6.1 Summary

Stress, worries and anxiety are experienced by more than 50% of pregnant women; it involves risk to both mother and fetus and increases the risk of postpartum depression. Although sex hormones are poised to have an anxiolytic effect (progesterone via $\gamma$-aminobutyric acid enhancement and attenuation of the noradrenergic response to stress, and estrogen via direct effect on the serotonergic system), anxiety symptoms may be exacerbated by pregnancy. In addition to genetic susceptibility and increased vulnerability to hormonal flux, the role transitions and social expectations are key factors in the development of antenatal anxiety. They may awaken painful memories, even in women without a history of anxiety.

Untreated, significant and ongoing antenatal anxiety exposes the fetus to excess glucocorticoids, which may influence the fetus’s susceptibility to enduring neuroendocrine changes. This fetal programming is believed to be mediated by cortisol binding to promote regions of genes, which influences their expression. The effects on stress-related behavior, emotions, and cognitive abilities in adult life along with other associated risks include preterm labor, low birth weight, and lower APGAR scores. Screening and treatment for antenatal anxiety can reduce these risks. So the investigator wanted to assess the efficacy of progressive muscle relaxation on stress, anxiety and pregnancy outcome among primigravidae at a selected hospital in Chennai.
The objectives of the study were to

- Evaluate the efficacy of progressive muscle relaxation on stress and anxiety among primigravidae
- Evaluate the efficacy of progressive muscle relaxation on pregnancy outcome among primigravidae
- Identify the relationship between stress and anxiety with pregnancy outcome among primigravidae
- Associate the selected background variables with stress and anxiety among primigravidae

The formulated hypotheses were

\( H_1 \): There is a significant difference in the level of stress among primigravidae who practice progressive muscle relaxation than those who do not.

\( H_2 \): There is a significant difference in the level of anxiety among primigravidae who practice progressive muscle relaxation than those who do not.

\( H_3 \): There is a significant difference in gestational age at birth among primigravidae who practice progressive muscle relaxation than those who do not.

\( H_4 \): There is a significant difference in mode of delivery among primigravidae who practice progressive muscle relaxation than those who do not.

\( H_5 \): There is a significant difference in APGAR score of the newborn of primigravidae who practice progressive muscle relaxation than those who do not.

\( H_6 \): There is a significant difference in birth weight of the newborn of primigravidae who practice progressive muscle relaxation than those who do not.
H₇: There is a significant difference in the occurrence of postpartum depression among primiparous mothers who practice progressive muscle relaxation than those who do not.

The assumptions of the study were

- Pregnancy is maturational crisis
- Individual is a biopsychosocial being in constant interaction with a changing environment
- Primigravida experiences mood disturbance
- Stress is cumulative which endangers the health of the mother and fetus
- Individual is viewed as holistic adaptive system
- Relaxation enhances the sense of well being

Related literature were reviewed and grouped under each category. Conceptual framework was based on Callista L.Roy’s adaptation model (1976).

The research design adopted for this study was randomized controlled trial. Video on progressive muscle relaxation was prepared by the investigator on consultation with experts. It consisted of impact of stress and anxiety on pregnancy, meaning, benefits of progressive muscle relaxation during pregnancy and steps of progressive muscle relaxation. It was explained through video and demonstrated by the investigator on one-to-one basis for a duration of 20-25 minutes for two consecutive days, a audio cassette/CD was issued to all primigravidae followed that primigravidae and were encouraged to have self practice at home with the help of audio cassette/CD daily once. A weekly reinforcement was given through the phone, a direct reinforcement was given
when they visited the antenatal clinic and encouraged maintain the daily performance dairy.

