FACTORS ASSOCIATED WITH RECOVERY AMONG PATIENTS AFTER ABDOMINAL SURGERY

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Thesis
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ABSTRACT

Abdominal surgery is a common operation procedure among patients with gastrointestinal and other related diseases. The goal of surgery is to cure the disease as well as to restore the patients as they transit to their optimum function. The aim of this research was to study the level of postoperative recovery and identify relationships between age, postoperative pain, co-morbidity, intra surgical condition, length of surgical incision and recovery in patients after abdominal surgery. This was a descriptive correlation research conducted among 191 patients undergoing abdominal surgery at Bach Mai hospital, Hanoi, Vietnam. The patients' ages were18 years and older. Data were collected by interviewing patients with questionnaires and obtaining demographic and medical data from patients' charts. Patients recovery was measured by the quality of recovery scale (QoR-15). Spearman's rho was employed to test the relationship among all variables. Transition theory was used as a framework for this study. The result revealed that 58.1% of the patients were male and 41.9% were female with ages ranging from 20 to 89. The average of age was 54.14 years (SD ± 14.94 years). The length of hospital stay ranged from 3 to 20 days with an average of 7.64 days (SD ± 3.36 years). Gastrointestinal disease was found in 114 patients (59.7%) followed by 54 patients with urological disease (28.3%). The surgical approach included laparotomy and laparoscopy. Postoperative surgical site infection occurred in 3 patients (1.6%). There were 38.2% of patients with one or more co morbid diseases. The overall quality of recovery scores was relatively in good pace with the mean of 128.91, (SD ± 12.82). However, considering each domain of recovery, it showed that patients had problem (the recovery) in their sleep pattern and their abilities to resume daily activities and work. Age, pain, co-morbidity, length of incision (cm) were negatively correlated with recovery $r = -0.350$, $r = -0.411$, $r = -0.428$, $r = -0.231$, respectively and Surgical Apgar score was positively correlated with recovery ($r = 0.289$), p value < 0.01. It is recommended that in order to enhance the patients' postoperative recovery to transit to their optimum health outcomes, pain control have to be taken into consideration. Patients with long surgical incisional wounds have comorbid diseases and show instability in their hemodynamic status during operation has to be closely monitored. Further research could be conducted in patients with other types of surgery to cover the overall picture of postoperative recovery.

KEY WORDS: QUALITY OF RECOVERY/ POSTOPERATIVE PAIN/ ABDOMINAL SURGERY/ TRANSITION THEORY

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CHAPTER I
INTRODUCTION

1.1 Background and significance of the study

Abdominal surgery is a procedure that involve incisions through the abdominal wall into the peritoneal cavity to intervene in the gastrointestinal tract or the abdominal organs such as stomach, gallbladder, small intestine, large intestine, appendix, liver, pancreas, spleen, esophagus, appendix, and urinary system (Asdemir, Celik, 2010; Uysal, Khorshid, Eser, 2010) with aim to solve many different diseases with many different reason such as infection, tumors or ileuses obstruction (California Pacific Medical Center, 2015). There are many types of abdominal surgery. But the most common surgeries include inguinal hernia surgery, abdominal exploration surgery, appendectomy, cholecystectomy or surgery for inflammatory bowel disease.

Nowadays, abdominal surgery can use different approaches such as laparoscopic surgery in which patient's abdominal wall is not explored but the approach will be done by inserting a tube of scope in to the abdominal cavity with small incision. Abdominal surgery can be conducted in conditions with or without prior preparation. It is considered as a major surgery so it must be carried out in the operating room under general anesthesia or epidural anesthesia. The pathology-surgical abdominal disorders are often accompanied by other serious systemic infections; water-electrolyte disorders; nutritional disorders; kidney dysfunction; respiratory disorders (Kehlet & Dahl, 2003). The abdominal disease and systemic disorders often deeply affect the possibility of health recovery after surgery, postoperative length of hospital stay and patient's discharge time.

There are millions of patients all over the world undergoing surgical procedures per year (Weiser et al., 2008). According to the Datamonitor, an international company providing market intelligence, the number of abdominal surgeries will increase significantly from 7.4 million surgeries in 2010 to 8.1 million surgeries in 2020 in the seven major markets including the US, Japan, France,

Germany, Italy, Spain, and the UK. The number of abdominal surgeries varies among age groups. There will be approximately 166,400 surgeries among patients at the age of less than 15 years; 5,125, 000 in those from 15 years to 44 years; 1,194, 000 in those from 45 to 64 years; and 950, 300 surgeries in those over the age of 65 (Datamonitor, 2011). In 2013, the statistics from the Bach Mai hospital showed that there were approximately 4,550 cases of abdominal surgeries annually at the Anesthesia department. The majority of abdominal surgeries were gastrointestinal surgery with 3,500 cases, followed by urological surgery 760 cases and 290 cases of other surgeries (report from Bach Mai hospital, 2013).

After surgery, patients are expected to recover to resume their physical functions, health status as well as previous activities. The quality of recovery after surgery is considered as an important measure of the early postoperative health status of patients (Stark, Myles, & Burke, 2013; Myles, Weitkamp, Jones, Melick, & Hensen, 2000; Gornall et al., 2013). Enhanced recovery after surgery programs address the factors that lead to organ dysfunction and delayed recovery associated with surgery which is necessary. Therefore, enhanced postoperative recovery will diminish the stress response to the trauma of an operation and minimize length of stay and potentially complications (Fayezizadeh, Petro, Rosen, & Novitsky, 2014).

Postoperative recovery is a going on process and resulted in returning to the preoperative level of normality including physical, psychological, social and habitual functions (Lee et al., 2014). It is commonly used as an outcome of surgery. Slow recovery after surgery may lead to many serious complications such as pneumonia, paralysis, bowel function problems, wound infection and prolonged length of hospital stay. Therefore, prevention of complications after abdominal surgeries remains as primary goal after admission to the Intensive Care Unit (ICU) **(**Havey, Herriman, & O'Brien, 2013). The recovery process after abdominal surgery can be well described by transition theory. Recovery is the natural transition process of patients (Meleis, Sawyer, Mesias, & Schumacher, 2000) who undergo abdominal surgery. It reflects a patient's ability to gain normal physiological functions after surgery (Allvin, 2009). Recovery after surgery depends on patient's illness, surgical types, and anaesthetic characteristic, quality of care as well as the presence of any adverse sequelae (Royse et al 2010; Stark, Myles, & Burke, 2013). Therefore, if

factors related to recovery transition are well understood together with making preparation and plan to manage these factors, their transition would be smoothly and successfully. There are many factors influence on recovery of patients who undergoing abdominal surgeries such as age, pain, co-morbidity, surgical incision and perioperative condition**.** These factors are considered as the conditioning factors that influence the transition process and outcomes. They can facilitate or inhibit a transition outcome (Meleis et al., 2000).

Age is an important factor associated with recovery after abdominal surgery. Many previous studies showed significantly different recovery among between age group. There are the high number of postoperative complications pneumonias (McAlister et al., 2003; Piazza, Miccich, Esposito, Romano, De Robertis, 2016) cardiovascular problems (Mangano, 2009; Piazza, Miccich, Esposito, Romano, De Robertis, 2016) and deliriums (Aldemir, Ozen, Kara, Sir, & Baç, 2001; Serafim et al., 2012; Robinson et al., 2009), surgical site infection in the elderly group that aged 65 years or over which lead to reduce speedily recovery (Olin et al., 2005).

All of surgical procedures are followed by pain, which may increase endocrine metabolic responses, nausea, and ileus and muscle spasm**.** Therefore they delay the recovery process (Kehlet & Dahl, 2003). Pain are common symptom and pattern of response among patients who have undergone abdominal surgery which affected to recovery of patient *(*Grady et al**.**, 2012; Bouman et al., 2014) such as prolong recovery of bowel function, increase thromboembolic, pulmonary complications and the length of hospital stay as well as reduce patient's satisfaction (Apfelbaum, Chen, Mehta, & Gan, 2003). Optimal postoperative pain management aims to reduce patient's discomfort, promote early mobilization and restoration, decrease morbidity and prevent acute pain developing into chronic pain (Corke, 2013).

Co-morbidity, a presence of underlying chronic conditions such as chronic heart disease, chronic obstructive pulmonary disease (COPD), hypertension can cause an adverse effect on patients undergoing surgery and may be responsible for the increased peri- operative risk, reduce recovery and consequently increase mortality in the elderly (Fukuda, Wada, Niki, Sugiyama, & Mushiake, 2012). Co-morbidities are associated with an increased risk of mortality and significant increases in length of stay and hospital costs (Kaplan et al., 2011).

Surgical Apgar score, used in the field of surgery, is measured at the end of surgical operations to estimate blood loss (EBL), the lowest mean arterial pressure (MAP), and the lowest heart rate (HR) during the operation; this helps to assess accurately patient's condition and chances of major complications or death. Michael Dullo showed that patients who have a significant lower surgical Apgar score which may the explanation for the higher complication rates *(*Dullo, 2011*).* Apgar score increases, the incidence of major complications and death decreased *(*$p < 0.001$*)* (Regenbogen et al., 2009).

Surgical incision related to postoperative recovery of patients undergoing abdominal surgery. Lower abdominal incisions including low midline laparotomy and inguinal incision which can cause significantly less respiratory disturbances and less postoperative pain in comparison to upper abdominal incisions (Mimica et al., 2007*)*. Besides, another study showed that the length of incision influences on pulmonary function among patients with cholecystectomy and patients with 6 cm surgical incision (mini cholecystectomy) had less severe pain, shorter hospital stay and faster respiratory recovery in comparison to those operated with 15 cm incision (O'Dwyer, McGregor, McDermott', Murphy', & O'Higgins', 1992).

Transition theory, the theoretical framework of this study, is a natural process and outcome of change. In this study, patient's recovery can be viewed as transition process in their health and illness. According to Meleis' transition theory the changing process of a person undergoing abdominal surgery can be clearly explored. The surgical procedures may be performed for a variety of reasons which affected organs' function in the abdominal cavity, including infection, obstruction, tumors or inflammatory bowel (California Pacific Medical Center, 2015). Transition Theory is useful in explaining changes in health and illness of patients after abdominal surgery as transitions of recovery process. This transition process is ongoing from the stage of healthy to the stage of illness and end of the result in recovery process. Thus, patients undergoing abdominal surgery have to experience with changes in their health status until they can get normal function after surgery. During the transition process a person experiences the changes in his/her health status (Meleis et al., 2000). This process lasts from preoperative days, during peri-operative, at multiple time postoperative periods until patients restore and resume

their previous health status or even better health status than usual (Royse et al., 2010).

The recovery process depends on many personal factors such as age, pain, co- morbidity, perioperative condition and surgical incision which can be facilitated or inhibited recovery. The relationship among personal factors is explained in transition theory and is considered as a conceptual framework for this study.

