CHAPTER II
REVIEW OF LITERATURE

This chapter consists of review of literature and conceptual framework. Literature review refers to the activities involved in searching for information on a topic and developing a comprehensive picture of the state as knowledge on that topic (Polit and Hungler, 1993). Therefore the researcher studied and reviewed the related literature to broaden the understanding about the topic and to gain an insight into the selected problem under study. The literature has been reviewed under the following headings:

PART I

Section A: Literature related to Post-operative pain
Section B: Literature related to Anxiety
Section C: Literature related to Quality of life
Section D: Literature related to Complementary and Alternative therapies
Section E: Literature related to Reflexology
Section F: Literature related to effectiveness of reflexology on Pain, Anxiety, Quality of Life and other physiological parameters

2.1 Section A: Literature related to Post-operative pain

Helmerhorst, Vranceanu, Vrahas and Smith Ring (2014) conducted a study to find out the risk factors for continued opioid use one to two months after surgery for musculoskeletal trauma. 145 patients were assessed using pain anxiety symptom scale. The patients who had higher score of catastrophic thinking, anxiety, post-traumatic stress disorder used higher level of opioid drugs (p=0.001). Patients who continued to use opioid pain medication one to two months after
surgery for musculoskeletal trauma had more psychological distress, less effective coping strategies and greater symptoms and disability than patients who didn’t take opioids, irrespective of injury, surgeries.

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 to optimize 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. Results revealed that 40 procedures with the highest pain scores(median numeric scale,6-7) included 22 orthopedic/trauma procedures on the extremities. Patients reported high pain scores after many minor surgical procedures, including appendectomy, cholecystectomy, hemorrhoidectomy and tonsillectomy, which ranked among 25 procedures with higher pain intensities.

Rockett, Simpson, Crossley and Blowey (2013) conducted a study to compare the pain experience of medical, surgical inpatients and patients attending a pain management centre. Medical inpatients with significant pain (moderate or severe pain on a verbal rating scale) using a battery of psychometric questionnaires and comparator samples of surgical inpatients and patients attending the pain management centre were recruited. Results of the study revealed medical group(n=37) and the surgical group(n=38) had similar prevalence of pain(16.7% and 19.9%).Chronic median pain(24/40,25/40) was common in the medical group (54%) and the surgical group(50%), also the study found that the characteristics of pain in medical and surgical groups were similar, with high levels of anxiety and depression.
Dawood, JoE, Girish P and Gary et al., (2011) did a survey among 200 non-teaching and 101 teaching U.S hospital to describe the structure and functions of the Acute Pain Services (APS). Data were collected through mailed questionnaire. Over all response rate was 35.9%. They found that APS was more formally organized in teaching hospital than non-teaching hospitals. APS includes Pain at rest (97%), Pain on activity (63%) and pain reassessment after intervention (88.8%). Intravenous patient controlled analgesia (IV-PCA) was managed by surgeons (75%). Epidural analgesic peripheral nerve block infusion was managed by anaesthesiologists. 62% of Register Nurses to adjust the IV PCA setting with in set parameters. 43% of the RNs had adjustment of epidural infusion rates and 21% practised peripheral nerve catheter local anesthetic infusion rate. The nurses do not have any independent role to control the pain in hospital setting.

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. Measures of pain (scores from 0-100) on a visual analogue scale were obtained three times a day on the day before surgery and on the days 0-4 post-operatively; mean pain intensity scores were calculated. Patients were classified as having no pain (score 0-5), mild pain (score 6-40), moderate pain (score 41-74) or severe pain (75-100). Results of the study revealed moderate or severe pain reported by 41% of the patients on day 0, 30% on days 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 (30-55%). A high prevalence of moderate or severe pain was found during the days 1-4 in the extremity surgery group (20-71%) and in the back/spinal surgery group (30-64%). Thus the study revealed that inspite of acute pain
post-operative pain treatment was unsatisfactory, especially after immediate and major surgical procedures.

Bruce, Julie and Krukowski (2001) conducted a prospective cohort study to assess the prevalence of chronic post-surgical pain and quality of life after gastrointestinal surgery for benign and malignant tumor among 435 patients at regional center at Northeast Scotland. The pain and QOL were assessed using the European organization for research treatment of cancer Quality of Life-C 30 questionnaire and MC Gill pain questionnaire. The study results showed that the prevalence of post-operative pain after 4 years was 18% and these patients had significantly poorer QOL score, independent of age, gender and cancer status.

Christoph Maier et al., (2010) conducted a study to assess the current status of pain management in German hospitals. The study was conducted among 2252 surgical and 999 non-surgical patients from 25 hospitals and the report showed that 12.4% of surgical, 16.7% of non-surgical patients reported no pain, 29.5% of the surgical, 36.8% of the non-surgical patients reported severe pain while moving and 50% of the surgical, 57% of the non-surgical patients reported that they were not satisfied with their pain management interventions. 45.6% of inadequate pain management was observed in surgical group and 29.6% in non-surgical groups.

Forrest et al., (2002) conducted a prospective randomized multi-centered trial to evaluate, compare the risks of serious adverse effects with Ketorolac versus diclofenac or Ketoprofen in adult patients after elective major surgery. The study evaluated the risks of death, increased surgical site bleeding, acute renal failure and allergic reaction with ketorolac versus diclofenac or Ketoprofen.
administered according to parenteral or oral dose and duration of treatment. A total of 11245 patients completed the trial and of those, 5634 patients received Ketorolac and 5611 patients received one of the comparators. 155 patients (1.38%) had serious adverse outcome with 19 deaths (0.17%), 117 patients with surgical site bleeding (1.04%), 12 patients with all allergic reactions (0.12%), 10 patients with acute renal failure (0.09%) and 4 patients with gastrointestinal bleeding (0.04%). The study findings revealed no significant difference between Ketorolac and Ketoprofen or diclofenac and post-operative anticoagulants increased the risks of surgical site bleeding equally with Ketorolac (odds ratio > 2.65, 95 CI = 1.57-4.67) and the comparators (odds ratio = 3.58, 95 CI = 1.93-6.70).

Lee Cooper, Craij Knight and Keneally (2009) conducted a meta-analysis study to evaluate the effect on NSAID on the post-operative renal function among 183 patients. The study result showed that the creatinine clearance was reduced by 21-28% on day one compared with control group. The study proved that NSAID produce asthma, especially in patients with aspirin induced sideeffects (Power 1990) and diclofenac sodium, aspirin, NSAID are highly associated with liver damage.

Couceiro, Valence, Lima, De Menezes and Raposo (1998) conducted a transversal study to evaluate the prevalence of 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 was mild (1 to 3), moderate (4 to 6) and severe (7 to 10) which were used to evaluate. 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, 43.5% were moderate and 27% of them were in severe pain. A significant association between the incidence of post-operative pain and type of surgery was observed. Thus the study demonstrated that an increased number of patients experienced pain in the first 24 hours after surgery and the incidence of pain was higher in patients undergoing general surgery.

Ogboli, Nwasor, Sule ST, Yusufule (2012) studied the prescription pattern and common drugs used in the management of post-operative pain in adult patients who underwent surgery at Ahmadu Bello University Teaching Hospital, Nigeria. The sample size was 138 in the age group between 17 years and 18 years and the mean age was 41 yrs. The Verbal Rating Scale (VAS) was used to assess the level of pain. The study result showed that 126 patients received intermittent intramuscular injections. In this, 61 patients received Pethidine, 53 patients received Pentazocine, 12 patients received Tramadol and 9 patients received non-steroidal anti-inflammatory drugs. Oral Paracetmol was received by 6 (4.3%) patients and only 3 (2.1%) patients did not receive any pain medications. This study revealed that moderate to severe pain is very common among female patients 81 (58.7%) than males 42 (29.7%).

2.1. Section B: Literature related to Anxiety

Miguel Romeo and Sgardoy Muniesa (2014) conducted a study on the effectiveness of information booklet in reducing preoperative anxiety and pain in patients undergoing urological surgery among 100 patients (50 in study group and 50 in control group). The study group received information booklet two days...
before the surgery. The results found that the preoperative anxiety was 21.06% in the study group and 30.6% in the control group, whereas, after the administration of booklet, the anxiety of patients in the study group had reduced to 0% while it was still 4% in the control group.

Pinar, Kest and Gungor (2011) conducted a quasi-experimental case control research which focused on the efficacy of pre-operative instruction in reducing anxiety following gynaecological surgery. The population study consisting of the gynaecologic surgery patients admitted to the gynaecologic oncology service at Zekai Tahis, Burak, Gynaecology Training & Research Hospital. They were recruited through a random sampling with 60 patients in each group. The study group was given a systematic pre-operative instruction while the control group was given routine nursing care. The data collection tools were Individual Information form and the State Trait Anxiety Inventory. The results revealed that incidence rates from post-operative anxiety score of the study group were lower than those of the control group (p<0.05), thus the study demonstrated patients who underwent that gynaecologic surgery and who were given systematic pre-operative instruction felt less anxious than the ones who were given merely a routine nursing care.