The study was conducted after getting approval from ethical committee. The setting was Sri Ramachandra hospital. The investigator got permission from the head of the department of obstetrics and gynecology. The researcher introduced herself to the participants and obtained the informed consent from those who met the inclusion criteria. Through block randomization participants were allotted to either the study or the control groups. The sample size was 250 (125 in the study and 125 in the control group). A pretest was conducted on all primigravidae at 21-22 weeks of gestation for background variables, level of stress and anxiety for study and the control groups. The tool used had 9 parts

Part I- Background variables includes the demographic and socio-psychoeconomic variable

Part II- Stress scale based on Calvin Hobel pregnancy specific stress

Part III- Anxiety by state and trait anxiety inventory By Spielberger C.D

Part IV- Pregnancy outcome

Part V- Maternal complications

Part VI- Foetus/ newborn complications

Part VII- Postpartum depression scale by Edinburgh Postpartum depression scale

Part VIII- PMR performance check list
Part IX- Daily practice dairy

The instrument was validated by experts and reliability was checked by test – retest and interrator observation method. A pilot study was conducted with 15% of proposed sample size and modifications were done based on the pilot study report and experts recommendations.

The posttest was conducted at 31-32 weeks of gestation after a period of 10 weeks of intervention. A follow up posttest at delivery was done to get the data regarding gestational age at birth, mode of delivery, APGAR score, birth weight of newborn, maternal and foetus/newborn complications, follow up posttest at 6 weeks of postpartum to assess the postpartum depression. Then one session of video assisted teaching was shown to the control group.

Findings of the study

The chi square revealed homogeneity between the study and the control groups with regard to the background variable except abuse (0.001**), the substance abuse by spouse (0.000***) and economic dependency (0.070*)

Stress

• Comparison of the level of stress among primigravidae in the pretest, 48 (38.4%) in the study group and 53 (42.45) in the control group had mild stress. 77 (61.6) in the study group and 72(57.6) in the control group had moderate stress. No significant difference was found between groups on stress. In the posttest, 51 (41.6%) in the study group and 19 (15.2) in the control group had mild stress, 67 (54.4) in the
study group and 71 (56.8) in the control group had moderate stress and 5 (4.0) in the study group and 35 (28.0) in the control group had severe stress. The groups had a significant difference exhibited by chi square value of 24.81 with \( p < 0.001 \).

- The pretest stress score of the study group was 49.47 with a SD of 8.94 and the control group had 48.38 with a SD of 8.65 which revealed absence of statistical significance in the stress score between groups.

- The posttest mean score of stress for the study group was 40.52 with a SD 8.61 and the control group had a mean score of 77.56 with a SD 8.89. There was a highly significant reduction in all the aspects of stress among the study group than the control group at \( p < 0.001 \).

- The mean difference of stress was 8.95 with a SD 2.70 and 29.18 with a SD 3.88 for the study and the control groups respectively. There was a highly significant reduction in the mean difference of the stress between the study and the control groups at the level of \( p < 0.001 \).

**Anxiety**

- Comparison of the level of state anxiety in the pretest, 36 (28.8%) in the study group and 41(32.8%) in the control group had mild anxiety. 89 (70.2%) in the study group and 84(67.2%) in the control group had moderate anxiety. No significant difference was found between groups on state anxiety. In the posttest, 22 (17.9%) in the study group and 9(7.2%) in the control group had mild anxiety, 97 (78.9%) in the study group and 84 (67.2%) in the control group had moderate anxiety and 4 (3.2%) in the study group and 32 (25.6%) in the control group had
severe anxiety. The groups had a significant difference exhibited by chi square value of 17.80 with p<0.001.

• The level of trait anxiety among primigravidae in the study and the control groups during pretest and posttest revealed that in the pretest, 39 (31.2%) from the study group and 43 (34.4%) in the control group had mild anxiety. 86 (68.8%) in the study group and 82 (65.6%) in the control group had moderate anxiety. No significant difference was found between groups on trait anxiety. In the posttest, 24 (19.5%) in the study group and 10 (8.0%) in the control group had mild anxiety, 95 (77.3%) from the study group and 83 (66.4%) in the control group had moderate anxiety and 4 (3.2%) in the study group and 32 (25.6%) in the control group had severe anxiety. The groups had a significant difference exhibited by chi square value of 18.60 with p<0.001.

