CHAPTER V
DISCUSSION

Pain is the common problem for all human beings and also the prime reason for people in consulting physicians. According to studies the prevalence of acute post operative pain is 80%. The drugs used to treat the pain may produce many complications. Hence in the present study, the investigator has attempted to control the acute post operative pain with foot reflex therapy. It is a form of alternative therapy which controls the acute post operative pain and anxiety and there by improves the quality of life.

As research findings have the potential to recognize and rationalize practice, the effect of foot reflex therapy on post operative pain, anxiety and quality of life of patients subjected to major abdominal surgery were determined and discussed in this chapter based on the objectives of the study. Also the strengths and limitations of the study are discussed in this chapter.

Characteristics of the study samples

Patients who were subjected to major abdominal surgery were selected in this study based on certain inclusion and exclusion criteria. Patients with severe anxiety and those operated for the removal of malignant tumours were excluded from this study.

Descriptive analysis of the demographic variables (Table 1) indicated that majority of them, 65 (36.1%) in the study group were in the age group of 51-60 years whereas in the control group and 66 (36.6%) were from same category. 59 (32.8%) in the study group and 59 (32.8%) in the control group were aged between 41-50 years. Males and females were equally distributed. Regarding the educational status of the patients, 14 (7.7%) in the study group and 8 (4.4%) in the control group were post graduates. 16 (8.9%) in the study and 24 (13.3%) in the control group were graduates. 9 (5%) and 57 (31.7%) in the study and the control groups had completed their higher secondary education. 99 (55%) in the study group and 55 (30.6%) in the control group had high school education.42(23.3)% in
the study and 36 (20.0%) in the control group had completed primary education. Majority of the study and the control group samples had completed primary education.

Regarding occupation of the patients, 28(15.6%) of the study group and 35(19.4%) of the control group samples were housewives. 124(68.8%) in the study and 121(67.2%) in the control group were unskilled workers. 14(7.8%) in the study and 18(10%) in the control group were skilled workers. 14(7.8%) in the study and 6(3.4%) in the control group were professionals. Majority of the patients 124(68.8%) in the study and 121 (67.2%) in the control group were unskilled workers.

On analysing the total family income per month, it was found that 15 (8.3%) in the study group and 11 (6.1%) in the control group had a monthly income range of above Rs. 19,575. 75(41.7%) in the study group and 66 (36.7%) in the control group had a monthly income of Rs. 7,323 - 19574 per month. 90 (50%) in the study group and 103 (57.2%) in the control group had a monthly income of Rs. 2,936 – 7,322. This results signified that nearly half of the study participants were from lower middle class family and one fourth of them were from middle class family.

135 (75%) in the study and 136 (75.6%) in the control group were from nuclear families. 42 (23.3%) from the study group and 41 (22.7%) from the control group were from joint families and 3(1.7%) in the study 3(1.7%) in the control group were from extended families.

With regard to marital status, 155(86.1%) in the study 149(82.8%) in the control group were married. 13(7.2%) in the study and 18(10%) in the control group were unmarried. 7(3.9%) in the study and 9(5%) in the control group were widows and 2(1.1%) in the study 3(1.6%) in the control were widowers and 3(1.7%) in the study and 1(0.6%) in the control were separated. The chi square value revealed homogeneity between the study and the control groups with regard to the demographic variables.
Distribution of clinical variables indicated that (Table 2) 9(5%) in the study and 19(10.6%) in the control were underweight. 122(67.8%) in the study, 141(78.3%) in the control were in normal BMI. 35(19.4%) in the study and 17(9.4%) in the control were overweight. 12(6.7%) in the study and 2(1.1%) in the control were in obese-I category and 2(1.1%) in the study and 1(0.6%) in the control were in obese–II category. These findings indicated that majority(50%) of the study and control group samples BMI were normal.