2.1. Section C: Literature related to Quality of life

Vojtech Kurfirst et al., (2014) conducted a study to explore the differences in clinical conditions and Health Related Quality Of Life (HRQOL) of patients before and after cardiac surgery, taking into account the influence of age and to describe factors influencing changes of HRQOL in the postoperative period. This was a prospective consecutive observational study with two measurements using
the SF-36 questionnaire before surgery and 1 year after surgery. The study consisted 310 patients with a mean age of 65 (SD 10.4) years and 101 patients (33%), who were older than 70, constituted the older group. This older group showed greater comorbidity, higher cardiac operative risk and lower HRQOL in the preoperative period as well as a higher prevalence of postoperative complications than the younger group. There was a significant improvement in all 8 health domains of the SF-36 questionnaire (p < 0.001) in the overall sample. There was no significant difference in a majority of HRQOL domains between the younger and the older group (p > 0.05). A higher value of preoperative PCS (Physical component summary) scores (OR 1.03, CI 1.00 – 1.05, p = 0.0187) and MCS (Mental component summary) scores (OR 1.02, CI 0.997 – 1.00, p = 0.0846) were the only risk factors for potential non-improvement of HRQOL after cardiac surgery, after correction for age, gender and type of surgery. The multivariate analysis has shown the higher preoperative HRQOL status as the only significant factor of potential non-improvement of postoperative HRQOL.

Yang, Sun, Lu Quian, Pang and Ding (2012) conducted a study to investigate the quality of life of cancer patients in Beijing and to explore the effect of cancer pain control on patient’s quality of life. Self-developed demographic questionnaires, Numeric Rating scale, SF 36 questionnaire were used to collect the data from conveniently selected 643 cancer pain patients from cancer hospitals. The study findings revealed that patients in pain control group had higher quality of life scores in 6 areas of SF36(p<0.05). Also the binary logistic regression results found that pain management satisfaction scores(p<0.001). Family average personal monthly income (p<0.029), current receiving chemotherapy (p<0.009) and cancer stage( p<0.001) were the predictors to cancer
pain controlled results. Thereby the study concluded that cancer patients in Beijing had poor quality of life and that adequate pain reduction will improve the quality of life of cancer patients.

Celine and Thomas (2012) conducted a prospective observational study in Gastrointestinal department in a tertiary, non-academic hospital in Mulhouse to assess the quality of life outcome. One year after gastrointestinal surgery. 37 malnourished elderly patients with a median age of 76 (range 66-86) who underwent gastrointestinal surgery between November 2007 and December 2008 were included in the study and followed up for 1 year. The quality of life was measured by the European Organization for Treatment of Cancer QLQ-C30 questionnaire. The mean global health status and the quality of life score in 17 of 24 living patients 1 year after surgery was 68.6 (SD 12.4) and no difference with the score of a reference population 70.8 (SD 22.1) was observed (p=0.68). The study thus concluded that despite high postoperative mortality and morbidity, an acceptable quality of life can be achieved in malnourished, elderly survivors of gastrointestinal surgery.

Hwang (2008) conducted a study to assess the quality of life and surgical outcomes following laparoscopic surgery for refractory gastro-esophageal reflux disease in 342 patients over 3 years. Patients were given GERD health related quality of life and SF36 questionnaire pre-operatively, at 6 months, and at 12 months or more months after surgery. The study findings revealed patients with Chronic Pain Syndrome (CPS) showed no improvement in general health QOL scores after laparoscopic anti reflux surgery, even though the GERD-HQOL showed significant improvement.
Maureen, Daniel, Kim and John (2002) conducted a cross sectional study to examine the post-surgical changes in the health-related quality of life. The study examined body mass index, depression, self-esteem and numerous health related quality of life variables in four groups of patients such as pre-surgery, several weeks post-surgery, 6 months post-surgery and 1 year post surgery. Subjects were assessed using three Health Related Quality Of Life measures, the short form 36 (SF36), the Impact Of Weight on Quality of Life Questionnaire and the Bariatric Analysis and Reporting Outcome System (BAROS). Subjects also completed the Beck Depression Inventory (BDI) and the Rosenberg Self-Esteem Scale (RSE). Results of the study found significant differences between pre-surgery and several weeks post-surgery on several SF-36 and IWQOL-Lite subscales, as well as, the RSE and BDI, significant differences were found on all the measures between several weeks post-surgery and 6 months post-surgery. Also significant differences were found on all the subscales of the IWQOL, no subscales of the SF-36, the RSE or the BDI between 6 months post-surgery and 1 year post-surgery. Patients reported as soon as 6 months after surgery, and stated that they experienced significant improvements in weight loss, medical comorbidities and quality of life, which placed them in the very good outcome group according to BAROS.

2.1. Section D: Literature related to Complementary and Alternative therapies

Anjaly (2013) conducted a study on the effectiveness of hand and foot massage on pain reduction and satisfaction among women who had undergone abdominal hysterectomy. A quasi experimental design was used for the present study. The sample consisted of 40 women who had undergone abdominal
hysterectomy (20 in the experimental and the control groups) were selected using purposive sampling technique. Tools used were the Baseline Proforma, Numerical Pain Rating Scale and a Satisfaction Rating Scale. Results revealed that the pain scores in the control group were higher than the experimental group after the hand and foot massage at 0\textsuperscript{th} minute (immediately after the massage), 60\textsuperscript{th} minute and 90\textsuperscript{th} minute after the intervention. The pain scores in the experimental group was high before the hand and foot massage whereas the scores showed a significant decrease in the measurements recorded at 0\textsuperscript{th} minute (immediately after the massage), 60\textsuperscript{th} minute and 90\textsuperscript{th} minute after the intervention and there was also a significant reduction of pain in the experimental group than the control group (t39 = 1.960; p<0.05). Also the women in the experimental group were highly satisfied with hand and foot massage. Thus the findings concluded that the hand and foot massage had significant effect on the pain among the women who had undergone abdominal hysterectomy. Hence it was concluded that the hand and foot massage was an effective non pharmacological, non-invasive and cost effective method that could be used effectively for the management of postoperative pain.

Rosen J et al., (2013) conducted a study to examine the effect of massage therapy to reduce the pain and anxiety in urban patients with cancer who had undergone surgical placement of a vascular access device port and assessed the effectiveness of the intervention in reducing per-operative pain and anxiety. A nine month randomized control trial of 60 cancer patients who underwent port placement were selected randomly and assigned to the study group and the control group. Both groups received 20 minutes interventions immediately pre and post-surgery. Data were collected on pain and anxiety before and after the pre-operative and post-operative interventions as well as the day after the surgery.
The study findings revealed that 67% of the participants were racial or ethnic minorities, majority were females and unemployed with an annual household income < $ 30000 and publically funded health insurance. Results reported statistically significant greater reduction in anxiety after the intervention compared with individuals receiving structured attention (−10.27 Vs. −5.21, P=0.0037).

Shneerson, Taskila, Gale, Greenfield and Chen (2013) conducted a systematic review of Randomized Controlled Trials (RCTs) to assess whether quality of life (QOL) improved in cancer survivors who had undertaken a complementary and alternative medicine (CAM) intervention, compared to cancer survivors who had not. Electronic databases including MEDLINE, Cochrane CENTRAL, CINAHL, PSYCHINFO, EMBASE, and Clinical-Trials.gov were searched from 1990 to 2012. Search terms incorporating the concepts of cancer survivors, QOL and various types of CAM were used. Results retrieved from 1767 records and screened 13 full text articles reviewed CAM interventions incorporated yoga, meditation or mindfulness, energy healing, medical qigong, homoeopathy, or mistletoe therapy. Ten of the studies used breast cancer survivors, whilst the remaining three included other cancer types. The studies had mixed results that showed a significantly greater improvement in QOL in the intervention group compared to the control group, or no significant difference between groups. This review has identified significant gaps in the evidence base for the effectiveness of CAM on QOL in cancer survivors.

McLeod, Roddy(2012) conducted a study to evaluate the effect of music therapy on patient anxiety during minor plastic surgery and the study found that
the pre-operative mean score in the control was 38.45(SD 11.50) and in the study group it was 38.50(SD 15.60) with a range of 20 – 76. During post-test, the mean score of post-operative anxiety mean score in the study group was 30.52(SD 9.82) with a range of 20-56. The mean anxiety score in the control group was 33.15(SD 10.60).

Betty, Adams, Sibbritt and Wode (2011) conducted a study to evaluate the Complementary and Alternative Medicine (CAM) use moderated distress and quality of life from pre to post diagnosis of cancer. It is a prospective longitudinal national cohort design, and the participants comprising of 718 middle-aged women from Australian under longitudinal study on women’s health who did not have cancer at survey, but who subsequently developed cancer, three waves data were collected; the wave prior to diagnosis (pre) at diagnosis(cancer) and after cancer(post) and the outcome measures on CAM use were studied using questionnaire, Distress by (PSS)and depression(CES-10),HQOL by physical, mental functioning(SF-36). The result showed that CAM –use significantly moderated the change over time in stress{F(561)=3.09,p=0.04}, depression {F(494)=3.14,p=0.04} CAM-users were significantly less depressed post-cancer compared to non-users(p<0.05). The study findings indicated that CAM users may be more psychologically vulnerable than non-users with respect to stress, with CAM acting as an effective psychological factors.

Denise Olivier et al., (2011) conducted a pilot study to assess the effect of massage on menopausal women with insomnia at Federal University of Sao Paulo. 16 women received one hour massage section weekly twice for 16 sections. The STAI (state &Trait) scale was used to assess the level of anxiety. Sleep diary
was maintained by the patients to assess the quality of sleep. The mean age was ±SD: 56.28±1.97 (SD) range 50 to 65 years, mean body index (BMI) <30kg/m2 and significant improvement in anxiety and depression.

Jasmine and Jayaseelam (2010) conducted a quasi-experimental study with a purposive sampling method in 36 cancer patients to assess the effectiveness of foot massage on pain among cancer patients in selected hospitals, Idukki and Kerala. The repeated measure time series with control group design was adopted. Observational and interview schedules were used to collect data. It was found that cancer patients in experimental group had significant reduction in pain after foot massage and especially effective among patients with cancer in reducing their pain.

