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Effect of Yogic Practices on Psychobiochemical Parameters in Girls with Cyclical Mastalgia: A Randomized Control Trial

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Abstract

Mastalgia is a common issue that disrupts the reproductive life of women. There is no accepted organic etiology and no definite cure for mastalgia. Mastalgia influences the general quality of life which is related to psychological variables. The present study administrated to determine the effect of yogic practice on breast pain, anxiety, stress, and biochemical profile with cyclical mastalgia girls. Forty females having breast pain past 6 months were recruited for this study and randomly assign into two groups (yoga group and control group) with the age range of 20–30 years (23.52 ± 2.28). Sixty days of yoga intervention were given to the yoga group. Breast pain shown a significant reduction in yoga group in compare to control group ($P < 0.001$). Similarly, yoga group found a significant reduction in anxiety ($P < 0.01$) and stress ($P < 0.01$) as compare to control group. There were no significant changes which were found in progesterone ($P > 0.05$) and estrogen ($P > 0.05$) in both groups but the magnitude of change was high in progesterone level in the yoga group. This study suggests that 2 months of yoga practice reduce the breast pain, anxiety, and stress in cyclical mastalgia girls.

Keywords: Anxiety, Breast pain, Cyclical Mastalgia, Estrogen, Progesterone, Stress, Yoga

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Introduction

Mastalgia synonymic breast pain is very common complaint in female being[1,2] and its description was found in 1829.[3] The evaluation of breast pain differs according to their clinical presentation, that is, cyclical mastalgia, non-cyclic mastalgia, and extramammary pain. Cyclical mastalgia, by definition, having breast pain prior the menstruation in luteal phase, it's clearly related with menstrual cycle. Non-cyclical mastalgia is not related with menstruation and it's usually occurred in unilaterally and described as a sharp burning pain that appears to be localized in the breast. It is common in 40–50 years of age in women.[4,5] Extramammary pain related with various factors which may interconnect with symptoms of breast pain.[6,7] Breast disease broadly divided into benign and malignant. Benign breast disorders are much more common than malignant conditions.[8] However, cyclical mastalgia is benign breast disease but generally, girls are unable to differentiate the condition of benign and malignant; therefore, 70% of women will attend a breast clinic at sometimes their lives due to fear of cancer and these types of fear lead to anxiety, stress, and other psychological and physiological disturbance.[9] Early studies of breast pain emphasized a psychosomatic origin and high level of emotional distress.[10] The previous study also reported a significant correlation with mastalgia of anxiety and depression.[11] Hormonal changes, estrogen, and progesterone also vary before start the menstruation phase.[12] Some of the alternative therapies were used as a treatment of mastalgia but after the few period of time, patients found adverse effects.[13] Yoga is now emerging as one of the promising therapies which address the needs of the woman with breast pain (mastalgia). Literature says that there are limited studies which have been done associate with yoga and mastalgia treatment, it gives significant improvement in affecting factor of mastalgia.[2] Treatment through yoga also was seen in cancer-related pain management.[7,14-16] Another study suggested that after the practicing of yoga, cancer patients found improvement in joint pain, fatigues, sleep disturbance, vigor, hot flashes, and pain-related symptoms.[17]

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The present study was planned to see if there is any difference in the psychological and biochemical parameters of mastalgia participants after the practicing of yoga for 2 months.

Methods

Forty girls with age range between 20 and 30 years (23.52 ± 2.82) participated in this study. The subjects were selected from girls' hostel of H.N.B.G University, Uttarakhand. These 40 girls were having the symptoms of mastalgia as per assessing tool of Cardiff breast pain chart. Participants were excluded from the study, who are married, pregnant, any kind of medication, taking contraceptive pills and also not having pain in the past 6 months. Subjects were randomly divided into experimental[18] and control group[18] with the help of online random sequence generator.[19] The study was approved by the Institutional Ethical Committee (Ref. No./2019/04) and sign informed consent was also taken from the subjects and as well as chief warden of the girl's hostel.

Research Design

The design of the present study is randomized control trial. Forty subjects were divided into two groups, experiment and control group, each group was consist of 20 subjects. Psychological

assessments were taken in 3 times of the study, that is, pre-post and follow-up and biochemical assessments were taken only 2 times, that is, pre and post. Ninety minutes yoga module was prepared by the experts and this yoga module consists of asanas, pranayama, meditation, and kriya (cleansing practice) [Table 1]. Experimental group was practiced per day 90 min yoga module for 60 days and control group was doing as usual their daily routine for 60 days.

