CHAPTER II

REVIEW OF LITERATURE

A review of literature is an essential aspect of scientific research. It provides a basis for future investigations. It justifies the need for replication, throws light on the feasibility of the study, indicates constraints of data collection and helps to relate the findings from one study to another with a view to establish a comprehensive body of scientific knowledge in a professional discipline.

This chapter consists of two sections:

**Section A:** Review of literature

**Section B:** Conceptual framework

**Section A**

**Review of related literature**

The collected reviews are categorized as

- Biophysiological status of postoperative period
- Impact of pain on surgical outcome
- Anxiety and depression among postoperative patients.
- Impact of anxiety and depression on surgical outcome
- Effectiveness of Reiki therapy
- Effects of Reiki therapy on surgeries and interventions

**Section B**

**Conceptual Framework**

Callista Roy's adaptation model (1970) was adopted for this study.
2.1 REVIEW OF RELATED LITERATURE

1. Biophysiological status of postoperative period

Pimentel, Clifton, Clifton, Watkinson and Tarassenko (2013) explained that patients who undergo upper-gastrointestinal surgery have a high incidence of post-operative complications, often requiring admission to the intensive care unit several days after surgery. A dataset comprising observational vital sign data from 171 post-operative patients taking part in a two-phase clinical trial at the Oxford Cancer Centre, was used to explore the trajectory of patients' vital sign changes during their stay in the post-operative ward using both univariate and multivariate analyses. The vital sign distributions from "normal" patients were found to vary over time from admission to the post-operative ward to their discharge home, but no significant changes in their distributions were observed from halfway through their stay on the ward to the time of discharge. The model of normality identified patient deterioration when tested with unseen "abnormal" data, suggesting that such techniques may be used to provide early warning of adverse physiological events.

Afuwape, Ogole and Ayandipo (2013) aimed to audit indications for splenectomy at the University College Hospital, Ibadan and to compare the intra-operative findings in trauma-related cases with the sonographic findings. The investigator retrospectively reviewed all adult (12 years and older) patients' records who had splenectomy between July 2003 and June 2010. Eighty-four patients were reviewed in the 7-year review period. The male to female ratio was approximately 2:1. The ages ranged from 14 to 76 years with a peak incidence in the third decade. Elective indications for splenectomy were 14 (16.6%), while 70 (83.3%) were emergency cases. Forty-four of the trauma-related patients had pre-operative abdominal ultrasound, of which 31 (70%) was reported as
sonographically normal prior to surgery, while the rest of the trauma-related cases were considered too ill for ultrasonography. Potentially significant injuries may be missed with screening sonography. For this reason, a physician must maintain a high index of suspicion and consider the patient's clinical status or an alternative imaging modality in excluding a diagnosis of splenic injury.

Seong Tan, Nik Mohamad, and Gan (2013) identified the association between pain intensity and its control by intravenous patient-controlled analgesia (IV-PCA) with fentanyl after a laparotomy for cystectomy/salphingoophorectomy, myomectomy, or hysterectomy in Malaysia. IV fentanyl infusion was administered to patients (n = 94) at 3 µg/kg/h to provide intraoperative analgesia after induction of general anesthesia. Postoperative fentanyl requirements were quantified via IV-PCA, and the amounts of rescue fentanyl required both during and after surgery were recorded. Mean values for PCA use as well as the visual analogue scores (VAS) for pain were documented for upto 24 hours. Subjects who underwent operations lasting >4 hours required more rescue fentanyl during surgery (p < 0.05). However, this group consumed less fentanyl during the first 4 hours after surgery (p < 0.05). The demand at the fourth 4-hour period was lower among subjects undergoing myomectomy compared with cystectomy/salphingoophorectomy or hysterectomy (p = .045). Only a poor correlation was observed between pain intensity and analgesic usage. Postoperative pain intensity was influenced by the type of surgical incision but neither the type of gynecologic surgery nor the duration of surgery. The relationship between subjective pain ratings with analgesic consumption is weak.

Sondra Fettes, Mary Mulvaine and Elaine Van Doren (2013) assessed the effect of preoperative forced-air warming on postoperative temperature and postanesthesia care unit
length of stay at Oaklawn Hospital, Marshall. Unintended hypothermia in the surgical patient has been linked to numerous postoperative complications, including increased risk for surgical site infection, increased oxygen demands, and altered medication metabolism. The lack of literature on the subject was part of the impetus for perioperative nurses in one hospital to conduct a quality improvement project to evaluate the effectiveness of preoperative warming on patients’ postoperative temperatures. 128 patients were randomly assigned to either a group that received a forced-air warming blanket preoperatively or a group that did not. Results showed that prewarming patients before surgery did not have an effect on patients’ postoperative temperatures.

Brandsborg (2012) described the epidemiology, type of pain, risk factors, and predictive factors associated with chronic pain after hysterectomy for a benign indication in Denmark among 1135 women one year after hysterectomy. Chronic postoperative pain was described by 32%, and the identified risk factors were preoperative pelvic pain, previous cesarean section, other pain problems and pain as an indication for hysterectomy. Spinal anesthesia was associated with a decreased risk of having pain after one year. The type of surgery (i.e. abdominal or vaginal hysterectomy) did not influence chronic pain.

Pinto, McIntyre, Nogueira-Silva, Almeida, and Araújo-Soares (2012) examined the role of demographic, clinical, and psychological risk factors in the development of persistent post surgical pain (PPSP) after hysterectomy due to benign disorders in Portugal. In a prospective study, a consecutive sample of 186 women was assessed 24 hours before surgery (T1), 48 hours after surgery (T2), and 4 months after surgery (T3). Regression analyses were performed to identify predictors of PPSP. Four months after hysterectomy, 93 (50%) participants reported experiencing pain (numerical rating scale
Age, pain due to other causes, and type of hysterectomy emerged as significant predictive factors. Baseline presurgical psychological predictors identified were anxiety, emotional illness representation of the condition leading to surgery and pain catastrophizing. Among the identified psychological predictors, emotional illness representation emerged as the strongest. Acute postsurgical pain frequency and postsurgical anxiety also revealed a predictive role in PPSP development. These results increase the knowledge on PPSP predictors and point healthcare professionals toward specific intervention targets such as anxiety (presurgical and postsurgical), pain catastrophizing, emotional illness representations, and acute pain control after surgery. This study found that presurgical anxiety, emotional illness representations, and pain catastrophizing are risk factors for PPSP 4 months after hysterectomy, over and above age and clinical variables. These findings improve knowledge on PPSP and highlight potential intervention targets for healthcare professionals.

Bergeron, Leduc, Marchand and Bourgault (2011) conducted a descriptive study to examine and analyze various data related to the postoperative pain assessment of 40 patients who underwent elective surgery in Sherbooke, Canada. Pain journals were to be completed by patients during every waking hour for the first three postoperative days to assess both pain intensity and pain unpleasantness. A post hoc analysis of patient records permitted verification of pain assessment by nurses for each patient. The results showed that not only was postoperative pain rarely assessed using a valid scale, it was also poorly documented. For the first postoperative day, the mean (± SD) pain intensity documented by nurses on a 0 to 10 numerical scale was 1.57±0.23, while the mean pain intensity noted by patients using the same scale was 3.82±0.41. Statistical analysis showed that there was
no significant correlation between mean pain intensity documented by nurses and the mean pain intensity noted by patients.