With regards to co-morbid diseases, 30(16.6%) in the study group and 42(23.37) in the control group were known cases of DM. 42(23.33%) in the study group and 44(24.88%) in the control group were hypertensive patients. 6(3.33%) in the study and 7(3.88%) in the control group samples were both DM and HT. 4(2.22%) in the study and 1(0.55%) in the control were diagnosed with hypothyroidism. 1(0.55%) in the study and 3(1.66) in the control suffered from asthma. 7(3.88%) in the study and 3(1.66%) in the control were diagnosed with other co morbidity and 90(50%) in the study and 80(44%) in the control samples were free from systemic diseases.

Majority of the samples, 103(57.2%) in the study group and 114(63.3%) in control group underwent surgery under to spinal anaesthesia and 77(42.8%) in the study group 66(36.7%) in the control group underwent surgery under general anaesthesia.

With regard to type of surgery, 68(37.77%) in the study and 72(40%) in the control group samples had undergone inguinal hernia repair. 55(30.55%) in the study and 60(33.33%) in the control group had undergone incisional hernia repair. 30(16.66%) in the study group and 35(19.46%) in the control group samples had undergone umbilical hernia repair. 10(5.56%) in the study group and 3(1.66%) in the control group’s samples had undergone appendectomy and 17(09.46%) in the study group and 10(5.55%) in the control group samples had undergone cholecystectomy.
The first objective of the study was to determine the effectiveness of foot reflex therapy on pain among patients who had undergone major abdominal surgery.

Pain

Table 3 represents the level of post operative pain among patients subjected to abdominal surgery from day one to day five. On day one, 46.7% (84), 51.5%(92), 2.2%(4) of the study group patients reported severe, mild and moderate pain respectively and all of them reported no pain whereas in the control group 41.68 (139), 56.66(40), 1.66(1) reported severe, mild, moderate pain and none of them reported no pain. During post assessment in the study group 32(17.30%), 75(61%), 73(7.7) had severe, moderate and mild levels of pain was reported by 117(65%), 61(33.88%), 2(1.11%), respectively. 17.26% of the severe pain was reduced in the study group whereas in the control group the reduction of pain severity pain was only 4.44%. It was statistically significant at p<0.001 level.

The current study result revealed that the mean difference score of pain (Table.6) from day 1 to day 5 of the study and control groups as follows{SG:CG (MD 2.18, SD 2.26; MD 0.20, SD 1.02)} day 2( MD2.51, SD1.81; MD 0.60, SD 0.99), day 3(MD 1.16, SD 1.75; MD 0.48, SD 1.04) day 4 (MD 2.05, SD 1.95; MD 0.7, SD 1.02) and (MD 0.62, SD 1.74; MD 0.3, SD 1) and all five days the pain reduction was highly significant at p<0.001 level and there was a highly significant change found between the groups.

The t and p value of pain score in the study and control groups showed that there were highly significant changes found within the study group on all five days. It was significant at p<0.001 level. These findings strongly supported the hypothesis “There will be a significant change in level of pain of patients who receive Foot Reflex Therapy than those who do not. Hence H1 hypothesis was accepted.