Assessment

Assessment of Breast Pain

Cardiff breast pain chart is used to record level of pain in whole month. In this pain chart, the woman fills her experience on a day-to-day basis.[18] There is the provision of recording the severity of pain by either marking the box as "full" square for severe pain or "half" triangle for mild-to-moderate intensity pain. Subject records the days of menses with the letter "p" inbox. Visual linear analog (VLA) scale, score of "0"–"10," also used for measurement the pain in daily basis. Women fill a numeric value say "9"–"10" if the pain is severe and "7"–"8" when pain is high, similarly, "4"–"6" for moderate and "0"–"3" when pain is mild. It helps to record the severity of pain on before, after, and during menstruation.

Table 1: Yogic intervention

Intervention	*Time*
Opening mantra-Gayatri mantra	1 min
Yogic breathing	2 min
Pawan muktasana series-1	10 min
Surya namaskar	10 min
Posture (asana)	-
• Standing poses (asana)	4 min
• Aardhakaticakrāsana (Halfwaist wheel pose)	1 min
• Pad hastasana	1 min
• Ardhacakrāsana (Halfwheel pose)	1 min
• Trikonāsana (Triangle pose)	1 min
Sitting poses	5 min
• Pashchimmotanasana	1 min
• Gomukhāsana (Cow face pose)	1 min
• Uśtrāsana (Camel pose)	1 min
• Saśankāsana	1 min
• Vakrāsana (Twisted pose)	1 min
Prone poses	3 min
• Bhujangāsana (Cobra pose)	1 min
• Dhanurāsana (Bow pose)	1 min
• Salabhāsana (Locust pose)	1 min
Inverted poses	1 min
• Sarvāngāsana (Shoulder stand)	1 min
Deep relaxation (yoga nidra)	20 min
Pranayama and kriya	12 min+15 min
• Kapalbbhati	40 stroke*3
• Nadishodhan.	9 cycle
• Bhastrika	20*3 round
• Bhramari	9 rounds
• *Kriya*	(Once in a week)
• Jalneti	
• Kunjal	
Meditation	5 min
• Chanting of a,u,m, and om (nādānusandhāna) 03 round each mantra	5 min
Shanti path	2 min
Total time	1 h 30min

Assessment of Anxiety

SCAT-SS developed by Dr. A.K.P. Sinha and L.N.K Sinha (1995), aims to evaluate the risk of anxiety and level of anxiety[20] symptoms objectively. The inventory consists of 90 questions, each with two possible answers scored between 0 and 1. Subject should have to give response either "Yes" or "No." No time limit is fixed for completing the test. However, usually, an individual takes 15–20 min in completing the test form. Reliability of the test is 0.92 and validity is 0.62.

Assessment of Stress

Stress scale is structured by Dr. M. Singh (2002). The stress scale[21] has been validated in Indian populations and reliability of the test is 0.82 and validity found 0.61. Stress scale consists of 40 items with three possible responses, including "always," "sometime," and "never." This stress scale is self-reporting scale of measuring stress.

Assessment of Biochemical Parameter

The etiology of cyclical mastalgia is disturbance in hormonal balance between estrogen, progesterone, and the responsiveness of the target organ to these hormones. For that, blood serum sample will be taken from girls on the 1st day of menstruation and collect post-data after 60 days of intervention. Then, we examined level of two hormones.

Data Analysis

Data were analyzed using the Statistical Package for the Social Science Version 20.0 (SPSS-20.0) (IBM Corporation., Armonk, N.Y., USA). Shapiro–Wilk test was used to test of normality. The data of each variable found not normally distributed, hence, we decided to choose non-parametric Mann–Whitney U-test for between-group condition comparisons and Friedman test was performed to detect for within group (before, after 2-month, and 1-month follow-up) followed by *post hoc* Bonferroni adjustment correct with Wilcoxon sign-ranked test which was performed to detect the statistical significance of condition in compared to respective baseline.

Results

After completing of 60 days of yogic intervention, breast pain shown the significant reduction in yoga group in compare to control group ($P < 0.001$); similarly, yoga group found significant reduction in anxiety ($P < 0.01$) and stress ($P < 0.001$) in compare to control group. There were no significant changes which were found in progesterone ($P > 0.05$) and estrogen ($P > 0.05$) in both groups.