Enes, Semir, Sefik, Husnija and Goran (2011) evaluated the intensity of postoperative pain and benefits of laparoscopic cholecystectomy compared to open cholecystectomy especially after anaesthetic infiltration of surgical incision at Cantonal Hospital Zenica, Bosnia and Herzegovina. This prospective cohort study included three groups of 30 patients each. All patients were of similar age, sex and ASA risk (American Society of Anaesthesiologists). Pain intensity was assessed seven times and its evaluation was performed using VAS (Visual Analogue Scale). Postoperative pain intensity was lower in patients operated by laparoscopic technique compared to the open method, measured on the VAS, especially for the first and second measuring. This difference is pronounced throughout the entire postoperative period (p<0.001). The pain intensity was significantly lower in patients treated with local anaesthetic (p<0.05). Laparoscopic cholecystectomy should be preferred over open cholecystectomy with respect to the intensity of postoperative pain, particularly after the application of local anaesthetic.

Hickey, Nugent, Burke, Hafeez, Mudrakouski and Shorten (2011) determined the prevalence of persistent postsurgical pain (PPSP) and its influence on functional status and examined associations between PPSP and single nucleotide polymorphisms of the catechol-O-methyltransferase (COMT) gene and the guanosine triphosphate cyclohydrolase 1 (GCH1) gene following mastectomy and reconstruction at Wilton, Ireland. A retrospective study was conducted at two teaching hospitals in Ireland. From the population of women who had undergone breast reconstruction following mastectomy for breast cancer over a 6-year period, 42 women agreed to participate in the assessment
Blood was taken for genetic analysis. 42 (55.3%) patients took part in the assessment and 18 (43%) reported PPSP. Those with PPSP achieved lower scores on the Patient-Specific Functional Scale (P = 0.040) and had been given more morphine perioperatively. A trend was noted between occurrence of PPSP and the val158met polymorphism of the COMT gene (P = 0.06). Persistent pain after mastectomy and breast reconstruction has a high prevalence (43%). Genetic mutations may contribute to the development of persistent pain following surgery.

Khan, Ahmed, Blakeway, Skapinakis, Nihoyannopoulos, Macleod, et al. (2011) described the concept of pain catastrophizing, its association with postsurgical pain, and its potential role in the management of postsurgical pain and postsurgical quality of life in London. Data for this review were identified from MEDLINE, EMBASE, and PsycINFO. Reference lists of selected articles were cross-searched for additional literature. High catastrophizing levels were found to be associated with increased pain severity, increased incidence of development of chronic pain, and poorer quality of life after surgery. There was no consensus on the relation between catastrophizing and analgesia consumption. Identifying and reducing catastrophizing levels can help to optimize pain management in surgical patients.

Stephan Schug and Esther (2011) reported that around 40% of 5130 chronic pain patients in 10 pain clinics in the United Kingdom had developed their chronic pain problem after surgery or trauma. This findings has led to a dramatic increase in interest in
this subject; searches on Pubmed for key words such as chronic or persistent postsurgical pain now reveal hundreds of publications on this topic. While most of these papers analyze pain after surgery, the original publication also suggested trauma as another major precursor of chronic pain. This suggestion has been confirmed by subsequent studies; in principle, every chronic pain has been acute pain at some stage. The problem is not limited to major surgery or major trauma, as even minor operations such as herniotomy can have significant consequences with regard to development of chronic pain. An editorial on the topic stated that “chronic pain is the most common and serious long-term problem after repair of an inguinal hernia”. The consequences of chronic postsurgical or post-traumatic pain are significant, not only in terms of suffering and reduced quality of life for the individual patient but also with regard to the subsequent costs to the health care and social support systems of our societies.

Ceyhan and Gulec (2010) analyzed whether postoperative pain is only nociceptive pain or not in Turkey. More than 75% of patients undergoing surgery suffer from acute pain. Most of this pain transforms into chronic pain. Currently, treatment of postoperative pain is based mainly on opioids, but results are not quite satisfactory. Postoperative pain is defined as a condition of tissue injury together with muscle spasm after surgery. Recently, peripheral and central sensitization has been shown within the mechanisms of postoperative pain generation. Accordingly, anti-convulsive drugs have been used successfully for the treatment of postoperative pain. Therefore, the issue of whether postoperative pain is purely a nociceptive pain remains a topic of debate. Considering that every surgical intervention might result in a nerve injury, it is not surprising to find neuropathic pain features within the postoperative pain itself. In light of these findings, it would be more precise to define postoperative pain as a combination of
inflammatory and neuropathic components instead of as pure pain. Thus, the appropriate postoperative treatment should be planned involving both of these components.

Werner, Mjobo, Nielsen and Rudin (2010) conducted a systemic review on predictive experimental pain studies. They reviewed 14 studies that have investigated the correlation between preoperative responses to experimental pain stimuli and clinical postoperative pain and demonstrated that the preoperative pain tests may predict 4-54% of the variance in postoperative pain experience depending on the stimulation methods and the test paradigm used. The predictive strength is much higher than previously reported for single factor analyses of demographics and psychologic factors. In addition, some of these studies indicated that an increase in preoperative pain sensitivity was associated with a high probability of development of sustained postsurgical pain.

Yan, Tingting, Yin, Wenjin, Zhou, Liheng, et al. (2010) performed a retrospective study of 883 female unilateral patients with lymph node negative breast cancer. Fever was defined as an oral temperature ≥38 in one week postoperation. Survival curves were performed with Kaplan-Meier method, and annual relapse hazard was estimated by hazard function. The fever patients were older than those without fever (P<0.0001). Hypertensive patients had a propensity for fever after surgery (P = 0.011). In the univariate survival analysis, we observed postoperative fever patients were more likely to recur than those without fever (P = 0.0027). The Cox proportional hazards regression analysis showed that postoperative fever (P = 0.044, RR = 1.89, 95%CI 1.02-3.52) was an independent prognostic factor for relapse-free survival. Postoperative fever may contribute to relapse in node negative breast cancer patients, which suggests that changes in host milieu related to fever might accelerate the growth of micro-metastatic foci.
Brandsborg, Dueholm, Nikolajsen, Kehlet, and Jensen (2009) conducted a prospective study of risk factors for pain persisting 4 months after hysterectomy in Denmark. Ninety women referred for hysterectomy for benign conditions completed the study. The women were interviewed and completed pain questionnaires before surgery and after 3 weeks and 4 months. Fifteen women (16.7%) had persistent pain 4 months after hysterectomy. In 11 women, the pain resembled their preoperative pain, whereas 4 women had pain likely to be related to surgery. Preoperative "pain problems elsewhere" and a high "acute postoperative pain intensity" were associated with having pain 4 months after hysterectomy (p = 0.004 and p = 0.034). A similar tendency was seen for preoperative "pelvic pain" (p = 0.059). Women with pain at 4 months reported lower quality of life in 4 Short Form-36 subscales and less control of pain preoperatively (p < 0.05 and p = 0.023). Pain persisting 4 months after hysterectomy is most often related to preoperative factors and acute postoperative pain.

Brandsborg, Nikolajsen, Hansen, Kehlet and Jensen (2007) conducted a nationwide questionnaire and database study on the risk factors for chronic pain after hysterectomy for benign indications after one year at Danish Pain Research Center. A pain questionnaire was mailed to 1,299 women 1 year after hysterectomy. Pain was reported by 31.9% 1 year after hysterectomy (chronic pain), and 13.7% had pain more than 2 days a week. Thirty two percent had chronic pain after hysterectomy and risk factors were comparable to those seen in other operations. Spinal anesthesia was associated with a lower frequency of chronic pain, justifying prospective study of spinal anesthesia for patients with a high risk for development of chronic postsurgical pain.
Pogatzki-Zahn, Zahn, Brennan, Igor Kissin and Simon Gelman (2007) investigated the clinical implications of basic research for postoperative pain in Germany. Postoperative incision pain is a unique and common form of acute pain. Although ample evidence indicated that an officious postoperative pain treatment reduces patient morbidity and patient outcome, recent studies demonstrated that about 50-70\% of patients experience moderate to severe pain after surgery indicating that postoperative pain remains poorly treated. Perhaps important reasons for this quandary were distinct mechanisms of incisional nociception compared to other pain conditions limiting the regimen to drugs designed for other clinical pain problems. Another reason might be the lack of an in-depth knowledge about the pathophysiology and neuropharmacology of postoperative pain.