According to literature review, researcher is interested in factors effect on recovery ability among patients undergoing abdominal surgeries. The postoperative recovery also shows health and illness transition as well as the health transition outcome. This study's results can be used and applied in nursing care to enhance postoperative recovery. Moreover, nurses can apply scales and guidelines to evaluate recovery and measure the return to baseline health after surgery as well as explore clinical factors which associated with patient's recovery (Hedgepeth, Wolf Jr, Dunn, Wei, & Hollenbeck, 2009). Consequently, nurses can make better care plans to improve postoperative outcome and patients' satisfactions.

1.2 Research questions

What are factors associated with recovery among patients after abdominal surgery?

1.3 Purpose of the study

1.3.1 To study the relationship among age, postoperative pain, co-morbidity, surgical condition, surgical incision with recovery in patients after abdominal surgery.

1.3.2 To identify the recovery level among patients after abdominal surgery.

1.4 Hypothesis

1.4.1 Age is negatively associated with recovery among patients after abdominal surgery

1.4.2 Pain is negatively associated with recovery among patients after abdominal surgery

1.4.3 Co-morbidity is negatively associated with recovery among patients after abdominal surgery

1.4.4 Peri-operative conditions (surgical Apgar score) is positively associated with recovery among patients after abdominal surgery

1.4.5 Surgical incision is negatively associated with recovery among patients after abdominal surgery

1.5 Concept framework

According to Meleis, 2000, transition theory can be used as a theoretical framework in this study. Because transition theory can clearly explain the relationship among factors associated with postoperative recovery among patient undergoing abdominal surgery. Recovery process is a natural transition and ongoing process which happens with the injury and stops only when patients return to previous health status and well-being. This change is affected by many factors such as age, postoperative pain, comorbidity, surgical Apgar and surgical incision. Transition theory can over all of independent and dependent variables in this study. The conceptual framework of this study is shown in figure 1.

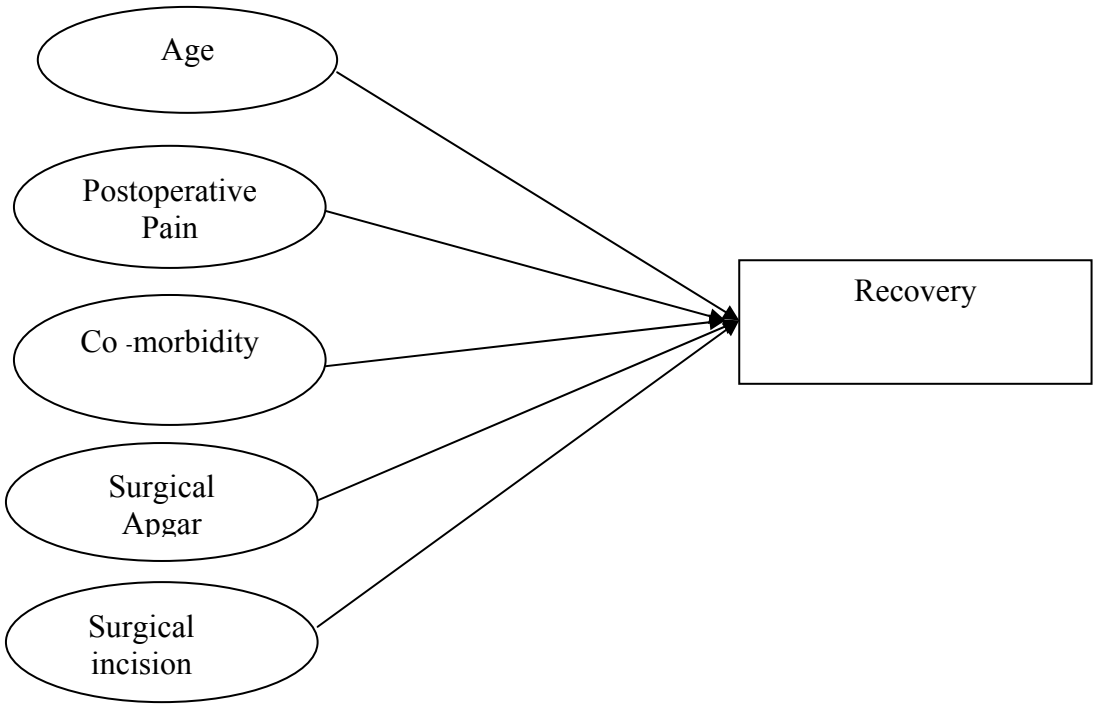

Figure 1.1: The association between age, postoperative pain, comorbidity, surgical incision, peri-operative conditions and recovery among patients with abdominal surgery**.**

1.6 Scopes of the study

This study aims to access factors influencing on recovery among patients after abdominal surgery before discharge from the hospital**.** The patients are 18 years old or older being treated as inpatients in the Surgical Department at Bach Mai hospital, Hanoi, Vietnam**.**

1.7 Expected outcomes and benefits

1.7.1 Nurses can use a wide range of theoretical and practical knowledge to enhance recovery of health status in patients during hospital stays.

1.7.2 Health care teams can evaluate and develop effective clinical nursing practice guidelines for the pain management to enhance recovery surgery.

1.7.3 The research results can be utilized to develop the quality of nursing care for patients with abdominal surgery.

1.8 Definition of terms

Recovery refers to a process of returning to the previous health status or resuming previous functions of patients who undergo abdominal surgery **(**Allvin et al**.**, 2007**).** Recovery is an important measure of the early postoperative health of patients which includes both physical and emotional features **(**Arakelian, 2011; Stark et al**.**, 2013; Royse et al**.**, 2010**).** The goal of recovery is returning normal function of patient after surgery**.** Post-operative recovery is a key outcome for any surgical operation**.** This is defined as the patients return to the normal health state after a surgery and regain of physical, physiologic and social functions**.** Post-operative recovery is a foundation for the evaluation of health care and patient satisfaction after surgery **(**Brandão, Sousa, Veiga, & Abelha, 2014; Guimarães-Pereiraa, Costab, Sousaa, & Abelhaa, 2015). In this study recovery will be measured by Quality of recovery- 15 items **(**QoR- 15**).** The possible score ranged from 0 to 150, while 0 is poor recovery and a maximum score of 150 is excellent recovery (Sá, Sousa, Santos, Santos, & Abelha, 2015; Stark et al., 2013; Kleif, Edwards, Sort, Vilandt, & Gogenur, 2015).

Postoperative pain refers to the level of pain that a patient faces after surgical procedure at the site of tissue injury in the surgery **(**Grady et al**.**, 2012; Bouman et al**.**, 2014**).** In this study postoperative pain will be measured by Numerical Rating Scale **(**NRS**).** NRS is a common pain scale being used in clinical practice as well as in clinical research. NRS is a rating scale showing number reflecting severity of pain from 0 to 10 in a horizontal line (Hawker et al., 2011).

Co-morbidity refers to the presence of one or more additional disorders or diseases occur in the same person, simultaneously or sequentially with a primary disease, insult, injury or disorder (Valderas, Starfield, Sibbald, Salisbury, & Roland, 2009). Co-morbidity is a concept that is used to present the notion of burden of illness or disease which affects an individual's physiologic reserve (Valderas et al., 2009). Comorbidity presents the interactions together among the illnesses and prognosis of both. Therefore, comorbidity is associated with worse health outcomes, more complex

clinical management, and increased health care costs. Co-morbidity is an important prognostic factor for Long-Term Survival outcomes (Lee et al., 2014). Questionnaire of co-morbidity is conducted by researcher and each disease is assigned a score of 1.

Surgical Apgar score refers to the level of physiological change during operative procedures of patients. It reflected by surgical blood loss, cardiovascular functions, and blood oxygen level. Surgical Apgar is developed by Gawande et al. Surgical Apgar score is calculated from the estimated blood loss (EBL), lowest heart rate (HR), and lowest mean arterial pressure (MAP) during the intra-operative period (Dullo, 2011; Gawande, Kwaan, Regenbogen, & Zinner, 2007). This score is the sum of the points from each category. The range of the score was 0 to 10. Surgical Apgar score can be effective in identifying patients at higher and lower than average likelihood of major complications after surgery and may be useful for evaluating interventions to prevent poor outcomes or death after surgery. A higher scores, surgical Apgar predicts that incidence of major complications and death decreased monotonically (Dullo, 2011; Gawande et al., 2007).

Surgical incision is a cut line made through the skin to facilitate an operation or procedure for any surgery. Surgical incision includes different types of incisions but the upper midline incision, lower midline incision and laparoscopic incision are common. The surgical incision presents a major part of the morbidity of the abdominal surgery (Patnaik, Singla, & Bansal, 2001). Open abdominal surgery is performed through large incisions to examine the abdominal organs and aids diagnosis of any problems. Laparoscopy is a minimally invasive approach which performed through small incisions to explore the abdominal cavity (Richardson, Carter, Fuhrman, Bolton, & Bowen, 2000).

Measuring the length of incision is performed in the first time of removal dressing after surgery. The researcher will use sterile gloves and the tapeline to measure the length of incision. After that, the result is checked to compare with operative note in the patient's record.

CHAPTER II
LITERATURE REVIEW

This chapter provides a literature review of the contents related to the research title, factors associated with recovery among patients after abdominal surgery. The contents enhance the understanding of phenomena of recovery among patients with abdominal surgery based on transition theory as following 4 issues including the conclusion part:

2.1 Problems among patients with abdominal surgery

2.1.1 Incidence of abdominal surgery

2.1.2 Type of abdominal surgery

2.1.3 Pathophysiology after abdominal surgery

2.1.4 Impact of abdominal surgery

2.1.4.1 Impact on physical function

2.1.4.2 Impact on psychological function

2.1.4.3 Impact to economic

2.2 Recovery among patients with abdominal surgery

2.2.1 The concept of recovery

2.2.2 Recovery among patients with abdominal surgery

2.3 Transition theory as a conceptual framework to explain recovery among patients with abdominal surgery

2.3.1 Transition theory

2.3.2 Transition theory and the patients with abdominal surgery

2.4 Factors associated with recovery among patients after abdominal surgery

2.4.1 Age associated with recovery among patient after abdominal surgery

2.4.2 Postoperative pain associated with recovery among patient after abdominal surgery

2.4.3 Comorbidity associated with recovery among patient after abdominal surgery

2.4.4 Peri-operative condition (surgical Apgar score) associated with recovery among patient after abdominal surgery

2.4.5 Surgical incision associated with recovery among patient after abdominal surgery

2.5. Conclusion

2.1 Problems among patients with abdominal surgery

2.1.1 Incidence of abdominal surgery

There are millions of patients all over the world undergoing surgical procedures per year (Weiser et al., 2008). According to the Datamonitor, an international company providing market intelligence, the number of abdominal surgeries will increase significantly from 7.4 million surgeries in 2010 to 8.1 million surgeries in 2020 in seven major markets including the US, Japan, France, Germany, Italy, Spain, and the UK. The number of abdominal surgeries varies between age groups. There will be approximately 166, 400 surgeries among patients at the age of less than 15 years; 5, 125, 000 in those from 15 years to 44 years; 1, 194, 000 in those from 45 to 64 years; and 950, 300 surgeries in those over the age of 65 (Datamonitor, 2011). This figure showed that people in the adulthood are majority group for abdominal surgery. Abdominal surgery is performed with the aim to treat diseases of gastrointestinal system including stomach, liver, bile duct, spleen, pancreas, small intestine, and large intestine (Asdemir, Celik, 2010; Uysal, Khorshid, Eser, 2010) and kidney and ureter disease. However, gastroenterological surgery is a common surgical procedure. Indeed, Finland performed about 50,000 gastroenterological surgical procedures including 13,500 patients undergoing major abdominal surgery in 2008 (National Institute for Health and Welfare, 2009). Likewise, the statistics from the Bach Mai hospital showed that there were approximately 4,550 cases of abdominal

surgeries annually at the Anesthesia department in 2013. The majority of abdominal surgeries were gastrointestinal surgery contributed about 3,500 cases, followed by urological surgery 760 cases and 290 cases of other surgeries (report from Bach Mai hospital, 2013).

