6.1 SUMMARY

Approximately a quarter of a billion people undergo surgery every year, hoping that operation will prevent symptoms, cure diseases and improve the quality of life. But the surgery process produces many complications such as tissue injury, hypoxia, acute postoperative pain, and other psychological factors that further impair the quality of life.

The drugs used to treat such consequences may produce side effects. All these factors further interfere the postoperative recovery, hence the investigator has made an attempt to reduce the acute postoperative pain, anxiety and improve the quality of life by introducing an CAM therapy, foot reflex therapy which is very simple to administer. Based on the statement of the problem,” Effectiveness of Foot Reflex Therapy on postoperative pain, anxiety and quality of life of patients subjected to major abdominal surgery”. The following objectives were formulated:

1. To determine the effectiveness of foot reflex therapy on pain among patients subjected to major abdominal surgery.
2. To determine the effectiveness of foot reflex therapy on anxiety among patients subjected to major abdominal surgery.
3. To determine the effectiveness of foot reflex therapy on Quality of Life among patients subjected to major abdominal surgery.
4. Correlate pain and anxiety with Quality of Life.
5. Associate pain, anxiety and Quality of Life with specific background variables

The researcher predicted the answers for the research questions which were formulated and it was framed in the form of hypotheses. They were,

**H1.** There will be a significant difference in pain score of patients who receive Foot Reflex therapy than those who do not.

**H2.** There will be a significant difference in the level of anxiety of patients who receive Foot Reflex therapy than those who do not.

**H3.** There will be a significant difference in the Quality of Life of patients who receive Foot Reflex therapy than those who do not.

**H4.** There will be a significant change in pulse rate of patients who receive Foot Reflex Therapy than those who do not.

**H5.** There will be a significant change in Respiration rate of patients who receive Foot Reflex Therapy than those who do not.

**H6.** There will be a significant change in systolic Blood Pressure of patients who receive Foot Reflex Therapy than those who do not.

**H7.** There will be a significant change in diastolic Blood Pressure of patients who receive Foot Reflex Therapy than those who do not.

**H8.** There will be a significant change in Oxygen saturation of patients who receive Foot Reflex Therapy than those who do not.
Assumptions

• Early intervention for acute post operative pain enhances the post operative recovery.
• Hospitalization and surgery create some degree of anxiety.
• Abdominal surgery impairs the quality of life.
• Foot Reflex therapy promotes mental well-being and thereby improves Quality of Life.

The sample comprised of 360, with 180 in the study group and 180 in the control group who were subjected to major abdominal surgery under general /spinal anesthesia and admitted in male and female surgical wards of Sri Ramachandra Medical College Hospital and Research Institute, Porur, Chennai during the time period of 2012 March to 2013 May. The patients who met the inclusion criteria were allotted to the study and the control groups using block randomization. The study group received routine care along with Foot Reflex Therapy from the first post operative day to the fifth post operative day by the investigator. Foot Reflex Therapy steps were demonstrated to the patient’s caregiver on the first postoperative day and a return demo was done on the fifth post operative day and the skill was assessed with performance check list. Further, a Foot Reflex Therapy hand book was handed over to the patient’s caregiver along with home performance assessment diary. They were instructed to continue the therapy at home from the day of discharge to the 21st post operative day, weekly thrice.

The study instruments consisted of socio demographic variables, clinical variables and pain was assessed by Visual Analog Scale(VAS) scale, Anxiety by
Charles D. Spielberger State Trait Anxiety Inventory (1991) and Quality of Life was measured by WHO BREF QOL scale.

The research assistant collected the data from the study and the control groups, the investigator implemented FRT for the study group along with the routine care for 30 minutes and post assessment done by the research assistant from the first post operative day to the fifth post operative day. On the fifth post operative day FRT was taught to the patient’s caregivers and a hand book on FRT was handed over to the patient’s caregivers. On the 21st post operative day a post test on quality of life was carried out.