Breast Pain

Between-groups comparison: Table 2 displays, Mann–Whitney U-test indicates that the breast pain score of yoga group ($Mdn = 21$) was not significantly differ than the control group ($Mdn = 21$), $U = 163.5$, $p = 0.327$ at baseline scores. The breast pain score of after 2-month yoga group ($Mdn = 9$) was significantly differ than the control group ($Mdn = 21$), $U = 15.5$, $P < 0.001$, at after score. At the 1-month follow-up, score of yoga group ($Mdn = 5$)

Table 2: Mean standard deviation and median score of breast pain, anxiety, and stress of yoga and control group

	Yoga (n=20)			*Control (n=20)*		
	Before Mean±SD (Median)	*After 2 months Mean±SD (Median)*	*1-month follow-up Mean±SD (Median)*	*Before Mean±SD (Median)*	*After 2 months Mean±SD (Median)*	*1-month follow-up Mean±SD (Median)*
Breast pain	20.60±3.66 (21)	10.15±4.68 (9)**^{c}	4.85±3.63 (5)***^{c}	19.05±4.57 (21)	21.10±3.18 (21)	20.80±3.11 (21)
Anxiety	43.15±17.52 (43)	32.35±16.14 (32)***^{a}	27.40±13.60 (26)***^{c}	38.75±10.11 (40)	42.45±8.73 (43.5)**	44.75±12.17 (45)
Stress	33.85±12.35 (35.5)	21.95±12.05***^{b} (20.5)	18.40±8.53***^{c} (19)	28.05±8.94 (29)	35.35±12.05 (33.5)	36.00±12.05 (33.5)

*P<0.05, **P<0.01, ***P<0.001 (within-group comparisons). ^{a}P<0.05, ^{b}P<0.01, ^{c}P<0.001 (Mann–Whitney U-test, between-groups comparisons at before and after 2 months comparisons)

was significantly differ than the control group (*Mdn* = 21), $U = 1.00$, $P < 0.001$ [Figure 1].

In yoga group: The Friedman test showed that there was significant different breast pain score measured before, after 2-month, and 1-month follow-up $\chi^2_F(2) = 36.08$, $P < 0.001$. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that breast pain scores after 2-month yoga therapy were significantly reduced ($z = -3.926$, $P < 0.001$) than scores before (*Mdn* = 21) and also scores 1-month follow-up (*Mdn* = 5) were significantly lower than scores before (−3.926, $P < 0.001$).

In control group: The Friedman test showed that there was significant different breast pain score measured before, after 2-month, and 1-month follow-up $\chi^2_F(2) = 15.13$, $P = 0.001$. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that breast pain scores after 2 months in control group were significant increased ($z = -2.595$, $P = 0.009$) than scores before (*Mdn* = 21) and similarly after 1-month follow-up (*Mdn* = 21) were significantly increased than scores before ($z = -2567$, $P = 0.010$).

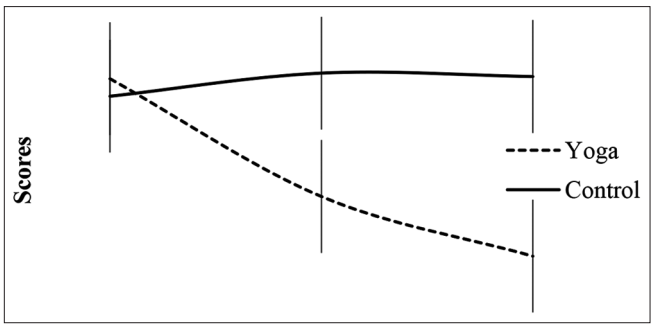

Figure 1: The graphical representation of change in breast pain score. Line graph for breast pain mean shift from the baseline, intervention at the end of 2 months, and follow-up after 1 month between the yoga group ($n = 20$) and control group ($n = 20$)

Anxiety

Between-group comparison: Table 2 displays, Mann–Whitney U-test indicates that the anxiety score of yoga group (*Mdn* = 43) was not significantly differ than the control group (*Mdn* = 40), $U = 175$, $P = 0.512$ at baseline scores. The anxiety score of after 2-month yoga group (*Mdn* = 32) was significantly differ than the control group (*Mdn* = 43.5), $U = 124$, $P = 0.040$, at after score. At the 1-month follow-up, score of yoga group (*Mdn* = 26) was significantly differ than the control group (*Mdn* = 45), $U = 71.5$, $P < 0.001$ [Figure 2].

In yoga group: The Friedman test showed that there was significant different anxiety score measured before, after 2-month, and 1-month follow-up $\chi^2_F(2) = 26.26$, $P < 0.001$. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that anxiety scores after 2-month yoga therapy were significantly reduced ($z = -3.122$, $P = 0.002$) than scores before (*Mdn* = 43). However, scores 1-month follow-up (*Mdn* = 26) were significantly lower than scores before ($z = -3.849$, $P < 0.001$).