Liza Dion et al., (2009) studied the effectiveness and feasibility of massage therapy delivered to post-operative thoracic surgery patients in USA. Those patients with higher level of pain for more than 4 days with anxiety and longer hospital stay for more than three days were assigned in the highest priority for massage therapy. The massage was provided to head, neck, back, shoulder, feet depending on the patient’s preference. The study results revealed that pain score had significant reduction. The mean pain scale difference from pretest to posttest was 3.49 (p<0.001).

Felicity, Lucy and George (2008) conducted a qualitative thematic analysis on use of complementary and alternative medicine (CAM) and patient’s perspective related to existing, expert led taxonomies. Semi structured interviews were conducted with 46 people who used CAM in southern England. Results reported that CAM was used in 4 different ways as treatment and as alternative,
complementary, or conventional treatments. Treats are portrayed as personal luxuries, but not identified as individual’s health need. Homeopathy and herbalism were viewed as alternative treatments by all participants, but participants viewed reflexology, aromatherapy massage, and osteopathy as treats rather than treatments.

Zhen Ju (2008) conducted a randomized control trial to assess the effect of acupuncture combined with massage of sole on quality of sleep of patients with insomnia. 58 cases of insomnia were randomly allocated into observation group(n=32) and control group(n=26), where the observational group were treated with oral administration of alprazolam, massage of sole and acupuncture at CV12,CV4,CV6 etc. and the abdomen as main points and the patients in the control group were treated with the alprazolam. The data before and after the treatment were collected with Pittsburg Sleep Quality Index (PSQI), Self Rating Anxiety Scale(SAS),Self rating Depression Scale (SDS).The study findings revealed significant difference in the scores of various factors in PSQI,SAS and SDS(p<0.01,p<0.05).The study concluded that abdominal acupuncture combined with massage of sole can improve the sleep quality of the patients with insomnia.

Jonathan et al.,(2007) conducted a cross-sectional study to identify the prevalence and pattern of CAM use in patients attending a rhinology outpatient clinic at Aberdeen Royal Infirmary teaching hospital in northeast Scotland. The study was conducted among 100 patients. The questionnaire included a tick list of 49 common herbal preparation and alternative therapies. The overall prevalence for CAM use was 65%; among them 18.7% of them were regularly using
reflexology. 65% of the patients had never used CAM and women were more likely to use CAM than men. It was statistically significant at p<0.012 level.

Chugh D (2006) conducted a quasi-experimental research approach with one group pretest-posttest design to determine the effect of ten minute foot massage on pain reduction in postoperative coronary artery bypass graft patients in a Cardio thoracic specialty hospital, Kolkata. Foot massage was given to selected patients twice a day for four days. At the end of each foot massage session, pain was measured. On the fourth day a self-report in the form of 5 point Likert scale was given to the patients to assess the psychological response of the patients. The result indicating a significant difference in the pre and post massage pain scores and the findings of the opinion showed that most of the patients (80-90%) expressed a positive opinion of foot massage which shows a high acceptability rate.

Rupet et al.,(2004) conducted a study on knowledge, quality of life, usages of Complementary and Alternative Medicine and Therapies on Inflammatory Bowel Diseases. The study population was between the age of 18 and 75 years from the Prince of Wales Hospital, Shatin, HongKong and the study period was between February 2002 and May 2002. The Inflammatory Bowel Diseases(IBD) knowledge questionnaires to assess the level of knowledge, Quality of Life and Disease Activity Index for assess the QOL were used. 162 IBD patients completed questionnaires, comprising 81 Chinese and 81 Caucasian and the mean age of both groups were similar (p=0.18) and the level of education was higher in the Caucasian group (51%university/college graduates) compared with 24% in the Chinese group (p=0.001),the median knowledge score was
significantly higher in the Caucasian IBD than Chinese group (57.0 and 50.5, respectively; mean difference, 6.5; p<0.001.). In regards to QOL, Chinese had higher QOL than the Caucasian group (median IBDQ difference, 44; p=0.013).

Kim MS et al., (2004) has conducted a study on the effect of hand massage on anxiety in cataract surgery using local anesthesia. This study comprised 59 patients who had undergone cataract surgery from December 11, 1996, to February 12, 1997. The patients were divided into those receiving a hand massage 5 minutes before surgery (experimental group, n = 29) and those not receiving a hand massage (control group, n = 30). Patients’ anxiety levels were measured using the Visual Analog Scale and by assessing the systolic blood pressure, diastolic blood pressure and pulse rate before and after the hand massage and 5 minutes before the end of surgery. Epinephrine norepinephrine, cortisol, blood sugar levels, neutrophil, and lymphocyte percentages in white blood cells were also measured. After the hand massage, the psychological anxiety levels, systolic and diastolic blood pressures, and pulse rate were significantly lower than before the massage. The hand massage significantly decreased epinephrine and norepinephrine levels in the experimental group. The result shows that the hand massage decreases the psychological and physiological anxiety levels in patients having cataract surgery under local anesthesia.

Hattan King and Griffith (2002) conducted a randomized control clinical trial to investigate the impact of foot massage and guided relaxation and the well-being of patients who had undergone CABG surgery. 258 samples were randomly assigned to either control or one of the two study groups. Physiological and physical variables were measured immediately before and after the intervention.
with discharge questionnaire. The study found that there was a significant effect of the intervention on the calm score (ANOVA, p=0.014) and there was a clear trend across all psychological variables, foot massage, foot bath and to lesser extent guided relaxation to improve psychological well-being. Thus the study concluded that the non-invasive techniques were effective for promoting psychological well-being in patients undergone CABG surgery.

Grealish, Lomasney and Whiteman (2000) conducted a study to measure the effect of foot massage on the subjective experience of pain, nausea and relaxation among cancer patients admitted in a cancer hospital at Southern Norway. A quasi experimental research design was used among 62 cancer patients. The result of the study revealed that the mean pretreatment pain score of 25.1 was decreased to 15.3. Mean pretest nausea score also decreased from 17.5 to 11.1 mm. The mean posttest relaxation score had increased which clearly indicates the effectiveness of foot massage on pain reduction and increase in relaxation.

Hulme, Waterman and Hillier (1999) conducted a study on the effect of foot massage on patients’ perception of care following laparoscopic sterilization as day care patients. The sample of 59 women who underwent laparoscopic sterilization as day care patients were randomly allocated into two groups. The experimental group received foot massage and analgesia post-operatively. The result showed that the experimental group consistently reported less pain following a foot massage than the control group.

Ji-Eun Han et al., (2004) conducted a study on the “Effect of Hand Massage on nausea, vomiting and anxiety of Childhood Acute Lymphocytic
Leukemia with high dose of chemotherapy. The subjects of this study consisted of 15 in experimental group and 15 in control group. All subjects were diagnosed with acute lymphocytic leukemia and admitted for high dose chemotherapy at the University Medical Center in Seoul, Korea. Hand massage was performed for 10 minutes twice a day for three days in the experimental group. The result showed that the hand massage could be effective in decreasing nausea, vomiting, state of anxiety, pulse rate and blood pressure of children with receiving high dose chemotherapy.

2.1. Section E: Literature related to Reflexology

McCullough, Liddle, Sinclair, Close and Hughes (2014) conducted a review aimed to assess the quality of evidence from RCTs that have tested changes in physiological or biochemical outcome parameters as a result of reflexology. Guidelines from the Cochrane Handbook of Systematic Reviews of Interventions were followed and databases were from searched inception to December 2013: AMED, CAM Quest, CINAHL Plus, Cochrane Central Register of Controlled Trials, Embase, Medline Ovid, Proquest, and Pubmed. Risk of bias was assessed independently by two members of the review team and overall strength of the evidence was assessed using the Grading of Recommendations, Assessment, Development, and Evaluation guidelines. Seventeen eligible RCTs met all inclusion criteria. A total of 34 objective outcome measures were analysed. Twelve randomised controlled trials and five feasibility or pilot randomised controlled trials, involving a total of 697 participants, were reviewed. The trial participants ranged from healthy volunteers to those suffering from a wide range of musculoskeletal, neurological, and systemic conditions including people with breast cancer, coronary artery bypass graft (CABG), chronic heart failure (CHF),
nursing home residents with dementia and cancer, chronic obstructive pulmonary disease (COPD), multiple sclerosis (MS), pregnant women, and women failing to ovulate. In total, 34 physiological or biochemical outcome measures were analysed in the 17 studies included. Significant within reflexology group changes were recorded for 11 outcome measures. These were blood pressure in five studies, heart rate in three studies, cortisol in two studies, salivary amylase, lymphocyte production, heart rate variability (HRV), R-R interval, pulse pressure, cardiac output, cardiac index (CI), and blood oxygen level dependant (BOLD) response, in one study each four outcome measures showed significant changes between the reflexology and control group salivary amylase. Systolic and diastolic blood pressure. CI. Ruiz-Padial et al., demonstrated significant changes in blood pressure as a factor of time, treatment number, and intervention. Eight of the studies compared reflexology to an active CAM control instead of sham treatment and eleven used a control measure which involved touching the participants feet. In one of the studies the same reflexology treatment was compared in two different participant groups. Although twelve studies showed significant changes within the reflexology group, only three studies investigating blood pressure, cardiac index, and salivary amylase resulted in significant changes between group changes in favour of reflexology.