6.2 MAJOR FINDINGS OF THE STUDY

With regard to socio demographic variables age, gender, occupation, monthly income, type of family and marital status were found to have homogeneity between the study and the control groups. Many of them in the study group, 99(55%) were high school qualified and in the control group, 57(31.7%) were of higher secondary education. With regard to occupation, 124(68.8%) in the study group and 121(67.2%) in the control group, were unskilled workers.90(50%) in the study and 103(57.2%) in the control group had a monthly income between Rs.2,936-Rs.7,322. With regard to marital status,155(86.1%) in the study and 149(82.8%) in the control group were married.122(67.8%) in the study and 141(78.3%) in the control group had a normal BMI.68(37.77%) in the study group and 72 (40%) in the control group had underwent inguinal hernioplasty surgery and 90(50.09%) from the study group and 80(44%) from the control group had no co-morbidity.
Pain

Level of pain

- On day 1, majority of the samples, 84 (46.7%) in the study group and 139 (41.68%) in the control group had severe pain. 92 (51.1%) in the study and 40 (56.66%) in the control group had moderate level of pain. 4 (2.2%) in the study and 1 (0.66%) in the control had reported mild pain. All of them reported pain during pretest. The p value indicated homogeneity between the groups. During post test majority of the study group's samples, 135 (75%) reported moderate pain whereas in the control group, 117 (65%) of them reported severe pain. The level of severe pain had reduced 28.88% in the study group whereas in the control group, the level of reduction was only 12.22%.

- On day 2, in the study group, 64 (35.6%) and 70 (38.9%) in the control group reported severe pain during pretest. Majority of the samples, 91 (50.6%) in the study and 119 (66.1%) in the control group reported moderate pain during posttest. The level of severity of pain was reduced to 34.5% in the study group whereas in the control group the level of reduction was only 13.9%.

- On day 3, in the pretest, none of them reported severe pain in the study group whereas in the control group, 13 (7.3%) had severe pain and during posttest in the study group none of them reported severe pain and majority of the samples, 130 (72.2%) reported mild level of pain whereas in the control group, 12 (6.7%) of them had severe and 98 (54.7%) of them had mild pain.

- On day 4, majority of the samples, 88 (48.9%) in the study group and 107 (60.1%) in the control group reported mild pain whereas in the posttest 116 (64.4%) in the study group and 74 (41.6%) in the control group reported
mild pain and majority of the samples, 58(32.2%) shifted to no pain in the study group whereas in the control only 13(7.3%) had a change.

- On day 5, during pretest, 92(51.1%) of the study group 59(33.1%) of the control group reported no pain and 88(48.9%) in the study and 77(43.1%) in the control had mild pain. During posttest in the study group, 146(81.1%) had no pain and 30(16.6%) had mild pain whereas in the control group 32(17.8%) were with moderate and 65(36.11%) reported mild pain.

Mean score of pain

- On day 1, in the study group, the mean score of pain during pretest was 6.23 with the SD of 1.36 and in the control group, the mean score was 4.05 with SD of 2.30. The mean score of pain had reduced during posttest with the MD score of 0.28. which was significant at p<0.001 level.

- On day 2, the mean score of pain during pre and post tests were 5.87 and 3.36 with the SD of 1.11 and 1.51. The MD score was 2.51 and it was statistically significant at p<0.001 level.

- On day 3, the mean score of pain during pre and post test were 2.88 and 1.72 with the SD of 1.42 and 1.25. The MD score was 1.16 and it was statistically significant at p<0.001 level.

- On day 4, the mean score of pain during pre and post tests were 3.33 and 1.27 with SD of 1.53 and 1.12. The MD score was 2.05 which was statistically significant at p<0.001 level.

- On day 5, the mean score of pain during pre and post tests were 0.66 and 0.03 with the SD of 0.79 and 0.32. The MD score was 0.62 which was statistically significant at p<0.000 level.
Anxiety

- Comparison of the level of state anxiety mean score among patients during pretest in the study group shows that 13(7.22%) were in normal, 160(89%) were with mild and 7(3.88%) had moderate anxiety whereas in the control group 16(8.88%) were with normal, 164(91.1%) had mild and none of them were with moderate level of anxiety. During posttest conducted on the fifth post operative day, 180(100%) in the study group were in normal status and none of them were with mild or moderate anxiety. In the control, 136(75.55%) were in normal and 44(24.44%) were with mild anxiety. It was significant at p<0.05 level.

- The mean anxiety score in the study group was 7.92 with SD of 8.88 whereas in the control group, the mean score was 1.81 with SD of 10.21(p=0.041) and it was significant at p<0.05 level. There was significant difference observed in mean score and mean difference score of anxiety between the groups and within the groups. Hence H2 hypothesis, "there is a significant difference in anxiety score of patients who receive Foot Reflex therapy than those who do not” was accepted.