In control group: The Friedman test showed that there was significant different anxiety score measured before, after 2-month, and 1-month follow-up $\chi^2_F(2) = 14.711$, $P = 0.001$. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that anxiety scores after 2 months in control group were significant increased ($z = 2.175$, $P = 0.03$) than scores before (*Mdn* = 40) and also scores after 1-month follow-up (*Mdn* = 45) were no significantly increased than scores before ($z = -2.354$, $P = 0.019$).

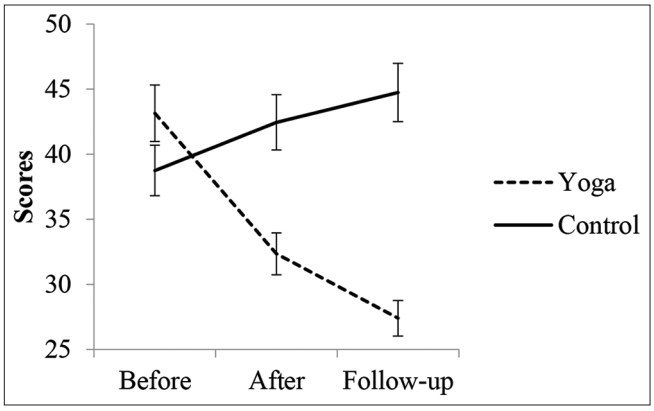

Figure 2: The graphical representation of change in anxiety score. Line graph showed that anxiety score has reduced from baseline score at the end of 2 month's intervention as compare to control, and similar reduction was found also at the end of follow-up.

Stress

In stress between-group comparison: Table 2 displays, Mann–Whitney U-test indicates that the stress score of yoga group (*Mdn* = 35.5) was not significantly differ than the control group (*Mdn* = 29), $U = 142.5$, $P = 0.121$ at baseline scores. The stress score after 2 months in yoga therapy group (*Mdn* = 20.5) was significantly differ than the control group (*Mdn* = 33.5), $U = 88$, $P = 0.002$.

After 1-month follow-up, score of yoga group (*Mdn* = 19) was significantly differ than the control group (*Mdn* = 33.5), *U* = 39.5, *P* < 0.001 [Figure 3].

In yoga group: The Friedman test showed that there was significant different in stress score measured before, after 2-month, and 1-month follow-up $\chi^2_F(2) = 27.227$, *P* < 0.001. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that stress scores after 2 months of yoga therapy were significantly (z = −3.885, *P* < 0.001) reduced than scores before yoga therapy (*Mdn* = 35.5) and reduction also were seen even after 1-month follow-up (*Mdn* = 19) than scores before (z = −3.883, *P* < 0.001).

In control group: The Friedman test showed that there was no significant different stress score measured before, after, and follow-up $\chi^2_F(2) = 5.029$, *P* = 0.81. *Post hoc* test using a Wilcoxon signed-ranked test with a Bonferroni-adjusted alpha level of 0.017 (0.05/3) showed that stress scores after 2 months in control group were not significantly increased (z = −2.136, *P* = 0.033) than scores before (*Mdn* = 29). However, scores after 1-month follow-up (*Mdn* = 33.5) were not significantly than scores before (z = 1.918, *P* = 0.06).

Biochemical Profile

In progesterone between-group comparison: Table 3 displays, Mann–Whitney U-test indicates that the progesterone of yoga group (*Mdn* = 0.78) was not significantly differ than the control group (*Mdn* = 0.61), *U* = 196.5, *P* = 0.925 at baseline. However, yoga group (*Mdn* = 0.64) was not significantly differ than the control group (*Mdn* = 0.65), *U* = 187.0, *P* = 0.738, after 2 months of yoga therapy [Figure 4].

Wilcoxon signed-ranked test showed that progesterone scores after 2 months of yoga therapy group were no significant change (z = −0.131, *P* = 0.896) than scores before yoga therapy (*Mdn* = 0.78).

Wilcoxon signed-ranked test showed that progesterone scores after 2 months of control group were not significantly changed (z = −0.457, *P* = 0.647) than scores before of control group (*Mdn* = 0.61).