Jeffery (2003) assessed patients’ postoperative pain experience and the status of acute pain management among 250 adults who had undergone surgical procedures in the United States, through National Family Opinion. Approximately 80\% of patients experienced acute pain after surgery. Of these patients, 86\% had moderate, severe, or extreme pain with more patients experiencing pain after discharge than before discharge. Experiencing postoperative pain was the most common concern (59\%) of patients. Almost 25\% of patients who received pain medications experienced adverse effects. Despite an increased focus on pain management programs and the development of new standards for pain management, many patients continue to experience intense pain after surgery.

2. Impact of pain on surgical outcome

Eker, Hansson, Buunen, Janssen, Pierik, Hop et al. (2013) compared laparoscopic vs open ventral incisional hernia repair with regard to postoperative pain and nausea, operative results, perioperative and postoperative complications, hospital admission, and recurrence rate. Multicenter randomized controlled trial was conducted between May 1999
and December 2006 with a mean follow-up period of 35 months in Rotterdam, The Netherlands. 206 patients from 10 hospitals were randomized equally to laparoscopic or open mesh repair. Perioperative complications were significantly higher after laparoscopy (9% vs. 2%). Visual analog scale scores for pain and nausea, completed before surgery and 3 day and 1 and 4 weeks postoperatively, showed no significant differences between the 2 groups. At a mean follow-up period of 35 months, a recurrence rate of 14% was reported in the open group and 18%, in the laparoscopic group (p = 0.30). The size of the defect was found to be an independent predictor for recurrence (p < 0.001). Perioperative complications were significantly higher in the laparoscopic group. Visual analog scores for pain and nausea did not differ between groups. The incidence of a recurrence was similar in both groups.

Liebermann, Awad, Dejong, Rivard, Sinacore and Brubaker (2013) estimated whether specific ambulation goals affect the adequacy or perceived barriers to ambulation in hospitalized surgical patients after major gynecologic surgery in Illinois, USA. 146 surgical inpatients were randomized to specific ambulation goals or routine care. Of the 129 participants with outcome data, 12% were discharged without any pedometer-recorded steps. The three main barriers to ambulation from a patient perspective were indwelling catheters (38.5%), intravenous poles (28%), and pain (12.5%). The median number of postoperative steps was higher after minimally invasive surgery (143) compared with laparotomy (27) (p=0.035). Approximately 12% of gynecologic surgical patients did not walk while hospitalized despite formal encouragement to ambulate. Ambulation is easily quantified and may improve with attention to modifiable barriers, potentially improving postoperative recovery.
Elizabeth Ogboli-Nwasor, Sa’adatu T Sule, and Lazarus M. D. Yusufu (2012) aimed to study the prescription pattern and the common drugs used in the management of postoperative pain in adult surgical patients at Ahmadu Bello University Teaching Hospital (ABUTH; Zaria, Nigeria). Following ethical approval, a prospective observational study of consecutive adult patients who had surgery at the ABUTH Zaria was performed from January to December 2005. 138 patients were included in the study. The age range was 17 to 80 years, with a mean age of 41 years. 132 (95.7%) of the prescriptions were written solely by the surgeon or surgical resident; passive suggestions were given by the anesthetists for only six patients (4.3%). Intermittent intramuscular injections of opioids/opiates were prescribed for 126 patients (91.3%), while nine patients (6.5%) received intermittent intramuscular injections with non-steroidal anti-inflammatory drugs. Moderate pain was recorded in 48 patients (34.8%), and 90 patients (65.2%) had mild pain 8 hours after their operation before subsequent doses of analgesics were given. More females (58.7%), than males (29.7%) suffered moderate to severe pain. Despite recent advances and the development of more effective techniques for postoperative pain control, a high proportion of patients still experience moderate to severe postoperative pain.

Sheridan, Foo, O'Shea, Gillanders, Williams, Fallon et al. (2012) conducted a cross-sectional, questionnaire-based study to examine the emotional characteristics of patients with persistent pain after breast cancer treatment (PPBCT) in long-term breast cancer patients at Edinburgh, United Kingdom. A secondary objective was to characterize the risk factors and severity of that pain. 111 patients completed the questionnaire; 33 (29.7%) patients reported chronic pain at a median time of 64 months postoperatively (interquartile range 54.25). Patients with persistent pain were not significantly more
anxious \((t(105)=-0.369, p=0.713)\) or depressed \((t(105)=0.713, p=0.507)\) than patients without pain. Patients with constant pain compared with intermittent pain were significantly more anxious \((t(25)=-3.460, P=0.002)\). Preoperative pain conferred a fivefold increased risk of PPBCT \((\text{OR}= 5.17, 95\% \text{CI} = 1.79-14.97, p=0.002)\); chemotherapy conferred a threefold increased risk \((\text{OR}= 3.004, 95\% \text{CI} = 1.22-7.40, p=0.017)\). Significant numbers of patients suffer from PPBCT.

VanDenKerkhof, Hopman, Reitsma, Goldstein, Wilson, Belliveau, and Gilron (2012) performed a pilot study to identify potential predictors of chronic post-surgical pain (CPSP) and other outcomes to consider for inclusion in future prospective studies of CPSP following abdominal gastrointestinal surgery at Kingston, Canada. 76 surgical patients during this prospective single-centre cohort study were followed. Pain characteristics, health-related quality of life (HRQOL), and healthcare utilization were assessed preoperatively, at six weeks postoperatively, and at six months postoperatively. The results revealed that prior to surgery, 42\% of patients reported no pain, 18\% reported remote pain, and 33\% reported pain at the surgical site. Six months after surgery, 29\% of patients with preoperative remote pain and 35\% of patients with preoperative pain at the surgical site reported CPSP. Pain-related interference declined from the preoperative to postoperative period, however, six months after surgery almost one-third of participants continued to report pain-related interference with mood (28\%), sleep (30\%), and enjoyment of life (30\%). Consistent with studies of other surgical procedures, measures of anxiety and depression were associated with an increased risk of CPSP. During the six months following surgery, 12\% of patients visited the Emergency Department, 15\% visited non-traditional providers, and 9.2\% visited a walk-in clinic for pain. Compared with Canadian
norms, HRQOL was poorer in all domains preoperatively and in most domains six months postoperatively.

Ann Vincent, Mary Whipple, Connie Luedtke, Terry Oh, Richa Sood, Robin Smith et al. (2011) explored whether pain and other fibromyalgia symptoms were worse among women who had undergone a hysterectomy with or without an oophorectomy versus those who had not in the United States. A total of 813 women were included; 328 had had a hysterectomy. Total FIQ scores from women who had had a hysterectomy were higher (worse symptoms) than those who had not (58.1 vs 56.4, p< 0.002). FIQ subscale scores of pain (p<0.003), fatigue (p<0.030), stiffness (p<0.035), and depression (p<0.008) were also worse in women who had had a hysterectomy. Similar to the FIQ, SF-36 physical component scores were worse in women who had had a hysterectomy (p <0.045). Pain and other fibromyalgia symptom severity were worse in women who had had a hysterectomy with or without an oophorectomy.