Quality of Life

- The pretest and posttest mean score with SD of physical dimension in the study group was 43.67 with SD of 9.70 and 51.02 with 10.77. The mean difference score was 7.35 and it was statistically significant at p<0.001 level.
With regard to psychological dimension the pre and posttest mean score was 43.60 with SD of 13.06 and 71.03 with 6.66. The mean difference score was 6.4 which was statistically significant at p<0.001 level.

The social dimension pre and posttest mean score was 52.96 with SD of 11.51 and 64.57 with SD of 7.51. The mean difference score was 4 which was statistically significant at p<0.001 level.

With regard to the level of independence the pre and post test score was 47.41 with SD of 18.39 and 76.18 with SD of 9.17 and the mean difference score was 9.22. It was statistically significant at p<0.001 level.

The mean difference score of physical dimension in the study and the control groups were 7.32 and 5.27, respectively. The mean difference score was higher in the study group than the control group. With regards to psychological dimension the MD scores were 27.43 and 7.65. They were statistically significant at p<0.001 level. The level of improvement was equal in social dimension and level of independent in both the groups(SG:9.3;CG :9.3 & SG:27.7;CG:27.7). The overall quality of life improvement was higher in the study group than the control group. Hence H3 hypothesis was accepted.
Pulse rate

Mean score

- The mean score of pulse rate during day 1 in the pre and posttest of the study group was 77.26 and 73.35 with SD of 3.95 and 6.45. The mean difference score was 3.91. It was statistically significant at p<0.001 level.
  - On day 2, the mean score of pulse rate was 74.30 with the SD of 3.20 in the study group whereas in the posttest, the mean score of pulse rate and SD were 74.52 and 3.90. There were no statistically significant changes found between the groups.
  - On day 3, the mean score of pulse rate was 74.82 with SD of 3.53 whereas in the posttest the mean score of pulse rate was 72.43 with SD of 2.90 and the mean difference score was 2.39. Which was statistically significant at p<0.001 level.
  - On day 4, the mean score of pulse rate was 72.52 with the SD of 2.80 whereas in the posttest the mean score of pulse rate was 71.46 and SD 2.41. It was statistically significant at p<0.001 level.
  - On day 5, the mean difference score of pulse rate in the study group was 74.24 with the SD of 3.51 whereas in the posttest the mean score of pulse rate was 72.11 with the SD of 2.67. It was statistically significant at p<0.001 level.

Respiration rate

- The mean difference score of respiration rate during day 1 in the study and the control group were 2.34 and 0.16 with the SD of 2.34 and 2.01. The mean
difference score was higher in the study group than the control group. It was statistically significant at p<0.001 level.

- On day 2, the mean difference score of respiration rate was 0.46 with SD of 2.82 in the study group whereas in the control group the mean difference score and SD were 0.05 and 0.99. There were statistically significant changes found between the groups at p<0.001 level.
- On day 3 the mean difference score of respiration rate was 0.45 with SD of 2.29 whereas in the control group the mean difference score was 0 with the SD of 2.29. It was statistically significant at p<0.001 level.
- On day 4 the mean difference score of respiration rate was 0.19 with the SD of 2.81 where as in the control group the mean difference and SD were 0.04 and 1.07. It was statistically significant at p<0.001 level.
- On day 5 the mean difference score of respiration rate in the study group was 0.84 with the SD of 2.74 whereas in the control group the mean difference was 0.03 with SD of 1.30. It was statistically significant at p<0.001 level.

**Systolic Blood pressure**

- On day 1, 30(16.66%) of them in the study group and 27(15%) in the control group showed high normal blood pressure during pretest whereas during post test, 24(13.33%) in the study group and 37(25.55%) in the control group showed high normal blood pressure. There was a statistically significant change found between the groups at p<0.05 level.
- On day 2 during pretest of the study group 64(35.55%) of them had high normal blood pressure and 2(1.11%) were in stage –I hypertension. During the
post test, 129(71.66%) of them were with normal blood pressure and none of them were in stage-I hypertension whereas in the control group, 3(1.66%) of them were in stage-I hypertension.