These findings was strongly supported by the study of T.sar et al.(2005) who conducted a study to evaluate the effectiveness of foot reflexology on acute post operative pain and anxiety among patients with digestive cancer.
Tsay et al. (2005) conducted a study to evaluate the effect of foot reflexology on acute postoperative pain and anxiety among patients with digestive cancer. The study group participants received foot reflexology for 20 minutes during 2nd, 3rd and 4th postoperative days and the control group received routine pain medication. The study revealed that the overall reduction of pain in the study group was significant (at p<0.05) when compared with the control group. Wang HL, Keck JF (2004) conducted a study to evaluate the effectiveness of foot and hand massage on postoperative pain. The study found that the foot and hand massage has the potential to assist in pain relief. Massaging the feet and hands stimulates the mechanoreceptors that activate the "no painful" nerve fibers, preventing pain transmission from reaching consciousness. The purpose of this pretest-posttest design study was to investigate whether a 20-minute foot and hand massage (5 minutes to each extremity), which was provided 1 to 4 hours after a dose of pain medication, would reduce pain perception and sympathetic responses among postoperative patients. A convenience sample of 18 patients rated pain intensity and pain distress using a 0 to 10 numeric rating scale. They reported decrease in pain intensity from 4.65 to 2.35 (t = 8.154, p <.001) and in pain distress from 4.00 to 1.88 (t = 5.683, p <.001). Another study also revealed the same results. Sommer et al., (2008) conducted a study to measure the prevalence of post-operative pain, in 1490 surgical patients who were receiving post-operative pain treatment according to an acute pain control. The study found that moderate or severe pain was reported by 41% of the patients on day 0, 30% on day 1 and 19%, 16% and 14% on days 2, 3 and 4. The prevalence of moderate or severe pain in the abdominal surgery group was high on postoperative days 0-1. It was around 30%-55%. And also Hans et.al (2013) conducted a study to assess the pain intensity on the first day after surgery and to improve post-operative pain therapy, to develop procedure specific, optimized pain treatment protocols. The study recruited 115,775 patients from 578 surgical wards in 105 German hospitals with 70764 patients who were asked to rate their worst pain intensity since surgery with numeric scale 0-10. Patients reported high pain scores after many minor surgical procedures, including appendectomy, cholecystectomy, hemorrhoidectomy and which ranked among 25 procedures with higher pain intensities.
The level of pain has an impact on the other physiological parameters which included pulse, respiration, blood pressure and oxygen saturation. In this study the investigator has assessed these parameters also.

**Pulse**

The present study revealed that there was a highly significant mean difference score observed in the study group (3.91, 0.22, 2.39, 1.06 and 2.13) and it was highly significant at p=0.000 level on day 1, 3, 4 and 5. No significant changes were found on day 2, whereas in the control the mean difference score was (0.71, 0.24, 1.34, 0.44 and 0.68) significant at p=0.000 level on day 1, day 4 and day 5 and p<0.01 level on day 2 and 0.05 level on day 3.

The independent t test revealed that the mean difference score was higher in the study group than the control group. It was highly significant at p=0.000 level on all five days.

These findings of this study strongly supported the hypothesis, “There will be a significant change in pulse rate of patients who receive Foot Reflex Therapy than those who do not”. Hence H4 hypothesis was accepted.

**Respiration**

Table: 15 shows the MD and SD of respiration rate among the study and the control group from day 1 to day 5 as 2.35, 2.48; 0.46, 2.82; 0.45, 2.90; 0.19, 2.81; 0.84, 2.74 and 0.16, 2.01; 0.05, 0.99; 0.00, 0.29; 0.04, 1.07; 0.03, 1.30. The independent t values (Table.14) of respiration was significant at p=0.000 level on all five days. Table.16 represents the paired t value of the study group. Highly significant mean difference score was observed on 1st POP day in the study group. It was highly significant at p=0.000 level whereas on day 2 (p=0.030), day 3 (p=0.039) level and during day 4 and day 5 there were no statistically significant changes. The findings of this study strongly supported the hypothesis “There
will be a significant change in respiration rate of patients who receive Foot Reflex Therapy than those who do not”. Hence H5 hypothesis was accepted.

Wan-An Lu et al.,(2011) conducted a study to evaluate the effect of foot reflexology on vagal modulation, decrease sympathetic modulation, and lower blood pressure in healthy subjects and patients with coronary artery diseases. Seventeen people with angiographically patent coronary arteries and 20 patients with CAD scheduled for coronary artery bypass graft surgery were recruited as the control and CAD groups, respectively. The normalized high-frequency power (nHFP) was used as the index of vagal modulation and the normalized very low-frequency power (nVLFP) as the index of vagal withdrawal and renin-angiotensin modulation. The results revealed that in both the control and the CAD groups, the nHFP had increased significantly, whereas the nVLFP had decreased significantly 30 and 60 minutes after FR, as compared with those before FR. The systolic, diastolic blood pressure and heart rate before foot reflexology 30 minutes after foot reflexology and 60 minutes after foot reflexology were 136.0 (129.8-141.8) 115.0 (109.8-123.3)‡ 124.0 (114.0-133.5)‡§, DBP (mmHg) 75.0 (72.8-80.3) 67.0 (63.0-73.3)‡ 67.0 (62.8-75.0)‡ and heart rate (b pm) 69.6 (63.2-76.8) 71.5 (61.2-77.3) 72.6 (65.1-78.4) respectively which significantly decreased after FR among participants of both the groups.