Eske Aasvang (2010) identified the predisposing factors that may help to identify the risk groups and guide anesthetic or surgical procedures in reducing risk for persistant postheriotomy pain (PPP) in Germany. A prospective study was conducted in 464 patients undergoing open or laparoscopic transabdominal preperitoneal elective groin hernia repair. Pain scores were collected on days 7 and 30 postoperatively. Fifty-five patients (12.4%) had “moderate/severe” PPP at 6 months. The results revealed that increased preoperative AAS score, increased preoperative pain to heat stimulation, and open surgery increased the risk for PPP (p< 0.02).
Hickey, Burke, Hafeez, Mudrakouski, Hayes, and Shorten (2010) assessed the severity of acute pain after breast surgery and its associated with the likelihood of subsequently developing persistent pain in Ireland. Persistent postsurgical pain (PPSP) after surgery for breast cancer has a prevalence of 20% to 52%. 28 women undergoing surgery for breast cancer completed visual analogue scales for pain and anxiety, the McGill Pain Questionnaire (long form) and the Hospital Anxiety and Depression Scale. Eight participants (28.6%) reported PPSP. Those who subsequently developed PPSP reported greater pain scores on the McGill Pain Questionnaire 5 days postoperatively than those that did not (pain rating index, p=0.014; present pain intensity, p=0.032). None had sought medical attention for their persistent pain. Patients with and without PPSP had similar scores of anxiety and depression, analgesic consumption, and adverse effects of analgesic therapy. Patients who developed PPSP experienced pain of greater intensity on the fifth postoperative day than those that did not.

Wang, Sands, Vaurio, Mullen and Leung (2007) determined the effects of postoperative pain and its management on postoperative cognitive dysfunction (POCD) at Palo Alto, USA. A prospective cohort study was conducted among 225 patients > or = 65 years of age underwent noncardiac surgery. POCD was defined as meeting statistical criteria for decline from the patient's preoperative performance levels on at least two of the three cognitive tests. Patients were on average 72 years old and 13% of patients experienced POCD on day 1, 7% on day 2, and 15% had POCD on either day 1 or day 2 after the surgery. Multivariate regression analyses revealed that only postoperative analgesia was associated with the development of POCD. Compared with those receiving postoperative analgesia through a patient-controlled analgesia device that administered opioids intravenously, those who received postoperative analgesia orally were at
significantly lower risk for the development of POCD (odds ratio: 0.22; 95% confidence interval: 0.06-0.80; Wald chi-square = 5.36, df = 1, p = 0.02). Older patients undergoing noncardiac surgery who are not delirious could experience significant declines in cognitive functioning postoperatively. Those at least risk of experiencing POCD were those who received postoperative analgesia orally.

Carr, Nicky Thomas and Wilson-Barnet (2005) sought to explore the impact of the psychological variables anxiety and depression, on pain experience over time following surgery at Dorset, UK. 85 women having major gynaecological surgery were assessed for anxiety, depression and pain after surgery. To gain further understanding, 37 patients participated in a semi-structured taped telephone interview 4-6 weeks post-operatively. Preoperative anxiety was found to be predictive of postoperative anxiety on day 2, with patients who experienced high levels of anxiety before surgery continuing to feel anxious afterwards. By day 4 both anxiety and depression scores increased as pain increased and one-third of the sample experienced levels of anxiety in psychiatric proportions whilst under one-third experienced similar levels of depression. These findings have significant implications for the provision of acute pain management after surgery. Future research and those managing acute pain services need to consider the multidimensional effect of acute pain and the interface between primary and secondary care.

3. Anxiety and depression among postoperative patients.

Carroll, Barelka, Wang, Wang, Gillespie, McCue, et al. (2012) hypothesized that both preoperative psychological distress and substance abuse would predict more prolonged
opioid use after surgery at Palo Alto, USA. Between January 2007 and April 2009, a prospective, longitudinal inception cohort study enrolled 109 of 134 consecutively approached patients undergoing mastectomy, lumpectomy, thoracotomy, total knee replacement, or total hip replacement. Preoperative psychological distress, substance use, and then the daily use of opioids was measured until patients reported the cessation of both opioid consumption and pain. Overall, 6% of patients continued on new opioids 150 days after surgery. Preoperative prescribed opioid use, depressive symptoms, and increased self-perceived risk of addiction were each independently associated with more prolonged opioid use. Preoperative prescribed opioid use was associated with a 73% (95% confidence interval [CI] 0.51%-87%) reduction in the rate of opioid cessation after surgery (P = 0.0009). Additionally, each 1-point increase (on a 4-point scale) of self-perceived risk of addiction was associated with a 53% (95% CI 23%-71%) reduction in the rate of opioid cessation (P = 0.003). Independent of preoperative opioid use and self-perceived risk of addiction, each 10-point increase on a preoperative Beck Depression Inventory II was associated with a 42% (95% CI 18%-58%) reduction in the rate of opioid cessation (P = 0.002). The variance in the duration of postoperative opioid use was better predicted by preoperative prescribed opioid use, self-perceived risk of addiction, and depressive symptoms than postoperative pain duration or severity.

Lewicka, Makara-Studzińska, Sulima, Wdowiak, Bakalczuk, Polska, et al. (2012) determined the level of depression in women during the early post-operative period in Poland. 220 women treated surgically for various gynecologic conditions were enrolled. The study was done between day 4-6 after surgery using Beck's Depression Inventory (BDI). The results were analyzed statistically. It was found that the mean level of depression on the BDI scale in the study group of women was 12.24 +/- 8.73. The mean
level of depression in patients who underwent surgery using the vaginal route was significantly greater \( p = 0.003 \) than in patients after laparoscopy and patients after laparotomy. The mean level of depression in the study group approached values found in depression. Patients after surgery using the vaginal route demonstrated higher levels of depression than patients after laparoscopy. Age, education, source of subsistence, and number of children had an impact on the level of depression in the study group.

Bower, Ganz, Irwin, Kwan, Breen, and Cole (2011) was interested in studying the inflammation and behavioral symptoms after breast cancer treatment in Los Angeles. Fatigue, depression, and sleep disturbance are common adverse effects of cancer treatment and frequently co-occur. Women \( (N = 103) \) who had recently finished primary treatment such as surgery, radiation, or chemotherapy for early-stage breast cancer completed self-report scales and provided blood samples for determination of plasma levels of inflammatory markers for soluble tumor necrosis factor (TNF) receptor II (sTNF-RII), interleukin-1 receptor antagonist, and C-reactive protein. Greater than 60% of participants reported clinically significant problems with fatigue and sleep, and 25% reported elevated depressive symptoms at the end of the treatment. Women treated with chemotherapy endorsed higher levels of all symptoms and also had higher plasma levels of sTNF-RII than women who did not receive chemotherapy \( (\text{all } P < .05) \). Fatigue was positively associated with sTNF-RII, particularly in the chemotherapy-treated group \( (P < .05) \). Depressive symptoms and sleep problems were correlated with fatigue but not with inflammatory markers. Results suggested that fatigue, sleep disturbance, and depression may stem from distinct biologic processes in post-treatment survivors, with inflammatory signaling contributing relatively specifically to fatigue.
Laura B. Dunn, Bruce A. Cooper, John Neuhaus, Claudia West, Steven Paul, Bradley Aouizerat et al. (2011) identified subgroups of breast cancer patients (n=398) with distinct trajectories of depressive symptoms in the first six months after surgery, as well as predictors of these trajectories at San Francisco. Growth mixture modeling was used to identify the latent classes based on Center for Epidemiological Studies-Depression scale scores completed prior to and monthly for six months after surgery. Four latent classes of patients with distinct depressive symptom trajectories were identified: Resilient (38.9%), Subsyndromal (45.2%), Delayed (11.3%), and Peak (4.5%). Patients in the Subsyndromal class were significantly younger than patients in the resilient class. Compared to the resilient class, Subsyndromal, Delayed, and Peak classes had higher mean trait and state anxiety scores prior to surgery. Except for axillary lymph node dissection (ALND), disease- and treatment-related characteristics did not differ across the classes. A greater proportion of women in the Subsyndromal class had an ALND compared to those in the resilient class. Breast cancer patients experience different trajectories of depressive symptoms after surgery. Of note, over 60% of these women were classified into one of three distinct subgroups with clinically significant levels of depressive symptoms. Identification of phenotypic and genotypic predictors of symptom trajectories after cancer treatment warrants additional investigation.

