CHAPTER V
DISCUSSION

Menstruation is typically a biological occurrence during a woman’s reproductive life, and up to 90% report perceiving one or more symptoms during the days before menstruation. PMS is the commonest problem faced by adolescent girls. It may hamper young girls in their ability to achieve their goal, and complete the rigors required for higher educational achievement, and overall physical health of adolescent girls thereby decreasing their self esteem, creating lack of self confidence. The researcher devised CBNS for the adolescent girls with PMS that aimed to prepare adolescent girls to have adequate knowledge on PMS, menstrual health and skill on YRT as a basis to develop positive attitude to deal with premenstrual distress, anxiety and depression.

As research findings have the potential to streamline and rationalize practice, the effectiveness of Cognitive Behavioral Nursing Strategies on PMS among adolescent girls were determined and discussed in this chapter based on the objectives of the study. Strengths and limitations of the study were also provided.

Characteristics of the study samples

Adolescent girls with mild, moderate or strong premenstrual distress and mild or borderline depression were selected for the study. As the focus of the intervention was preventive and promotive in nature, the adolescent girls who had severe premenstrual distress and moderate depression, severe depression and extreme depression were excluded from the study as the focus shifted from preventive to curative one for these adolescent girls.

Descriptive analysis of the demographic variables (Table 9) indicated that majority of them, 66 (41%) in the study group and 70 (43.8%) in the control group
were in the age group of 13-14 years. 58 (36%) in the study group and 66 (41.2%) in the control group were aged between 15-16 years.

Regarding the educational status of the mothers, 26 (16.3%) in the study group and 28 (17.5%) in the control group had no formal education. 37 (23%) in the study and 36 (22.5%) in the control group had completed their higher secondary education. 32 (20%) and 31 (19.4%) in the study and the control group were post graduates respectively. With respect to educational status of the father, 30 (19%) in the study group and 28 (17%) in the control group had primary education. 41 (25%) in the study and 43 (27%) in the control group completed high school education. 30 (19%) and 22 (14%) in the study and control group were graduates respectively. 6 (4%) had no formal education in both the groups. This indicated that nearly 36% of the adolescent girls in the study and the control group were from educationally empowered family so most of them were from educationally deprived family.

The total family income per month highlighted that 66 (41%) in the study group and 70 (43.8%) in the control group had family income range of Rs. 6570 – 8750. 42 (28%) in the study group and 42 (26%) in the control group had a family income range of Rs. 8760 - 17515 per month. This signified that nearly half of the adolescent girls were from lower middle class family and one fourth of them were from upper middle class family.

118 (74%) in the study and 121 (76%) in the control group were from nuclear family and 42 (26%) from the study group and 39 (24%) from the control group were from joint family. The chi square revealed homogeneity between the study and the control groups with regard to the demographic variables.

Distribution of personal variables indicated that (Table 10) 102 (64%) of the adolescent girls in the study and 105 (66%) in the control group had normal weight.
16 (10%) and 10 (6%) in the study and the control group had obesity respectively. The class performance of adolescent girls revealed that 84 (52%) in the study group and 72(45%) in the control group were good performance 65 (41%) in the study group and 78 (49%) in the control group were fair performance in the class.

Majority of them, 108 (68%) in the study group and 102 (64%) in the control group had not missed their classes during menstruation. 52(32%) in the study group and 58(36.2%) in the control group had missed their classes during menstruation. Similarly, Christina John (2007) in her study had noticed 23% absenteeism among adolescent girls during menstruation. With regard to the habit of exercise adolescent girls were matched in to a pair according to the habit of exercise. Nearly half of them, 83 (52%) in the study group and 79 (49%) in the control group did not exercise regularly. The chi square revealed homogeneity between the study and the control groups with regard to the personal variables.

Distribution of gynecological variables among adolescent girls (Table 11) showed that majority of them, 96 (60%) adolescent girls in the study and 94 (59%) in the control group attained menarche at 13 years. 30 adolescent girls had attained menarche at 12 years in both the groups. In the present study, the mean age of menarche of the respondents were 12.8 years, whereas in a study conducted in Rajasthan by Khanna et al.(2005) the mean age of menarche was found to be 13.2 years.