- There was a statistically significant change found between the groups at p<0.05 level

- On day 3 during pretest, 46(25.55%) of them were with high normal blood pressure and 4(2.22%) were in stage –I hypertension in the study group whereas in the control group, 53(29.44%) were with high normal and 11(6.11%) were in stage-I hypertension. During post test, 129(71.66%) were in normal blood pressure and none of them were in stage-I hypertension in the study group whereas in the control group, 3(1.66%) of them were in stage-I hypertension. There was a statistically significant change found between the groups at p<0.05 level

- On day 4 during pretest, 40(22.22%) of them were with high normal blood pressure and 2(1.11%) were in stage –I hypertension in the study group whereas in the control group, 63(35%) of them were with high normal and 7(3.88%) were in stage-I hypertension. During post test, 164(91.11%) of them were with normal blood pressure and none of them were in stage-I hypertension in the study group, in the control group 4(2.22%) of them were in stage-I hypertension. There was a statistically significant change found between the groups at p<0.000 level

- On day 5 during pretest, 175(75.55%) of them were with normal and 44(24.44%) were with high normal blood pressure in the study group whereas in the control group, 44(24.44%) of them were with high normal and 6(3.33%) were in stage-I hypertension. During post test of the study group
168(93.33%) of them were with normal blood pressure and none of them were in stage-I hypertension, whereas in the control group, 3(1.66%) of them were in stage-I hypertension. There were statistically significant changes found between the groups at p<0.000 level.

**Diastolic blood pressure**

**Level of diastolic blood pressure**

- On day 1, 26(16.66%) of them in the study group and 28(16.00%) in the control group showed high normal diastolic blood pressure during pretest whereas during post test, 2(10%) in the study group and 27(15%) in the control group showed high normal diastolic blood pressure. There was a statistically significant change found between the groups at p<0.05 level

- On day 2 during pre assessment, of the study group 20(11.12%) of them were with high normal blood pressure and none of them were in stage –I hypertension. During post test, 12(6.66%) of them were with high normal blood pressure and none of them was in stage-I hypertension whereas in the control group, 31(17.23%) of them were with high normal blood pressure and 1(0.55%) showed stage-I hypertension. During post assessment, 30(16.66%) of them were with high normal blood pressure and none of them was in stage-I hypertension. There was no statistically significant change found between the study group and the control group.

- On day 3 during pre assessment 21(11.66%) of them were with high normal blood pressure and none of them was in stage –I hypertension in the study group whereas in the control group,30(16.66%) of them were with high
normal and none of them was with stage-I hypertension. During post assessment, 20(11.12%) of them were in high normal blood pressure and none of them was in stage-I hypertension in the study group whereas in the control group 32(17.77%) of them were with high normal blood pressure. There was a statistically significant change found between the groups at p<0.05 level.

- On day 4 during pretest, 20(11.12%) of them were with high normal blood pressure and none of them was in stage –I hypertension in the study group whereas in the control group, 32(17.78%) of them were with high normal and none of them was in stage-I hypertension. During post test, 3(1.66%) of them were with high normal blood pressure and none of them was in stage-I hypertension in the study group whereas in the control group, 27(15%) of them were in stage-I hypertension. There was a statistically significant change found between the groups at p<0.01 level.

- On day 5 during preassessment, 163(90.55%) of them were normal and 17(9.45%) were in high normal blood pressure in the study group whereas in the control group 150(83.34%) of them were with high normal and 17(9.45%) were in stage-I hypertension. During post assessment, 176(97.77%) of them were with normal blood pressure and 4(2.23%) of them were with high normal blood pressure in the study group whereas in the control group, 155(86.12%) of them were in high normal blood pressure and none of them was in stage-I hypertension. There was a statistically significant change found between the groups on day 5.
Correlation

- Moderate positive correlation was found between pre and post assessment pain and pre assessment respiration
  
  - The post assessment of respiration was correlated with pretest respiration and systolic BP post test at p<0.05 level and moderate positive correlation was found between post assessment respiration and posttest pain at p<0.01 level.
  
  - Weakly negative correlation was observed between diastolic blood pressure and pulse pretest and pain post assessment at p<0.05 level
  
  - Pretest diastolic BP was correlated with systolic BP posttest and pain post assessment at p<0.01 level.
  
  - Oxygen saturation pre assessment score had moderately positive correlation with post test systolic BP and post assessment of pain score at p<0.01 level.
  
