



## Psycho-Biological Changes with Add on Yoga Nidra in Patients with Menstrual Disorders: a Randomized Clinical Trial

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### ABSTRACT

**Introduction:** Menstrual disorders are common problems among women in the reproductive age group. Yuga interventions may decrease the physical and psycho-biological problems related to menstrual disorders. The present study was aimed to assess the effect of Yoga Nidra on psycho-biological problems in patients with menstrual disorders.

**Methods:** A total number of 100 women recruited from the department of obstetrics and gynecology and were then randomly allocated into two groups: a) intervention received yogic intervention and medication for 6 month, and b) control group received no yogic intervention and they only received prescribed medication). Psycho-biological General Well-Being Index (PGWBI) and hormonal profile were assessed at the time of before and after six months on both groups.

**Results:** The mean score of anxiety, depression, positive well-being, general health, and vitality scores, as well as hormonal levels, in posttest were significantly different in intervention group as compared with pretest. But there was no significant difference in control group.

**Conclusion:** Yoga Nidra can be a successful therapy to overcome the psychiatric morbidity associated with menstrual irregularities. Therefore, Yogic relaxation training (Yoga Nidra) could be prescribed as an adjunct to conventional drug therapy for menstrual dysfunction.

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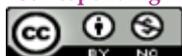
### Introduction

Menstrual disorders are common problems faced by women, which contributes to physical and psycho-biological problems. Most luteal phases marked by menstrual bleed occurring between 21-35<sup>th</sup> day with 3-10 days of bleeding and 30-40 ml of blood loss on an average. Menstrual dysfunction is common problem in the population of reproductive age group. The affected women have high rates of amenorrhea (9%) and menstrual irregularity (33%). The psycho-biological factors including stress

and deprivation were found to be associated with menstrual irregularities.<sup>1</sup>

Approximately 19% of women aged 18-55 years reported experiencing menstruation-related problems during menstrual cycle throughout their reproductive life. The problems include fatigue, pain, vomiting, anxiety, and depression. Fluctuations in hormones that regulate menstruation, such as estrogen and progesterone, can affect appetite, digestion, and energy levels, which all of which affect the mood. Therefore, menstrual disorders are common disorders, which contributes to physical

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and psycho-biological problems. Either single or combinations of medications are available for the patients with menstrual disorders, e.g. medroxy progesterone, norethistrone, ethinyl estradiol, levonorgestrol, tranexemic acid, and ethamsylate. Today's, non-pharmacological and complementary approach is proposed for treatment of these complications.

Practice of Yoga is simplest method of relaxation which helps to improve the physical and psycho-biological status. Previous study shows that there was significant alteration of autonomic functions and psycho-biological status by using yoga.

Moreover, regular practice of yoga has positive effects on menstrual cycle and psycho-biological well-being probably by balancing neuro-endocrinal axis.<sup>2</sup> Another study proposed that, yoga reduced the severity and duration of primary dysmenorrhea. Author also suggests that yoga is a safe and simple approach for primary dysmenorrhea.<sup>3</sup> The significant effect of relaxation technique was also observed in subjects of premenstrual syndrome, in which the stress is considerably reduced by relaxation.<sup>4,5</sup> Previous studies also reports the significant effects of the yoga (especially Yoga Nidra) on the menstrual disorders.<sup>6-10</sup>

Practice of Yoga Nidra is a simple method of relaxation which is practiced in the flat lying position of shavasana (lying on the back, the arms and legs are spread at about 45 degrees), and followings the spoken instruction of yoga therapist. Yoga Nidra, which is derived from the tantras, is a powerful and wonderful technique. This technique is not only useful for physical or mental relaxation but also for preparing the mind for yogic discipline.<sup>5</sup> It concerns mainly with Pratyahara (the fifth state of Astanga Yoga which involves withdrawal of senses) and Dharana (concentration). It is to be understood that ordinary sleep is not relaxation and tensions cannot always be resolved completely in ordinary sleep. Yoga Nidra is qualitatively different relaxation.

During the practice of Yoga Nidra the consciousness is at different levels. It is a 'sleep' where all the burdens are thrown off to attain more blissful state of awareness, a relaxation much more intense than ordinary sleep. When one practices Yoga Nidra, it opens the deeper phases of the mind.<sup>11</sup>

Regular and proper practice of Asanas and Pranayamas have been proposed beneficial for all women. It may be useful for women who suffer from menstrual disorders. Asanas can be defined as a physical Yoga posture or position that is designed to help the body and enhance the body's functions. Yoga exercises is useful method by creating strength and endurance, improving circulation and energy flow, cleansing organs and other systems, and expanding muscles and joints.