With regard to menstrual duration, most of them, 102 (64%) in the study and 84 (53%) in the control group had menstrual bleeding for four to six days. 46 (29%) and 58 (36%) in the study and the control group had menstrual bleeding for less than three days respectively. 130 (81%) in the study and 136 (85%) in the control group had pain during menstruation. 30(19%) and 24 (15%) in the study and the control
group had no pain during menstruation respectively. The findings of the present study showed a high prevalence of dysmenorrhea, that is, 83% among adolescent girls in both the groups. Similar findings were reported by George and Bhaduri (87.87%) and Jayashree and Jayalakshmi (74%).

There was a history of very regular menstrual cycle among 83 (52%) adolescent girls in the study and 88 (55%) in the control group. The menstrual flow history revealed that 29 (18%) in the study and 36 (22%) in the control group had heavy menstrual bleeding, 53 (33%) in the study and 70 (44%) in the control group had moderate bleeding, and 78 (49%) in the study group and 54 (34%) in the control group had light bleeding.

The PMS awareness highlighted that 112 (70%) in the study group and 100 (63%) in the control group were unaware about PMS. 48 (30%) in the study group and 60 (37%) in the control group were aware about PMS. The chi square indicated no significant dispersion between the groups for all the gynecological variables, expect for menstrual duration and menstrual flow where a dispersion at p<0.01 was noted between the groups.

The first objective of the study was to evaluate the effectiveness of Cognitive Behavioral Nursing Strategies on premenstrual syndrome among adolescent girls.

Premenstrual distress

This study showed (Table 12) that in the pretest 60 (38%) adolescent girls in the study group and 52 (33%) adolescent girls in the control group had mild premenstrual distress. 94(59%) adolescent girls in the study group and 98 (61%) adolescent girls in the control group had moderate level of premenstrual distress. Strong premenstrual distress was found among six adolescent girls in the study group.
and 10 adolescent girls in the control group. No significant difference was observed between the groups on premenstrual distress ($\chi^2 = 5.04$, $p=0.060$).

These findings are consistent with the findings of the study (Patil & Wasnik Wadke, 2010) done among adolescent girls in rural areas of Maharashtra, India and which has stated that more than 50% of the subjects had one or other symptoms of PMS. Similarly, Sharma, Malhotra, Taneja, and Saha (2010) studied type and frequency of the problems related to menstruation among adolescent girls in New Delhi, India. The results revealed that 63.1% had one or other symptoms of premenstrual syndrome.

In this study during the posttest I, 102 (68%) in the study group and 31 (19%) in the control group had mild premenstrual distress. 48(32%) in the study group and 105(66%) in the control group had moderate level of premenstrual distress. Strong premenstrual distress was not found among the study group and 24 adolescent girls in the control group had significant difference observed during the posttest I between groups as shown by chi square value of 82.90 with $p<0.001$.

During the posttest II, 120 (80%) in the study group and 31 (19%) in the control group had mild premenstrual distress. 29(19.4%) adolescent girls in the study group and 111(70%) in the control group had moderate level of premenstrual distress. Strong premenstrual distress was found among one adolescent girl in the study group and 18 adolescent girls in the control group. The groups had significant difference as shown by chi square value of 116.78 with $p<0.001$. Findings by Goodale, Domar, and Benson (1990) supported the study findings of the current study. They found 58% reduction in PMS after three months of daily relaxation compared with 17% to 27% improvement in two control group. Similarly, Taylor (1996) found that learning proper breathing also reduces the symptoms of anxiety and in 1999 tested a
combination of behavioral and cognitive relaxation strategies and found that strategies are very helpful in managing PMS.

Assessment of premenstrual distress (Table 16) among adolescent girls in the study group showed significant reduction in mean score from 57.08 during the pretest to 34.92 during the posttest I, comparison of the pretest - posttest II shows that the mean value of premenstrual distress in the posttest II was lower (mean=40.92, SD=17.48) than the pretest (mean=57.08, SD=20.69), which was highly significant at p <0.001. Comparison of the posttest I - posttest II reveals that the adolescent girls pretest level premenstrual distress had significantly reduced from 57.08 mean score to 40.92 mean score during the posttest II, which was highly significant at p <0.001 and comparison of mean difference shows that the adolescent girls premenstrual distress had reduced more between the pretest and posttest I (22.16 Mean Difference) than the pretest and posttest II (16.16 Mean Difference). The reason for the increase in premenstrual distress score during 68th day when compared to 38th day may be due to the 1st post assessment which was done during the course of practice but the post assessment two was done 7 days after the completion of practice. Another reason may be due to the nature of PMS. PMS symptoms may vary from month to month and there may even be symptom-free months. Similarly (Table 17) in the control group there was a significant increase in the mean score of premenstrual syndrome at the level of p<0.001, when compared to the pretest - posttest I, pretest - posttest II, except posttest I - posttest II.