Sliz, Smith, Wiebking, Northoff and Hayley (2012) conducted a study that investigated the immediate neurophysiological effects of different types of massage in healthy adults using functional magnetic resonance imaging (FMRI). Much attention was given to the default mode network, a set of brain regions showing greater activity in the resting state. These regions (i.e. insula, posterior and anterior cingulate, inferior parietal and medial prefrontal cortices) were
postulated to be involved in the neural correlates of consciousness, specifically in arousal and awareness. The study assumed that massage would modulate these same regions given the benefits and pleasant affective properties of touch. Healthy participants were randomly assigned to one of the four groups such as Swedish massage, reflexology, massage with an object or a resting control condition. The right foot was massaged while each participant performed a cognitive association task in the scanner. The results showed that the Swedish massage treatment activated the subgenual anterior and retrosplenial/posterior cingulate cortices. This increased blood oxygen level dependent (BOLD) signal was maintained only in the former brain region during performance of the cognitive task and the reflexology massage condition selectively affected the retrosplenial/posterior cingulate in the resting state, whereas massage with the object augmented the BOLD response in this region during the cognitive task performance. Thus the study suggested implicating these interventions for better understanding how alternative treatments might affect resting state neural activity and could ultimately be important for devising new targets in the management of pain and mood disorders.

2.1 Section F: Literature related to effectiveness of Reflexology on pain

Dalal, Maran, Pandey and Manjari (2014) conducted a randomized control trial to determine the efficacy of reflexology in managing patients with diabetic neuropathy. Subjects (N = 58). These patients were randomly distributed into reflexology and control groups in which both the group patients were treated with on-going pharmacological drugs. Reflexology group patients were additionally treated holistically with the hypothesis that this therapy would bring homeostasis among body organ functions. This was a caregiver-based study with a follow-up
period of 6 months. The outcome measures were pain reduction, glycaemic control, nerve conductivity, and thermal and vibration sensitivities. The skin features leading to the detection of the abnormal functional states of body parts were also recorded and analysed. Results revealed reflexology group showed more improvements in all outcome measures than those of control subjects with statistical significance. Thus the study exhibited the efficient utility of reflexology therapy integrated with conventional medicines in managing diabetic neuropathy.

Nancy A. Hodgson and Doreen Lafferty (2012) conducted an experimental crossover design study to investigate and compare the effects of Reflexology and Swedish massage therapy on physiologic stress, pain, and mood in older cancer survivors residing in nursing homes. The study included 18 nursing home residents aged 75 or over who were diagnosed with solid tumour in the past 5 years and following completion of cancer treatments. The interventions were 20 minutes of Swedish Massage Therapy to the lower extremities, versus 20 minute Reflexology, using highly specified protocols. Pre- and post-intervention levels of salivary cortisol, observed affect, and pain were compared in the Swedish massage therapy and Reflexology conditions. Results implied, both reflexology and Swedish massage resulted in significant declines in salivary cortisol, pain and improvements in mood. Thus the study concluded Swedish massage therapy and reflexology were feasible in the population of cancer survivors, where both interventions were well tolerated and produced measurable improvements in outcomes.

Eghbali, Safari, Nazari and Abdoli (2012) conducted a double-blind clinical trial to investigate the effect of reflexology on chronic low back pain
intensity. The study population consisted of 50 female and male nurses suffering from chronic low back pain working in hospitals affiliated with Isfahan University of Medical Sciences. The participants were divided into two groups of reflexology and non-specific massage. A questionnaire was completed through interviews and a 40 minute session of interventions were performed three times a week for two weeks. Pain intensity was measured by Numerical Analogue Scale for pain before and after the intervention. The findings revealed a significantly higher reduction in pain intensity scores in the reflexology group after the intervention, as compared with the non-specific massage group. However, the non-specific massage was also significantly effective in reducing pain. Thus the study concluded reflexology can be effective in reducing the severity of chronic back pain, and it is able to reduce pain from moderate to mild. Thus, this technique is recommended to be performed by nurses as a complementary therapy in patient care.

Valiani, Shiran, Kianpour and Hasanpour (2010) conducted a quasi-experimental study to review the effect of reflexology on pain and outcomes of the labor. 88 primiparous mothers referred to selected hospitals of Isfahan for vaginal delivery were selected using simple random sampling method and then randomized in to two groups. Data collection tools were the demographic data questionnaire, profile and outcomes of the labor and the short-form of the McGill Questionnaire for Pain Rating Index (PRI) assessment. The intervention was general and specific reflexology in the active phase of labor. PRI was assessed before the intervention and four times after the intervention (3-5 cm, 6-8 cm and 9-10 cm dilatations) and during the second stage of labor. There was no significant difference between groups before intervention. In the reflexology group, there was a significant difference between the PRI before and after the 4
stages of intervention (p < 0.001). PRI was significantly different between studied groups after intervention (p < 0.001). The length of active phase of labor was significantly different between the two groups; but this difference was not significant during the second (p = 0.29), and the third (p = 0.27) stages. The difference between the 1st minute and the 5th minute Apgar score (p < 0.001) and rate of hemorrhage between the two groups were different significantly (p = 0.02). Thus the study concluded that reflexology can decrease the labor pain and also it is a safe technique and it can be replaced as an alternative for pharmacological methods to control the pain.

Mahboubeh, Valiani, and Zare (2010) conducted a quasi-experimental study that aimed to compare and determine the efficacy of reflexology and Ibuprofen on reduction of pain intensity and duration of menstrual pain. This clinical trial was done among 68 students with primary dysmenorrhea living in Isfahan University of Medical Sciences’ dormitories. Simple random sampling technique was used and based on the inclusion criteria the students were randomly divided into two groups. In the reflexology group, the subjects received 10 reflexology sessions (40 minutes each) in two consecutive menses cycles. The Ibuprofen group received Ibuprofen (400 mg), once every eight hours for 3 days during 3 consecutive menses cycles. To assess the severity of dysmenorrhea, Standard McGill Pain Questionnaire, Visual Analog Scale (VAS) and pain rating index (PRI) were used in this study. The findings of the study showed that the two groups had no statistically significant difference in terms of demographic characteristics (p > 0.05). Reflexology method was associated with more reduction of intensity and duration of menstrual pain in comparison with Ibuprofen therapy. Independent and Paired t-test showed that there was a significant difference in the
two groups between intensity and duration of menstrual pain using VAS and PRI in each of the 3 cycles between reflexology and Ibuprofen groups (p < 0.05). The study concluded that reflexology was superior to Ibuprofen on reducing dysmenorrhea and its treatment effect continued even after discontinuing the intervention in the third cycle.

Smyth, Hughes and Lowe-strong (2009) conducted a study to investigate the effectiveness of reflexology on pain in multiple sclerosis population. 73 participants were randomly allocated to receive either precision or sham reflexology weekly for 10 weeks. Outcome measures were taken pre and post treatment with follow up at 6 and 12 weeks by a researcher blinded to group allocation. The primary outcome measure was pain and it was recorded using VAS. A significant (p<0.0001) and clinically important decrease in pain intensity was observed in both groups compared with baseline. Median VAS score was reduced by 50% following treatment, and maintained for up to 12 weeks. Significant positive changes were observed in fatigue, depression, disability, spasm and quality of life. Thus the study concluded that reflexology offered clinically significant improvements for multiple sclerosis symptoms.

Dolatian, Hasanpour, Montazeri and Alovi Majd (2008) conducted a randomized clinical trial on effect of reflexology on pain intensity as well as to determine the duration of labor in primiparas among 120 parturient women with low risk pregnancy at Shahid Akbarabadi Hospital, Iran. The parturient were divided into 3 groups. Each group received 40 minutes of reflexology, emotional support and routine care. The study results revealed that during cervical dilatation
pain intensity was significantly lowered compared with those received routine care and maternal support.

Quinn, Hughes and Baxter (2008) conducted a randomized controlled trial to investigate the effectiveness of reflexology on the management of non-specific low back pain among participants recruited and randomized into either reflexology treatment or sham treatment once per week for six consecutive weeks. The visual analog scale and Mc Gill pain questionnaire, Roland–Morris disability questionnaire and SF-36 health survey were used at baseline, 6 weeks, 12 weeks and 18 weeks. The results revealed that VAS scores for pain reduced in the treatment group by a median value of 2.5 cm, with minimal change in the sham group (0.2 cm). Results revealed that reflexology had a positive effect on low back pain. Thus the study concluded that reflexology appears as a treatment in the management of low back pain.

Sei Young Oh, Ching Ha, Young Soon Le, Dong Soo Kim and Myung Sook Lee, (2006) conducted a study to examine the effectiveness of hand reflexology on pain, feeling and nursing practice in post-operative patients. 45 samples from surgical ward of clinical setting were selected and pre and post-test were conducted using VAS for pain and feeling, physiological measurements and questionnaire for nursing care were also collected. Intervention consisted of 5 minutes hand reflexology therapy applied to both hands of participants by two research assistants at the same time. The study findings revealed that there was significant pain relief ($t=-4.04, p=0.0001$), improvement in feeling ($t=19.44, p=0.001$) and an increase in skin temperature ($t=3.54, p=0.001$). Also the study found the applied skills that subjects preferred were press-rotate (80%), press
walk (35.56%) and press rolling (31.11%) where the effectiveness of nursing practice scored was 3.99 ±1.97 out of 5 and the nurse-patient relationship and effective response of nursing intervention ranked the highest with 4.31.

Pongpiyapibon (2005) conducted a quasi-experimental pre-test post-test control group design to assess the effects of symptom management with reflexology programme on pain and frequency of pain medication taken in elderly patients with prostatectomy. 40 elderly patients who matched were selected and assigned to the study group and the control group. The intervention-symptom management with reflexology program on pain consisted of four sessions such as symptom experienced assessment, knowledge providing, reflexology and evaluation phases. Study findings concluded that the post-test mean score on pain of study group was significantly lower than that of pre-test (X=7.230, X=3.75, t=16.336, p<0.001), the post-test mean score of pain of study group was significantly lower than that of the control group (X=3.75, X=6.65, t= −10.627, p<0.001) and the post-test mean score of frequency of pain medication taking of study group was significantly lower than that of the control group (X=1.05, X=1.85, t= −2.36, p<0.05).

