diseases requiring surgery, Pelvic inflammatory disease (PID) or Pregnancy were excluded from the study. Subjects who did not participate in yogic intervention classes (>80% Yoga Nidra classes) were also excluded from the study.

Anthropometric measurements were taken before and after study. Height was measured with the participants standing without shoes and was recorded to the nearest of 0.5 cm. Weight was measured using a digital scale, with the participants wearing light clothing, and was recorded to the nearest 100 grams.

Under the guidance and supervision of yoga experts and faculty, subjects performed Yoga Nidra practice. Yoga Nidra, which is derived from the tantras, is a systematic method of inducing complete physical, mental and emotional relaxation (16). Yoga Nidra is performed in shavasana. It has several steps like – Resolve, Rotation of consciousness, and awareness of the breath, Feeling and sensation, Visualization, ending the practice with resolve (17). It helps in restoring mental, emotional, and physical health by way of relaxation, and makes the mind more conducive to *pratyahara* – withdrawing senses from their objects, *dharana* - concentration, and meditation. Such a practice helps harmonize two hemispheres of the brain and the two aspects

of autonomic nervous system (sympathetic and parasympathetic). The impressions in the subconscious are brought to surface, experienced and removed. Thus, the fixation of awareness on the body is replaced with the awareness linked to subtler aspects of prana (the life force) and spiritual dimensions allowing for maximizing of the pure yet unmanifested potential within. Total duration of this practice was 35-40 minutes/day, five days in a week in the morning for six months. Yoga Nidra practice was done in the department of physiology CSMMU UP, Lucknow.

Statistical analysis

The two groups were compared on these scores using one-way ANOVA. P value of <0.05 was taken to be significant. InStatS software version 3.05 was used for the analysis (www.graphpad.com).

RESULTS

One hundred and seventy four women attended the pre-screening visit, but 24 were not participating due to family problems. A total of 150 women were randomly assigned to intervention and control group. Data for

TABLE I: Baseline demographic profile of the subjects participated in the yogic intervention program.

Variables	Control group (N=75)	Intervention group (N=75)	P value
Age (yrs)	27.62±7.78	28.53±7.07	0.46
BMI (kg/m ²)	21.98±4.22	23.21±4.88	0.10
WC (cm)	75.61±12.92	77.36±13.10	0.41
HC (cm)	90.12±11.93	94.52±12.19	0.02
WHR	0.83±0.07	0.81±0.06	0.05

Data presented are mean±SD, BMI, Body Mass Index; WC, Waist Circumference, HC, Hip Circumference, WHR, Waist Hip Ratio.

analysis is available for 126 women; 24 women were lost to analysis for several reasons. Tables I show the baseline characteristics for total patients intervention and control group. Relief in symptoms after six months in both groups are given below in table 2 and Q-statistic (IS) for testing homogeneity of risk differences have been applied.

DISCUSSION

Individuals recruited for this intervention program constitute a representative sample of the large number of patients suffering from menstrual problems. Patients

TABLE II: Relief in symptoms after six months in both Intervention and Control Groups.

Variables	Control group		Intervention group		Q-static, P Value
	Pre (n=75)	Post (n=61)	Pre (N=75)	Post (n=65)	
Pathological Amenorrhea	30	23	32	18	1.20; 0.27
Dysmenorrhea	32	26	34	24	0.49; 0.48
Oligomenorrhea	21	14	18	6	1.02; 0.31
Polymenorrhea	14	6	16	5	0.34; 0.56
Menorrhagia	11	8	13	9	0.07; 0.78
Metrorrhagia	17	14	16	9	0.65; 0.42
Hypomenorrhea	10	4	13	8	0.05; 0.82

TABLE III: Variables in control and intervention groups before and after the study.

Variables	Control group		Intervention group		P value
	Baseline (N=75)	After six months (N=61)	Baseline (N=75)	After six months (N=65)	
BMI (kg/m ²)	21.98±4.23	21.12±4.08	23.21±4.89	22.24±4.85	0.06
SBP (mmHg)	122.86±7.24	121.21±7.39	121.96±7.63	118.98±7.03*	0.01
DBP (mmHg)	78.84±8.41	75.37±7.97	77.37±8.63	73.15±8.08** ^f	0.0005
Heart Rate (bpm)	71.72±8.81	70.67±8.45	72.07±9.71	69.14±9.14 ^f	0.01
Postural Hypotension (mm Hg)	8.76±2.45	7.05±1.94**	8.97±3.03	7.2±2.07** ^f	0.0001
Sustained hand grip (mm Hg)	13.91±2.41	12.55±2.26*	14.52±2.58 [#]	13.44±2.67	0.0001
Expiration-Inspiration Ratio	1.36±0.33	1.25±0.31	1.29±0.36	1.19±0.37*	0.03
30:15 Beat Ratio	1.35±0.38	1.19±0.33	1.33±0.44	1.16±0.41*	0.01
Valsalva Ratio	1.77±0.68	1.59±0.52	1.81±0.71	1.68±0.55	0.17
LF	1374.8±2058.9	1367.8±2163.5	1314.9±1981.0	1303.2±2025.7	0.99
HF	891.0±1359.8	818.2±939.9	848.3±1327.6	824.9±1337.0	0.98
LF/HF	1.47±0.67	1.35±0.43	1.56±1.03	1.50±0.70	0.43