The benefits of the Cognitive Behavioral Nursing Strategies employed in this study provided support for the use of a multifactorial approach to interventions where cognitive, physical and psychological factors were addressed within the programme, as well as a decrease in the study group total premenstrual distress scores than control
group (p < 0.001). There was also a reduction in the study group's premenstrual distress subscale scores (Table 32, 33) of pain, negative affect, impaired concentration, behavioral change and control. The adolescent girls in the study group reported less premenstrual distress symptoms, 60 days after the CBNS implementation, while no significant changes were found in the control group. Group comparability and similarity were established using the pretest scores of both the study and control groups (p= 0.703, Table 26) to improve the effectiveness of the control in the research design. Thus it could be claimed that the reduction in premenstrual distress scores was not due to natural changes which might have affected both conditions equally, but is most likely due to the effect of the treatment (Hugh Coolican 2009). Additional support for the benefits of the CBNS implementation for the study group comes from the control group findings of no significant differences between pre and posttest total premenstrual distress scores, all eight premenstrual distress subscale scores. The study findings were consistent with the study result of other researchers. Busse, Montori, Krasnik, Patelis-Siotis, and Guyatt (2009) conducted a systematic review and meta-analysis to determine the efficacy of psychological interventions for premenstrual syndrome. Result revealed that they have identified nine randomized trials used interventional strategies, of which 5 tested cognitive behavioral therapy and found that cognitive behavioral therapy significantly reduces both anxiety (effect size [ES] = -0.58; 95% confidence interval [CI] = -1.15 to -0.01; number needed to treat [NNT] = 5), and depression (ES = -0.55; 95% CI = -1.05 to -0.05; NNT = 5), and also suggests a possible beneficial effect on behavioral changes and interference of symptoms on daily living. The study concluded cognitive behavioral therapy may have important beneficial effects in managing symptoms associated with premenstrual syndrome.
The positive outcomes of the CBNS in this study were evident by the significantly reduced numbers of negative comments about the impact of PMS symptoms on adolescents' various activities in the posttest premenstrual distress measurement. All five aspects of behavioral change subscale item (Appendix D2) including poor school or work performance, taking naps, staying at home, avoiding social activities and decreased efficiency had significantly decreased mean scores when compared with pretest baseline data, while improving the quality of life of adolescents is a major concern for care. It was encouraging to find a significant reduction in symptoms together with a decrease in self reported impact on adolescents various aspects of life. Hence nurses can be placed in the school setting of India (In Tamil Nadu state in India, there is less awareness about concept of school health nurse) to promote health and to facilitate self-care skills among adolescent girls as parents and teachers are often seen as authority figures, whereas nurses are seen as approachable and suitable to talk about reproductive health issues. This task could be easily shouldered up by community health nurses who are well equipped and already prepared with the knowledge base for both the content and process of health education. Thus not only is their knowledge of the behavioral, biological and nursing sciences helpful in teaching, but are also able to design learning packages that account for the entry level of the learner and for the style of teaching needed for this age group (Redman, 1993). Experimentation on CBNS and premenstrual distress has not been researched sufficiently (may be subjected for correction). Though there are no similar studies found, enough evidences are available on PMS and educational programme, relaxation technique and yoga separately.

The positive findings of the present study are consistent with the assumption that education programs benefit individuals with PMS. The importance of education
in the management of PMS, which has been well documented (Min A.K, 2002; Kim, 2006), and was supported by the positive outcomes found among the adolescents of this study. The findings that the CBNS had positive effects on premenstrual distress of pain, negative affect, impaired concentration, behavioral change and control are consistent with the findings of Seideman, 1990; Janita Chau and Anne Changg, 1999. A similar finding was observed in the study of Kirkpatrick et al. (1990) reported a significant decrease in total PMS scores in one of the experimental groups of adult women. While considerable benefits of the CBNS have been demonstrated, there were two areas where no improvement was found. These two areas were water retention and autonomic reaction of premenstrual distress sub categories. The present study indicated that there was statistically significant difference in the premenstrual distress between the groups during posttest I and posttest II. Hence the first hypothesis of the study (H1) “There is a significant difference in the premenstrual distress among adolescent girls who participate in the cognitive behavioral nursing strategies than who do not” was accepted by the researcher.