Pranayama is a Sanskrit (ancient Indian language) word meaning "extension of the prana or breath" or "extension of the life force". The word is composed from two Sanskrit words: prana meaning life force (noted particularly as the breath), and ayama, to extend or draw out. (Not "restrain, or control" as is often translated from yam instead of ayama). Therefore, Asanas and Pranayamas are helpful in preserving the general health and reducing the minor complaints regarding menstruation by improving the vigor and strength of the body.<sup>12</sup> However, it should be noted that, yogic practices are not advisable during menstruation for 3-5 days.

Yoga helps correcting and balancing the functioning of the endocrine system, toning up nervous system by relaxing the body and mind, and reducing psycho-biological problems of the patients.<sup>11</sup> In the present study we want to examine the effect of Yoga Nidra on the menstrual disorders and psycho-biological problem associated with menstruation.

## Materials and methods

The study was a randomized controlled trial among women with menstrual irregularities. The study was conducted in

Lucknow, Uttar Pradesh (India) from 2008 to 2013. The study was granted by institutional ethics committee and written informed consent was obtained from all participants. Sample size of the study was calculated with the help of PS Power and Sample Size Calculations (version 2.1.30; William D. Dupont and Walton D. Plummer, Vanderbilt University, USA), by considering type I error of 0.05 and power of 80%, the expected difference in the experimental and control mean was 1.8 with standard deviation of 4.35 and ratio between intervention and control group was considered.<sup>13</sup> A total of 100 subjects were included and were randomly assigned into two groups including intervention and control group. The intervention group consisted of 50 subjects who received both Yoga Nidra apart from regular medications and the control group consisted of 50 subjects who received only medications.

Subjects were randomly assigned to each group. For this, we used computer-generated randomization table in the study. Small paper chits written either case or control were placed in opaque, sequentially numbered envelopes prepared by a biostatistician who was blind to the participants.

Women suffering from menstrual irregularities diagnosed by senior consultants were recruited from the Department of Obstetrics and Gynecology, King George's Medical University U.P Lucknow. Participants aged between 18 to 45 years with current menstrual irregularities (pathological amenorrhea, dysmenorrhoea, oligomenorrhoea, polymenorrhoea, hypomenorrhoea, menorrhagia, and metrorrhagia) for more than 6 months were included. Interested individuals were initially screened for eligibility by senior consultants. According to inclusion and exclusion criteria, eligible subjects were invited for yoga classes.

Conservatively diagnosed patients who are consenting were recruited. Women having known gynecological neoplasm,

requiring surgery, having Pelvic inflammatory disease (PID), and pregnant women are excluded from the study.

The anthropometric measurements and history of previous treatments such as physical therapy and yoga therapy were inquired and recorded. Either single or combination of medications e.g. Medroxy progesterone, norethistrone, ethinyl estradiol, levonorgestrol, tranexemic acid, ethamsylate were prescribed to the patients by the consultants as and when required.

Baseline assessments of all the subjects were carried out. Psycho-biological assessment employing Psycho-biological General Well-being Index (PGWBI) and biochemical parameters including thyroid-stimulating hormone (TSH), follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin, progesterone, estradiol, testosterone, and DHEA-S (dehydroepiandrostone sulfate) was conducted before and after six months of Yoga Nidra intervention. Psychological General Well-being Index (PGWBI)<sup>14</sup> consists of 22 self-administered items, rated on a 6-point scale so the score varies between 22 to 132, which assess psycho-biological and general well-being of respondents in six health related quality of life (HRQoL) domains: anxiety, depression, positive well-being, self-control, general health and vitality. The higher scores indicate better quality of life.

Anthropometric measurements were also recorded. 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 cloths, and was recorded to the nearest 100 grams.

Five milliliters of peripheral fasting blood was collected during 2<sup>nd</sup> or 3<sup>rd</sup> days of menstrual cycle (follicular phase) from all the subjects before yogic intervention for baseline investigations and after six months. For estimation of hormonal profile, serum was separated by centrifuge machine (3500-

4000 rotations/minute) at room temperature.