• The overall anxiety among primigravidae in the study and the control groups during pretest and posttest revealed that in the pretest, 38 (30.4%) in the study group and 44 (35.2%) in the control group had mild anxiety. 87 (69.6%) in the study group and 81 (64.8) in the control group had moderate anxiety. No significant difference was found between groups on overall anxiety. In the posttest, 26 (21.1%) from the study group and 11 (8.8%) from the control group had mild anxiety, 93 (75.6%) in the study group and 82 (65.6%) in the control group had moderate anxiety and 4 (3.2%) in the study group and 32 (25.6%) in the control group had severe anxiety. The groups had a significant difference exhibited by chi square value of 19.80 with p<0.001.
• The mean difference of anxiety between the study and the control groups revealed that the pretest to posttest mean difference in the state anxiety for the study group was 2.13 with a SD 6.79 and for the control group it was 10.24 with a SD 8.83 which revealed that there was a significant decrease in state anxiety for the study group at p<0.001. The pretest to posttest the mean difference in the trait anxiety for the study group was 1.18 with a SD 6.02 and for the control group it was 2.96 with a SD 6.31 and the pretest to posttest mean difference of overall anxiety for study group was 1.66 with a SD 6.35 and for the control group it was 6.61 with a SD 7.23 which revealed that there was a significant decrease in overall anxiety for the study group at p<0.001

Pregnancy outcome

• Regarding gestational age at birth, 108 (88.5%) in the study group and 98 (79.7%) in the control group delivered after 37 weeks and 14 (11.5%) in the study group and 25 (20.3%) in the control group delivered before 37 weeks. The mean weeks of gestational age at birth was 38 with a SD 3.6 for the study group and 37.2 with a SD 4.2 for the control group which revealed that there was a statistical significant difference in the gestational age at delivery between the study and the control groups at p<0.05.

• With regard to mode of delivery, 90 (74.2%) in the study group and 61 (49.6%) in the control group had normal vaginal delivery, 27 (21.8%) in the study group and 50 (40.7%) in the control group had a caesarean section, between the study and the control group there was a statistical significance in the mode of delivery at P<0.001.
• In relation to **APGAR score** of newborn between the study and control group among primigravidae. 120(98.3%) in the study group and 110(89.4%) in the control group had APGAR score of 7-10 score. 2 (1.7%) in the study group and 10 (8.2%) in the control group had APGAR of 4-6, none of the babies in the study group and 3 (2.4%) in the control group had APGAR score of 0-3. There was no statistical difference between the study and the control groups. The mean APGAR score was 8.3 with a SD 0.2 for the study group and 8.0 with a SD 0.6 for the control group. This revealed no statistical different between the groups.

• The **birth weight of newborn**, between the study and the control groups revealed that 76 (62.3%) the study group of the newborn had birth weight between 2.5-2.9 kg against 56 (45.5%) in the control group. The mean birth weight was 2.71 kg with a SD 0.39 for the study group and 2.59 with a SD of 0.54 for the control group. There was a statistically significant difference at the level of P<0.01.

• There is an increased occurrence of all **maternal complications** among the control group in comparison with the study group. A statistically significant difference was found in the occurrence of PIH, GDM, induced labor and delayed wound healing at p<0.05 and anemia at p<0.01 among control group than the study group.

• Comparison of maternal complications with the level of anxiety between the study and the control groups showed an increased occurrence of all maternal complications among the control group in comparison with the study group. But no statistical significant difference was found in the occurrence of complications between the control group and the study group.
• Comparison of the foetal/newborn complications between the study and the control group revealed an increased occurrence of all foetal/neonatal complications among the control group in comparison with the study group. There is a statistical significant difference in the occurrence of birth asphyxia and jaundice p <0.05 and neonatal respiratory distress at p<0.01 among the control group than the study group.