Anxiety

This study considered trait anxiety and state anxiety as one of the outcome variables used to assess the PMS. According to Hodges, 1967 and Spielberger, 1977 person with greater elevations in state anxiety will have more threat to self esteem and more trait anxiety than do low state anxiety individuals. Hence researcher opted to use both the state anxiety and trait anxiety as repeat measure to evaluate effect of CBNS.

Anxiety being one of the major expressions of stress, it needs interventions to overcome that. The reason for anxiety among adolescent girls with PMS could be many including combination of biological changes and social transitions that create an increasingly complex environment that exposes adolescents to a widening array of
stressors and challenges (Lucy & Osbom, 2005; Bandura, 2005). School demands, negative thoughts and feelings about themselves, changes in their bodies, exploring his or her own identity; problems with peer group, unsafe living environment, separation/divorce of parents; chronic illness within the family unit, moving or changing schools, being involved in too many activities (Cobb, 2007; Dubat, Punia, & Rashmi Goyal, 2007). In India, the main documented cause of anxiety among school children and adolescents is parents’ high educational expectations and pressure for academic achievement (Deb, 2001). For this relaxation is one of the answers. Rao & Nagendra (2008); Sandlund & Norlander (2007) and Pilkington, Kirkwood, Rampes and Richardson (2005) acknowledged that the YRT is an effective relaxation technique, it could help to reduce anxiety. Researcher felt yoga relaxation alone will not be enough to reduce anxiety, knowledge needs to be provided about menstruation and manage PMS symptoms such as premenstrual distress, anxiety and depression effectively for this reason researcher had planned to implement CBNS.

The findings of this study bring to the lime light that CBNS (YRT and ITLS) is a beneficial nursing intervention for reducing PMS symptoms such as premenstrual distress, anxiety and depression. The state anxiety and trait anxiety were found to be significantly (p< 0.001) lesser among the adolescent girls in the study group than the control group during posttest I and posttest II (Table 28, 29) and a similar effect could also be observed when compared with the anxiety within the group that was between pretest and posttest I and II (Table 20 to 22). Though there were no similar studies found on CBNS and anxiety, enough evidences were available for yoga relaxation technique and anxiety in various field and populations. These findings were consistent with the following research that had used trait and state anxiety measurement to test the effect of YRT.
Nidhi Gupta, Shveta Khera, Vempati, Ratna Sharma and Bijlani (2005) conducted study to assess the impact of short-term comprehensive lifestyle intervention, based on yoga, anxiety levels in normal and diseased subjects at All India Institute of Medical Sciences, New Delhi, India. The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, lectures and films on philosophy of yoga, the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were anxiety scores, taken on the first and last day of the course. Anxiety scores, both state and trait anxiety were significantly reduced. Among the diseased subjects significant improvement was seen in the anxiety levels of patients with hypertension, coronary artery disease, obesity, cervical spondylitis and those with psychiatric disorders. The observations suggest that a short educational programme for lifestyle modification and stress management leads to remarkable reduction in the anxiety scores within a period of 10 days. Similarly Michalsen, 2005, found that after the intervention there was a decrease in the anxiety level in the study group during the treatment period, whereas there were no changes in the control group.

The study findings indicated that the anxiety among the adolescent girls decreased in the study group than the adolescent girls in the control group. Hence the second hypothesis, H2, that “There is a significant difference in the anxiety among adolescent girls who participate in the Cognitive Behavioral Nursing Strategies than who do not” was accepted.

**Depression**

The present study reveals that there was a highly significant difference in the mean scores of depression between the pretest (17.12) and posttest I (10.68) of the study group (Table 24) at p<0.001 level. In the control group (Table 25) also significant
difference was noted but that statistical difference due to increase in the depression score between the pretest (17.87) and the posttest I (18.59). Comparison of the pretest and the posttest II also reveals significant difference in the both groups same as the pretest and posttest I. During the pretest there was no significant difference observed between the groups however highly significant statistical difference existed at p<0.001 level during the posttest I and the posttest II (Table 30).