2.1.2 Type of abdominal surgery

Abdominal surgery is a surgical approach that involves intervention through abdominal wall, abdominal muscle and peritoneum in order to achieve effective treatment outcomes including pathology within abdominal cavity such as perforation or leakage from abdominal organs, gastrointestinal tract obstruction, intestinal ulcers, tumors or cancer or abdominal injuries (California Pacific Medical Center, 2015). Hence, bowel diseases that leads to bowel elimination becoming quite common in patients who underwent abdominal surgery. According to Lee et al, Sendir et al the incidence is reported from 25% to 40% in hospitalized patients, who require the surgery (Lee, Yang, Park, Yu, & Kim, 2014; Sendir, Buyukiylmaz, Asti, Gurpinar, & Yazgan, 2012).

Nowadays, abdominal surgery can be performed using different approaches such as laparoscopic surgery. This minimal invasive is a technique that has that has developed rapidly (Gundavda & Bhandarwar, 2012). Laparoscopic surgery is has been being considered the gold standard for many diseases in the abdomen to solve some diseases of gastrointestinal such as cholecystitis and appendicitis (Richardson, Carter , Fuhrman, Bolton, & Bowen, 2000), colorectal resection for benign and malignant disease (Dewinter, de Velde, Fieuws, D'Hoore, & Rex, 2014) as well as urology surgery including kidney and ureter disease. Both types of laparotomy and laparoscopic surgery are used for a variety of surgical problems. The recovery from these two types can be different. Laparoscopic surgery with minimally invasive techniques have been shown to aim with reducing postoperative pain, promoting pulmonary function, earlier return of bowel functions (Ülker, Anuk, Bozkurt, & Karasu, 2014), decreasing length of hospital stay (Carroll & Alavi, 2009; Dewinter et al., 2014), fewer wound infections, and less post‐operative morbidity (Gundavda, & Bhandarwar, 2012; Dewinter et al., 2014). Moreover, laparoscopic surgery provides a better outcome, shorter recovery time, and an earlier return to

normal activity as well as creates better cosmetic results than open abdominal surgery (Richardson et al., 2000). In contrast, open abdominal surgery is performed through large incisions into the peritoneal cavity thus leads to lengthy recovery times, delayed in return to daily activities and large cosmetic defects because it leaves long surgical incisional wound on the abdomen (Richardson et al., 2000). Generally, advantages of laparoscopy accepted as safe and effective. However, many literature reviews show that although laparotomy creates more injuries in vital structure, more bleeding and infection, this surgery is in need among patients who have contraindication for laparoscopic surgery such as morbid obesity (Ülker et al., 2014).

Abdominal surgery can be conducted in conditions with or without prior preparation and is performed in the operating room under general anesthesia or epidural anesthesia. Any operative procedure in the abdominal cavity with laparotomy or laparoscopic surgery so surgeon have to intervention in abdominal cavity in order to excise or repair damaged, redundant or malignant tissue (California Pacific Medical Center, 2015), thus which created the change in intra-abdominal. This was affected to the physiological function and recovery of the patient. Many pathophysiological disorders occur after abdominal surgery aggravates systemic condition of patients, slow down physiological rehabilitation after surgery. Although, there are many advanced methods of anaesthesia, and surgery as well as peri-operative care but major surgical procedures are still followed with postoperative complications such as pain, cardiopulmonary infection, surgical wound infection, thromboembolic complications, cerebral dysfunction, nausea and gastrointestinal paralysis, fatigue which lead to prolonged recovery time and prolonged duration of hospitalization (Arakelian, 2011).

2.1.3 Pathophysiology after abdominal surgery

Many pathophysiology changes can occur in the perioperative period and are related to the stress response after surgery (Sivrikaya, 2012). The stress response, which is a common characteristic among surgical patients (Desborough, 2000; Sivrikaya, 2012), which leads to changes in organ functions (Sivrikaya, 2012) by increasing secretion of pituitary hormones and activation of the sympathetic nervous system (Desborough, 2000). During and after surgical procedure, a patient's body

responds with strong changes in neural, endocrine and metabolic systems (Kranke et al., 2015) and this process leads to transformation in organ functions. These functional changes can be caused by the trauma-including endocrine metabolic changes and activation of several biological cascade systems such as cytokines, complement, arachidonic acid metabolizes, nitric oxide and free oxygen radicals. These changes are explained by increasing secretion of catabolic hormones, decreasing secretion or effects of anabolic hormones, hyper-metabolism and increasing cardiac work caused autonomic system activation, impaired pulmonary function, pain, gastrointestinal side effects with nausea and paralytic ileus, a change in the coagulatory fibrinolytic systems favoring coagulation and thrombosis, and loss of muscle tissue and immune depression (Kocamanoglu et al., 2011). Although, the surgical stress response may be presented as a cellular defense mechanism and minimal physiological response would be beneficial (Kocamanoglu et al., 2011) but these changes in postoperative organ function may also be implicated in the development of postoperative complications. The pathogenesis of morbidity after surgery is related to the pathophysiological role of the various components in surgical stress response. Therefore, understanding the pathophysiological responses of abdominal surgery will be improved surgical outcomes (Kehlet & Dahl, 2003).

The pathophysiological changes after major abdominal surgery are presented as following:

1) Postoperative pain response

All surgical procedures are followed by pain, which may increase endocrine metabolic responses, nausea, ileus and muscle spasm, and thereby, may delay recovery process. Postoperative pain impacts on both physiological and psychological which caused activate the sympathetic nervous system by increasing heart rate, blood pressure, and peripheral vascular resistance (Vaajoki, Kankkunen, Pietilä, & Vehviläinen-Julkunen, 2012). If pain control is inadequate, pain may result in activation of the sympathetic nervous system, which can lead to a variety of detrimental physiologic responses and may be associated with the extent of morbidity and mortality (Sivrikaya, 2012). Thereby, pain relief may be a powerful technique to change surgical stress responses (Sivrikaya, 2012).

2) Immunosuppression

Abdominal surgery causes to decrease immune system with reducing hypersensitivity response to recall antigen stimulation, T-cell dependent antibody response, IL-2 production and HLA-DR antigen expression, IFN- production and T-cell blastogenesis. In contrast, neutrophil and macrophage functions are activated with increased release of oxygen radicals and TNF, and chemotaxis. Thereby, trauma level following minimally surgery is limited and can reduce immunosuppression and risk of infection (Kehlet & Dahl, 2003).

3) Postoperative hypoxaemia can occur by the reduction in pulmonary function lead to cardiac, cerebral and surgical wound complications (Kehlet & Dahl, 2003).

4) Respiratory system

The abdominal cavity manipulation is considered the main mechanism that causes respiratory muscle dysfunction which is affected by anesthesia and pain. Therefore, the upper abdominal surgery leads to reduce diaphragmatic function which is presented by atelectasis, reduction in vital capacity, and hypoxemia (Martinez, Silvac, Silvac, Netod, & Júniore, 2015). Postoperative pulmonary complications such as atelectasis, respiratory infections, wheezing and respiratory failure and pneumonia lead to impaired pulmonary functions (de Cleva et al., 2014; Kehlet & Dahl, 2003). These complications affected patient's recovery, prolonged length of hospital stays increased morbidity and mortality (Brooks-Brunn, 1997). In addition, factors during intraoperative period including anaesthesia, being in supine position, pain, cytokines, endothelial adhesion factors and immunosuppression may have unexpected effects in the postoperative period (Kehlet & Dahl, 2003).

5) Postoperative thromboembolic complications may occur, despite which previous is prevented. The mechanic of postoperative thromboembolism is the consequence of decreasing extremity blood flow, hypercoagulability and increasing thrombocyte aggregation, impairing fibrinolysis and loss of vessel wall integrity (Kehlet & Dahl, 2003).

6) Renal function and urinary retention

Patients undergoing lower abdominal surgery, often have many discomfort by pain and difficulty in urinating. Water and sodium excretion are reduced by the

hormonal responses after surgery due to the enhanced secretion of ADH, aldosterone and rennin (Holte, Sharrock, & Kehlet, 2002). The spinal and epidural local anaesthetic techniques, as well as postoperative opioid analgesia can create inhibitor effect on bladder muscle function lead to urinary retention after surgery (Holte et al., 2012). General anaesthesia may affect renal haemodynamics and function which is explored in the depression of the glomerular filtration rate, urinary volume and sodium excretion (Holte et al., 2002). The water reabsorption in the kidney cause by the increasing of ADH secretion that leads to diuresis and a decrease in plasma concentrations of sodium (Holte et al., 2002). Accordingly, hyponatremia is expected among patients after abdominal surgery.

7) Gastrointestinal system

Abdominal surgery commonly causes a temporary inhibition of intestinal motility (van Bree et al., 2012) by anesthesia and due to surgical manipulation (Berger, Ridolfi, & Ludwig, 2015), longer operations, increased blood loss, and result as postoperative ileus (Nguyen, Maithel, Nguyen, & Bechtoldc, 2015). Bowel activity is inhibited by surgical stress which causes the hormonal and metabolic change and leads to stimulation of the release of prostaglandins and cytokines by inflammatory response following abdominal surgery (Chao et al., 2013). Functional changes in bowel smooth muscle after surgery can be related to inflammatory changes and hormonal responses to the trauma of surgery (Carroll & Alavi, 2009). The symptoms of postoperative ileus include nausea, vomiting, abdominal distention, abdominal tenderness, and delayed passage of flatus and stool (Carroll & Alavi, 2009; Wallström & Frisman, 2013; Berger, Ridolfi, & Ludwig, 2015). In addition, the oedema of the intestine may result in fluid overload which can lead to the delay in gastrointestinal motility, increase in translocation of endotoxin or bacteria from intestinal tract into blood circulation, with potentially deleterious implication (Holte et al., 2002). Moreover, paralytic ileus may be prolonged and lead to increasing the risk of electrolyte disturbances such as hyponatremia and metabolic acidosis (Holte et al., 2002).

8) Surgical stress and fluid responses

Surgical stress is a physiological response with the aim to reduce in intravascular pressure so the fluid is moved from the extravascular to the intravascular space which occurs due to hypovolaemia leading to fluid movements from tissue to

blood. Surgical stress is characterized by increased pituitary hormones secretion and inflammatory origin (Desborough, 2000). Thus, some hormones such as ADH, aldosterone and the renin–angiotensin II involved in this response may be associated with the distribution of body fluids lead to conservation of sodium and water and to excretion of potassium (Holte et al., 2002).