Shwetha, Kumar and Kulwant (2004) conducted a study to find the efficacy of reflexology in patients with post-operative pain after general surgery. 60 adult patients from general surgery unit in AIIMS were randomly allocated to two groups; the reflexology group and control group, where the pain intensity was measured by Visual Analogue Scale of 0-10. In reflexology group, the pain was measured at the time scale of 0, 2, 6, 24 hours and 20 minutes prior to each hour. In the control group the pain score was measured at the time intervals of 0, 2, 6, 24
hours only. The results showed significant decrease in the pain scores (p=0.000) as well as the requirement and quantity of painkiller drug also (p<0.009).

Wang H L and Keck J F(2004) conducted a pre-test, post-test design to determine the effectiveness of foot and hand massage on reduction of pain and sympathetic responses among post-operative patients. 18 samples were randomly selected and pain intensity and distress were measured using 0 to 10 numeric rating scale. The study findings revealed that there was a decrease in pain intensity from 4.65 to 2.35(t=8.154, p<0.001) and in pain distress from 4.00 to 1.88(t=5.683, p<0.001). Statistical analysis showed significant decrease in sympathetic responses to pain (ie. heart rate and respiratory rate). Study concluded that foot and hand massage appears to be an effective, inexpensive, no risk, flexible and easily applied strategy for post-operative pain management.

Kevin, Kunz and Kunz (2001) conducted an experimental study to determine the effect of reflexology in patients with postoperative pain after general surgery at All India Institute of Medical Science in New Delhi. The sample size was 60 patients and they were randomly divided into two groups. Pain score was measured by monitoring the visual analogue scale. In Group I pain has been measured at the time scale of 0, 2, 6, 24 hours, and also (0hrs-20min) (2hrs-20min) (6 hours -20min) (24 hours -20min). Twenty minutes is the time interval before and after therapy. In Group II, pain score had been measured only at time intervals of 0, 2, 6, 24 hrs. Findings of the study revealed that there was a significant decrease of requirement and quantity of drugs and pain score in Group I in comparison with Group II. The study concludes that there is a positive correlation between the foot reflexology and postoperative pain.
Kesselring, Spichiger and Muller (1999) conducted a study to demonstrate the effects of foot reflexology on well-being, voiding, bowel movements, pain and sleep in women who underwent abdominal surgery. 130 samples were randomly assigned to one of the three interventional groups and interventions such as foot reflexology, foot massage or talking were provided for five days which lasted for 15 minutes. Foot reflexology was offered by nurse reflexologists and the control’s interventions were provided by the nurses who cared for the patients. The study findings revealed that foot reflexology resulted in a better ability to void in samples whose indwelling catheter were removed (p=0.024). The participants of foot reflexology group slept the worst (p<0.02) and they did better than the control group samples in well-being (p<0.006) and experienced less pain (p=0.011). There were no differences among groups in the domain of postoperative bowel movements. Study also suggested foot massage as a soothing nursing intervention for post-operative patients.

Hayes and Cox (1999) conducted a nonequivalent control group, pretest-posttest design study in a University hospital in Seoul Korea among 40 patients, who were operated under general anesthesia, to investigate the effects of foot massage on pain in post abdominal operative patients. Severity of pain was checked with visual analogue scale and vital signs were measured. The severity of pain decreased significantly in the experimental group as compared to the control group following the foot massage; the pulse rate in the experimental group was lower than that in the control group following the foot massage. The systolic blood pressure in the experimental group was lower than that in control group following the foot massage.
ANXIETY

Hughes, Krirsnakriengkrai, Kumar and Donough (2011) conducted a feasibility study to assess the effect of reflexology and control interventions on anxiety, heart rate and blood pressure following mental stress test. The study recruited 25 participants who were randomly allocated to either reflexology group or control group in the Health and Rehabilitation science Research Institute at University of Ulster, Northern Ireland. Mental Stress was induced before and after intervention. Participants in the reflexology group received 20 minutes of reflexology and the control group received 20 minutes of relaxation with therapist holding each participant feet. The study design was considered to be feasible where significant reduction in systolic blood pressure (22%, p=0.03) and in diastolic blood pressure (26%, p=0.01) during mental stress following reflexology compared to the stress period prior to intervention. In contrast there was a 10% reduction in systolic blood pressure (p=0.03) but a 5% increase in diastolic blood pressure (p=0.67) during the period of mental status following the control intervention compared to results obtained during mental stress prior to the intervention.

Quattrin et al., (2006) aimed to evaluate the effectiveness of foot reflexology on anxiety patients. Among 30 patients, 15 in study and 15 in control group were allotted. The study group received foot reflexology and the Spielberger State Trait Anxiety Inventory was used to assess the level of anxiety before and 24 hours after the intervention. The average trait anxiety score during pretest in the study and the control groups was 32.4 (SD=10.1) and 28.2 (SD=11.5) and state anxiety was 55.7 (SD=7.3) and 57.1 (SD=11.9). The average score of state anxiety in the study and the control group was 47.7 (SD=4.4) and 56.3 (SD=12). It
was statistically significant at $p<0.05$ level and the average difference between the pre and post- test state anxiety in the experimental and the control group was $7.9$($SD=7.2$) and $0.8$($SD=3.3$). It was statistically significant at $p<0.0001$. The result revealed that the foot reflexology significantly reduce the level of anxiety.

Stephenson et al. (2007) conducted a study on effects of foot reflexology on anxiety. Foot reflexology alleviated anxiety and pain for twenty-three patients with breast and lung cancer. Researchers noted a significant decrease in anxiety for patients diagnosed with breast or lung cancer and a significant decrease in pain for patients with breast cancer. It was found that it had important implications for nursing practice as both professionals and lay people can be taught reflexology. Reflexology is a simple technique for human touch which can be performed anywhere, requires no special equipment, is non-invasive and does not interfere with patients’ privacy.

Gwen, Alla, Azfar and Charles (2007) conducted quasi experimental on feasibility of reflexology and guided imagery intervention during chemotherapy. 96 patients participated and convenient sampling technique was adopted. Patients selected their own choice of intervention such as reflexology, guided imagery, reflexology and guided imagery and or interview only group. Data on demographic, depression(Canters for Epidemiological Studies-Depression 20 scale(CES-D)), anxiety (State Trait Anxiety Inventory) and functional status were assessed using Functional Assessment of Cancer Therapy(FACT-G). Among 96 patients, 22(23%) were selected to use guided imagery, 40(41%) for GI and Reflex, 21(22%) reflexology and 13(14%) participated in interview only technique. The study result exposed that the participants who dropped out from the guided
imagery group had mean FACT-physical well-being scale of 16.22 Vs 19.61 for participants retained (p=0.03), emotional well-being score of 12.44 Vs 17.1 participants retained (p=0.03) and reflexology group CES-D scores of 4.83 compared to 12.53 of patients who were retained (p<0.01).

Kashani, Babaee, Bahrami, and Valiani (2012) conducted a study to determine the effect of relaxation on depression, anxiety and stress in women who underwent mastectomy for breast cancer. This clinical trial was conducted among 48 breast cancer patients who were selected by simple random sampling. They were randomly assigned into two groups of control and case. The control group was treated only by usual medical therapy, whereas the case group was treated by combined medical-relaxation therapy. Data collection tools were the validated Depression, Anxiety and Stress Scale (DASS42) and a demographic questionnaire. Data were analyzed by SPSS using descriptive statistics, repeated measures analysis of variance (ANOVA), chi-square test and paired t-test. The findings revealed that the baseline mean scores of depression, anxiety and stress were not significantly different between the case and control groups. However, the scores in the case group improved significantly after the treatment (p < 0.05). On the contrary, such improvement was not seen in the control group.

QUALITY OF LIFE

Wyatt, Sikorskii, Rahbar, Victorson and Yuo (2012) conducted a longitudinal randomized clinical trial to evaluate the safety and efficacy of foot reflexology given to specific areas of the feet on health related quality of life with Cancer Specific Health Related Quality Of Life Scale. A convenient sample of 385 Caucasian women with advanced stage 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 weekly 30 minute sessions of either foot reflexology or lay foot massage. The study findings revealed significant reduction in mean dyspnoea 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 were safe among even the most fragile patients with advanced stage of breast cancer and contributes to improvement in physical function, dyspnoea and fatigue.

Fabrice Michel et al (2013) conducted a study on Health-related quality of life and its determinants in children with a congenital diaphragmatic hernia. The aim of this study was to assess the impact of CDH treated according to the most recent concepts and methods outlined above on child survivors’ QoL and their parents’ QoL. The data on socio-demographics, antenatal history and delivery, initial hospitalization history were recorded. Self-reported data were collected by mail, including current clinical problems of the children (13-symptom list), children’s QoL (Kidscreen-27 questionnaire), and parents’ QoL (Short-Form 36 questionnaire). Children’s QoL score was compared with controls and QoL of survivors of childhood leukemia. Parent’s QoL was compared with controls. Non-parametric statistics were employed. In this study, forty-two families agreed to participate and questionnaires were completed by 32 of them. Twenty-one children had a current clinical problems related to CDH. All the QoL scores of
CHD survivors were significantly lower compared with controls. The physical well-being dimension was significantly higher for CHD survivors compared with survivors of childhood leukemia. Gastro-esophageal reflux at discharge, antenatal diagnosis, length of stay in the PICU, and neuropsychological and respiratory issues significantly impacted QoL scores of children. The parents of CHD survivors had significantly poorer score in emotional role dimension compared with controls. This study concluded that the impact of CDH on QoL seems to be important and must be understood by clinicians who treat these children and their parents.