Comparison of the level of depression (Table 13) showed that in the study group 48% of the adolescent girls become normal after CBNS implementation during the posttest II as compared to none in the control group. 4% of the adolescent girls in the study group had borderline depression compared to 57% of the adolescent girls in the control group. Moderate depression was found among 11% of adolescent girls in the control group but no one had it in the study group. Though, paired t tests (Table 24, 25) showed statistically significant difference in both the groups, the difference in the control group due to the increase in the depression score during posttest. One possible explanation for the increase of depression during premenstrual phase may be due to the presence of high trait anxiety among this group of adolescent girls (mean 52.67). Persons with high levels of trait- anxiety (Spielberger 1996) tend to perceive greater danger in situations that threaten self- esteem than do persons with lower levels of trait anxiety.

There was a highly significant statistical difference that existed at p<0.001 level between the study group and the control group on depression (Table 30) during the posttest I. In the posttest II the depression mean scores were 12.68 with the SD of 3.26 in the study group and 18.07 with the SD of 2.57 in the control group. A significant reduction in the level of depression was noted among the study group than the control group at p<0.001. The findings of this study strongly supported the third
hypothesis “There is a significant difference in the level of depression among adolescent girls with premenstrual syndrome who participate in the Cognitive Behavioral Nursing Strategies than who do not”. Though there were no similar studies found on CBNS and depression, enough evidences were available for yoga relaxation technique and depression in various field and populations. The study findings were consistent with the study done by Khushubu Rani, Tiwari, Uma Singh, Agrwal, Archana Ghildiyal and Neena Srivastava (2011) on impact of Yoga Nidra on psychological general well being in patients with menstrual irregularities. Result revealed that anxiety decreased significantly \(p<0.003\) and depression decreased significantly \(P<0.01\) in the Yoga group. Positive wellbeing and general health improved significantly \(P<0.02\), and vitality improved significantly \(p<0.01\) after six months of Yoga therapy in the Yoga group compared with the control group. Other studies have also shown that those with depression could benefit from yoga and related Practice (Janakiramaiah, Gangadhar, Naga, Harish, Subbakrishna, & Vedamurthachar 2000; Shapiro et al., 2007; Rao et al., 2008). During depression, there is a decrease in neurotransmitters such as serotonin and norepinephrine. Besides, an increase in the level of cortisol that has a role in causing depression by regulating the function of serotonin and norepinephrine (Kaplan & Sadock 2007). Yoga helps in decreasing the cortisol levels leading to a counter-regulatory effect to reduce the depressive symptoms.

**Knowledge on PMS**

In the present study as depicted in table 14, the baseline knowledge level among adolescent girls in both the groups exhibited a status of inadequate knowledge among 140 (93%) in the study group and 148 (92.5%) in the control group (<50%). The mean scores were 7.36 (out of 20) with the SD of 1.98 (Table 18) in the study.
group and it was 6.92 with the SD of 2.037 in the control group (Table 19), the mean difference knowledge score between the study and control group was 0.44 with the t value of 1.83, which was statistically not significant (Table 27). Janita Chau and Anne Chang (1999) estimated the mean knowledge score on PMS to be 16.57 (SD=2.41) out of 30.

Awareness of the students on PMS was poor in the study, this was consistent with a report of poor awareness about the menstrual problem in a previous study carried out amongst rural adolescent girls (Singh, Deri, & Gupta, 1999). Similarly Esimai & Omoniyi Esan, 2008) reported that at Nigeria among college students only 29% were aware of menstrual abnormalities as a problem.

The posttest I level of knowledge (Table 14) indicated that 108 (72%) adolescent girls in the study group had adequate level of knowledge (> 75%) as compared to none in the control group. 28% of adolescent girls in the study group had moderately adequate level (50 – 75%) of knowledge compared to 7.5% of adolescent girls in the control group. 92.5% adolescent girls in the control group had inadequate knowledge (< 50%) as compared to none in the study group. Though paired t test (Table 18 and 19) showed statistically significant improvement in both the groups, the increase was marginal in the control group (mean 6.92, 6.95, 7.26). This minimal difference in knowledge might be due to the influence of pretest. The range of improvement scores (7.36, 15.44, 14.48) was consistently better among adolescent girls in the study group.

This study showed that on the posttest I the mean knowledge score was 15.44 with the SD of 1.58 in the study group and it was 6.95 with the SD of 2.02 in the control group, the mean difference knowledge score between the study and the control group was 8.49 with the t value of 40.95 (p<0.001), which was highly significant at
one percent level. In posttest II a highly significant statistical difference existed between the groups at p<0.001 level. In the posttest I and posttest II knowledge scores showed a significant improvement among adolescent girls in the study group. The mean difference knowledge score (Table 18) from baseline to posttest I was -8.08 (one week after intervention) and from baseline to posttest II was -7.12 in the study group (one month after intervention) indicated that short term memory retention was good when compared to long term retention.