Chiara, Jerry, Rennique, Ellison, Krohn, and Pamela (2010) compared depressive symptoms in women with and without prolapse and evaluate impact on quality of life by the University of Pittsburgh. This is a secondary analysis of a case–control study assessing the effect of prolapsed on body image. Cases had prolapse and sought surgery (Pelvic Organ Prolapse Quantification stage ≥2). Controls had stage ≤1. Subjects completed the Pelvic Floor Impact Questionnaire (PFIQ), Pelvic Floor Distress Inventory, and the Patient
Health Questionnaire-9 (PHQ-9) at baseline. Cases completed measures 6 months post-operatively. Baseline questionnaires were completed by 75 cases and 65 controls; 57 cases completed post-operative measures. Cases were 5-fold more likely than controls to have depressive symptoms. Cases with depressive symptoms had higher PFIQ scores than cases without symptoms. PHQ-9 scores improved post-operatively. Depressive symptoms are common in women with prolapse and were decreased following surgical treatment.

Hickey, Burke, Hafeez, Mudrakouski, Hayes and Shorten (2010) examined the relationship between acute pain after surgery for breast cancer and the likelihood of subsequently developing Persistent Post Surgical Pain (PPSP) in Ireland. 28 women undergoing surgery for breast cancer completed visual analogue scales for pain and anxiety, the McGill Pain Questionnaire (long form) and the Hospital Anxiety and Depression Scale. Analgesic requirements and adverse effects of analgesic therapy were noted. Eight participants (28.6%) reported PPSP. Those who subsequently developed PPSP reported greater pain scores on the McGill Pain Questionnaire 5 days postoperatively than those that did not (pain rating index, P=0.014; present pain intensity, P=0.032). None had sought medical attention for their persistent pain. Patients who developed PPSP experienced pain of greater intensity on the fifth postoperative day than those that did not.

4. Impact of depression and anxiety on postoperative outcome

Hoon, Chi Sally and Hong-Gu (2013) performed a literature review to explore the effects of preoperative and postoperative psychosocial interventions on the outcomes of patients with colorectal cancer, including physical, psychological and social functioning, as well as the quality of life. A literature search for studies on psychosocial interventions for patients with colorectal cancer published between 2002 and 2012 was undertaken from
Eleven studies met the inclusion criteria and were included after methodological quality appraisal. Various psychosocial interventions, including educational interventions, cognitive-behavioural therapy, relaxation training and supportive group therapy were found to reduce colorectal patients' length of hospital stay, days to stoma proficiency and hospital anxiety and depression, and to improve patients' quality of life. Home visits, telephone sessions, individual teaching sessions and group sessions were commonly conducted. Various forms of psychosocial interventions improved psychosocial outcomes of patients with colorectal cancer.

Marasanov, Mokhov and Gordeeva (2013) conducted a study to identify the pharmacological correction of the psycho-emotional status in breast cancer patients in the postoperative period in Russia. It was established by the presence of psychological disorders in 120 breast cancer patients in postoperative chemotherapy and considered the need for correction of revealed changes in the psycho-emotional sphere to improve the quality of life of patients. The use of psychotrophic drugs to correct the mental and emotional status in 80 women has improved their status. It had a positive effect on the postoperative course, and helped to create the installation for continued treatment.

Turaga, Malafa, Jacobsen, Schell, and Sarr (2011) found that depression is highly prevalent in patients with pancreatic cancer and could result in fatal outcomes from suicides in the United States. They reviewed data in the SEER database for patients diagnosed with pancreatic adenocarcinoma from 1995-2005. Among 36,221 patients followed for 22,145 person-years, the suicide rate was 135.4 per 100,000 person-years. The corresponding rate in the US population aged 65-74 years was 12.5 per 100,000 person-years, with a Standardized Mortality Ratio (SMR) of 10.8 (95% CI, 9.2-12.7).
Greater suicide rates were noted in males (Odds Ratio (OR) 13.5 [95% CI, 3.2-56.9, P < .001]) and, among males, in patients undergoing an operative intervention (OR 2.5 [95% CI, 1.0-6.5, P = .05]). Married men had a lesser risk of committing suicide (OR 0.3 [95% CI, 0.1-0.6, P = .002]). Median survival among patients undergoing operative intervention was 2 months for those who committed suicide compared with 10 months for those who did not commit suicide. Male patients with pancreatic adenocarcinoma have a risk of suicide nearly 11 times that of the general population. Patients who undergo an operative intervention are more likely to commit suicide, generally in the early postoperative period.

Mertens, Roukema, Scholtes and De Vries (2011) identified the predictors (clinical symptoms and trait anxiety) of negative symptomatic outcomes at 6 weeks after cholecystectomy. Consecutive patients ($n = 133$), 18–65 years, with symptomatic gallstone disease, completed symptom checklists and the state-trait anxiety inventory preoperatively and at 6 weeks after cholecystectomy. High trait anxiety was the only predictor of persistence of biliary symptoms at 6 weeks after cholecystectomy (OR = 6.88). In addition to clinical symptoms, high trait anxiety was a predictor of negative symptomatic outcome at 6 weeks after cholecystectomy.

Torer, Nursal, Caliskan, Ezer, Colakoglu, Moray et al. (2010) analyzed the effect of anxiety and depression on the postoperative complications and length of hospitalization of patients with breast cancer in Turkey. Beck's Depression Inventory (BDI) and Hospital Anxiety and Depression Scale (HADS) were filled out by the patients pre-operatively. Patients were asked to rate their pain by the visual analogue scale (VAS) after surgery. Age, seroma volume, day of drain withdrawal, complications, and pathological stages were noted. The median age of 49 patients with the diagnosis of breast cancer was 51 (36-
There was a significant correlation between the pain score and Beck, HADS, HADS (anxiety) and HADS (depression) (8 hours; \( p = 0.021, 0.001, 0.004, 0.005 \) and 24 hours; \( p = 0.005, 0.012, 0.006, 0.120 \)). The mean HADS depression score in those patients with complications was 9.1 +/- 4.2 and that of patients with no complications was 6.6 +/- 3.1 (\( p = 0.047 \)). The mean hospital stay of patients with a normal HADS score (< 19) was 2.9 +/- 1.1 days, whilst that of patients with an abnormal HADS score was 3.8 +/- 1.2 days (\( p = 0.016 \)). Patients with abnormal HADS anxiety and abnormal HADS (total) scores had an earlier stage of breast cancer (\( p = 0.077, p = 0.063 \)).