Brittany Schroeder, Jennifer Doig, and Kalyani Premkumar (2014) conducted a study to evaluate the effect of massage therapy to improve the leg function and overall quality of life (QoL). Massage is a noninvasive treatment that many individuals with multiple sclerosis (MS) use to supplement their conventional treatment. The research design adopted in this study was a two-period (rest, massage) crossover design. Twenty-four individuals with MS ranging from 3.0 to 7.0 on the Expanded Disability Status Scale (EDSS) received Swedish massage treatments for four weeks. Exercise capacity and leg function as well as QoL were assessed using the Six-Minute Walk Test (6MWT) and the Hamburg Quality of Life in Multiple Sclerosis (HAQUAMS) instrument, respectively. Assessments were measured before and after a massage period and a rest period where no massages were employed. The results displayed no significant changes in 6MWT distances or HAQUAMS scores. However, the participants perceived improvement in overall health as expressed in written comments. This study concluded that massage is a safe, noninvasive treatment that may assist MS
patients in managing the stress of their symptoms. Future studies with larger sample size and cortisol measures are warranted.

MartinadeZwaan, Ekaterini Georgiadou, Christine E. Stroh, Martin Teufel, Hinrich Köhler, Maxi Tengler and Astrid Müller (2014) conducted a study on body image and quality of life in patients with and without body contouring surgery following bariatric surgery—a comparison of pre- and post-surgery groups. A cross-sectional study design was adopted in this study and patients prior to bariatric surgery (n=79), patients after bariatric surgery who had not undergone body contouring surgery (BCS) (n=252), and patients after bariatric surgery who underwent subsequent BCS (n=62) three groups were compared. All participants completed self-report questionnaires assessing body image (Multidimensional Body Self Relations Questionnaire, MBSRQ), quality of life (IWQOL-Lite), symptoms of depression (PHQ-9), and anxiety (GAD-7). The results revealed that 62 patients (19.2%) reported having undergone a total of 90 BCS procedures. The most common were abdominoplasties (88.7%), thigh lifts (24.2%), and breast lifts (16.1%). Post-bariatric surgery patients differed significantly in most variables from pre-bariatric surgery patients. Although there were fewer differences between patients with and without BCS, patients after BCS reported better appearance evaluation (AE), body area satisfaction (BAS), and physical functioning, even after controlling for excess weight loss and times since surgery. No differences were found for symptoms of depression and anxiety, and most other quality of life and body image domains.

Maren Schmidt, Bruno Neuner, Andrea Kindler, Kathrin Scholtz, Rahel Eckardt, Peter Neuhaus, Claudia Spies conducted a Prospective cohort pilot study
on Prediction of Long-Term Mortality by Preoperative Health-Related Quality-of-Life among Elderly Onco-Surgical Patients (2014) at Tertiary university hospital in German. The aim of the study was to evaluate the association between preoperative health-related quality of life (HRQoL) and mortality in a cohort of elderly patients (.65 years) with gastrointestinal, gynecological and genitourinary carcinomas. 126 patients scheduled for onco-surgery were included. Prior to surgery as well as 3 and 12 months postoperatively all participants completed the EORTC-QLQ-C30 questionnaire (measuring self-reported health-related quality of life). Additionally, demographic and clinical data including the Mini Mental State Examination (MMSE) were collected. Surgery and anesthesia were conducted according to the standard operating procedures. Primary endpoint was the cumulative mortality rate over 12 months after one year. Changes in Quality of life were considered as secondary outcome. The result revealed Mortality after one year was 28%. The univariable and multivariable logistic regression analysis baseline of HRQoL selfreported cognitive function (OR per point: 0.98; CI 95% 0.96–0.99; p = 0.024) and higher symptom burden for appetite loss (per point: OR 1.02; CI 95% 1.00–1.03; p = 0.014) were predictive for long-term mortality. Additionally the MMSE as an objective measure of cognitive impairment (per point: OR 0.69; CI 95% 0.51–0.96; p = 0.026) as well as severity of surgery (OR 0.31; CI 95% 0.11–0.93; p = 0.036) were predictive for long-term mortality. Global health status 12 months after surgery was comparable to the baseline levels in survivors despite moderate impairments in other domains. This study concluded that objective and self-reported cognitive functioning together with appetite loss were prognostic for mortality in elderly cancer patients. In addition, impaired cognitive dysfunction and severity of surgery were predictive for one-year
mortality whereas in this selected population scheduled for surgery age, gender, cancer site and metastases were not.

Wilkinson, Barnes and Storey (2008) conducted a review to assess evidence of the effectiveness of massage for patients with cancer, in terms of reducing physical or psychological symptoms, improving quality of life, or producing unwanted side effects using the Cochrane principles. An initial comprehensive search of electronic databases was carried out in 2003 and updated in 2006. Eligible trials were randomized controlled trials, controlled before-and-after (pre-post) studies and interrupted time-series studies. Participants were adults with a diagnosis of cancer and receiving care in any healthcare setting. Interventions were limited to massage and or aromatherapy massage carried out by a qualified therapist. Outcome measures to be included were patient-reported levels of physical and psychological indices of symptom distress and quality of life (measured using validated assessment tools). In the review, 1325 papers were considered. Ten trials met the inclusion criteria and their results suggest that massage might reduce anxiety in patients with cancer in the short term and may have a beneficial effect on physical symptoms of cancer, such as pain and nausea.

Stephenson, Swanson, Dalton, Keefe and Engelke (2007) conducted an experimental pre-test/post-test study to compare the effects of partner delivered foot reflexology and usual care plus attention on patients' perceived pain and anxiety. Patient partner dyads were randomly assigned to an experimental or control group. 42 experimental and 44 control subjects comprised 86 dyads of patients with metastatic cancer and their partners, representing 16 different types of cancer; 23% of the patients had lung cancer, followed by breast, colorectal,
and head and neck cancer and lymphoma. The subjects had a mean age of 58.3 years, 51% were females, 66% had a high school education or less, and 58% were Caucasians, 40% were Afro Americans, and 1% was a Filipino. The intervention included a 15 to 30 minute teaching session on foot reflexology to the partner by a certified reflexologist, an optional 15 to 30 minute foot reflexology session for the partner, and the partners delivered foot reflexology intervention for the patient for 30 minutes. The control group received a 30 minute reading session from their partners. Following the initial partner delivered foot reflexology, patients experienced a significant decrease in pain intensity and anxiety. A nurse reflexologist taught partners how to perform reflexology on patients with metastatic cancer pain in the hospital, resulting in an immediate decrease in pain intensity and anxiety; minimal changes were seen in the control group, who received usual care plus attention.

Hodgson, (2001) conducted a study on reflexology impact of cancer on patient’s quality of life. Twelve patients in the palliative stage of cancer with various tumour types were randomised into two groups. They were randomly assigned to receive either reflexology or placebo reflexology. All participants completed a linear analogue self-assessment scale relating to quality of life. All participants then received three sessions of either reflexology or placebo reflexology. The same person, a qualified reflexologist, provided the interventions for both groups. The participants were not aware of which intervention they were receiving. All participants then completed a second linear analogue self-assessment scale relating to quality of life. Results revealed that participants felt that their quality of life had improved, even those who had received the placebo treatment. The reflexology group, however, reported more benefits than the
placebo group. There was a significant difference (p = 0.004) between the reflexology group and the placebo group. Thus this study showed that reflexology does have an impact on the quality of life of patients in the palliative stage of cancer.

**PAIN, ANXIETY, QUALITY OF LIFE**

Attias and Schiff (2012) conducted a comparative study to evaluate the effectiveness of reflexology in improving peri-operative patient centred outcomes. 234 adult patients undergoing various abdominal surgeries were selected in which 89 patients received standard medical care and 145 patients received reflexology on top of standard medical care. Numeric VAS scores for anxiety, pain and well-being were collected pre and post treatment. The results of the study revealed significant reduction of VAS score for all outcomes i.e. anxiety score reduced from 5.2 to 3.2 (n=145, p<0.0001), pain from 5.3 to 2.9 (n=79, p<0.0001) and well-being improved from 5.2 to 6.7 (n=69, p<0.0001). Symptomatic improvement was significantly better in reflexology group as compared to the standard of care group for all parameters (p>0.001). In the sub group, patients experienced moderate to severe symptoms, more prominent improvement was found, where anxiety scores were reduced from 7.1 to 2.7 (n=94, p<0.0001); pain from 7.2 to 4 (n=54, p<0.0001) and well-being improved from 3.7 to 6.4 (n=47, p<0.0001). The study concluded that reflexology therapy significantly improved the common symptoms in patients who had undergone surgical intervention.

Taha and Ali (2011) conducted a study to measure the effect of reflexology on pain and quality of life (QOL) in patients with Rheumatoid
Arthritis (RA). An 8-week course of reflexology treatments were given to patients who had RA. A quasi experimental research design was used with 2-month follow-up. The study was conducted in the outpatient clinic of the RA Departments at Zagazig University Hospital, on 39 female adult patients diagnosed as having RA without deformity of bones or destruction of joints. Perceived pain and QOL were assessed using three validated outcome measures: Bio-socio-demographic and disease (RA) characteristics, the Rheumatoid Arthritis Quality of Life (RAQOL) questionnaire, the Pain Assessment Questionnaire (Numerical Rating Scale) and Health assessment questionnaire (HAQ). The study results revealed that improvements in patients’ QOL, pain and health status at the post-intervention phase and at the follow-up phase. Satisfaction QOL scores had moderate statistically significant negative correlations with the duration of illness throughout the study phases, while the scores of the importance of QOL had weak to moderate statistically significant negative correlations with age and duration of illness. The study concludes that hands and feet reflexology applied to rheumatoid arthritis patients is effective in reducing their pain, improving their QOL and their total health status, and these positive impacts are not affected by patient’s age and duration of illness. Therefore, reflexology must be considered as a complementary treatment modality in rheumatoid arthritis.