Data presented are mean±SD. Analysis of data was done by one-way ANOVA and post-hoc by Tukey-Kramer test. The * depicts comparison with Control – Baseline and the # depicts comparison with Control – after 6 months, and the f depicts comparison with Study-Baseline. ***P<0.001; ###P<0.001; #P<0.05.

participating in the intervention group were requested to follow yoga nidra intervention program as prescribed by the researcher. In the light of above tables it is clear that yoga nidra practices are helpful to prevent the menstrual problems of reproductive age group women. The practice of yoga generally includes meditation, relaxation (yoga nidra), breathing exercises and various physical postures (19). In addition, adults participating in a yoga intervention found that yoga was easily learned and performed (20). Studies conducted in different region showed that both, activity scheduling and relaxation training were effective treatments for spasmodic dysmenorrhea, with both treatments producing improvements on general measures of dysmenorrhea, a symptom severity measure, and an activity measure (21).

In present study SBP, DBP, postural hypotension and sustained hand grip, in Table III changed significantly after yoga nidra practice, our results corroborate with

the findings of Datey et. al. found that yoga nidra therapy adopted either alone or as an adjunct therapy has been observed to reduce systolic readings (SBP) by an average of 15-20 mm Hg, and diastolic readings (DBP) by 10 mm Hg after 3 weeks or more practice (22-24). A recent, study conducted at the Stanford University School of Medicine (USA) demonstrated that the drop in blood pressure induced by daily yoga nidra practice has a far-reaching effect, extending throughout the day, and is not merely a transient effect coincident with the practice session (25). Another controlled study, which was conducted at the Langley Porter Neuropsychiatry Institute in California, found that reduction in blood pressure and anxiety levels in hypertensive patients continued for 12 months after yoga nidra training (26). In the Table III, heart rate, expiration inspiration ratio and 30:15 beat ratios changed significantly after yoga nidra practice in this study. Telles et. al. also reported that the rate of respiration (RR) and heart rate (HR) decreased significantly (27). But there was

no significant change observed in other ANS variables. Yogic practices help to distract our attention from chronic worrying, giving us a respite from daily distress or current problems all of which help to reduce heart rate which is also seen in the present study.

All the parameters given in the table 2 clinically changed but not statistically significant. Yet it was observed that after Yoga Nidra practice patients relieved from painful cramps, heavy bleeding and irregular periods. Although number of patients—suffering, reduced in intervention and control groups because both groups were taking medication, reduction in intervention was higher than control group. How yoga nidra works it is not fully documented but it has been reported previously that yoga nidra is deep relaxation technique. The relaxation response is characterized by a decrease in the activity of the sympathetic nervous system that results from conditioning and training. During this response there is a decrease in the oxygen consumption, heart rate, blood pressure and respiration rate and an increase in the alpha waves of the electroencephalogram. The relaxation response is not just simple relaxation. In simple relaxation, changes in the rate of respiration, oxygen consumption and alpha wave activity do not occur. The relaxation response is thought to modify the way in which stressful stimuli affect the sympathetic nervous system.

Menstrual disorders such as amenorrhea/ oligomenorrhea depend on many factors, including race, genetic makeup, BMI, and family history. Most of the studies on

menstrual disorders have emphasized mainly on the drug management, while only a few stressed on alternative practices and the perceptions in different settings. It is well known that every health problem not only presents it with different epidemiological profiles in different population settings but also perceived and managed differently. It is not yet certain that altered ANS activity is responsible for the increased risk of mortality and medical morbidity associated with menstrual disorder patients. Unfortunately such types of study have not been performed in menstrual disorder patients.

Limitations of this study were that we have included Amenorrhea, Dysmenorrhea, Oligomenorrhea, Polymenorrhea, Menorrhagia, Metrorrhagia, and Hypomenorrhoea in the present study together. Sample size is not enough to analyze oligomenorrhea and menorrhagia separately. The phase of the menstrual cycle was based on the participants reports not on ultrasound scans this is also a limitation of the study.

In conclusion the present study demonstrated the efficacy of Yoga Nidra on autonomic nervous system variables in patients of menstrual irregularities. Yoga Nidra practice is helpful in patients of menstrual disorders.