In estrogen between-group comparison: Table 3 displays, Mann–Whitney U-test indicates that the estrogen of yoga group (*Mdn* = 36.43) was not significantly differ than the control group (*Mdn* = 40.16), *U* = 173.0, *P* = 0.478 at baseline. Yoga group (*Mdn* = 37.97) was not significantly differ than the control group (*Mdn* = 44.01), *U* = 139.0, *P* = 0.102, after 2 months [Figure 5].

In yoga group: Wilcoxon signed-ranked test showed that estrogen scores after 2 months of yoga therapy group were no significant change (z = −0.075, *P* = 0.940) than scores before yoga therapy (*Mdn* = 36.43).

In control group: Wilcoxon signed-ranked test showed that estrogen scores after 2 months of control group were not significantly changed (z = −0.161, *P* = 0.107) than scores before of control group (*Mdn* =40.16).

Discussion

The present study has been dealing with effect of yoga intervention on cyclical mastalgia. Cyclical mastalgia mainly associated with physiological and psychological factors. A study found that the prevalence of mastalgia is 40–71% in woman.[22] Breast pain in women may have a negative effect on their lives and interfere with activity, relationships, and quality of life.[23] The effect of the mind on the body and that of the body on the mind is known by yoga, for that current study helps to determine effect of yoga on various factors to affect cyclical mastalgia including anxiety, stress, and endocrine profile. Breast pain is common problem and cyclical breast pain affects up to two-third of woman being duration of her reproductive age. In the present study, we have conducted to find the reduction in breast pain in experimental group as compare to control group after the yoga practices of 60 days. Between-group comparison [Table 2] found that breast pain score of after 2-month yoga group (*U* = 15.5, *P* < 0.001) was significantly differ than the control group at after score. At also after the 1-month follow-up, score of yoga group was significantly differ than the control group (*U* = 1.00, *P* < 0.001). Yoga practice would be effective therapy for reduce breast pain management. A study has also been done on nursing women with mastalgia and there was significant reduction in breast pain after the 3 months of yoga practices.[2]

The result presented in Table 2 showed reduction in anxiety level of mean score 43.15 ± 17.52–32.35 ± 16.14 in after 2 months and after 1 month follow-up (27.40 ± 13.60) in yoga group. Supportive study has been found; Kanat *et al*.[24] is stated that yoga brings significant reduction in anxiety. Another study

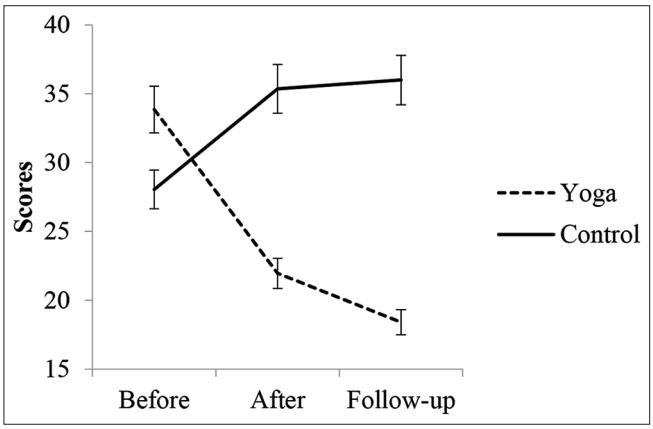

Figure 3: The graphical representation of change in stress score. Line graph for stress mean shift from the baseline, intervention at the end of 2 months, and follow-up after 1 month between the yoga group (*n* = 20) and control group (*n* = 20)

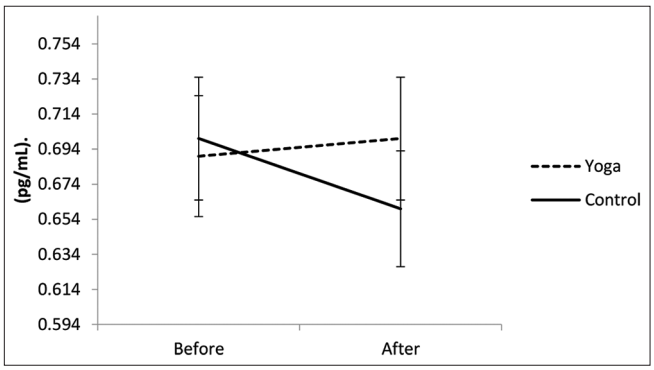

Figure 4: The graphical representation of change in progesterone score. Line graph for progesterone mean was not change significantly but slight magnitude of change was found at the end of 2 months, between the yoga group (*n* = 20) and control group (*n* = 20).