Tsay, Chen, Chiu Chen, Hung-Ru Lin, and Kuan-Chia Lin (2008) conducted a randomized controlled trial to investigate the efficacy of foot reflex therapy as adjuvant therapy in relieving pain and anxiety in postoperative patients with gastric cancer and hepatocellular cancer. The study design was a randomized controlled trial. Data were collected from 4 surgical wards of a medical center in 2005 in Taipei, Taiwan. Sixty-one patients who had received surgery for gastric
cancer or hepatocellular carcinoma were randomly allocated to an intervention (n = 30) or control (n = 31) group. Patients in the intervention group received the usual pain management plus 20 minutes of foot reflex therapy during postoperative days 2, 3, and 4. Patients in the control group received usual pain management. Outcome measures included the short-form McGill Pain Questionnaire, visual analogue scale for pain, summary of the pain medications consumed, and the Hospital Anxiety and Depression Scale. Results demonstrated that patients reported moderately high levels of pain and anxiety postoperatively while patients under study were managed with patient-controlled analgesia. Using generalized estimation equations and controlling for confounding variables, less pain (P < .05) and anxiety (P < .05) over time were reported by the intervention group compared with the control group. In addition, patients in the intervention group received significantly less opioid analgesics than the control group (P < .05). Findings from this study provide nurses with an additional treatment to offer postoperative digestive cancer patients to manage the pain.

Donal and Mathuana (2008) conducted a study to assess the effect of reflexology on pain and anxiety in patients with cancer. 30 cancer patients upon hospitalization were randomly assigned to receive reflexology or no intervention. State anxiety was measured before, immediately after and 24 hours after intervention. Anxiety was reduced after reflexology, with the average score being significantly lower than in the control group (p < 0.05). The score in the reflexology group had not changed significantly from the immediate post-treatment measurement. Reflexology was taught to 42 partners of patients with metastatic cancer and compared with a control intervention where another 44 partners read to patients with similar diagnoses. The intervention was assigned randomly to the
participant couples. Each intervention lasted for 30 minutes, before and after which pain and anxiety were assessed with validated instruments. On an average, anxiety was reduced by 62% in the reflexology group compared to the 23% in the control group (p=0.001). Pain decreased by 34% after reflexology compared to 2% in the control group (p=0.001). The study did not report any side effects in the subjects. Thus, this study supported the use of reflexology for the pain relief and anxiety in cancer patients.

Kasedluksame (2005) conducted a study to compare the effect of pre-operative information, pre-operative information combined with foot reflexology with aromatherapy and conventional nursing care on unpleasant symptoms (pain, anxiety, sleeplessness, fatigue, well-being) in post-open heart surgery patients. 45 post-open heart surgery patients were selected through purposive sampling and were arranged into one control group and two experimental group. Data were collected with the questionnaire that included demographic profile and unpleasant symptoms form. In this study, the control group received conventional care where the study group I received information on pain relief after cardiac surgery and group II received information on pain relief after cardiac surgery along with foot reflexology with aromatherapy on 1st, 2nd, and 3rd day after open heart surgery. The study findings from mean scores, revealed that the unpleasant symptoms scores in group which received pre-operative information combined with foot reflexology with aromatherapy was lowest, which showed that the mean of unpleasant symptoms score in open-heart surgery patients add 3 times, were statistical different among the groups at the level of 0.05.

Nancy et al., (2007) conducted a study to evaluate the effect of partner delivered foot reflexology on cancer pain and anxiety among 86 patients at
Southeastern United States. The patients were diagnosed with 16 different groups of cancer. 23% had lung cancer, followed by breast, colorectal, head, neck and lymphoma. The subjects had mean age of 58.3 years, 51% were females, 66% had a high school education, 58% were Caucasians, 40% were Afro Americans and 2% were Filipinos. The study group was exposed to 15 to 30 minutes of teaching section of foot reflexology to the partner by a certified reflexologist and an optional 15 to 30 minute foot reflexology section for the partner and 30 minutes partner delivered foot reflexology intervention for the patients. The control group received a 30 minutes reading section from their partners. The study result revealed that significant differences were found on post intervention pain, between the total intervention and the control groups \( (1,83)=11.74, p=0.001 \) eta squared =0.12 a moderate effect) and on the experimental and control subgroup with moderate to sever pre intervention pain \( F(1,29)=8.41, p=0.007 \) eta squared =0.23,a large effect). The total experimental group had a 34% reduction in pain from baseline to post intervention compared to only a 2% reduction in the control group. With regard to anxiety, significant differences were found on post intervention anxiety between the total intervention and the control group \( F(1.83)=12.27, p=0.001, \text{eta squared}=0.13 \) a moderate effect) and for the total group, 48% of the intervention group and 32% of the control group experienced an anxiety score reduction.

Oncology nursing forum (2000) conducted a study to test the effects of foot reflexology on anxiety and pain in patients with breast and lung cancer. Quasi experimental pre-post, cross over design was used in a medical oncology unit in a 314 bed hospital in the South-eastern United States and were receiving regularly scheduled opioids and adjuvant medications on the control and intervention day.
Procedures included an intervention condition (foot reflexology to both feet for 30 minute) and a control condition for each patient (with at least a two day break). No changes were made in patient’s regular schedule or medications following the foot reflexology intervention, the end result showed patients with breast and lung cancer experienced a significant decrease in anxiety. One of the three pain measures showed that breast cancer experienced a significant decrease in pain.

**OTHER PARAMETERS**

Dalal, Bharathi Maran, Pandey and Manjari (2014) conducted a study to explore the efficacy of foot reflexology on physiological parameters in diabetic neuropathic patients. 58 patients diagnosed with diabetic neuropathy were randomly distributed into reflexology and control groups in which both group’s patients were treated with ongoing pharmacological drugs. Reflexology group patients were additionally treated holistically with the hypothesis that this therapy would bring homeostasis among body organ functions. This was a caregiver-based study with a follow-up period of 6 months. The outcome measures were pain reduction, glycemic control, nerve conductivity, thermal and vibration sensitivities. The skin features leading to the detection of the abnormal functional states of body parts were also recorded and analyzed. Results of the study revealed reflexology group showed more improvements in all outcome measures than those of control subjects with statistical significance. Thus the study exhibited the efficient utility of reflexology therapy integrated with conventional medicines in managing diabetic neuropathy.

Wan-An Lu, Gau-Yang Chen and Cheng-Deng Kuo (2011) study investigated the effect of foot reflexology (FR) on the autonomic nervous
modulation in patients with coronary artery disease (CAD) by using heart rate variability analysis. 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. Results revealed that in both control and CAD groups, the nHFP was increased significantly whereas the nVLFP decreased significantly 30 and 60 minutes after FR, as compared with those before FR. The systolic, diastolic, mean arterial, and pulse pressures were decreased significantly after FR in both groups of participants. In the CAD group, the percentage change in heart rate 30 and 60 minutes after FR was smaller than that in the control, and the percentage change in nVLFP 60 minutes after FR was smaller than that in the control. In conclusion, a higher vagal modulation, lower sympathetic modulation, and lower blood pressure can be observed following 60 minutes of FR in both controls and CAD patients.

Alexandropoulou et al., (2009) conducted a three-armed randomized, controlled trial that aimed to determine the effects of reflexology on host defense and endocrine function in women with early breast cancer. Six weeks after surgery for early breast cancer, 183 women were randomly assigned to self-initiated support (SIS), SIS plus foot reflexology, or SIS plus scalp massage. Data were collected at three time points: T1 (6±1 week post breast surgery), T2 and T3 (4 and 10 weeks post completion of CAM, respectively). Patients randomized to reflexology or massage received 8 sessions at weekly intervals for 8 weeks commencing 7 weeks after surgery. Peripheral blood mononuclear cells and serum
were isolated at T1 (6 weeks post-surgery; baseline), T2 and T3 (4 and 10 weeks post completion of intervention, respectively). Lymphocyte phenotyping found that CD25+ cells were significantly higher in the massage group compared with the SIS group at T3. The percentage of T cells, and more specifically the T helper subset expressing IL4, decreased significantly in the massage group compared with the SIS group at T3. This change was accompanied by an increase in the percentage of CD8+ T cytotoxic cells expressing IFNγ in the massage group. Natural killer and lymphokines activated killer cell cytotoxicity measurements, serum levels of cortisol, prolactin and growth hormone, and flow cytometry assessment of their corresponding receptors all revealed no significant differences between the three groups of patients. This study provided evidence that the immunological balance of patients can be altered in a potentially beneficial manner by massage.

Ko YS and Park MK (2007) conducted a study that examined the effects of self–foot reflexology on fatigue and sleep states. A non-equivalent pre-test post-test quasi-experimental study was performed among 40 female nurses. Self-foot reflexology was prescribed for 20 women nurses in the study group for 40 minutes, 2 times/week during 4 weeks on right and left feet. The results revealed that the fatigue score of the study group was found lower than that of the control group and sleep states score in the study group were significantly higher than that of the study group.

Csk Ross et al., (2002) conducted a randomized control trial on the effect of foot reflexology on mood and symptom rating of advanced cancer patients at Fairmile Marie Curie Centre. The study was conducted among 26 patients. The
study group received foot reflexology and the control group received foot massage. Hospital Anxiety and Depression Scale was used to assess the mood. The study results revealed that foot reflexology is a very pleasurable experience for cancer patients in the palliative setup.