9) Edema, wound healing and tissue hypoxaemia

Edema is characterized by subcutaneous fluid accumulation, which leads to impaired tissue oxygen due to increased endothelial cellular distance (Holte et al., 2002). Edema is also a result of the cytokine response to surgical injury which causes increased vascular permeability leading to redistribution of plasma proteins and fluid from the intravascular to the interstitial space (Vaughan-Shaw et al., 2013). Pathological edema can lead to the infective complications, delayed wound healing, delayed gastrointestinal recovery and increased length of hospital stay (Vaughan-Shaw et al., 2013). Wound healing is affected by inflammatory response which may lead to tissue damage (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998). Therefore, wound healing can be inhibited by tissue hypoxaemia and the surgical response (Kehlet & Dahl, 2003). This inflammatory response caused signs of redness, heat, swelling and pain (Layzell, 2014).

2.1.4 Impact of abdominal surgery

Surgery is a serious experience, with multiple stressful components both physically and psychologically for patients in the postoperative period (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998; Kehlet & Dahl, 2003; Wallström & Frisman, 2013). Physical symptoms such as pain, nausea are often related to psychological symptom including fear and anxiety about complications (Wallström & Frisman, 2013).

2.1.4.1 Impact on physical function

Abdominal surgery can lead to pain, nausea, vomiting and paralytic ileus, surgical stress, impaired pulmonary function, increased cardiac demands, and risk of thromboembolism and many other complications (Kehlet & Dahl, 2003). Patients' postoperative discomforts such as pain and nausea and vomiting may greatly affect their state of well-being and may even prolong the hospital stay of

patients. These discomforts may be the result of patients' illnesses, surgical procedures, anesthesia techniques, and their previous health status (Robleda, Roche-Campo, Sanchez, Gich, & Banos, 2015). Gastrointestinal function is reduced by surgical abdominal procedures, and is followed the appearance of nausea, vomiting, abdominal distension, and constipation (Robleda et al., 2015). Postoperative nausea and vomiting is one of the most commonly symptom with about 30% patient experiencing postoperative per 100,000,000 patients worldwide which reported adverse effects of anesthesia (Smith, Smith, & Smith, 2012). According to Nguyen et al, approximately 20% of patients undergoing laparoscopic gastrointestinal surgery have related to postoperative ileus. This is a major barrier in patients' recoveries, which lead to increased morbidity, longer lengths of hospital stay, readmission rates, and hospital costs (Nguyen et al., 2015). Postoperative pulmonary complications are important risks of increased morbidity and mortality and hospital length of stay (Cheifetz, Lucy, Overend, & Crowe, 2010; de Cleva et al., 2014). Pulmonary dysfunction may contribute to the development of pulmonary oedema, atelectasis, pneumonia or respiratory failure (Holte et al., 2002)

2.1.4.2 Impact on psychological function

Many patients experienced significant amounts of pain with 80% and discomfort after surgery including 11% having severe pain, and 24% delays recovery among patients undergoing surgery (Kehlet & Dahl, 2003). Acute postoperative pain severity can be predicted for emotional distress, especially anxiety and depression (Bruce et al., 2012). Feeling of malaise and postoperative fatigue is one of factors that affects patients' recoveries and their abilities to return work after abdominal surgery (Desborough, 2000) because this is a part of the stress response caused by surgery. Although patients undergoing surgery is uncomplicated but postoperative fatigue can be prolonged leading to hampers their daily life (Kahokehr, Sammour, Sahakian, Zargar-Shoshtari, & Hill, 2010). Postoperative fatigue is a problem which associates to the magnitude of surgical injury, postoperative impairment of nutritional status, loss of muscle mass and function. Postoperative catabolism process and muscle wasting are important factors lead to development of fatigue after surgery (Kehlet & Dahl, 2003).

Postoperative anxiety can significant impact on the intensity of pain and surgical outcomes such as might increase the intubation time, impair the inflammatory response, increase cardiovascular workload and delay wound healing (Rejeh et al., 2013). Surgery anxiety includes multiple stressful components which can affect to postoperative recovery through both behavioral and physiological mechanisms. Surgery anxiety lead to increase the adverse effects of pain on immune and endocrine function which influence wound healing (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998). In addition, postoperative anxiety can cause a sensory overload and lack of sleep leading to physiological problems, and therefore delay self-care after surgery (Rejeh et al, 2013).

Sleeping is significantly disordered in postoperative patients which caused by factors as cytokines, pain, use of opioids, noise , awakenings during monitoring and nursing care (Kehlet & Dahl, 2003).

Delirium is common postoperative complication (Aldemir, Ozen, Kara, Sir, & Baç, 2001; Serafim et al., 2012; Robinson et al., 2009) that related to higher mortality and other severe complications, poor functional recovery and longer length of hospital stay (Jakobson et al., 2014). Delirium occurs in 12.8% of patients undergoing surgery (Jakobson et al., 2014).

Generally, the change in patients' emotional responses to surgery can influence on surgical outcome. This change is the result of the amount of anesthetic while it creates adverse effects on the immune and endocrine systems (Kiecolt-Glaser et al., 2015).

2.1.4.3 Impact to economic

Abdominal surgery is the major health problem in both developed and developing countries. It affects people and economic of the countries. Major abdominal surgery impacts on the well being of the patient and associated prolonged postoperative recovery (Kahokehr et al., 2010). Therefore, patients normally have to experience all of postoperative discomforts such as pain, paralytic ileus, pneumonia and other complications which increase in costs of health-care services.

In fact, patients undergoing abdominal surgery are associated with increasing risk for pulmonary complications in the postoperative period leading

to the length of hospital stay and morbidity and mortality (de Cleva et al., 2014). Postoperative pulmonary complications constitute approximately 25% of post operative deaths. Pulmonary function's impairment is characterized by reducing about 50 - 60% in vital capacity and 20% in functional residual capacity, even though there have been constant improvements of anaesthetic techniques (Cheifetz, Lucy, Overend, & Crowe, 2010).

In addition, postoperative ileus causes the prolong hospitalization (Chao et al., 2013; Nguyen et al., 2015), and an increase in the probability of infections or postoperative complications, as well as pulmonary compromise (Yang et al., 2012). The financial burden of postoperative ileus is enormous (Hayes, 2012; Berger, Ridolfi, & Ludwig, 2015; Nguyen et al., 2015) and was estimated approximately US$1.5 billion annually in patients undergoing abdominal surgery (Berger, Ridolfi, & Ludwig, 2015).

2.2 Recovery among patients with abdominal surgery

2.2.1 The concept of recovery

Postoperative recovery is an imperative period for any surgical procedure (Allvin et al., 2009). At this time the body will need a period of time to consume normal healthy state, previous normal activities so that restore any tissue that might have been damaged as part of the operation as well as after an illness and therapeutic intervention. The concept of postoperative recovery is always concerned in studies although there is no standard definition. Therefore, recovery may be defined as the process of returning and/or attainment of normal physiological functions and the previous health status, a sense of wholeness and wellbeing, as well as returning to the level of independence/dependence in daily activities including recovery about physical, psychological, social and habitual functions (Allvin, 2009). Recovery after surgery is a complex process involving multiple domains, including biological and physiological variables, symptoms, physical, emotional, social and economic function, health perception and overall quality of life (Neville et al., 2014; Miller & Mythen, 2014). Postoperative recovery can be affected by the patient's illness, the extent and

outcome of surgery, history of patients and current physical conditions (Arakelian, 2011). Recovery is natural change process of personal condition after surgeries that characterized by a period of immediate deterioration post-surgery, and are followed by a gradual rehabilitation to baseline level (Miller & Mythen, 2014). This rehabilitation period can last longer than healthcare providers may expect (Miller & Mythen, 2014). Recovery after surgery depends on many factors such as patient, type of surgery, anaesthetic characteristics, the presence of any of numerous adverse sequelae (Brandão, Sousa, Veiga, & Abelha, 2014; Miller & Mythen, 2014), surgery conditions as well comorbidities (Yaghoobi et al., 2015). Postoperative recovery is continuity process which begins at the time of surgery and is complete when the patient returns to their baseline function (Neville et al., 2014; Awad & Chung, 2006). Consequently, the recovery period is necessary to rebuild strength and allow the healing process to take place. Recovery‘s quality after anesthetic and surgery has been considered an important measure for evaluating the early postoperative health status of patients (Karaman et al., 2012; Brandão et al., 2014). Good postoperative recovery is increasingly recognized as a critical outcome after surgery with aim to reduce surgical complications, decrease costs of treatment and increase the speed of patient‘s resuming their previous activities (Royse et al., 2010).

Quality of recovery- 40 items **(**QoR- 40**)** is a global measure of recovery (Stark et al., 2013). The QoR- 40 including 40-item questionnaire was developed by Myles et al for the purpose of measuring quality of recovery following anesthesia and surgery **(**Brandão et al., 2014)**.** Quality of recovery- 15 items **(**QoR- 15**)** is a short-form version of the 40 questions original questionnaire and provides a valid, reliable, responsive, and efficient method to assess the quality of a patient**’**s postoperative recovery **(**Brandão et al., 2014; Sá et al., 2015; Stark et al., 2013)**.** In addition, the QoR- 15 questionnaire can provide information to improve the quality of anesthesia and surgery as well as evaluates impact of changes in health care delivery **(**Sá et al., 2015; Brandão et al., 2014)**.** The QoR- 15 uses an 11-point numerical rating scale and includes five main dimensions**:** emotional state, physical comfort, physiological support, physical independence and pain**.** The result of this questionnaire is assessed as following**:** a minimum score of 0 is poor recovery and a maximum score of 150 is excellent recovery **(**Sá et al., 2015; Stark et al., 2013). The QoR- 15 questionnaire

results in a score of 0 - 150 with a high score which is defined as a good quality of recovery **(**Stark et al., 2013; Kleif, Edwards, Sort, Vilandt, & Gogenur, 2015)**.** Conversely, a patient with a QoR- 15 score lower to the mean QoR- 15 score isdefined as a poor quality of recovery **(**Brandão et al., 2014).

2.2.2 Recovery among patients with abdominal surgery

Abdominal surgery has caused a significant physiological stress and is followed by a period of convalescence and recovery. Therefore, after surgery, patients are expected to recover to resume their physical functions, health status as well as previous activities. Recovery is a continuous process that begins from the end of intraoperative care period until a patient's returning his/her preoperative physiological state (Awad & Chung, 2006).