The study findings were consistent with the results of other researchers. Kim, 2006 conducted a study to identify the effects of PMS nutritional education program among student nurses, 29 in the experimental group and 27 in the control group. The experimental group participated in PMS nutritional education program for 8 weeks. Data were collected before and after the education, and with the measurement tools focused on premenstrual symptoms, PMS knowledge, and self care behaviors. After the intervention, the experimental group showed a significant increase in knowledge regarding PMS (Z=6.32, p=.000) and self care behaviors (t=3.00, p=.004) compared to the control group. Similarly, Janita Chau and Anne Chang (1999) developed an educational program to determine its efficacy in increasing knowledge and decreasing the severity of PMS symptoms. Immediately following the educational program, the schoolgirls in the experimental group had significantly increased knowledge scores as measured using the premenstrual syndrome knowledge questionnaire (PMSKQ). The result indicated a significant increase in the posttest PMSKQ scores for the experimental group when compared with the pretest PMSKQ scores (Z = 4.68, p < 0.0001).

The study findings indicated that the knowledge had improved among the adolescent girls with PMS in the study group than the adolescent girls in the control
group. Hence the fourth hypothesis, H4, that “There is a significant difference in the knowledge on PMS among adolescent girls who participate in the Cognitive Behavioral Nursing Strategies than who do not” was accepted.

The second objective of the study was to identify the relationship among premenstrual distress, anxiety, depression of adolescent girls.

The relationship among premenstrual distress, anxiety, depression and PMS knowledge among adolescent girls in the study and the control groups determined through Pearson product-moment correlation coefficient. In this study there were (Table 35, 36) significant weak positive correlations between the premenstrual distress -state anxiety, premenstrual distress -depression and depression – state anxiety was found among both the study and the control groups adolescent girls. Consistent to this result, Ronchi, Muro, Marziani and Rucci (2000) found that there was a strong and positive association between late leuteal phase dysphoric disorder and depressive symptoms. Similarly Lane and Francis (2003) mentioned that both overall and specific subtypes of premenstrual symptomatology were found to correlate with external locus of control, anxiety and depression. In addition, locus of control was found to moderate the relationship between premenstrual symptomatology, anxiety and depression. The adolescent girls who had higher T-anxiety score were found to show comparatively higher S- anxiety score. T- anxiety and S- anxiety within the study group (r=0.54) and the control group (r= 0.33), and a moderate positive correlation with p value highly significant (<0.001). This is supported by the Spielberger’s theory of anxiety that one who is naturally anxious will become more anxious when put in a stressful situation (Spielberger, 1983; Spielberge, 1972).
The perusal of Table 37’s data reveals that during the posttest I there were highly significant (p <0.001) moderate negative correlations between the YRT-state-anxiety, YRT - trait anxiety and YRT- premenstrual distress. There was significant weak negative correlation between the YRT - depression. In the posttest II there were significant (p <0.01) weak negative correlations between YRT-state-anxiety and YRT - trait anxiety. There was highly significant moderate negative correlation between the YRT – depression and YRT- premenstrual distress. This clearly shows that yoga practice leads to a significant alleviation of state anxiety, trait anxiety, depression and premenstrual distress level of the practitioner. The results are in agreement with those reported in Shashi, Chawla, Dhar,and Katiyar. (1991), Gupta & Gupta (2006), Gupta, Khera, Vempati, Sharma, and Bijalani (2006) and Jadhav and Havalappanavar (2007) which also reported a decrease in state anxiety level significant at P<0.001 level as a result of yoga practice. Kaliappan and Shanmugam (1982) and Venkatesh et al. (1994) found significant reduction in state anxiety level at P<0.05 level. Shashi, Chawla, Dhar, and Katiyar (1991); Gupta & Gupta (2006); Gupta et al., (2006); Jadhav and Havalappanavar (2007); Kaliappan and Shanmugam (1982) and Venkatesh et al. (1994) observed a reduction in trait anxiety level at P<0.05 level due to the practice of yoga. Similarly Dvivedi, Mahajan, Mittal and Singhal (2008) found that 61-point yoga relaxation technique to be effective in providing relief from PMS.

The third objective of the study was to associate selected background variables (age, BMI, class performance, exercise, age at menarche, menstrual duration, menstrual flow, pain during menstruation and place of residence) with premenstrual syndrome among adolescent girls.