Table : 5 shows the level of systolic blood pressure from the first post operative day to the fifth post operative day. During day 1, 22(12.22%) from the study group and 19(10.55%) from the control had systolic blood pressure in stage-I hypertension and during post interventional assessment, 3(1.66%) in the study group 9(0.5%) in the control group had stage-I hypertension. On day 2 2(1.11%) in the study and 5(2.77%) in the control group samples had stage-I hypertension whereas during post interventional assessment none of them in the study group and 03(1.66%) in the control group had stage-I hypertension.4(2.22%) in the study and 11(6.11%) in the control group showed stage-I hypertension on day 3. None of them in the study group and 7(3.88%) in the control group showed stage-I hypertension during pre interventional assessment on day 4 whereas in the post interventional assessment, none of them in the study and 4(2.21%) in the control
group showed stage-I hypertension. During day 5, none of them in the study group and 6(3.33%) of the control group’s samples showed stage-I hypertension where as during post interventional assessment none of them in the study and 3(1.66%) in the control group showed stage-I hypertension.

The independent t test revealed the difference between the groups. The mean difference score of systolic blood pressure in the study group on day 1, day 2, day 3, day 4 and day 5 were as follows (8.42, 0.54, 4.10, 4.13 and 3.90), whereas in the control group they were 1.40, 0.28, 1.23, 0.58 and 0.05. The t values were p=0.000 level on day1, day3, day4 and (p<0.07) on day 5 and no significant changes were found on day 2, the p value was 0.288. The findings of this study strongly supported the hypothesis “There will be a significant change in systolic blood pressure of patients who receive Foot Reflex Therapy than those who do not”. Hence H5 hypothesis was accepted.

**Diastolic Blood Pressure**

With regards to systolic blood pressure during pre assessment in the study group 150(83.34%) of them had normal, 26(14.44%) had high normal and 4(2.23%) had stage I diastolic blood pressure. Whereas, in the control group 146(81%) had normal, 28(16%) had high normal and 6(3%) of them had stage I hypertension. During post assessment in the study group, none of them had stage I hypertension whereas in the control group 4(2.23%) of them had stage I hypertension.

During day 2, 20(11.12%) in the study group and 31(17.23%) in the control group had showed high normal, blood pressure and none of them showed stage I hypertension whereas during posttest 12(6.66%) in the study group and 30(16.66%) in the control group were with high normal blood pressure. In the study group, 8(4.44%) of the samples moved to normal blood pressure whereas in the control group the improvement was only 1(0.05%).

During day 3’s on pre interventional assessment, 21(11.66%) showed high normal diastolic blood pressure in the study group whereas 30(16.66%) in the control group had
high normal BP. During post interventional assessment, 20(11.12\%) in the study group and 32(17.77\%) in the control group’s samples were with high normal blood pressure and none of them showed stage I diastolic blood pressure in both the groups.

On day 4, 20(11.12\%) in the study group and 32(17.78\%) in the control group’s samples showed high normal blood pressure whereas during post assessment, 3(1.66\%) in the study group and 27(15\%) in the control group samples showed high normal blood pressure. 17(9.44\%) of the study group samples moved to normal diastolic blood pressure compared with control group, the level of improvement was only 5(2.77\%).