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REFERENCES

1. Muktananda Swami. Nawa Yogini Tantra-Yoga for women. Yoga publications trust, India, Bihar, Munger 2003-04; 31.
2. Muktananda Swami. Nawa Yogini Tantra-Yoga for women. Yoga publications trust, India, Bihar, Munger 2003-04; 32.
3. Sundell G, Milsom I, Andersch B. Factors influencing the prevalence and severity of dysmenorrhea in young women. *Br J Obstet Gynaecol* 1990; 97: 588-594.
4. Harlow SD, Park M. A longitudinal study of risk factors for the occurrence, duration and severity of menstrual cramps in a cohort of college women. *Br J Obstet Gynaecol* 1996; 103: 1134-1142.
5. Wood C, Larsen L, Williams R. Menstrual characteristics of 2343 women attending the Shepherd Foundation. *Aust NZ J Obstet Gynecol* 1979; 19: 107-110.
6. Sobczyk R. Dysmenorrhea: the neglected syndrome. *J Reprod Med* 1980; 25(4 Suppl): 198-201.
7. Ylikorkala O, Dawood MY. New concepts in dysmenorrhea. *Am J Obstet Gynecol* 1978; 130: 833-847.
8. Kannel WB, Kannel C, Paffenbarger RS, Cupples LA. Heart rate and cardiovascular mortality: the Framingham study. *Am Heart J* 1987; 113: 1489-1494.
9. Dyer AR, Persky V, Stamler J, Paul O, et al. Heart rate as a prognostic factor for coronary heart disease and mortality: findings in three Chicago epidemiologic studies. *Am J Epidemiol* 1980; 112: 736-749.
10. Seccareccia F, Pannoza F, Dima F, et al. Heart rate as a predictor of mortality: the MATISS Project. *Is J Public Health* 2001; 91: 1258-1263.
11. Ewing RJ. In "A text book of clinical disorders of the autonomic nervous system" London Oxford University Press (1992); 312-333.
12. Weiling W, Borst C, Karemaker JM. Testing for autonomic neuropathy: Initial heart rate response to active and passive change of posture. *Clin Physiol* 1985; 23: 678-690.
13. Mishra UK, Kalita J. (2006) Clinical Neurophysiology II edition Elsevier, India.
14. Levin AB. A simple test of cardiac function based upon the heart rate changes induced by the vasalva maeuver. *AJ Cardiol* 1966; 18: 90-99.
15. Task Force of eh European Society of Cardiology and the North American Society of Pacing and Electrophysiology. Heart rate variability standards of measurement, physiological interpretation, and clinical use. *Circulation* 1996; 93: 1043-1065.
16. Sarswati Satyananda Swami.Yoga Nidra.Yoga publications trust, India, Bihar, Munger 2006; 1.
17. Sarswati Satyananda Swami.Yoga Nidra. Yoga publications trust, India, Bihar, Munger 2006; 72.
18. Whitehead A, Whitehead J. A general parametric approval to the meta-analysis of randomized clinical trials. *Statistics in Medicine* 1991; 10: 1665-1677.
19. Nayak NN, Shankar K. Yoga: a therapeutic approach. *Phys Med Rehabil Cli* 2004; 15: 783-798.
20. Khalsa SB. Treatment of chronic insomnia with yoga: a preliminary study with sleep-wake diaries. *Appl Psychophys Biof* 2004; 29: 269-278.
21. Sandra T. Sigmon¹, Rosemary O. Nelson. The effectiveness of activity scheduling and relaxation training in the treatment of spasmodic dysmenorrhea, *Journal of Behavioral Medicine*, Volume 11, Number 5/October, 1988; 483-495.
22. Datey KK, Deshmukh SN, Dalvi CP, Vinekar SL. Shavasana: a yogic exercise in the management of hypertension. *Angiology* 1969; 20: 325-333.
23. Brauer AP, Horlick LF, Nelson B, Farquhar JU, Agrad WS. Relaxation therapy for essential hypertension: Veteran's Administration outpatients study. *J Behav Med* 1979; 2: 21-29.
24. Patel C. Yoga and biofeedback in the management of hypertension', *Lancet, Lancet* 1973; 10; 2(7837): 1053-1055.
25. Agras WS, Taylor CB, Kraemer HC. Relaxation training: blood pressure lowering blood pressure reductions. *Arch Gen Psychiat* 37 (1980), pp. 859-863.
26. Lekh Raj Bali. Long term effect of relaxation on blood pressure and anxiety levels of essential hypertensive males: a controlled study. *Psychosom Med* 41(8), Dec. 1979; pp. 637-639.
27. Telles S, Nagarathna R, Nagendra HR. Autonomic changes while mentally repeating two syllables-one meaningful and the other neutral, Vivekananda Kendra Yoga Research Foundation, K. G. Nagar, Bangalore. *Indian J Physiol Pharmacol* 1998; 42(1): 57-63.