Table 3: Mean, standard deviation, and median score of progesterone and estrogen of yoga and control group

	Yoga (n=20)		*Control (n=20)*	
	Before	*After 2 months*	*Before*	*After 2 months*
	Mean±SD (Median)	*Mean±SD (Median)*	*Mean±SD (Median)*	*Mean±SD (Median)*
Progesterone (pg/mL)	0.69±0.24 (0.78)	0.70±0.23 (0.64)	0.70±0.36 (0.61)	0.66±0.24 (0.65)
Estrogen (pg/mL)	41.56±13.71 (36.43)	42.21±17.03 (37.97)	46.82±17.76 (40.16)	50.96±21.16 (44.01)

*P<0.05, **P<0.01, ***P<0.001 (within-group comparisons). [a]P<0.05, [a]P<0.01, [a]P<0.001 (Mann–Whitney U-test, between-groups comparisons at before and after 2 months comparisons)

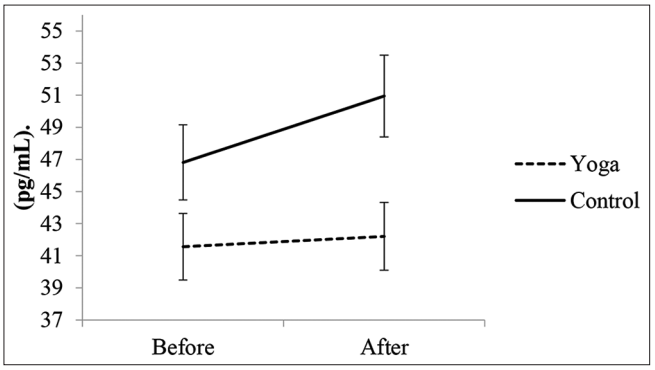

Figure 5: The graphical representation of change in estrogen score. Line graph for estrogen mean shift from the baseline, intervention at the end of 2 months, between the yoga group (n = 20) and control group (n = 20)

by investigator[25,26] reported yoga as a supportive therapy for improving mental health, stress, and anxiety reduction. Similarly, investigators[27] have been conducted a randomized control trial on mindfulness meditation for generalized anxiety disorder (GAD). In this study, 93 individuals assigned and diagnosed with GAD for 8-week group intervention with mindfulness-based stress reduction (MBSR). This study has shown result that MBSR associated with a significantly greater reduction in anxiety as measured by the various anxiety measure tools.

Looking at another psychological variable, "stress" [Table 2] displaying the stress score after 2 months in yoga therapy group was significantly differ than the control group (P = 0.002). After 1-month follow-up, score of yoga group was significantly differ than the control group, P < 0.001. Reduction in stress also was seen in employees after the 8 and 16 weeks of yoga practices.[28] Similarly, hath yoga also showed the decline trend in stress and anxiety on women.[29] According to study, yoga is the panacea for current epidemics of depression and has been found to be a solution to conditions which linked to stress.[7] The yogic lifestyle, yogic diet, yogic behaviors, and various yogic rituals help people to improve their mind, body, and well-being. Yoga helps one to resist stress by normalizing the experience of stress, enhancing the response to it, and effectively removing pent-up stress across different forms of stress.

The etiology of cyclical mastalgia is not well known. There are many factors to expose breast pain in women's reproductive lives.[30] It may be caused by the normal changes in hormones. In the present study, we have tried to get the effect of yoga therapy on hormonal profile on mastalgia women. One study reported but not associated with yoga and its suggest that topical progesterone locally added to the breast has been used in France for several years, but was not equivalent to placebo in a limited randomized controlled crossover trial.[31] Our study also measures the progesterone and between-group comparisons showed found that yoga group was not significantly differ than the control group [Table 3]. However, magnitude of change was seen high in yoga group [Figure 4]. Within-groups also found no changes in progesterone level. Estrogen hormone also showed no change [Figure 5] in between- and within-group comparison [Table 3]. Mastalgia pain has psychological impact also and that is why during the pain high level anxiety and stress score was found. Similarly, breast pain chart showed the high pain before start the menstruation. However, after the 60 days of yoga practices, reduction was found in anxiety and stress and that reflection showed in the breast pain. However, hormonal changes were not found any changes after the 60 days of yoga practices.

Conclusion

This randomized control study of 60 days with yogic intervention has shown significant improvement in anxiety, stress, and breast pain in cyclical mastalgia on university girls. Thus, we can conclude that health-care expert or physician may recruitment yoga practice as frontline management for cyclical mastalgia.

Conflicts of Interest

There are no conflicts of interest.

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