The following kits were used for the estimation of the parameters studied – TSH ELISA by RFCL Ltd. SIDCUL, Haridwar Uttarakhand, FSH, LH, Prolactin ELISA by Dialab Ges. M.B.H., Estradiol, Progesterone, Testosterone by Syntron Bioresearch, Inc., and DHEA-S ELISA by Adaltis Italia S.P.A. The laboratory tests were performed in the Department of Pathology, King George's Medical University U.P Lucknow. External quality assurance service to the laboratory was provided by the Bio RAD and internal assurance was also procured. Elisa reader was used for measuring the variables taken in the study.

Yoga Nidra intervention: the Yoga Nidra intervention was originally developed by Swami Satyananda Saraswati, School of Yoga, Munger, Bihar, India.<sup>11</sup> Yoga instructor was selected by an expert panel for this study. The yoga classes for the patients consisted of 30 to 35 minute /day session, five days in week where Yoga Nidra taught by a trained Yoga Therapist at the Department of Physiology King George's Medical University, Lucknow, Uttar Pradesh for first three months. Thereafter the patients were advised to continue the same at their homes for next three months; the yoga lasted for 6 months in the intervention group. Also, a diary provided to them for noting the schedule of home based practice was verified. The details were cross checked with attendant accompanying.

Statistical analysis was done using GraphPad InStat version 3.05 software Inc. year 2000. Paired t-test was used to determine the mean difference scores of all the parameters of the subjects at baseline and after six months in both intervention and control groups. The differences in pre and post intervention scores were used for the analysis. This was done to take into account the imbalances, if any, at the baseline characteristics of the subjects. The independent t-test was used to compare the

differences in scores between the groups (yoga vs. non yoga group).<sup>15,16</sup>

## Results

Out of 100 subjects, 5 subjects from intervention group and 8 subjects from control group were considered drop outs.

Out of 13 drop outs, 8 patients could not follow the time schedule and 5 were not willing to continue as research subjects after one week. Out of 50 subjects from the intervention group, 45 subjects attended Yoga Nidra sessions till end (completed at least 80% classes of Yoga Nidra). One of the patients who dropped out in later part of the study reported non-restorative sleep after first four to five days of initiating the Yoga Nidra practices. Another lady who discontinued found it difficult to find time for the practicing Yoga Nidra. The numbers of subjects completing the study were 45 and 42 in intervention and control groups, respectively. The Mean (SD) age of women was 26.57 (7.45) years in the intervention group, and 25.52 (6.27) year for control group.

Table 1 and 2 shows baseline and post intervention PGWBI scores and hormonal profile of both intervention and control groups. The mean score of anxiety, depression, positive well-being, general health, and vitality scores in posttest were significantly different in intervention group as compared with pretest ( $P < 0.05$ ) (Table 1).

But there were no significant differences in control group. Table 2 depicts the significant differences in The mean of hormonal level including Thyroid-Stimulating Hormone, Follicle-Stimulating Hormone, Luteinizing Hormone, Prolactin within intervention group was significantly different in posttest as compared with posttest ( $P < 0.05$ ). But there was no significant differences in control group ( $P > 0.05$ ) (Table 2).

Table 3 and 4 depicts comparison of mean differences in PGWBI scores and hormonal profile. Significant improvement in

domains of anxiety ( $P<0.01$ ), depression ( $P<0.02$ ), positive well-being ( $P<0.01$ ), general health ( $P<0.04$ ) and vitality ( $P<0.02$ ) in intervention group was noted after six months of yogic intervention when compared to control group (Table 3).

There was no statistical difference in domain of self-control in intervention

group when compared control group (Table 3). We found significant changes in thyroid-stimulating hormone ( $P<0.02$ ), follicle-stimulating hormone ( $P<0.01$ ), luteinizing hormone ( $P<0.001$ ) and prolactin ( $P<0.03$ ) in intervention group as compared to control group (Table 4).

**Table 1.** Mean of scores of PGWBI (psychological general well-being schedule index) at baseline and after six months in intervention and control groups (paired t-test)

	Intervention group, (N=45)				Control group, (N=42)			
	Baseline	Post-test	t	P	Baseline	Post-test	t	P
<b>Anxiety</b>	14.1 (3.35)	16.2 (3.30)	3.24	0.02	14.3 (4.15)	14.9 (4.60)	1.74	0.5
<b>Depression</b>	9.25 (2.11)	10.7 (1.30)	2.56	0.02	9.35 (2.91)	9.85 (2.53)	1.61	0.1
<b>Positive well-being</b>	11.3 (2.43)	12.8 (1.63)	2.65	0.01	11.2 (1.93)	11.37 (3.48)	1.21	0.3
<b>Self-control</b>	9.0 (2.40)	9.1 (2.19)	2.50	0.07	9.28 (2.71)	9.98 (2.61)	1.32	0.3
<b>General health</b>	9.08 (2.87)	10.1 (2.81)	2.61	0.04	9.37 (3.02)	9.98 (2.71)	1.11	0.2
<b>Vitality</b>	11.2 (2.81)	12.3 (2.54)	2.11	0.03	10.9 (2.53)	10.88 (3.21)	1.52	0.2