Greene, Attix, Weldon, Smith, McDonagh, and Monk (2009) designed a prospective cohort study to determine if individuals who perform poorly on preoperative cognitive tests and/or exhibited depressive symptoms would be at high risk for the development of postoperative delirium. One hundred non-demented patients, 50 years and older, scheduled for major, elective noncardiac surgery at the Duke University completed a preoperative test battery that included measures of global cognition, executive function and symptoms of depression. The overall incidence of delirium was 16% and was associated with increased hospital length of stay (\( p<0.05 \)) and an increased incidence of postoperative complications (\( p<0.01 \)). Delirious subjects did not differ from their non-delirious cohorts with regard to their preoperative global cognitive function, preexisting medical comorbidities, age, anesthetic management or history of alcohol use. Preoperative executive scores (\( p<0.001 \)) and depression (\( p<0.001 \)), as measured by the Trail Making B test and Geriatric Depression Scale Short Form, respectively, were found to be independent predictors of postoperative delirium.
Sharma, Sharp, Walker, and Monson (2007) found that the predictors of early postoperative quality of life (QoL) after colorectal cancer resection are not clear and aimed to identify those factors. A consecutive series of eligible patients undergoing elective resection for colorectal cancer were invited to participate from Hull, UK. Standardised, reliable and validated psychological questionnaires (HADS, PANAS, MRS, FACT-C, EQ-5D) were administered seven days prior to surgery and then six weeks after discharge. 104 patients with colorectal cancer were recruited. There were 70 males (67.3%) and the mean age of the group was 67.6 years. Postoperative anxiety and depression were closely related to the preoperative anxiety and depression scores \(p < 0.001\). Other QoL scores also showed significant correlation with the respective preoperative scores. Anxiety, depression, and FACT functional wellbeing scores were also correlated with the incidence of postoperative morbidity. On multiple regression analysis postoperative morbidity, tumour node metastasis (TNM) stage, presence of stoma and preoperative QoL scores were found to independently predict postoperative QoL scores.

Masheb, White, Toth, Burke-Martindale, Rothschild, and Grilo (2007) conducted a study to examine the relative prognostic significance of weight and depressive symptoms for 12-month postoperative health-related quality of life (HRQL) in extremely obese gastric bypass patients in New Haven. Participants comprised 137 extremely obese patients undergoing gastric bypass surgery. Presurgery and 12 months postsurgery participants completed the Medical Outcomes Study Short Form-36 Health Survey, a standard measure of HRQL, and the Beck Depression Inventory (BDI). At baseline the predictors accounted for 19% of the variance of physical HRQL, and 56% of the variance of mental HRQL. At 12 months after surgery, the predictors accounted for 32% of the variance of physical HRQL and 48% of mental HRQL. In the prediction of 12-month
postoperative HRQL, baseline BMI, BMI unit change, baseline BDI, and improvements in BDI score made significant contributions to most of the medical outcomes study Short Form-36 Health Survey scales. Demography contributed little to these predictor analyses. Depressive symptoms made greater contributions than weight and demography, and change in BDI score made the greatest contributions (ranging from 3% to 37%) of all the variables tested.

Matsushita, Matsushima and Maruyama (2005) assessed the pre and postoperative quality of life (QOL) of patients with gastrointestinal cancer, and investigated the relationship between QOL, and various psychological and clinical factors at Tokyo Medical & Dental University. 85 patients who underwent surgery for gastrointestinal cancer and 26 control patients undergoing surgery for digestive diseases other than cancer were interviewed. Two tests were administered to assess QOL and psychological status, respectively: the Japanese-language version of the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C 30 and the Japanese-language version of the Hospital Anxiety and Depression Scale (HADS). Each test was administered before surgery, before discharge and 6 months after discharge. Changes in EORTC QLQ-C 30 sub-scale scores over time were compared among advanced-phase, early-phase, and control patients. All groups showed significant changes in subscale scores of QOL. The scores of the advanced-phase group indicated worse QOL than the early-phase and control groups in many areas. The results suggested that QOL in gastrointestinal cancer patients is variable over time and is influenced by various clinical factors including the depression and anxiety.
5. Effectiveness of Reiki therapy

Nadia Birocco, Camilla Guillame, Silvana Storto, Giuliana Ritorto, Cristiana Catino, Nisha Gir, et al. (2013) investigated the role of Reiki in the management of anxiety, pain and global wellness in cancer patients in Italy. The study population was 118 patients (67 women and 51 men; mean age, 55 years) with cancer at any stage and receiving any kind of chemotherapy. Before each session, the nurses collected the patient's personal data and clinical history. Pain and anxiety were evaluated according to a numeric rating scale by the Reiki practitioners. Each session lasted about 30 min; pain and anxiety scores were recorded using a Visual Analog Scale (VAS), together with a description of the physical feelings the patients perceived during the session. All 118 patients received at least 1 Reiki treatment (total number, 238). In the subgroup of 22 patients who underwent the full cycle of 4 treatments, the mean VAS anxiety score decreased from 6.77 to 2.28 (p < .000001) and the mean VAS pain score from 4.4 to 2.32 (p = .091). Overall, the sessions were felt helpful in improving well-being, relaxation, pain relief, sleep quality and reducing anxiety. Offering Reiki therapy in hospitals could respond to patients' physical and emotional needs.

Beard, Stason, Wang, Manola, Dean-Clower, Dusek et al. (2011) performed a pilot randomized controlled trial to examine the clinical effects of 2 complementary (CAM) therapies, relaxation response therapy (RRT) and Reiki therapy, in men being treated with external beam radiotherapy (EBRx) for prostate cancer at the Dana-Farber/Brigham. Study participants were randomly assigned to weekly RRT, Reiki therapy twice weekly, or wait-list control. Well-validated instruments measured anxiety (STAI), depression (CES-D), and quality of life in cancer patients (FACT-G) at randomization and 3 subsequent time points. Fifty-four men were randomized, and 16 of 18 (89%) of RRT and 15 of 18 (83%) of Reiki patients completed the intervention protocol. Significant improvement was found on the
emotional well-being subscale of the FACT-G quality of life scale in the RRT group compared with the Reiki and control groups ($P = .01$). In participants who were classified as “anxious” at baseline, statistically significant improvement occurred in the RRT group ($P = .02$), and a positive trend was found in the Reiki group ($P = .10$). This pilot study documented the feasibility of conducting a RCT of CAM therapies in men undergoing EBRx for prostate cancer. Relaxation response therapy improved emotional well-being and eased anxiety in participants. Reiki therapy also had a positive effect in anxious patients.

Bowden, Goddard and Gruzelier (2011) conducted a randomised controlled single-blind trial on the efficacy of Reiki at benefitting mood and well-being. 40 university students from Goldsmiths, University of London, London, half with high depression and/or anxiety and half with low depression and/or anxiety were randomly assigned to receive Reiki or to a non-Reiki control group. Participants experienced six 30-minute sessions over a period of two to eight weeks, where they were blind to whether noncontact Reiki was administered as their attention was absorbed in a guided relaxation. The participants with high anxiety and/or depression who received Reiki showed a progressive improvement in overall mood, which was significantly better at five-week follow-up, while no change was seen in the controls.

Diaz-Rodriguez, Arroyo-Morales, Cantarero-Villanueva, Fernandez-Lao, Polley, and Fernandez-de-las-Penas (2011) investigated the immediate effects of the secretory immunoglobulin A (sIgA), α-amylase activity and blood pressure levels after the application of a Reiki session in nurses with Burnout Syndrome in Spain. Sample was composed of 18 nurses (aged 34-56 years) with burnout syndrome. Participants were randomly assigned to receive either a Reiki treatment or a placebo (sham Reiki) treatment, according to the established order in two different days. The ANOVA showed a significant
interaction time x intervention for diastolic blood pressure ($F=4.92$, $P=0.04$) and sIgA concentration ($F=4.71$, $P=0.04$). A Reiki session can produce an immediate and statistically significant improvement in sIgA concentration and diastolic blood pressure in nurses with Burnout Syndrome.

Morse, and Beem. (2011) revealed the benefits of Reiki therapy for a severely neutropenic patient with associated influences on a true random number generator at Georgetown, USA. The patient was a then 54-year-old severely ill man who had hepatitis C types 1 and 2 and who did not improve with conventional therapy. Energetic healing and Reiki therapy was administered initially to enhance the patient's sense of well-being and to relieve anxiety. Possible effects on the patient's absolute neutrophil count and hematocrit were incidentally noted. Statistically significant relationships were documented between Reiki therapy, a quieting of the electronically created white noise of the RNG during healing sessions, and improvement in the patient's neutrophil count. Future studies assessing the effects of energetic healing on specific biologic markers of disease are anticipated. Concurrent use of a true RNG may prove to correlate with the effectiveness of energetic therapy.