Postoperative recovery is divided into three phases as following : early recovery is stage from the discontinuation of anesthetic agents until patients recover vital postoperative reflexes (discharge from recovery room), intermediate recovery is period that patients regain stable vital functions (from recovery room discharge until hospital discharge) and late recovery begins with discharge and lasts until patients achieve preoperative health and wellbeing and return to baseline functions such as performing daily activities (Arakelian, 2011; Neville et., 2014; Awad, & Chung, 2006; Allvin, 2009; Coles, 2013). Indeed, the anaesthesia recovery (awakening from anaesthesia) is an important period from the end of surgical process to the return of consciousness during perioperative period (Guo, Li, Liu, & Herr, 2014). Many problems are associated with anaesthesia and surgery occurring in the immediate postoperative period such as nausea and vomiting (9.8%), hypoxia (6.8%), hypothermia and shivering (5 - 65%), delirium in patients older patients (10% in those who are over the age of 50) and hypotension (2.7%) (Coles, 2013). These complications may be difficult to be treated, and this leads to delayed discharge from recovery room (Coles, 2013). Postoperative intermediate recovery is a period of caring when patients are continuously monitored of heart rate, blood pressure, pulse oximetry, consciousness level, pain and nutrition after each surgery (Thomsen et al., 2014). In the intermediate phase, postoperative recovery is assessed on physiological stability, returning of organ function and patient mobility, resolution of pain and

nausea and cognitive recovery which is presented by length of hospital stay. Length of hospital stay is an outcome of recovery when patients achieve discharge criteria for example they can have less pain, show good wound healing, resume gastrointestinal function, able to enjoy food, feeling rested, have had a good sleep, able to look after personal toilet and hygiene unaided and able to communicate with family or friends. Late recovery is a period of ongoing physical and psychological recovery until a patient has returned to his/her preoperative physiological status and can resume daily activities. This period can occur at home, in the ward, or at other facilities (Coles, 2013).

Postoperative recovery is different among individuals, and recovery ability is influenced by many factors such as age, gender type of surgery (Berg, Kjellgren, Unosson, & Årestedt, 2012) and social factors during recovery process (Arakelian, 2011). However, the recovery process includes a belief in the patient and his/her ability to care as well as involving the patient in his/her own care thought health education, support and encouragement from the health care staff to promote smooth recovery (Arakelian, 2011). In fact, in order to get patient‘s returning to normal functions and previous activities, both patients and health care staff have to effectively cooperate in the postoperative recovery (Arakelian, 2011). Postoperative recovery is a nature and dynamic process during and is an important part of the surgical process which patients try to regain their independence and return to everyday life (Wallström & Frisman, 2013). Therefore, quality of recovery after anesthesia is an important measure of the early postoperative health status of patients (Stark, Myles, & Burke, 2013; Karaman, 2014) and quality of recovery measuring provides insight into the impact of surgical on patients undergoing abdominal surgery (Hedgepeth, Wolf Jr, Dunn, Wei, & Hollenbeck, 2009). Slow recovery after surgery may lead to many serious complications such as pneumonia, paralysis, bowel function problems, wound infection and prolonged length of hospital stay. Therefore, prevention of complications after abdominal surgeries remains as primary goal after admission to the ICU (Havey, Herriman, & O’Brien, 2013). Enhanced recovery after surgery is conducted with aims to reduce the surgical stress (Lassen et al., 2013; Yang et al., 2012; Hughes, et al, 2014; Cestonaro, Schieferdecker, Thieme, Cardoso, & Campos, 2014; Wijk, Franzen, Ljungqvist, & Nilsson, 2014; Aahlin., 2014; Knott et al., 2012; Lohsiriwat, 2014;

Dorcaratto, Grande, & Pera, 2013; Kim, Kang, Lee, Oh, & In, 2013; Fayezizadeh, Petro, Rosen, & Novitsky, 2014) and organ dysfunction (Wijk et al., 2013; Kim et al., 2013) to promote early return to physiological function and to facilitate postoperative recovery (Aahlin 2014; Cestonaro 2014; Lohsiriwat, 2014), shorter length of stay after surgery, and reduction in complications (Wijk et al., 2013;Yang et al., 2012; Cestonaro et al., 2014; Hughes et al, 2014; Pedziwiatr et al., 2008; Fayezizadeh et al., 2015), faster return of bowel function, earlier mobilisation and lower pain scores (Knott et al., 2012).

2.3 Transition theory as a conceptual framework to explain recovery among patients with abdominal surgery

2.3.1 Transition theory

Transition theory is used as a theoretical framework in this study. Major concepts of the middle range theory of transition include 4 main components including: (a) Nature of transitions which refer to type and characteristics of transition. (b) Transition conditions refer to factors that can facilitate or inhibit transition process and outcomes. Transition conditions include personal, community, or societal factors and personal conditions include meanings, cultural beliefs and attitudes, socioeconomic status, preparation, and knowledge.(c) Patterns of response refer to the outcomes of transition which reflect the state of a person after transit in his/her health trajectory process. (d) Nursing therapeutics refers to the nursing interventions which are performed to facilitate healthy transition (Meleis et al., 2000). In this study, patient's recovery can be viewed as transition process in their health and illness. Accordingly, Meleis' transition theory can be employed to clearly explain the changing process of a person undergoing abdominal surgery. It is the change in health and illness of patients receiving surgery that create a transition outcome, recovery from abdominal surgery. Transition outcome depends on personal factors. It means that patient's postoperative recovery have relationship with transition conditions, factors which can be facilitated or inhibited recovery. This relationship is clearly

explained in transition theory. Transition Theory explains health and illness transition of personal after surgery as a recovery process. All surgeries are followed by recovery as a compulsory process. Therefore, transition theory is useful in explaining transition process of all of surgeries as patients with orthopedic surgery, breast surgery, elective surgery, emergency surgery; surgery among patients with injuries. These patients were also in transition process from the stage of being healthy to the stage of illness. They are also passing over intraoperative care, experiencing surgical stress as pain, wound healing, etc. Transition process after surgery is the result of recovery ability and combined with personal factors, both will create a transition outcome.

2.3.2 Transition theory and the patients with abdominal surgery

Recovery is an ongoing process that begins from the end of intraoperative care period until the patient returning his/her preoperative physiological state (Awad & Chung, 2006). Patients are required abdominal surgery with aim to treat the gastrointestinal diseases or any diseases of organs within abdominal cavity and the consequences of surgery were viewed as transition outcome. Therefore, the changes in health and illness of patients who undergo abdominal surgery can be explained by transition theory, because transition process is assessed by the result of recovery after surgery which is related to personal factors (Meleis et al., 2000). Patients undergoing abdominal surgery will experience transition process of health and illness; they will undergo changes in their health status until they achieve normal physiological functions after surgery.

Transition conditions of patients after abdominal surgery are those circumstances that affect the way a person changes through the phases of recovery such as early recovery begins from the discontinuation of anesthetic agents until recover of protective reflexes and motor functions; intermediate recovery when the patient achieves criteria for discharge; and late recovery begins with discharge until patients achieve preoperative health and wellbeing (Coles, 2013). When patients experience transition phases, there are many problems can affect quality of recovery process as pain, bleeding, hypotension etc. Surgical complications are considered the factors that inhibited recovery process. The success of recovery depends on many factors which can be facilitated smooth recovery process such as previous wellbeing

patients, a standard of monitoring and caring of qualified responsible staffs should be maintained until the patient is preoperative health as well as encourage ability patient's self care. Recovery after surgery depends on patient's illness, surgical types, and anaesthetic characteristic, quality of care as well as the presence of any adverse sequelae (Brandão, Sousa, Veiga, & Abelha, 2014). Therefore, if factors related recovery transition is well understood together with making preparation and plans to manage these factors, their transition would be smoothly and successfully.

There are many factors influencing recovery of patients with abdominal surgeries such as age, pain, comorbidity, perioperative condition and size and site of surgical incision. These factors are the personal factors that influence the transition process and outcomes. They can facilitate or inhibit a transition (Meleis et al, 2000). Moreover, recovery process is explained as a pattern response including different methods care to reduce stress response when patients experience a surgical procedure with aim to facilitate the conservation physiological function and promote postoperative recovery (Miler, Gan, Tong, & Thacker, 2014). Transition theory also provides a clear concept in nursing practices, because it clearly describes nursing therapeutics as responsibilities of nurses in facilitating patient's recovery after surgery. Besides, when nurses well understand this theory, they can provide good cares and evaluate the outcomes of transition. Therefore, enhanced recovery process may reduce the surgical stress response, organ dysfunctions and improve gastrointestinal function as encouraging early oral nutrition and to facilitate mobilization so achieve good recovery and reduce complications (Miler et al., 2014).

2.4 Factors associated with recovery among patients after abdominal surgery

2.4.1 Age associated with recovery among patients after abdominal surgery.

Age is one of the factors which can predict recovery among patients after surgery (Mayo et al., 2011). Many previous studies showed significantly different

recovery among between age group. Indeed, Kleif reported that there is a positive correlation between age and the postoperative recovery (r = 0.19, 95% CI: 0.04 – 0.36, p = 0.03) (Kleif, Edwards, Sort, Vilandt, & Gogenur, 2015). For example as following:

Young patients were aged less than 60 years old who recover fast than elderly patients with over 60 years old. This is demonstrated by difference in anatomy, physiology, metabolism among age group. According to Hermans, incidence of young patients who had to be admitted to the ICU after surgery as well as the presentation of complications and mortality are less than elder patients ($p < 0.01$) (Hermans et al., 2010. Likewise, Ghnnam showed that young patients were hospitalized for less than elderly patients ($p < 0.01$) after surgery (Ghnnam, 2012).

As the population ages, the number of geriatric patients receiving abdominal surgery will significantly increase (Guo et al., 2014; Ong, Guang, & Yang, 2015; Fukuda, Wada, Niki, Sugiyama, &Mushiake, 2012; Kenig, Richter, Olszewska, & Żychiewicz, 2014). Approximately 2 million older Americans undergo abdominal surgery per year (Massarweh, Legner, Symons, McCormick, & Flum, 2009). Older patients who response low to the surgical stress, reduced physical strength and muscle weakness due to decreased capacity of cells, tissues and organs (Terzioglu et al., 2012; Tahiri et al., 2015). These physiological changes in elder are a result by aging process which may influence recovery after surgery (Santana, do Amaral, Pereira, Delphino, & Cassiano, 2014). Additionally, adults 65 years or older may have greater difficulty in recovering from surgery (Massarweh, Legner, Symons, McCormick, & Flum, 2009) by adding comorbidity, reducing physiological and poorer nutritional status (Kahokehr, Sammour, Sahakian, Zargar-Shoshtari, & Hill, 2010). Therefore, elder patients can have the risk of complications and mortality at the postoperative period (Terzioglu et al., 2012; Tahiri et al., 2015). Factors associated with risk of postoperative complications and death incidence in elder patients including advanced age, co-morbid disease, and major surgery (Jakobson et al., 2014). In sum, the postoperative recovery process in older patients was seen slow.