Sudmeier et al., conducted a study on “The Effect of Reflexology on Kidney Function”. 32 healthy young adults (17 women, 15 men) were randomly assigned to the verum or placebo group. The verum group received foot reflexology at zones corresponding to the right kidney, the placebo group was treated on other foot zones. Before, during and after foot reflexology, the blood flow of three vessels of the right kidney was measured using colour doppler sonography. The result shows that the organ-associated with foot reflexology is effective in changing renal blood flow during Foot Reflex therapy as a Supportive Care Intervention for children with cancer.

Egger I et al., conducted a study on the influence of reflex zone therapy of the feet on intestinal blood flow measured by color Doppler zoography 32 healthy adults (19 women and 13 men) were randomly assigned to the treatment or the placebo group. Subjects of the treatment group received foot massage on the zones assigned to the intestines and those of the placebo group received massage on zones unrelated to the intestines. Before, during and after FRZM, the blood flow velocity, the peak systolic and the end diastolic velocities in the superior mesenteric artery as well as the resistive index as a parameter of vascular resistance were calculated. The result revealed that the reduction in the resistive index observed in the treatment group which supported the assumption that FRZM improves blood flow in the organs.
Frankel (2005) has done a study on the effect of reflexology on bar receptor reflex sensitivity, blood pressure and sinus arrhythmia. Frankel found that “The reflexology and foot massage groups showed significantly greater reductions in bar receptor reflex sensitivity compared to the control group. This study found no significant difference in blood pressure after intervention. The frequency of sinus arrhythmia after reflexology and foot massage increased by 43.9% and 34.1%, respectively.

Vicar Greenwood, Fewell, Arcy, Chandrasekaran, Aldridge (2007) conducted a cross-over experimental design on evaluation of anxiety, Salivary cortisol and melatonin secretion following reflexology treatment at LCI Anglia Ruskin University, UK. Thirty patients participated and the outcome measures of pain, anxiety and cardiovascular parameters, salivary cortisol and melatonin concentrations were assessed before and after reflexology. The study result revealed that the salivary cortisol level had significantly reduced after foot reflex therapy.

Steenkamp et al., (2012) conducted a literature review on facilitating nurse’s knowledge of the utilization of reflexology in adults with chronic diseases, to enable informed health education during comprehensive nursing care. 1171 research radicals were reviewed for the evidence of utilization of reflexology to promote well-being and quality of life in adults with chronic diseases. There is a statistically significant evidence in terms of effectiveness of reflexology to promote well-being and to improve sensory and urinary symptoms associated with multiple sclerosis (Wang, Tsai, Lee, Chang Yang 2008) and a primary experimental study supported the evidence of the systematic review (Siev-Ner, Gamus, Lerner-Geva & Achiron 2003). A statistically significant reduction in the frequency of seizures of patients with intractable epilepsy was reported by a primary experimental study of evidence class A (Dalai, Tripathi & Bajpai 2008).
PART II

2.2 CONCEPTUAL FRAMEWORK

Callista Roy Adaptation Model

Nursing theories frame, explain or define the provision of nursing care. The investigator identified Sister Callista Roy Adaptation Model to be suitable for this study. Roy's model sees the individual as a set of interrelated systems such as biological, psychological, social and the individual strives to maintain a balance between these systems and the outside world, but there is no absolute level of balance. Individuals strive to live within a unique band in which he or she can cope adequately.

Roy's model sees ‘a person’ as "a biopsychosocial being in constant interaction with a changing environment. The person is an open, adaptive system who uses coping skills to deal with stressors. Roy sees the ‘environment’ as "all conditions, circumstances and influences that surround and affect the development and behaviour of the person".

Roy describes stressors as stimuli and uses the term residual stimuli to describe those stressors whose influence on the person is not clear. Originally, Roy wrote that health and illness are in a continuum with many different states or degrees possible. Roy's goal for nursing is "the promotion of adaptation in each of the four modes, thereby contributing to the person's health, quality of life and dying with dignity".

It has four modes which includes physiological, self-concept, role function and interdependence. Basic to Roy’s model are three concepts: the human being,
adaptation, and nursing. The human being is viewed as a biopsychosocial being who is continually interacting with the environment. The human being’s goal through this interaction is adaptation. The person has two major internal processing subsystems, the regulator and the cognator." These subsystems are the mechanisms used by human beings to cope with stimuli from the internal and external environment. The regulator mechanism works primarily through the autonomic nervous system which includes endocrine, neural, and perception pathways. This mechanism prepares the individual for coping with environmental stimuli. The cognator mechanism includes emotions, perceptual/information processing, learning, and judgment. Three types of stimuli influence an individual’s ability to cope with the environment. These induce focal stimuli, contextual stimuli, and residual stimuli. Adaptation occurs in four modes which include the physiologic mode, the self-concept mode, the role function mode, and the interdependence mode. The goal of nursing is to promote adaptation of the client during both health and illness in all four of the modes.

**Input**

The post operative patients exposed to variety of stimuli has to adopt. The adaptation depends on the degree and type of exposure to the stimuli. According to Roy’s adaptation, the types of stimulus are residual, contextual and residual stimuli and to cope up using these stimuli, the patients should get exposed to different types of comfort devices and therapies.

**Focal stimuli**

Focal stimuli are those that immediately confront the individual in a particular situation. In the current study the surgical incision pain is experienced by the patients who have undergone major abdominal surgery is a focal stimuli.
**Contextual stimuli**

Contextual stimuli are those internal, external and all other stimuli that influence the situation. In this study the acute post operative pain is influenced by anxiety, type of surgery, age, gender, BMI, Co-morbidity, anxiety and social support.

**Residual stimuli**

Residual stimuli include the individual’s beliefs or attitudes that may influence the situation. In this study previous history of hospitalization, type of surgery, pain threshold, marital status, type of family, monthly income experience with health care providers, lack of knowledge regarding outcome of the surgery.

**Control process**

The control process includes biological and psychological coping mechanisms. It has two subsystem coping mechanism.

**Regulator**

The individual’s regulator mechanism is involved primarily with the physiological mode. The input is mediated by one of the control process subsystems which is a regulator coping mechanism. The regulator mechanism is an automatic neuroendocrine response. In this present study, the neuroendocrine response includes secretion of pain modulator (prostoglandine, substance B and H) and mode elevators (seratonine).
Cognator

The cognator subsystem represents perception, information, processing and judgements influenced by learning and emotion. In this study the patient has had accepted to receive the foot reflex therapy by the investigator and to follow with care given by patients care giver at home after discharge from the hospital and accepted FRT demonstration and information.

Output

Output is the adaptative or non adaptative behaviour. The adaptation occurs if the stimuli is well controlled and the maladaptation is due to inadequate control of stimuli. The residual and focus stimuli are well controlled. In the current study, the foot reflex therapy has well controlled the level of post operative pain and anxiety and quality of life. In the current study the adaptative behaviours were decreased (or) absence of pain, anxiety and normal bio physiological parameters such as BP systolic, BP diastolic, pulse rate, respiration rate, oxygen saturation and improved QOL. The non adaptative behaviors were elevated (or) persistent pain and anxiety, altered bio physiological parameters and impaired QOL.

Feed back

The non adaptative behavior may lead to feedback. The adaptation level results from the pooled effect of all other relevant stimuli.

Adaptation Mode

These include the physiologic mode, the self-concept mode, the role function mode, and the interdependence mode.
Physiologic mode

In physiological mode, adaptation involves the maintenance of physical integrity. Basic human needs such as nutrition, oxygen, fluids, and temperature regulation are identified with this mode. In the current study the level of pain, pulse respiration, blood pressure and oxygen saturation were measured.

Self concept mode

A function of the self-concept mode is the need for maintenance of psychic integrity. Perceptions of one’s physical and personal self are included in this mode. In the current study, level of anxiety, quality of life were consider as self concept mode.

Role function mode

The need for social integrity is emphasized in the role function mode. When human beings adapt to various role changes that occur throughout a lifetime, they are adapting in this mode. Restlessness, non cooperation with care providers are all mal adaptative response. The need for social integrity is also emphasized in the interdependence mode.

Interdependence mode

Interdependence involves maintaining a balance between independence and dependence in one’s relationships with others. Dependent behaviors include affection seeking, help seeking, and attention seeking. Independent behaviors include mastery of obstacles and initiative taking. The goal of nursing is to promote adaptation of the client during both health and illness in all four of the modes. In current study patient care giver delivered foot reflex therapy at home after discharge from the hospital was accepted by the patients.
ENVIRONMENTAL STIMULI

Focal Stimuli
- Post Operative Pain

Contextual stimuli
- Type of Surgery
- Age
- Gender
- BMI
- Co-morbidity

Residual Stimuli
- Pain Threshold
- Marital Status
- Type of Family
- Monthly Income
- Lack of knowledge on surrounding

Foot Reflex Therapy

Feed Back

Interdependent Mode
Relationship investigator of Patient Care giver

Cognator
- FRT by Investigator
- FRT by PCG
- FRT

Physiological Mode
- Pain Perception
- Effect on bio physiological parameters BP, O₂, Pulse Respiration
- Level of QOL
- Level of Anxiety

Regulator
- Release of Chemical Pain mediators
  (Prostoglandine Brakykine)
- Neural pathway painful stimuli mediated by nonpainful stimuli
- Endocrine change secretion of seratonica

Out put

Non Adaptive Behaviour
- Elevated/persistent of pain
- Altered bio physiological parameter (BP, O₂, Saturation Pulse, Respiration)
- Persistent Anxiety
- Impaired QOL

Effective

Adaptive Behaviour
- Decreased/Absence of pain
- Normal bio physiological Parameters BP, Pulse, Respiration, O₂ Saturation
- Decreased/Absence of Anxiety
- Normal
- Improved QOL

Figure 2.1: Conceptual Framework of Foot Reflex Therapy on post operative pain based on Roy’s Adaption