  - There was a weakly positive correlation between pretest anxiety with pre and post assessment respiration, pre and post assessment systolic blood pressure, post assessment diastolic blood pressure and posttest pain at p<0.01 and a weakly positive correlation with diastolic BP and respiration were found during pre assessment at p<0.05 level.
  
  - Correlation that existed between pulse and anxiety at p<0.05 level during post assessment, pulse and diastolic BP, pain post and pulse post assessment during posttest at p<0.001 level and negative correlation found between pain and social relationship at p<0.001 level in the study group. There was a negative correlation found on pain post assessment and pulse post assessment at p<0.001, level pain and social
relationship anxiety and quality of life of patients during pre and post intervention assessment in the study group.

**Associate pain, anxiety and Quality of Life with specific background variables**

**Pain with background variables.**

- The post assessment pain score in the study group was associated with educational status and type of surgery at p<0.001 level, sex and monthly income at p<0.05 level.
- The pre assessment respiration rate in the study group was associated with educational status at p<0.01 level, type of occupation, monthly income at p<0.05 level and marital status at p<0.001 level.
- A significant association existed between sex of the study participants and BMI at p<0.05 level during pulse rate post assessment in the study group.
- The study group's post assessment systolic blood pressure was associated with educational status, marital status, BMI, type of anaesthesia and type of surgery at p<0.05 level.
- There was a significant association found on the post assessment oxygen saturation with type of surgery at p<0.05 level.

**Conclusion**

The study findings conclude that the foot reflex therapy has more positive effect on acute postoperative pain and anxiety of patients subjected to major abdominal surgery. Patients subjected to major abdominal surgery have significant changes in physiological parameters and show some degree of anxiety and impaired quality of life. Patients those who received Foot Reflex Therapy for five days post
operatively and further continued the therapy being given by patients care givers at home have produced more significant positive effect on pain, anxiety and quality of life. Foot Reflex Therapy is an effective therapy to control acute post operative pain, anxiety and improve the quality of life of patients.

6.3 NURSING IMPLICATION

6.3.1 Nursing Service

- This study provides evidence of Foot Reflex Therapy as effective on acute post operative pain, anxiety and improve the quality of life. Pain is a first sign in all types of health problems and also common reason for patients to seek health care. The foot reflex therapy is a therapy which nurses can perform anywhere at any time without any instruments and any harmful side effects and also it enhances the nurse patients therapeutic and interpersonal relationship.

- Foot reflex therapy has proved effective on systolic and diastolic blood pressure also. So it should be recommended to the hypertensive patients to maintain normal blood pressure and it can be even taught to patients with chronic diseases to perform themselves without seeking others helps.

6.3.2 Nursing Administration

- The alternative therapies like foot reflexology are not actively implemented in clinical practice. Therefore the nursing administrators should take initiative to implement such therapies to minimize the complications due to drugs administration used to prevent the pain and anxiety.
• Special CNE programme should be organized for staff nurses to teach and train such alternative therapies in order to improve the independent role of nurses.

• The nursing administrator should organize in service education programme and continuous education programme on such alternative therapies for patients expectation.

6.3.3 Nursing Education

• Foot reflexology therapy should be included in nursing syllabus and separate theory and practical hours should be allotted to educate such therapies to the students.

• Separate master programme should be initiated in nursing field in order to develop the master of nurse in alternative therapy.

• Nurses in surgical unit who deal with pain should be trained in foot reflex therapy and it should be included as one of the pain control strategies.

6.3.4 Nursing Research

• Many literature studies support that Foot Reflexology reduce or alleviate many health problems. Clinical trials should be undertaken to find out the scientific evidence.

• Young researchers should take initiative to develop body of knowledge on Foot Reflex Therapy and mobilize the fund to find out the bio physiological changes with objective measurements.
6.4 RECOMMENDATIONS

The finding of the study helps to develop further recommendations as follows:

- Comparative study can be done among various types of surgery and anesthesia.
- Comparative study can be done using reflexology stick / hand alone
- Biochemical markers can be used to assess the efficacy of the interventions
- A similar study could be conducted with a comparison of other complementary therapy
- A similar study can be done in various settings and among different age groups and at various conditions.
- A similar study can be conducted with intervention more than 21 days and post test done after 3 months.
- A similar study can be conducted to rule out the prevalence of chronic post operative pain.
- A cross over study can be conducted to find out the efficacy of foot reflex therapy and foot massage.