Postoperative older patients are related to a higher level of pain which leaded to increase anxiety and longer hospitalization (Rejeh et al., 2013), increase pulmonary complications and chronic pain syndromes (Guo et al., 2014). Elderly patients with comorbidity, poorer nutritional status is thought to be associated with

postoperative fatigue leading to hamper daily life for prolonged periods of time (Kahokehr et al., 2010). Delirium is a frequent complication following surgery in elderly patients (Hermanset al., 2010; Jakobson et al., 2014; Robinson et al., 2009) with rates of postoperative delirium range from 15% to 50% leading to length of stay, higher mortality and health-care cost. Accordingly, Jakobson et al, risk factors such as older age, co-morbidity, cognitive, sensory and functional impairment which associated with postoperative delirium (Jakobson et al., 2014). The development of postoperative delirium related to postoperative complication, length of hospital stays and higher death rates at 30 days, 6 months, and 1 year (Lagoo-Deenadayalan, Newell, & Pofahl, 2011). Postoperative infections including the urinary tract, lungs, and surgical site are important reasons of morbidity and mortality in elderly patients (Lagoo-Deenadayalan et al., 2011). Many studies showed following as: Jakobson et al reported that infectious complications were pneumonia (6.1%), intra-abdominal infection (4.2%) and wound infection (4.2%). In addition, septic shock occurred in 4.1% of the patients. Fukuda et al reported that surgical site infection was the most frequently complication and occurred in 21 patients with 22.3%, followed by pneumonia with 12.8% (Fukuda, Wada, Niki, Sugiyama, & Mushiake, 2012). Rejeh et al reported that postoperatively pulmonary complications occur in 2.1% - 10.2% of elderly patients including atelectasis, hypoxemia, hypoventilation, acute respiratory distress syndrome, and pneumonia (Rejeh et al., 2013) (P values for all these complications were less than 0.05). Postoperative cardiovascular complications result in the risk of other complications and are cause of postoperative morbidity and mortality following surgical procedures (Lagoo-Deenadayalan et al., 2011).

Elderly patients with emergency abdominal surgery are associated with increased morbidity and mortality, because variety of reason such as comorbidities (Thomsen et al., 2014), insufficient screening, unrecognized symptoms, and inadequate overall access to the health care system (Fukuda et al., 2012). The ability to adapt the surgical stress on older patients is very low because of decreased physiologic reserve. Therefore they can have difficulty in recovering from surgery and can have postoperative complications which increase risk of mortality rates (Massarweh et al., 2009). Indeed, following to Massarweh et al, rates of postoperative complications is reported as 65 - 69 years, 14.6%; 70 - 74 years,16.1%; 75 - 79 years, 18.8%; 80 - 84

years, 19.9%; 85 – 89 years, 22.6%; and 90 years, 22.7%; trend test, p = 0.001 and mortality rates as 65 - 69 years, 2.5%; 70 - 74 years, 3.8%; 75 - 79 years, 6.0%; 80 - 84 years, 8.1%; 85 - 89 years, 12.6%; and 90 years, 16.7%; trend test, p = 0.001) (Massarweh et al., 2009). According to Kenig et al, patients aged over 65 years old account for approximately 50% of all emergent operations and 75% of operative mortality (Kenig, Richter, Olszewska, & Żychiewicz, 2014). Additionally, Fevang also found a significant correlation between age and illness with 52% of patients older than 75 years (p = 0.001) which related to death and complication (Fevang et al., 2000).

In conclusion, age is an important factor which associated with recovery after abdominal surgery.

2.4.2 Postoperative pain associated with recovery among patients after abdominal surgery

Abdominal surgery has a high rate of postoperative pain (Grady et al., 2014; Layzell, 2014), which was associated with delayed postoperative recovery and more complication (Good et al., 2005). Even though, modern surgical techniques are developed with aiming to improve the quality of life for many patients after surgery but patients still have to experience by pain and anxiety (Dreyer et al., 2015). Pain is one of the most discomfort symptoms (Sivrikaya, 2012) and is common among patients who have undergone abdominal surgical procedures (Good et al., 2005; Vallano, Aguilera, Arnau, Banos, & Laporte, 1999). Postoperative pain is an unpleasant sensory which affecting physical and emotional of patients undergoing surgery (Rad et al., 2015). Although, surgery is a treatment method to relieve pain and discomfort caused by illness but itself is an important factor that creates to pain (Rad et al., 2015). Pain inflammatory response is one of the most important components of pain perception (Bugada et al., 2015). Therefore, the changes in neuroendocrine, respiratory and renal function, gastrointestinal activity, circulatory and autonomic nervous system activity are associated with postoperative pain (Sivrikaya, 2012).

The level of pain of patients undergoing abdominal surgery is related to the extent of tissue damage (Corke, 2013; Rad et al., 2015; Layzell, 2014) lead to ischaemia, release of neuropeptides at the trauma site and throughout the nervous

system (Rejeh, Heravi-Karimooi, Vaismoradi, & Jasper, 2013) and the site of surgery (Corke, 2013). Pain following surgery is a common outcome, the experience pain is complex and the origin is multifactorial but most pain is related to the wound (Layzell, 2014). Therefore, understanding the physiological processes that lead to persistent pain, we can use therapeutic interventions by optimal pain management to minimize the progression from acute to chronic pain (Reddi & Curran, 2014). Previous studies showed that 10%, 20 - 40% and 40 - 60% of the patients undergoing surgery suffer from low pain, moderate pain and severe pain, respectively (Rad et al., 2015). Acute postoperative pain potentially leads to postoperative morbidity and persistent post-surgical pain. Approximately 80% of patients is reported by levels of pain which frequently see in all of studies (Robleda et al., 2015). Of those, 11% experienced severe pain which can affect patient satisfaction and delay in recovery with 24 % as result by pain (Layzell, 2014). Postoperative pain is the most common reason for delay in recovery because pain interferes with various activities, such as inhibition of cough and sputum excretion leading to atelectasis, retention of secretions and pneumonia, cardiovascular side effects such as hypertension and arrhythmias; impaired gastrointestinal function leading to postoperative nausea and vomiting; delays mobilization leading to decrease blood flow in lower extremities and a higher risk of deep vein thrombosis (Sivrikaya, 2012). Severe postoperative pain can exacerbate the anxiety response and associated with psychological complications (Rejeh, et al., 2013; Good, Anderson, Ahn, Cong, & Stanton-Hicks, 2005) that prolong the length of hospital stay and reduce patient satisfaction (Vaajoki et al., 2012; Layzell, 2014; Good et al., 2005). Chronic pain can prolong more than 3 months after surgery and can seriously affect patient's quality of life and their daily activities (Reddi & Curran, 2014). Chronic pain is an adverse outcome from surgery which related to cost to society in terms of suffering and disability (Sivrikaya, 2012). According to Brandão et al, (46%) patients reported postoperative pain at 24 hours and 28% patients developed chronic postoperative pain at 3 months. Postoperative pain 24 hours was associated with more chronic postoperative pain at 3 months ($p = 0.021$). Patients with chronic pain reported worse quality of recovery (103 vs. 121, $p < 0.001$) using a QoR- 15 mean global score. This result showed the relationship between poorer quality of recovery compared to postoperative pain at 24 hours and a worse recovery compared

to the development of chronic pain (Brandão, Sousa, Veiga, & Abelha, 2014). Thereby, chronic postoperative pain is considered a common healthcare problem which associated with significant morbidity and it presents an important outcome measure after surgery (Brandão et al., 2014). Following to above adverse effect of pain, therefore, designing strategies to reduce pain aiming to prevent complications and promote recovery after surgery is needed.

Pain diagnosis and pain relief is viewed as a basis for nursing care and is one of the most important duties of nurses (Rad et al., 2015). Therefore, postoperative pain management is considered as one of the most important parts of peri-operative care with aim to promote patient's comfort (Hu, Tsou, Chan, & Chang, 2013), facilitate early mobilization (Corke, 2013), improve postoperative outcome (Hu et al, 2013). Effective pain management after surgery contributed facilitating postoperative recovery and decreases the length of hospitalization (Rad et al., 2015). Multimodal analgesia aims to control and prevent postoperative pain to promote early mobilization, early enteral nutrition, reduce stress response through the use of regional anesthetic techniques and a combination of analgesic agents (Sivrikaya, 2012). Epidural analgesia is viewed as the “gold standard” for the postoperative pain management (Duncan & Haigh, 2013), and is the most inhibitory effective on surgical stress responses (Sivrikaya, 2012).

Consequently, epidural analgesia provides better postoperative pain controlling than opioid analgesia due to reducing surgical stress and decreasing the incidence of complications after surgery (Marret, Rolin, Beaussier, & Bonnet, 2008). Conversely, the use of epidural analgesia can cause adverse effects such as respiratory depression, hypotension and urinary retention (Vaajoki et al., 2012). Thereby, the decision to choose any analgesic is depend on patients ‘co-morbid conditions, psychological status, and the type of surgical procedure. The multimodal analgesia can reduce peri-operative morbidity, decrease the length of hospital stay, and improve patient satisfaction without affecting safety (Sivrikaya, 2012). Good pain control after surgery aims to prevent postoperative complications such as hypertension, myocardial ischemia, decrease in alveolar ventilation, immobility, deep venous thrombosis, paralytic ileus and delays wound healing (Sivrikaya, 2012; Corke, 2013). Pain management following abdominal surgery is uncompleted leading to complications

such as delayed recovery and ambulation, prolonged hospitalization with dissatisfaction of patients (Rejeh et al., 2013; Myles, Weitkamp, Jones, Melick, & Hensen, 2000). as well as psychological changes that increase morbidity and mortality resulting in costs and that reduce quality of life (Sivrikaya, 2012). Despite, there are many clinical guidelines and various standards for pain management, but many patients continue to experience intense pain after surgery (Sivrikaya, 2012; Zalon, 2014) with the incidence ranging from 29.6% to 86% (Zalon, 2014). In conclusion, postoperative pain can increase the physiologic stress response; contribute to complications and prolonged length of stay which associated with postoperative recovery (Good et al., 2005).

The Numeric Rating Scale (NRS) for pain is widely used to measure the intensity of pain in adults (Childs, Piva & Fritz, 2005; Rodriguez, 2001). This scale includes 11 - item NRS which is a horizontal line with number range from 0 - 10. An 11-point NRS describes the best reflecting the level of pain with 0 representing for “no pain” and 10 representing for “worst imaginable pain” (Jensen & McFarland, 1993; Rodriguez, 2001). A higher score indicates greater pain intensity (Hawker et al., 2011). The values on the pain scale correspond to pain levels as follows: 0 = No pain, 1 - 3 = mild pain, 4 - 6 = moderate pain, 7 - 10 = severe pain. The NRS takes 1 minute to complete (Hawker et al., 2011) and identifies the level of pain.