Deborah, Lorna and John (2010) conducted a randomised controlled single-blind trial of the effects of Reiki and positive imagery on well-being and salivary cortisol in London. The study investigated whether participants who received Reiki would show greater health and well-being benefits than a group who received no Reiki. Participants experienced ten 20-min intervention sessions over a period of two and a half to 12 weeks. Self-report measures of illness symptoms, mood and sleep were assessed pre–post-intervention as was salivary cortisol. While the Reiki group had a tendency towards a
A substantive increase was seen in the no-Reiki. The Reiki group also had a near-significant comparative reduction in stress, although they also had significantly higher baseline illness symptoms and stress scores.

Shamini and Mills (2010) examined 66 clinical studies with a variety of biofield therapies such as Reiki, therapeutic touch, and healing touch in different patient populations as a systemic review at Los Angeles, USA. They conducted a quality assessment as well as a best evidence synthesis approach to examine evidence for biofield therapies in relevant outcomes for different clinical populations. Results revealed that biofield therapies show strong evidence for reducing pain intensity in pain populations, and moderate evidence for reducing pain intensity hospitalized and cancer populations. There was moderate evidence for decreasing negative behavioral symptoms in dementia and moderate evidence for decreasing anxiety for hospitalized populations. There is equivocal evidence for biofield therapies effects on fatigue and quality of life for cancer patients, as well as for comprehensive pain outcomes and affect in pain patients, and for decreasing anxiety in cardiovascular patients.

Kathy, Linda E. Carlson, and Karin Olson (2007) examined the effects of Reiki, a type of energy touch therapy, on fatigue, pain, anxiety, and overall quality of life in Canada. Participants received Reiki for 5 consecutive daily sessions, followed by a 1-week washout monitoring period of no treatments, then 2 additional Reiki sessions, and finally 2 weeks of no treatments, and in the rest condition, participants rested for approximately 1 hour each day for 5 consecutive days, followed by a 1-week washout monitoring period of no scheduled resting and an additional week of no treatments. Sixteen patients (13 women) participated in the trial: 8 were randomized to each order of conditions (Reiki then rest; rest then Reiki). Fatigue decreased within the Reiki condition ($P=.05$) over the course of
all 7 treatments. In addition, participants in the Reiki condition experienced significant improvements in quality of life compared to those in the resting condition ($P < .05$). On daily assessments in the Reiki condition, presession 1 versus postsession 5 scores indicated significant decreases in tiredness ($P < .001$), pain ($P < .005$), and anxiety ($P < .01$), which were not seen in the resting condition.

Stephen E. Crawford, V. Wayne Leaver, and Sandra D. Mahoney. (2006) explored the efficacy of using Reiki treatment to improve memory and behavior deficiencies in patients with mild cognitive impairment or mild Alzheimer's disease at Passamaquoddy Indian Reservation. This study was a quasi-experimental study comparing pre- and post-test scores of the Annotated Mini-Mental State Examination (AMMSE) and Revised Memory and Behavior Problems Checklist (RMBPC) after four weekly treatments of Reiki to a control group. The participants were treated at a facility provided by the Pleasant Point Health Center on the Passamaquoddy Indian Reservation. The sample included 24 participants scoring between 20 and 24 on the AMMSE. Demographic characteristics of the sample included an age range from 60 to 80, with 67% female, 46% American Indian, and the remainder white. Twelve participants were exposed to 4 weeks of weekly treatments of Reiki from two Reiki Master-level practitioners; 12 participants served as controls and received no treatment. Results indicated statistically significant increases in mental functioning and memory and behavior problems after Reiki treatment.

Shore (2004) examined the long-term effects of energetic healing in patients. An experimental design employing a 3 x 3 factorial MANOVA on symptoms of psychological depression and self-perceived stress as measured by the Beck Depression Inventory, Beck Hopelessness, and Perceived Stress scales were used. Forty-six participants were randomly assigned to 1 of 3 groups such as hands-on Reiki, distance Reiki or distance Reiki placebo
and remained blind to treatment condition. Each participant received a 1 to 1.5 hour treatment each week for 6 weeks. Pretest data collected prior to treatment demonstrated no preexisting significant differences among groups. Upon completion of treatment, there was a significant reduction in symptoms of psychological distress in treatment groups as compared with controls (P < .05; Eta square ranging from .09-.18), and these differences continued to be present 1 year later (P < .05; Eta square ranging from .12-.44).

Karin Olson, John Hanson, and Mary Michaud (2003) compared pain, quality of life, and analgesic use in a sample of patients with cancer pain (n = 24) who received either standard opioid management plus rest (Arm A) or standard opioid management plus Reiki (Arm B) in Canada. Participants either rested for 1.5 hr on Days 1 and 4 or received two Reiki treatments (Days 1 and 4) one hour after their first afternoon analgesic dose. Visual analogue scale (VAS) pain ratings, blood pressure, heart rate, and respirations were obtained before and after each treatment/rest period. Analgesic use and VAS pain scores were reported for 7 days. Quality of life was assessed on Days 1 and 7. Participants in Arm B experienced improved pain control on Days 1 and 4 following treatment, compared to Arm A, and improved quality of life.

Robert Schmehr (2003) analysed the measures to enhance the treatment of HIV/AIDS with Reiki training and treatment in New York City. Since the introduction of highly active anti-retroviral therapy (HAART) in 1996, the rate of death from AIDS in the US and Europe has decreased more than 50%. Quality of life and productivity for people living with HIV/AIDS (PLWA) have significantly improved. However, HAART regimens are complicated and must be followed strictly to remain effective. PLWA have a higher frequency of psychiatric distress, substance abuse and disruptions in social support.

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networks, making adherence to the demanding HAART protocols even more difficult. PLWA often need healing beyond their medications. A comprehensive approach to care is required. This case report described how one PLWA successfully used a hospital-based Reiki treatment and training program as part of a comprehensive approach and had reduction in depression, anxiety, and substance abuse, supported for adherence to HAART, and early return to work.

6. Effects of Reiki therapy on surgeries and interventions

Bourque, Sullivan and Winter (2012) determined whether the use of Reiki decreases the amount of meperidine administered to patients undergoing screening colonoscopy at Boston. A chart review of 300 patients was conducted to obtain baseline average doses of meperidine patients received as the control. Following the chart review, 30 patients were recruited to the Reiki study. Twenty-five of the study arm patients received Reiki in conjunction with meperidine. Five randomly chosen study arm patients received placebo Reiki in conjunction with meperidine in an attempt to blind the clinicians to the treatment received by the patients. Results showed that there were no significant differences in meperidine administration between the patients in the chart review group (control) and the Reiki group. The study revealed that 16% who received Reiki, together with intravenous administration of conscious sedation, received less than 50 mg of meperidine. All the patients in the chart review group received more than 50 mg of meperidine. Results from this pilot study suggest that there may be a decrease in meperidine needed during screening colonoscopy when patients receive Reiki treatments before the procedure. A larger study powered to detect smaller medication differences is the next step in more accurately determining the effect of Reiki on pain management.
Hulse, Rosalinda, Stuart-Shor, Eileen, Russo and Jonathan (2010) examined the use of Reiki prior to colonoscopy to reduce anxiety and minimize intraprocedure medications compared with usual care, pilot study in Boston. A prospective, nonblinded, partially randomized patient preference design was employed using 21 subjects undergoing colonoscopy for the first time. Symptoms of anxiety and pain were assessed using a Likert-type scale. Between-group differences were assessed using chi-square analyses and analysis of variance. There were no differences between the control \((n = 10)\) and experimental \((n = 11)\) groups on age \((\text{mean} = 58 \text{ years}, \text{SD} = 8.5)\) and gender \((53\% \text{ women})\). The experimental group had higher anxiety \((4.5 \text{ vs. } 2.6, p = .03)\) and pain \((0.8 \text{ vs. } 0.2, p = .42)\) scores prior to colonoscopy. The Reiki intervention reduced mean heart rate \((-9 \text{ beats/minute})\), systolic blood pressure \((-10 \text{ mmHg})\), diastolic blood pressure \((-4 \text{ mmHg})\), and respirations \((-3 \text{ breaths/minute})\). There were no between-group differences on intraprocedure medication use or postprocedure physiologic measures. Although the experimental group patients had more symptoms, they did not require additional pain medication during the procedure, suggesting that anxious people may benefit from an adjunctive therapy, anxiety and pain are decreased by Reiki therapy for patients undergoing colonoscopy, and additional intraprocedure pain medication may not be needed for colonoscopy patients receiving Reiki therapy. This pilot study provided important insights in preparation for a rigorous, randomized, controlled clinical trial.