The association between selected background variables and tri - indicators of adolescent girls with premenstrual syndrome in the study and the control group was
determined through Chi square test and ANOVA. A significant association existed for BMI, class performance, place of residence at p< 0.01 level and menstrual duration at p< 0.05 with posttest I premenstrual distress among adolescent girls in the study group (Table 40). The study findings were consistent with the results of other researchers. Megan Moreno (2009) found that women with a body mass index (BMI) of 30 or above were nearly 3 times more likely to have PMS than women who were not obese. Ray, Mishra, Roy and Das (2010) stated that the rural and urban adolescents differed significantly (p<0.05) with respect to age at menarche, skipped and irregular cycles, premenstrual syndrome, duration of menstrual discharge. Wong and Khoo (2010) investigated 1092 multi – racial Asian adolescents from 94 schools on physical and emotional well being of their reproductive health. The result revealed that 80.7 and 83.6 % of the participants experienced one or more affective and somatic symptoms respectively in the pre menstrual phase. The effect of functional impairment and quality of life, in order of importance, included poor class concentration, restriction of social and recreational activities, difficulty to mingle with friends, and poor class performance. Despite the evident impact, only 10.3% of the adolescent girls knew about their condition.

Significant association existed between (Table 38) the posttest I knowledge on PMS and class performance, menstrual duration, place of residence and menstrual flow at p< 0.01 among adolescent girls in the study group. Similarly significant association (Table 39) of posttest I knowledge on PMS with frequent class missing during menstruation, habit of exercise, pain during menstruation at p< 0.05, BMI, menstrual flow at p< 0.01 and menstrual duration, at p< 0.001 existed among adolescent girls in the control group.
State anxiety had association (Table 42) with BMI, menstrual duration at p< 0.01 level and age at p< 0.001 level among adolescent girls in the study group. Table 43 depicted a significant association of state anxiety with place of residence at p< 0.01 level and pain during menstruation at p< 0.05 level among adolescent girls in the control group. These findings were consistent with the study done by Bijan Moghimidehkordi et al. (2007) on associations between obesity and perceived depression, anxiety and stress. The result revealed that the prevalence of perceived depression, anxiety, and stress were higher in women. A higher proportion of underweight and obesity was observed in women. Being underweight, overweight and obese were associated with a one to four-fold increased risk for perceived depression, anxiety and stress.

Association existed between the posttest I depression and menstrual duration and habit of exercise at p< 0.01 among adolescent girls in the study group (Table 46). Table 47 exhibited association between the posttest I depression and BMI, habit of exercise at p< 0.01 and frequent class missing during menstruation at p< 0.05 among adolescent girls in the control group. Consistent with this, Roca et al. (2003) stated that physical activity may also have an impact on the HPA axis by reducing cortisol levels through a modification to psychological or behavioral reaction to stress. One of the studies found that women with daily stress and suffering from PMS had higher levels of cortisol than control subjects while another study found that women who experienced more stress on a day-to-day basis (and thus had higher cortisol levels) had more frequent and severe PMS. Other studies have found that physical activity may affect the hypothalamic-pituitary-gonadal (HPG) axis causing a decrease to estrogen and progesterone levels, resulting in fewer menstrual symptoms (Daley, 2009).
As mentioned above in this study cross tabulation (χ^2) result showed that premenstrual distress had association with habit of exercise among the control group’s adolescent girls. This result was further substantiated by the multiple linear regressions. Table 49 projected that the linear combination of the six variables (age, BMI, class performance, class missing during menstruation, habit of exercise and pain during menstruation) had moderate linear relationship to the dependent variable (premenstrual distress) among adolescent girls in the control group, R squared = .418, adjusted R squared = .395, F = 18.30, P= .000. An estimated 41.8% of variance of the background variables could be accounted for the linear combination of predictors, age, BMI, class performance, class missing during menstruation, habit of exercise and pain during menstruation. Slopes for age and pain during menstruation were positive and slopes for class performance, BMI, class missing, and habit of exercise were negative.