**Table 2.** Mean of hormonal profile at baseline and after six months in intervention and control groups (paired t-test)

	Intervention group, (N=45)				Control group, (N=42)			
	Baseline	Post-test	t	p	Baseline	Post-test	t	P
<b>TSH</b> ( $\mu$ U/ml)	3.80 (2.03)	2.36 (1.82)	5.93	0.001	3.42 (2.27)	3.17 (2.00)	1.20	0.3
<b>FSH</b> ( $\mu$ U/ml)	17.03 (7.72)	16.16 (6.88)	5.02	0.01	16.16 (7.55)	16.04 (4.96)	1.71	0.4
<b>LH</b> (mIU/ml)	19.23 (10.47)	17.40 (8.70)	9.37	0.002	18.99 (8.18)	18.14 (7.91)	1.51	0.2
<b>Prolactin</b> (ng/ml)	16.42 (6.86)	15.59 (6.37)	8.37	0.01	15.94 (5.63)	15.28 (6.91)	1.72	0.6
<b>Progesterone</b> (ng/ml)	7.27 (7.17)	7.82 (7.26)	9.51	0.08	8.35 (7.83)	8.95 (7.51)	1.71	0.4
<b>Estradiol</b> (Pg/ml)	112.56 (73.80)	113.8 (66.94)	23.64	0.14	113.36 (69.06)	113.54 (68.99)	1.34	0.4
<b>Testosterone</b> (ng/ml)	1.71 (1.28)	1.55 (1.13)	4.42	0.26	2.90 (1.75)	2.23 (1.68)	1.42	0.1
<b>DHEA-S</b> ( $\mu$ g/ml)	1.79 (0.81)	1.43 (0.81)	4.01	0.35	1.92 (1.02)	1.74 (1.03)	1.65	0.6

TSH: Thyroid-stimulating Hormone, FSH: Follicle Stimulating Hormone, LH: Luteinizing Hormone and DHEA-S: Dehydroepiandrostone Sulfate

**Table 3.** Comparison of mean differences in PGWBI between intervention and control groups (independent sample t-test)

	Intervention group (N=45)	Control group (N=42)	t	p
<b>Anxiety</b>	0.75 (0.42)	0.57 (0.22)	2.30	0.01
<b>Depression</b>	0.78 (0.45)	0.43 (0.22)	2.12	0.02
<b>Positive well-being</b>	0.85 (0.33)	0.62 (0.40)	2.16	0.01
<b>Self-control</b>	0.55 (0.22)	0.64 (0.33)	0.18	0.7
<b>General health</b>	0.90 (0.33)	0.67 (0.22)	1.68	0.04
<b>Vitality</b>	0.52 (0.11)	0.31(0.18)	1.18	0.02

**Table 4.** Comparison of hormonal profile (student's independent sample t-test) between intervention and control groups

Variables	Intervention group (N= 45)	Control group (N=42)	P
<b>TSH</b> (µU/ml)	0.54 (0.61)	0.18 (0.97)	0.02
<b>FSH</b> (mIU/ml)	1.72 (2.27)	0.75 (0.48)	0.01
<b>LH</b> (mIU/ml)	1.46 (1.21)	0.52 (2.17)	0.001
<b>Prolactin</b> (ng/ml)	1.66 (1.32)	1.34 (1.35)	0.03
<b>Progesterone</b> (ng/ml)	1.39 (1.34)	1.41 (1.39)	0.09
<b>Estradiol</b> (Pg/ml)	2.04 (1.78)	2.33 (1.49)	0.30
<b>Testosterone</b> (ng/ml)	0.52 ( 0.67)	0.67 (1.07)	0.24
<b>DHEA-S</b> (µg/ml)	0.28 ( 0.67)	0.15 (0.37)	0.27

TSH: Thyroid-stimulating hormone, FSH: Follicle stimulating hormone, LH: Luteinizing hormone and DHEA-S: Dehydroepiandrosterone Sulfate