2.4.3 Comorbidity associated with recovery among patients after abdominal surgery

Comorbidity is presented with one or more additional disorders or illnesses occurring in the individual patient that affected on patient’s health status. Therefore, comorbidity is a risk that related to recovery among patients after abdominal surgery. The risk of postoperative complications, morbidity rate and mortality may be due to advance age followed by a high frequency of comorbidity (Jakobson et al., 2014; Fevang et al., 2000). Co-morbidities including cardiovascular as hypertension (46.8%), chronic heart disease (18.1%), pulmonary as COPD (14.9%), endocrine, and renal are more common in elderly patients (Fukuda et al., 2012). Elderly patients with diminishing physiologic reserves who have any comorbidity can lead to functional status deterioration and a higher incidence of postoperative

complications (Tahiri et al., 2015). According to Kaplan, comorbidities such as congestive heart failure, liver disease, thromboembolic disease, and renal disease associated with an increased risk of mortality and length of hospital stay as well as affected on recovery process of patients. Specially, elderly patients undergoing emergency surgery with multiple comorbidities were presented with higher mortality (20.6%) compared with young patients without multiple comorbidities undergoing an elective operation (0.1%) (Kaplan et al., 2011). Likewise, Kenig et al showed that the most common postoperative complications in elder patients with co-morbidities were wound infection (47 patients – 25.5%), cardiac complications (40 patients – 21.7%), pulmonary complications (37 patients – 20.1%), renal failure (30 patients – 16.3%), respiratory failure requiring intubation (27 patients-14.7%), delirium and other neurologic complications 921 patients – 11.4%, urinary tract infection (15 patients – 8.1%), intraperitoneal abscess (7 patients - 3.8%), fistula formation (6 patients – 3.2%), bleeding (3 patients – 1.6%), dehiscence (3 patients - 1.6%) and other minor complications (23 patients – 12.5%) (Kenig et al., 2014). In addition, the dysrhythmia (odds ratio 1.6, 95% CI 1.2-2.6, p = 0.02), vascular disease (odds ratio 2.1, 95% CI 1.43.1, p = 0.02) and renal disease (odds ratio 1.4, 95% CI 1.2-2.8, p = 0.01) were independent risk factors of morbidity and mortality after surgery (Kenig et al., 2014). The result of Sá et al showed that patients with COPD, diabetes, and arterial hypertension had lower quality of recovery scores after surgery as (101 vs 118, p = 0.047), (38% vs 18% p = 0.017), (66% vs 45% p = 0.035), respectively (Sá, Sousa, Santos, Santos, & Abelha, 2015). This result suggests as a poor quality of recovery which related to cormobidity.

According to previous studies, comorbidity has been used to predict the burden of illness or disease which is associated with worse health outcomes and postoperative recovery.

2.4.4 Peri-operative condition (surgical Apgar score) associated with recovery among patients after abdominal surgery

Surgical Apgar score for the field of surgery is calculated at the end of any surgical operation to the estimated blood loss (EBL), lowest heart rate (HR), and lowest mean arterial pressure (MAP) entered in the anesthesia record during the

operation. This helps to assess accurately patient's condition and chances of major complications or death. Dullo and Regenbogenet et al showed that patients who have a significantly lower surgical Apgar score will surfer the higher complication rates and had significantly longer median length of stay ($p < 0.0001$) *(*Dullo, 2011; Regenbogen et al., 2008). The same as result of Dullo, previous studies showed that surgical Apgar score could predict patients postoperative morbidity and mortality rate which occur in patients with a surgical score ≤ 4 with C-statistics = 0.72; $p < 0.0001$ while patients with scores of 9 or 10 are less complication and death (Gawande, Kwaan, Regenbogen, Lipsitz, & Zinner, 2007; Regenbogen et al., 2008). Beside that, Baltaza saw a positive correlation between length of stay and Apgar score at $p = 0.0095$, $r = 0.3$ and patients with lower Apgar score had an increased length of stay (Regenbogen et al., 2008; Baltazar et al., 2014). The Apgar score ranged from 0 to 10, with lower scores associated with worse outcomes (Regenbogen et al., 2008; Gawande et al., 2007; Reynolds, Sanders, Schildcrout, Mercaldo, & Jacques, 2011) such as the decision to admit a patient to the ICU with a Apgar score of 0 - 2 (95% CI 6.88 - 30.19, $p < 0.001$) compared to patients with a Apgar score of 9 - 10. Postoperative complications or death occurred among the patients with a surgical score ≤ 4. Opposite, the patients with scores of 9 to 10, risk of complications were significantly lower ($p = 0.04$) *(*Dullo, 2011*)* and the death is presented for 0 ($p < 0.0001$) (Gawande et al., 2007; Regenbogen et al., 2008; Regenbogen et al., 2009). Solbol showed that the Apgar score was strongly correlated with hospital mortality, with a lower score associated with higher mortality rates (Apgar score 0 - 2 (8.7%); 3 - 4 (7.0%); 5 - 6 (2.9%); 7 - 8 (1.0%); 9 - 10 (0.5%); $p < 0.001$) (Sobol, Gershengorn, & Wunsch, 2013). In addition, length of stay has been considered as a measure of outcome after surgery to assess early postoperative recovery. Therefore, according to previous studies, the surgical Apgar score strongly correlated with postoperative outcomes ($p < 0.0001$) (Regenbogen et al., 2008) and postoperative recovery (Baltazar et al., 2014).

Surgical Apgar score is a simple surgical score which is calculated basing on the EBL, lowest HR, and lowest MAP during an operation. Surgical Apgar provided a meaningful estimate of patients' condition and risk for postoperative complications (Baltazar et al., 2014; Sobol, Gershengorn, & Wunsch, 2013). Surgical Apgar score with the range of the score was 0 to 10. The utility of a 10 -

point surgical Apgar score is applied to rate surgical outcomes. A higher score on surgical Apgar predicts the incidence of major complications and death decreased monotonically (Dullo, 2011; Gawande et al., 2007).

2.4.5 Surgical incision associated with recovery among patients after abdominal surgery

Abdominal surgery is explored by incision through the abdominal wall. The incision goes through layers of skin, subcutaneous fat, muscle and the peritoneum (Layzell, 2014). Therefore, surgical incisions cause tissue damage (Layzell, 2014), caused by ischemia and release of neuropeptides at the trauma site and throughout the nervous system (Rejeh et al., 2013) which results in acute post-operative pain in all of surgeries (Layzell, 2014). Tissue damage is caused by surgery leading to a physiological inflammatory response (Layzell, 2014). Inflammatory mediators including cytokines, histamine, leukotrienes, bradykinin and prostaglandins are released from damaged tissue, inflammatory cells (Reddi & Curran, 2014), platelets and plasma components which cause vasodilation and increased vascular permeability (Layzell, 2014). This inflammatory response created to signs of redness, heat, swelling and pain (Layzell, 2014). Wound healing is related to the inflammatory response because this will facilitate structural and functional repair process of injured tissue. Therefore, the minimal physiological response would be beneficial (Kocamanoglu et al., 2011). The inflammatory response is an important mechanism which contributed to pain, and impact on neuroendocrine and immune function leading to affect to wound healing process. Pain following abdominal surgery is related to the surgical incision. Acute post-operative pain can be appeared in the first few days after surgery by surgical incision. Postoperative pain can be severe which affects serious to patient recovery. Consequently, good pain management can help improving outcome and enhancing recovery (Layzell, 2014). In contrast, acute pain is not controlled which have adverse effect on wound healing and prolong the postsurgical recovery.

The upper abdominal surgery involves an incision above or extending above the umbilicus. This type of surgery includes hernia repair, gall bladder removal, large bowel removal, exploratory laparotomy, and other interventions in the abdominal cavity that performed by laparotomy or laparoscopy (Grams, Ono, Noronha,

Schivinski, & Paulin, 2012). Laparotomy with upper abdominal incisions leads to severe pain, which affected pulmonary function parameter (Mimica et al, 2007; Martinez et al., 2015), including lung volumes, flow rates, arterial blood gases and diaphragmatic function leading to respiratory complications (Bablekos, Michaelides, Analitis, & Charalabopoulos, 2014) such as atelectasis, retention of secretions, hypoxemia, and pneumonia. Respiratory dysfunction can appear with 80% of patients with upper abdominal surgery which increased the length of hospital stay and treatment costs and contributed significantly to the morbidity and mortality (Grams et al., 2012) range from 20% - 25% and 3% - 5% (Bablekos et al., 2014). Moreover, upper abdominal surgery with wound is in the breathing area thereby interferes with abdominal muscle use for deep breathing coughing, and moving (Vaajoki et al., 2011). This increases morbidity rates after surgery and leads to delayed recovery (Ahmed, Latif, & Khan, 2013). In addition, transverse incision and elliptic incision of the upper abdomen were associated with severe hypoxia, higher pulmonary shunt values and severe pain as well as have to optimal pain management (Mimica et al., 2007). Low abdominal incisions with low midline laparotomy and inguinal incision can cause significantly less respiratory disturbances and less postoperative pain compares to upper abdominal incisions *(*Mimica et al., 2007*)*. Besides that, O'Dwyer showed that the length of incision influences on pulmonary function among patients with cholecystectomy and patients with minor on 6cm surgical incision (mini cholecystectomy) had less severe pain, shorter hospital stay and faster respiratory recovery compared to those operated on 15cm incision (95% CI, p = 0.0069) (O'Dwyer, McGregor, McDermott', Murphy', & O'Higgins', 1992).

Laparoscopic incisions can be presented with less significantly pain, shorter convalescence, reduce surgical stress and limit inflammatory response (Antoniou, Antoniou, Koch, Pointner, & Granderath, 2014) as well as reduce postoperative ileus (POI) incidence due to decrease bowel manipulation and blood loss (Nguyen et al., 2015). Therefore, laparoscopy has advantages over laparotomy by smaller surgical scars, faster recovery from surgery, less pain and earlier return of bowel functions (Ülker, Anuk, Bozkurt, & Karasu, 2014) as well as earlier return to normal activity (2 weeks) than open abdominal surgery (4 - 6 weeks) (Richardson, Carter, Fuhrman, Bolton & Bowen, 2000) and shorter length of hospital stay (least 4 -

7 days with open surgery and 1 - 2 days with laparoscopic surgery) (Richardson et al., 2000; Dewinter, de Velde, Fieuws, D'Hoore, & Rex, 2014; Pędziwiatr et al., 2014) and reduce risk of postoperative complications (Pędziwiatr et al., 2014). Overall, the results of previous studies showed that the location of incision and length of incision which associated with postoperative recovery.

Measuring the length of incision is performed in the first time of removal dressing after surgery. The researcher will use sterile gloves and the tapeline to measure the length of incision. After that, the result is checked to compare with operative note in the patient's record.

2.5 Conclusion

Abdominal surgery is very common among patients receiving elective surgery. However, abdominal surgery presents significant challenges for patient recovery (Thompson et al., 2012). Both type of surgery including open or laparoscopic surgery are performed in the operating room under general anesthesia or epidural anesthesia. Thereby, many problems can occur in the perioperative care. Surgical complication and discomfort surgeries may influence on the speed of recovery process. The recovery process after surgery can be viewed as a transition process because it is continuously change in health and illness of patients. This process also begins from the end of intraoperative care until return to previous health stage or daily activities and feels wellbeing. Patients undergoing abdominal surgery always expect a good recovery which reduce surgical complications, reduce rate of morbidity, shorten length of stay and decrease cost care. Consequently, in order to obtain smooth recovery, nurses should facilitate driving factors such as improvement in standard of monitoring and caring, qualified responsible staffs, surgeons and especially the encouragement of the helps of patients' family and patient's self-care. On the other hand, inhibiting factors lead to delayed recovery process as pain and postoperative complications which will be rejected soon. Postoperative recovery aims to reduce the surgical stress, to promote early return to physiological function and reduce length of hospital stay. Overall, the goal of caring patients undergoing abdominal surgery is to promote recovery process which includes physical, psychological and social functions.