• Comparison of foetus/newborn complications with level of anxiety between the study and control groups showed an increased occurrence of all foetal/neonatal complications among the participants of the control group in comparison with the study group. There was no statistically significant difference found between the study and the control groups.

• The mean percentage of the maternal complications for the study group was 3.80 with a SD of 5.86 and for the control group it was 8.77 with a SD of 9.23 which was statistically significant at the P <0.001. With regard to foetal/newborn complications the mean percentage of the complication was 1.93 with a SD of 4.35 for the study group and it was 7.15 with a SD of 10.95 for the control group which was statistically at the p <0.001. The overall complications between the study and the control group was statistically significant at the p <0.001.

• Postpartum depression among primimothers of the study and the control group showed that 8 (7%) of the study group participants had post partum depression and 24 (20%) of the control group participant had post partum depression.
• The mean score of post partum depression for the study group was 6.9 with a SD. of 2.45 and for the control group it was 10.54 with a SD. of 2.71. There was a statistically significant difference in mean value at the level of p<0.001.

• The frequency and percentage distribution of **PMR performance** among primigravidae in the study group showed that 100% of the participants followed core guidelines in both post assessment I & II. 92% participants in the post assessment I and 94% in post assessment II followed core and pre requisite guidelines. 8% participants in the post assessment I and 7% participants in the post assessment II followed core and not followed pre requisite guidelines.

**Correlation**

• There was a positive correlation between stress and state anxiety, trait anxiety, post partum depression. A negative correlation between stress and Gestational age at birth and birth weight.

• There was a strong negative correlation between PMR and stress and PMR and state anxiety at p<0.001, and moderate negative correlation between PMR and post partum depression at p<0.01 and PMR and trait anxiety p<0.05 and moderate positive correlation between PMR and birth weight P<0.01 and PMR and gestational age at birth at p<0.05.

**Association with background variables**

**Study group**

There was association found between

• Pretest stress and age at p<0.05 and source of health information at p<0.001
• Pretest stress and social support from husband at p<0.05, physical abuse and economical commitment p<0.01 and alcohol use p<0.001 at p<0.01.

• Posttest stress and age at p<0.05 and source of health information at p<0.01.

• Posttest stress and social support from husband at p<0.05, physical abuse and economical commitment p<0.01 and alcohol use p<0.001.

• Pretest state anxiety and type of family at p<0.05 and source of health information at p<0.01.

• Pretest state anxiety and social support from husband at p<0.05 physical abuse and economical dependency p<0.01 and alcohol use at p<0.001.

• Pretest trait anxiety and education and nature of work at p<0.01 and source of health information at p<0.001 level.

• Pretest trait and physical abuse and economical commitment at p<0.01 and alcohol use p<0.001.

• Posttest state anxiety and source of health information at p<0.001.

• Posttest state anxiety and social support from husband at p<0.05, physical abuse at p<0.01 and alcohol use p<0.001.

• Posttest trait anxiety and source of health information at p<0.001.

• Posttest trait anxiety and physical abuse and economical commitment at p<0.01 and alcohol use p<0.05.

Control Group

• Pretest stress and source of health information at p < 0.01.

• Pretest stress anxiety and verbal abuse at p<0.01 and economical commitment p<0.001.

• Pretest state anxiety and source of health information at p<0.001,
• Pretest state anxiety and some to have trust and economical dependency at p<0.001 and physical abuse and alcohol use at p<0.01.

• Pretest trait anxiety and source of health information at p<0.001 and type of family at p<0.05,

• Pretest trait anxiety and family support p<0.01 and some to have trust, sexual abuse at p<0.05

• Posttest stress and source of health information at p<0.01, Posttest stress and verbal abuse at p<0.01

• Posttest trait anxiety and income at p<0.05 and source of health information at p<0.001, posttest trait anxiety and sexual abuse at p<0.001.