During day 5, 17(9.45\%) of them had high normal blood pressure in the study group whereas in the control group 30(16.66\%) in the post assessment 4(2.23\%) of the study samples were with high normal blood pressure where as in the control group the high normal blood pressure was 25(13.88\%) and in the both groups none of them showed high normal diastolic blood pressure.

Table.13 represents the mean difference score of diastolic blood pressure between the pre and post assessment of the study and the control groups from first post operative day to the fifth post operative day. A significant mean difference was observed on day 1, day 3, day 4 and day 5 at p=0.000 level and there were no significant changes observed on day 2. These findings of this study strongly supported the hypothesis “There will be a significant change in diastolic blood pressure of patients who receive Foot Reflex Therapy than those who do not”. Hence H6 hypothesis was accepted.

This study result was closely consistent with the study result of Mahini, Leilasadat, Maboobeh and Reza(2011) who conducted a study on the effect of foot reflexology on patients vital signs before coronary artery bypass graft surgery. 50 patients received foot reflexology for 30 minutes which included foot stalk on planter surface of the foot at the beginning of the section and followed by pressure given to four major plantar reflex points (solar plexus, pituatory, heart and liver) . The other reflexology areas of the planter surfaces of the foot were also massaged and finally the intervention was completed with massaging
the solar plexus by the researcher. The statistical paried t-test showed that there was a significant difference in the intervention group between the average systolic BP\(p=0.029\) and diastolic BP\(p=0.013\) before and after the intervention, although, the average reduction of respiratory rate was 56% in the intervention group and heart rate reduction was approximately 2 beats per minutes after the reflexology. The independent t test revealed that the systolic and diastolic BP had significantly reduced before and after the conduction of reflexology. It was significant at \(p<0.012\) level.

2. Determine the effectiveness of foot reflex therapy on anxiety among patients who have undergone major abdominal surgery.

The level of state anxiety measured during pre interventional assessment in the study group showed that 13(7.22%) patients had normal, 160(89%) of them had mild and 07(3.88%) had moderate level of anxiety whereas in the control group 16(8.88%) had normal, 164(91.1%) had mild and none of them had moderate level of anxiety. During post assessment, 180(100%) in the study group samples reported no anxiety whereas in the control group, 136(75.55%) still showed mild and 44(24.44%) had moderate level of anxiety. Table 5 shows the MD between the study and the control group was SG-MD:7.92,SD:8.08 and CG-1.81,SD:1021 which significant at \(p<0.05\) level. “There will be a significant change in the level of anxiety of patients who received Foot Reflex Therapy than those who do not”. Hence H7 hypothesis was accepted.

This study findings are highly consistent with Kiyohara et.al(2004)study. They aimed to evaluate the level of anxiety on the day before surgery as related to the information known by the patients regarding diagnosis, surgical procedure, or anesthesia. The Spielberger State-Trait Anxiety Inventory (STAI) was used to measure patient’s anxiety levels. One hundred and forty-nine patients were selected and 82 females and 38 males were interviewed. The state-anxiety levels were alike for males and females \((36.10 \pm 11.94 \text{ vs.} 37.61 \pm 8.76)\) (mean \(\pm\) SD). Trait-anxiety levels were higher for women \((42.55 \pm 10.39 \text{ vs.} 38.08 \pm 12.25, P = 0.041\) ). Patient’s educational level did not influence the state-anxiety level but was inversely related to the trait-anxiety level. Unfamiliarity with the
surgical procedure raised state-anxiety levels (P = 0.021). A lower state-anxiety level was found among patients who did not know the diagnosis but knew about the surgery (P = 0.038).

3. Determine the effectiveness of foot reflex therapy on Quality of Life among patients after major abdominal surgery

The quality of life was assessed with four domain scores. In regard to physical dimension score it was 43.67 with SD of 9.70 for the study group during pre interventional assessment, where as in the post interventional assessment it was 51.02 with SD of 10.77 and the mean difference score was 7.35. The physical dimension MD score was higher in the study group compared with the control groups (MD:5.20). The psychological dimension mean score during pretest in the study group was 43.60 with SD of 13.06 where as during post test the mean score was 71.03 with SD of 6.66.