Regression analysis of posttest I state anxiety (Table 54) with selected background variable indicated that the linear combination of the six independent variables (age, BMI, class performance, class missing during menstruation, habit of exercise and pain during menstruation) had moderate linear relationship to the dependent variable (state anxiety), R squared = .307, adjusted R squared = .278. An estimated 30.7% of variance of the background variables could be accounted for the linear combination of predictors, age, BMI, class performance, class missing during menstruation, habit of exercise and pain during menstruation. Four measures of predictor’s age, class performance, habit of exercise and pain during menstruation were most strongly related to state anxiety. Slopes for BMI, class performance and habit of exercise were negative and slopes for age, class missing, and pain during menstruation were positive.
The researcher believe that one of the most important gifts we can give someone with chronic health conditions are the tools to reduce their symptoms showing them how to create better health each day. The researcher’s passion has driven her commitment to prepare information booklet titled “the easy way to feel good” to provide self-help health tools that allow real-time feedback for adolescent girls. Information booklet shows exactly what choices in foods, treatments and lifestyle affect the increase or decrease in their symptoms. This information gives them invaluable knowledge that can help them reduce their symptoms, creating life-changing results for adolescent girls with PMS.

The subjects who practised CBNS felt that they have learnt a skill in the form of YRT that can be used in stressful situations to become relaxed and for better management of stress. They experienced that the yoga program helped in decreasing nervousness, tensions, depression, downheartedness, hopelessness, illness and bodily disorders. They felt happy, satisfied, cheerful and lighthearted. They experienced a new outlook of life. Furthermore, it could be that the energy was used to handle the feelings and emotions that they previously suppressed. In this present study, physical, psychological and cognitive improvement in subjects with PMS, secondary to implementation of CBNS appears to have the potential to generate positive effects on wellbeing.

This discussion concludes that CBNS could be used as nursing intervention for adolescent girls with premenstrual syndrome in the outpatient units, and inpatient units of various hospitals, community centers, schools and in the community at large by nursing staff, community health nurses, school health nurses and student nurses. This intervention could be implemented for normal adolescent girls and who is in prepubertal phase as well as to the women in general.
Strengths of the study

Most of the studies on PMS prevalence in India have been conducted as a retrospective record to gather premenstrual symptoms. As a consequence a bias of report could be found with higher symptom occurrence, intensity and prevalence of PMS, to decrease this problem a prospective daily record system has been used in this study.

The study was a challenging process throughout. The study sample were fairly large in number (N=320), allowing the study to be generalized to the ninth and eleventh grade adolescents girls.

Yoga relaxation technique was given in eight steps involving both mind and body application. The session of group YRT practice continued for a period of two months under the researcher’s guidance. The duration and pattern of practice used for the study was an added strength.

Menstrual problems were rarely considered for health deviations. This study was done on PMS among adolescent girls which had been an unexplored area in the particular setting, this was an added strength to the study. The study allowed the adolescent girls to interact freely among the group member and community health nurse (researcher) regarding reproductive health issues, which was more a ventilating strategy in helping her to identify the reproductive problems and to seek health care services. More than 6% of adolescent girls were identified to have reproductive tract infection in this study.

Interactive Teaching - Learning Session focusing on lifestyle measures for managing premenstrual syndrome that would have helped the adolescent girls to select management strategies based on individual needs. Theory based skill intervention was another strength to the study. Anecdotally, a few participants in this
studycommented to theresearcher on their perceived value of the yoga relaxation therapy. Most participants said that they felt “incredibly relaxed” after completing the exercise and planned to continue. Another participant reported that she had taught her elder sisters and friends so that they could also do the exercise during their menstrual cycles. Most of the participants felt this will be useful during exam time.

Limitation of the study

The study was limited to school adolescent girls, which is not guidance to other adolescent girls. To perform prospective daily record, daily symptom dairy was used as the assessment tool, the instrument has 47 symptoms, and the numerous number of the item to record in daily symptom dairy seemed to be a burden for the participants.

Participants were limited to 9th or 11th standard students so it could not be representative of adolescent age which included only 14 to 18 years old.

A further possible limitation stems from the subjective definition of depression and PMD in this study, with subjects rating themselves as “distressed” used for recruitment. However, the primary purpose of this study was to evaluate the effects of CBNS on one of the greatly featured benefits to the adolescent girls, namely stress reduction and empowerment.

Measurement of psychological phenomena is complex and difficult. Yet, the baseline values for anxiety and depression in our participants were all above the population based mean (Andreas Michalsen et al., 2005; Jadhav and Havalappanavar 2009), thus confirming that our population studied was in fact distressed. Because emotional distress and even mild elevations of depressive symptoms have been associated with adverse outcomes, our findings raise the possibility that the health benefits of CBNS might be clinically meaningful.