6.2 Conclusion

The study suggests that the progressive muscle relaxation practices is useful during pregnancy by decreasing stress, anxiety and improving the pregnancy outcome in terms of gestational age at birth, mode of delivery, birth weight and reducing the occurrence of post partum complications.

6.3 Implications of the study

Some of the implications derived from the present study could be applied in various fields like practice, education, administration and research.

6.3.1 Nursing practice

• Antenatal mothers need to have routine screening for psychological morbidities such as stress and anxiety and execute management strategies by specialist nurse.
• Implementing the relaxation techniques regularly enhances the mental health of both the mother and foetus.

• Antenatal mothers are able to practice this relaxation with encouragement, education and assistance from nurses.

• Nurses can conduct awareness programs regarding the benefits of relaxation techniques in reducing stress and anxiety at various settings such as hospitals and community.

• Progressive muscle relaxation brings a definite reduction in the level of stress and anxiety. As a nurse, this message should be echoed in the clinical and community setting.

• Nurses in the clinical setting play a vital role in disseminating evidence-based complementary alternative medicine (CAM) practices to help women teach one-to-one basis to lead a healthy environment and reduce psychological morbidities.

• The present study strongly suggested with adequate literature support and the PMR improves the sense of wellbeing of the antenatal women and foetus

6.3.2 Nursing Education

• Continuing nursing education programs can be conducted to enhance nurses’ knowledge and skills in providing competent care for those women who experience anxiety for various causes at hospitals and in community settings.

• Nursing students may be involved to give education on relaxation techniques.

• Nurse educators should create plans for ample opportunities for their students to practice and bring awareness about progressive muscle relaxation to the clinical
and community settings. CAM is not only helping the particular age group but it is applicable for all age groups of population existing in this world.

### 6.3.3 Nursing administration

- The administrator can communicate these findings to nurses and they can incorporate this in daily patient care. The administrator can motivate the nurses to attend classes on relaxation techniques.

- Nurse administrator should integrate complimentary therapies in managing psychological morbidity at different levels of prevention in various areas of health care delivery system. It should be placed in policies and protocols to ensure uniform practice by health care team members.

- The administrator should encourage research activities on CAM in the clinical and community areas, to provide physical facilities to practice progressive muscle relaxation for the patients, family members and care team members.

- Nurse Managers can keep up their team members to conduct health education program on PMR in the inpatient and outpatient department in the clinical setting. Also organize mass health awareness program, rally, and camps on meditation to propagate it in the community settings.

### 6.3.4 Nursing Research

- Practice emerges from research. Evidence based practice improves the quality of nursing care. Research adds value to the comprehensive and holistic care.

- Nurses can be motivated and encouraged by the nursing educators and administrators to conduct research and take up projects that utilize various therapies to overcome stress and anxiety.
• Nurse can be motivated to bring innovative ideas on clinical research by inculcating various complimentary therapies in patient care. Nurses should be encouraged to participate in the research activities through evidence based nursing practice to bring laurel to the nursing profession.

• Nurses can be motivated by granting of funds towards conduction of research and offering awards and rewards for their work

6.4 Recommendations for further research studies

The findings of the study help to develop further recommendations as follows:

• Comparative study to assess efficacy of the intervention between normal mothers and high risk mothers using Roy’s adaptation model.

• Studies may be replicated in other settings especially community areas

• Biochemical markers can be used to assess stress and anxiety on efficacy of the intervention

• A similar study on primigravidae can be conducted at different gestational weeks

• A comparative study can be done between muscle relaxation therapy and some other complementary and alternative therapies

• Longitudinal follow up study can be done to assess the efficacy of the intervention.

• Transcultural studies can be done to assess the stress and anxiety and efficacy of various intervention.

• Knowledge, practice and attitude about PMR among other health care team members can be studied.