In relation to social dimension the mean, SD during pretest in the study group was 52.96 and 11.51, during post assessment it was 64.57 with SD 64.57 and the MD score was 11.61 compared with the control group 9.3. The level of independence had significantly improved in the study group and the mean and SD was 47.41 with 18.39 during pretest whereas in the post test the mean score was 76 with SD of 9.17 and the MD score was 28.77 compared with control group, 27.7. The t value of all domains (Physical, Psychological, Social and Level of independent) was significant at p=0.000 level.

This study findings were closely consistent with the study conducted by Wyatt, Sikorskii, Rahbar, Victorson and Yuo (2012). It was a longitudinal randomized clinical trial to evaluate the safety and efficacy of foot reflexology to specific areas of the feet on health related quality of life with Cancer Specific Health Related Quality of Life Scale. A convenience sample of 385 Caucasian women with advanced stage of breast cancer receiving chemotherapy or hormonal therapy from 13 community based medical oncology clinics across Mid co Eastern United States were randomized into reflexology group(n=98),lay foot manipulation(n=95) and combined care(n=96). The intervention
comprised four weeks which included 30 minute sessions of either foot reflexology or lay foot massage. The study findings revealed significant reduction in mean dyspnea severity compared to the control group (p<0.01) and lay foot reflexology (p=0.02). Also a mean improvement was found for physical functioning for the reflexology group compared to the control group (p<0.04) and lay foot massage group reported significantly lower score on fatigue severity (p<0.01). Thus the study found reflexology and lay foot massage to be safe among even the most fragile patients with advanced stage of breast cancer and contributes improvement in physical function, dyspnea and fatigue.


The relationship among pain, anxiety, and quality of life among patients subjected to major surgery in the study and the control groups determined through Pearson product-moment correlation coefficient. In this study the results are shown in tables 30, 31, 32 & 33.

During post assessment in the study group there was a significant moderate positive correlation between the respiration and O$_2$ saturation.

Significant positive correlation between respiration and BP diastolic and negative correlation were found between pain and pulse.

Strong positive correlation was found between BP diastolic and BP systolic, pulse and respiration, pulse and BP diastolic, pulse and BP systolic, O$_2$ saturation and pulse.

Significant positive correlation was found between respiration and BP diastolic, BP systolic and BP diastolic, respiration Oxygen saturation, Pulse and BP diastolic, pulse and BP systolic, Oxygen saturation and pulse.

Correlation existed among pain, anxiety and quality of life of patients during pre and post interventional assessments in the study group. There was a strong positive correlation between the pre assessment anxiety and quality of life domain score of physical domain, pre assessment psychological domain, post assessment psychological
domain at p<0.000 level. Post assessment pain score was strongly correlated with psychological domain, level of independent and social relationship post at p<0.001 level. The pre assessment pain correlated with pre assessment level of independent and pre assessment social relationship at p<0.01 level. The pre assessment pain correlated with social relationship post assessment at p<0.05 level.

In the study group, there was a weak positive correlation between post assessment of pulse and anxiety at p<0.05 level.


In the control group, there was no correlation between post assessment pulse and anxiety. Weak negative correlation existed between the pre assessment of pain and social relationship. Strong positive correlation existed between BP diastolic post assessment and BP systolic post assessment, pulse post assessment and BP systolic post assessment.