Pamela J. Potter (2007) conducted a randomized pilot study to determine feasibility of testing Reiki, a complementary therapy intervention, for women undergoing breast biopsy \((\text{BB})\) in Washington. Thirty-two women scheduled for BB were randomized to Reiki intervention versus conventional care control. Anxiety and depression were evaluated using self-report questionnaires. Analysis found no significant mean differences
between groups over time. Comparably low baseline anxiety levels (possible selection bias) decreased naturally with time allowing little room for observing treatment effect. Reiki, when administered in the naturalistic setting of a complementary therapy office, did not suggest evidence of efficacy. The researcher suggested that Reiki therapy when offered within the bounds of the conventional care setting may be more feasible for addressing BB distress.

Vitale, Anne, O’Connor, and Priscilla C. (2006) conducted a pilot study to compare reports of pain and levels of state anxiety in 2 groups of women after abdominal hysterectomy at New Jersey, USA. A quasi-experimental design was used in which the experimental group \( (n = 10) \) received traditional nursing care plus three 30-minute sessions of Reiki, while the control group \( (n = 12) \) received traditional nursing care. The results indicated that the experimental group reported less pain and requested fewer analgesics than the control group. Also, the experimental group reported less state anxiety than the control group on discharge at 72 hours post operation. The authors recommend replication of this study with a similar population, such as women who require nonemergency cesarean section deliveries.
2.2 CONCEPTUAL FRAMEWORK

Based on Callista Roy’s Adaptation Model

Sister Callista Roy, a member of the Sisters of Saint Joseph of Carondeler, was born October 14, 1939, in Los Angeles, California. While working towards her master’s degree, Roy was challenged in a seminar with Dorothy E. Johnson to develop a conceptual model for nursing. She began conceptualizing her model in 1968 when Mount Saint Mary’s College adopted the adaptation framework as the philosophical foundation of the nursing curriculum.

Man as a whole is made up of six subsystems. The primary, functional, or control processes subsystem consists of the regulator and the cognator. The secondary, effector subsystem consists of the four adaptive modes: physiological needs, self concept, role function and interdependence.

Roy views regulator and cognator as methods of coping. Perception of person links the regulator with the cognator with the input and the regulator is transformed into perceptions. Perception is a process of the cognator. The responses following perception are feedback into the cognator and the regulator.

The four adaptive modes of the second subsystem in Roy’s model provide form or manifestations of cognator and regulator activity. Responses to stimuli are carried out through four modes. The mode’s purpose is to achieve physiological, psychological and social integrity. Interrelated propositions of the cognator and regulator subsystems link the systems of the adaptive modes. Relationships between the four adaptive modes occur
when internal and external stimuli affect more than one mode or when one mode becomes focal, contextual or residual stimulus for another mode.

The person is an adaptive system. System inputs include the (i) three classes of stimuli (focal, contextual, and residual) that arise from within the person and the external environment and (ii) the adaptation level. Adaptation level is fluid, is composed of all three classes of stimuli and represents the person’s standard or range of stimuli in which response will be adaptive.

Inputs are mediated by the control process subsystems of cognator and regulator coping mechanisms. The regulator mechanism is an automatic neuroendocrine response, whereas the cognator subsystem represents perception, information processing and judgements influenced by learning and emotions. Coping activity may or may not be adequate to maintain integrity. A system difficulty is present when coping activity is inadequate as a result of need excess or deficits.

The system effectors are the adaptive modes, which includes physiologic, self concept, role function and interdependence. The regulator and cognator subsystems manifest their activity in these modes. The persons adaptive system output is a response that may be adaptive or ineffective. Adaptive responses are those that contribute to adaptation goals such as responses that promote growth, survival, reproduction and self mystery. Adaptation is an ongoing purposive response. Adaptive responses contribute to health and the process of being and becoming integrated, ineffective response do not. The nurse, using nursing process, promotes adaptive response in adaptive modes thus energy is freed from inadequate coping to promote health and wellness. System responses
in each mode are assessed, that is, described using objective and subjective data. Behaviors can be assessed by observation, measurement and interviewing. A tentative judgment on whether the behavior is adaptive or ineffective is then made. Stimuli influencing the adaptive system are then identified. A nursing diagnosis follows, goals are set and interventions selected. Goals are mutually agreed upon and a goal setting hierarchy proposed.

Survival is a priority goal, followed by goals that promote growth, ensure continuation of the race or the society and promote attainment of full potential. Factors precipitating ineffective behavior are changed and coping behavior, that is, adaptation level, is broadened. The person’s level of coping is continuously revised. Evaluation of interventions requires returning to the first steps in the nursing process.

In the present study, input includes the background variables of the study participants such as demographic variables, socio economic variables, clinical variable and surgical variables. The coping mechanism that is adapted in the present study is Reiki therapy. For the participants in the study group Reiki therapy was provided for seven consecutive days along with routine care, whereas routine care was only provided to the control group.

The effectors in the present study are the biophysiological status, anxiety and depression. Pre assessment of the biophysiological status was daily for seven days among the study participants before intervention in the study group and at 4 p.m in the control group. Post assessment was done one hour after Reiki therapy which was given 40 minutes in the study group and at 6 p.m in the control group for seven consecutive days from first post-operative day (POD) to 7\textsuperscript{th} POD.
Pretest on anxiety and depression was conducted in the study and control groups on 1\textsuperscript{st} POD using State Trait Anxiety Inventory (STAI) and Center for epidemiological studies Depression (CESD) scale. Posttest I, II and III was carried out on 7\textsuperscript{th}, 14\textsuperscript{th} and 21\textsuperscript{st} POD respectively in the study and control groups using the same questionnaires. Effective and ineffective change was monitored during the output process. Reassessment would be made based on the feedback on the ineffective change process.
Figure 2.1: Conceptual framework based on Callista Roy’s Adaptation Model

Background variables of patients subjected to major surgical procedures in study & control groups

Demographic variables
Age, gender, place of residence, educational qualification, occupation, type of family & marital status

Socioeconomic variables
Family monthly income, medical expense bearer, social support & family dependency

Clinical variable
Co-morbid illnesses

Surgical variables
Type of anesthesia, type of surgery, duration of surgery

Pre assessment
Biophysiological status (from 1st to 7th POD before intervention)

Pretest
Using STAI & CSED scale (On 1st POD)

Study group
Routine care +
One session of
Reiki therapy
for 7 consecutive days

Post assessment
Biophysiological status (from 1st to 7th POD after intervention)

Posttest
Using STAI & CSED scale (On 7th, 14th & 21st POD)

Control group
Routine care

Control group
Routine care

Effective change

Ineffective change

INPUT

CONTROL PROCESS

OUTPUT

FEEDBACK