## Discussion

The present study revealed significant improvement in anxiety scores after six months of intervention with Yoga Nidra in intervention group in comparison to control group. Previous studies have also shown significant reduction in the trait anxiety scores following meditation<sup>17</sup> and breathing exercises.<sup>18</sup> Studies have also reported reduction in state anxiety following muscle relaxation techniques and listening to music.<sup>19</sup> During anxiety, there is an increased response of hypothalamus and heightened sympathetic activity. Yoga Nidra appears to regulate hypothalamus, in a way resulting in decreased sympathetic (excitatory) nervous activity and increased parasympathetic (inhibitory) function.<sup>11</sup> In the intervention group which practiced Yoga Nidra for six months, there was significant decrease in their degree of depressive symptoms (according to the psycho-biological general wellbeing Index). Other studies also have shown that those with depression could be benefited from Sudarshan Kriya and related practices.<sup>20</sup>

Previous studies have also shown that using yoga interventions in other conditions (cancer survivors, self-reported emotional distress), found to be effective in depressive and mood symptoms, as well as anxiety and physical well-being.<sup>21</sup>

The results showed that there was a significant improvement in positive wellbeing, general health and vitality in intervention group. Yoga Nidra is believed to balance psychic and vital energies within the psychic channels (Nadis) of the energy framework underlying the physical body.

Free flow of these energies is considered to be the basis of optimal physical and mental health. Findings from other studies also is in line with present study.<sup>22-24</sup>

However, in domain of self-control there was no statistically significant difference, but in intervention group there was more improvement in this parameter when compared to the control group. However, previous studies have found significant improvement in self-esteem with Yogic exercises.<sup>25</sup>

Furthermore, the results showed that Yoga Nidra intervention program decreased depressed mood, feelings of guilt, insomnia, genital problems, tension, fear and anxious mood which are symptoms included as items of PGWBI.

Subjects experienced better control over their feelings. Previous studies have also shown the beneficial effects of one week of yoga program in self rated fear, anxiety, sadness and disturbed sleep in tsunami survivors of the Andaman Islands. There was a significant decrease in self rated fear, anxiety, sadness and disturbed sleep,

respiratory and heart rate was also significantly improved.<sup>26</sup>

There was significant change in TSH, FSH, LH, and Prolactin levels in intervention group as compared to the control group. Previous studies found that long term practice of yoga lead to decreased TSH, growth hormone, and prolactin imbalances significantly. Metabolic effects of meditation (Yoga Nidra) includes a decreased adrenocortical activity, long term decreased cortisol secretion and lesser thyroid stimulating hormone (TSH) abnormalities.<sup>27</sup>

Metabolic effects of meditation (Yoga Nidra) includes a decreased adrenocortical activity, long term decreased cortisol secretion and decreased thyroid stimulating hormone (TSH). Imbalances in the hormonal profile also predispose women to depression, especially in relation to pituitary, thyroid and reproductive hormones. The practice of hatha yoga and Asanas has been found to be extremely effective in rectifying the situation.<sup>12</sup>

Menstruation is dependent on the proper functioning of the chain made up of hypothalamus- pituitary-ovary and uterus.

Pituitary hormones, follicle stimulating hormone (FSH), luteinizing hormones (LH), prolactin and thyroid hormones are required for normal development of ova and need to be investigated in cases of chronic anovulation oligomenorrhea and amenorrhea.<sup>28</sup> It was inferred that after Yoga Nidra practice, patients acquired relief in heavy bleeding and irregular menstrual periods. As other research project, our study has some limitations.

The main limitation was that amenorrhea, dysmenorrhea, oligomenorrhea, polymenorrhea, menorrhagia, metrorrhagia, and hypo menorrhea were included in the study all together. The sample size was not large enough to analyze the hypomenorrhic group and hypermenorrhic subgroups separately. The information of the menstrual cycle was based on the participant's self-reports not based on

ultrasound scans; this is also another limitation of the study. In future this study could be repeated in other populations with large number of patients. Further, some other yogic practices may be tried and compared with the present ones.

## Conclusion

Yoga Nidra can be an effective practice to overcome the psychiatric morbidity associated with menstrual irregularities apart from bringing the hormonal profile towards normalcy. Therefore, Yogic relaxation training (Yoga Nidra) could be prescribed as an adjunct to conventional drug therapy for menstrual dysfunction.

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## Ethical issues

None to be declared.

## Conflict of interest

The authors declare no conflict of interest in this study.

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