5. Association of pain, anxiety and Quality of Life with specific background variables:

a) Pain with clinical 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. In the control group, during assessment the association was observed on age of the patients at p<0.05 level. The pre assessment pain score in the study group was associated with Educational status at p<0.05 level, monthly income at p<0.01 level and type of surgery at p<0.001 level. In the control group, the pretest pain score was associated with sex of the patients and type of surgery at p<0.05 level.
This study result was consistent with the study conducted by Couceiro, Valence, Lima, De Menezes and Raposo (1998) who found a positive correlation with post-operative pain in hospitalized patients and its association with gender and type of surgery. Interviews were conducted with 187 patients undergoing surgeries. The incidence of pain in the first 24 hours and its severity according to a numeric rating scale: mild (1 to 3), moderate (4 to 6) and severe (7 to 10) were evaluated. The study findings revealed that 48.4 % (n=30) among men and 66.8%(n=55) among women reported pain. The prevalence of pain showed no differences regarding gender(p=0.536) and age(p=0.465). As for pain severity, 29.4% of the patients referred mild pain and it was moderate in 43.5% and severe in 27%. A significant association between the incidence of post-operative pain and type of surgery was observed. This study demonstrated that an increased number of patients experience pain in the first 24 hours after surgery and the incidence of pain was higher in patients undergoing general surgery.

B) Respiration with background variables

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. The pre assessment respiration rate in the control group was associated with educational status, type of family at p<0.05 level, and type of occupation, type of surgery at p<0.01 level.

C) Pulse with background variables

The association between selected background variables and pain, anxiety and quality of life of patients subjected to major abdominal surgery in the study and the control group was determined through Chi square test and ANOVA. A significant association existed between sex of the patients, BMI, at p< 0.05 level during post assessment pulse rate in the study group. The post assessment pulse rate in the control group on day 5 was associated with age, marital status and co morbidity of the patients. The pre assessment pulse rate was associated with age of the patients and type of anaesthesia and in the control
group the association was found among age, marital status at \( p < 0.05 \) level and co morbidity at \( p < 0.01 \) level.

**D) Systolic Blood pressure with background variables**

The study group’s post test systolic blood pressure was associated with educational status, marital status, BMI , type of anaesthesia and type of surgery at \( p < 0.05 \) level. In the control group, an association was found with age of the patients at \( p = 0.000 \) level. The pre test systolic blood pressure in the study group was associated with educational status at \( p = 0.000 \) level and type of anaesthesia at \( p < 0.05 \) level and in control group an association was found on age of the patients at \( p = 0.000 \) level and occupation of the patients at \( p < 0.05 \) level during pre assessment.

**E) Diastolic Blood pressure with background variables**

Pre assessment diastolic blood pressure in the control group was associated with age of the patients at \( p < 0.01 \) level and type of surgery at \( p < 0.05 \) level.

**F) Oxygen saturation with background variables**

In the study group significant association was found on the post assessment oxygen saturation with type of surgery at \( p < 0.05 \) level. In the control group, during post assessment, an association was found with age of the patients at \( p < 0.05 \) level. During pre assessment in the study group an association was found with monthly income and type of surgery at \( p < 0.05 \) level. In the control group an association between age of the patients and type of occupation was found at \( p < 0.05 \) level, type of anaesthesia and type of surgery at \( p < 0.001 \) level.

**Strength of the study**

- This study was a prospective randomized controlled trial design. Across the time measurements of pain, pulse, respiration, systolic and diastolic blood pressure and oxygen saturation were done.
- With block randomization, simple random sampling technique was used to allot the samples into the study and the control groups.
Confounding factors were identified and controlled (age, sex, occupation, type of abdominal surgery and type of anaesthesia.)

The foot reflex therapy intervention was delivered on an one to one basis by the investigator and the investigator underwent professional training on foot reflexology and foot massage.

The basic techniques of foot reflex therapy was taught to patient’s care givers with appropriate illustrations.

Foot reflex therapy hand book was issued to the patients caregivers free of cost.

Care giver’s skill was ensured using checklist on foot reflex therapy procedure which was developed by the investigator.

Foot reflex therapy was delivered at home by patients caregivers and continuity of care was reinforced by the investigator (telephonic reinforcement weekly once)

The pain, anxiety and quality of life was assessed using standardized tools and permission was obtained from the authors.