According to literature review, the researcher interested in accessing factors associated with recovery among patient after abdominal surgery. These factors related to health and illness transition as well as health transition outcome. In Vietnam, the studies measure comprehensive recovery process among patients with abdominal surgery as well as descriptive relationship among these factors and patients' recovery is still limited. The researcher anticipates that the results from this study can be used as foundation knowledge for health care staffs to develop appropriate effective guidelines to promote patients' postoperative recovery. Moreover, nurses can apply scales and guidelines to evaluate recovery and measure the returning to baseline health after surgery as well as explore clinical factors associated with recovery (Hedgepeth et al., 2009).

CHAPTER III
METHODOLOGY

In this chapter, research design, population, and sample of the study, studied instruments and their validity and reliability, data collection procedure, human right protection, and data analysis used in this study was consecutively presented.

3.1 Research design

The study was a descriptive correlation research, aimed to study the relationship among age, postoperative pain, co-morbidity, surgical condition, and surgical incision with recover in patients after abdominal surgery, and to identify the recovery level among patients after abdominal surgery.

3.2 Population and sample of the study

3.2.1 The population of this study

The population of this study included patients undergoing abdominal surgery, age were 18 years and older, both males and females, both open and laparoscopic surgery in Surgical Department at Bach Mai hospital, Hanoi, Vietnam.

3.2.2 The sample of the study

Sample was selected according to the following these inclusion criteria:

1) Able to verbally communicate with the researcher in Vietnamese language.

2) Patients who had undergone abdominal surgery, both open and laparoscopic surgery

The exclusion criteria for the participants were as follows:

1) The patients had the result of pathologies post- operation as severe cancer metastasis, having severe post operative infection or hypovolemic shock from massive postoperative bleeding as indicated by the physicians' diagnosis.
2) Incomplete fills out questionnaire

3.2.3 Sample calculation

The researcher tested the relationship between age, postoperative pain, co-morbidity, surgical Apgar score, surgical incision and recovery among patients after abdominal surgery. Three parameters required including 1) the level of significance $\alpha = 0.05$, 2) the power of the statistical test (Power $1 - \beta = 0.8$) and 3) the effect size. Because there was limited study about these variables, the researcher selected medium effect size for this study (ES = 0.2). The sample size in this study calculated by using G*power 3.1.9.2 program to determine the minimum number of participants needed for co-relational design (Faul, Erdfelder, Buchner, & Lang, 2009). Based on G*power 3.1.9.2, sample size was 191 patients.

3.3 Setting

Bach Mai hospital, the first special – category comprehensive general hospital of Vietnam, is an intensive health facility at the highest technical level and is responsible for various important tasks in the health sector of the country. Bach Mai Hospital established in 1911. With nearly 2000 beds, 2 Institutes, 8 Centers, 21 Clinical departments, 6 Para-clinical departments, 9 Functional departments, 1 Nursing college school. Its modern system of equipment and facilities has also helped fulfill its responsibility in performing a number of important tasks of the country's health sector: Providing care and treatment at the highest level, training, scientific research, providing guidance and direction to health facilities of lower levels, disease and epidemic prevention and control, international cooperation, health economic management.

The research was conducted in Surgical Department at Bach Mai hospital, Hanoi, Vietnam. Data was collected before patients discharged from the hospital. The

study was carried out from 8 am to 4 pm everyday. General surgery department includes three units such as emergency outpatient unit and two inpatient units (including patients with abdominal, injury, brain disease). There are approximately 30 medical physicians and 45 nurses with 150 beds. Every day, there are 15 - 20 patients obtaining abdominal surgeries. Health care services are provided by the physicians and nurses' daily from 8 am to 4.30 pm such as examine patients by physicians, performing patient's hospital admission, providing care to the patients according to their needs, pain control, and patients' hospital discharge. However, there was no specific guideline to promote patients' postoperative recovery.

3.4 Instruments

The instruments used for data collection included 5 parts as follows:

Part 1: General information of the patients

The questionnaire collects demographic data of patients included name, age, gender, BMI, residence, education, marital status, occupation, income, insurance, the date in the hospital, the date of surgical, the date of discharge length of hospital stay

Part 2: Information related to illness and treatment

The questionnaire collects the history of present illness and previous treatment included diagnosis, alcohol drink, co-morbidity, surgical method, surgical condition, method of anesthesia, surgical incision, previous operations, the distance between previous surgery, current health status, and complication after surgery and knowledge about the illness.

Demographic data and information related to patient's illness were analyzed for the frequency and percentage distribution findings.

Questionnaire of co-morbidity was conducted by researcher and each disease was assigned a score of 1.

The researcher had developed a plan to measure a length of surgical wound with these following manners:

Measuring length of incision: This activity was performed by the researcher. This was carried out at the first time of removal surgical wound dressing

after surgery. This procedure was not the routine procedure in the regular practice of the settings. However, the researcher herself was a registered nurse who had been working in this setting for more than 10 years and was considered as an expert nurse in surgical nursing. Usually, the incisional wound was opened for wound dressing by staff nurses once a day. Moreover, this procedure was allowed by the in charged-surgeon of the setting.

1) Preparation for wound measuring:

1.1Preparing a tapeline (a sterile tapeline made from cotton cloth).

1.2 Using sterile gloves

2) Performing:

The First step: Removed the dressing which covered on the surgical wound.

The Second step: The research used sterile gloves and a sterile tapeline to measure the incisional wound line (one tapeline was used for one patient)

The Third step: Put the tapeline measure along the wound and made a mark on the tape according to the length of the wound.

The Fourth step: measured the length of the tapeline with the mark by using a ruler with centimeters.

The Final step: Recorded result of the incisional wound length by centimeters.

The result was checked to compare with operative note in the patient's record

Part 3: Numerical Rating Scale (NRS)

Pain level of subjects in this study was measured by Numerical rating scale (NRS). NRS is a common pain scale being used in clinical practice as well as in clinical research. This pain scale was developed by McCaffery in the year 1968 (Bijur, Latimer & Gallagher, 2003) and has been tested for its reliability in the various group of patients including patients with acute and chronic pain showing the alpha Cronbach ranging from 0.8 to 0.91 (Koneti & Jones, 2016). NRS is a rating scale showing number reflecting the severity of pain from 0 to 10 in a horizontal line.

Subjects were asked to verbally rate their pain on this scale with "0" equal to no pain and "10" equal to worst possible pain.

The researcher properly instructed the subject in how to rate their pain using the following statements:

1. I would like you to rate your pain on a scale from zero to ten.
2. 'Zero' means you have no pain at all.
3. 'Ten' means the worst possible pain you can image.
4. What number would you give to your pain?

The values on the pain scale correspond to pain levels as follows:

1 – 3 = mild pain

4 – 6 = moderate pain

7 – 10 = severe pain

Part 4: Surgical Apgar Score.

Surgical Apgar score is developed by Gawande et al. Surgical Apgar score is calculated base on the estimated blood loss, lowest mean arterial pressure, and lowest heart rate entered during the peri-operative**.** The score is the sum of the points from each category to confirm the utility of a 10-point surgical Apgar score (Regenbogen et al., 2009). A higher scores, surgical Apgar predict that incidence of major complications and death decreased (Dullo, 2011; Gawande et al., 2007).

Part 5: Quality of Recovery 15 Item -The QoR 15 score

Quality of recovery-15 items **(**QoR- 15**)** is a short-form version, which was developed by evaluating and selecting items that based on extensive clinical and research experience with the 40-item **(**QoR- 40**).** The QoR- 15 questionnaire is a valid, reliable and easy to use tool for measuring the quality of patient's postoperative recovery. The result of this questionnaire is assessed as following**:** a minimum score of 0 is poor recovery and a maximum score of 150 is excellent recovery **(**Sá et al., 2015; Stark et al., 2013). The QoR- 15 with 11-point numerical rating scale was constructed for positive items (0 = "none of the time to 10 = "all of the time) and for negative items the scoring was reversed; maximum score 150). The QoR- 15 questionnaire ranges of 0 - 150 score with a high score will present a good quality of recovery (Kleif, Edwards, Sort, Vilandt, & Gogenur, 2015). Conversely, patients with a QoR-15 score lower to the mean QoR- 15 score are defined as a poor quality of recovery

(Brandão et al., 2014). Similary, patients with postoperative complications, and those who had undergone a poor postoperative recovery, would have a lower QoR- 15 score (Stark et al., 2013).

The QoR- 15 includes two parts following as:

PART A (0 - 10)

0 = none of the time [poor].

10 = all of the time [excellent]

1 = able to breathe easily; 2 = been able to enjoy food; 3 = feeling rested; 4 = have had a good sleep; 5 = able to look after personal toilet and hygiene unaided; 6 = able to communicate with family or friends; 7 = getting support from hospital doctors and nurses; 8 = able to return to work or usual home activities; 9 = feeling comfortable and in control; 10 = having a feeling of general well-being

PART B (10 - 0)

10 = none of the time [excellent]

0 = all of the time [poor]

11 = moderate pain; 12 = severe pain; 13 = nausea or vomiting; 14 = feeling worried or anxious; 15 = feeling sad or depressed.

Cronbach's alpha co-efficiency of the QoR- 15 is more than 0.8 (Stark et al., 2013; Sá et al., 2015; Myles et al., 2000).

3.5 Instrument Reliability and Validity

3.5.1 Instrument Reliability

After obtaining the IRB approval the NRS, surgical Apgar score, QoR- 15 were used in 30 patients who had undergone at the Surgical Department in Bach Mai Hospital, Hanoi, Vietnam. According to above evidences and the reliability of scale were tested with Cronbach's alpha co-efficiency of more than 0.8. All scales were applied in this study. The reliability by Cronbach's alpha coefficient were employed to test each instrument reliability for 30 patients and for the whole sample (n = 191) (Table 3.1).

Table 3.1 Reliability of scales **(**n = 30 and n = 191**)**

Scale	Number of Item	Cronbach's Alpha (n = 30)	Cronbach's Alpha (n = 191)
Quality of recovery	15	0.872	0.90

3.5.2 Instrument Validity

The instrument of this study included demographic data, information related to patient's illness, Pain - NRS, surgical Apgar score and QoR- 15. These instruments were translated into Vietnamese by English teacher and verified by 5 experts including doctors, head nurse, nurses in order to confirm the feasibility and the understanding of the contents for using in patients after abdominal surgery before discharge hospital. Their content validity was inspected and suggestions were made.

3.6 Data collection process

The data collection was conducted in the following sequences:

3.6.1 After getting the approval and receiving permission to data collection.

The researcher met the director of the hospital, head of the surgical department and head nurse of surgical department in order to explain the purposes of data collection and asked for permission to collect data from patients with abdominal surgery. The Head nurse introduced researcher to target population.

3.6.2 The researcher self-introduced, made a relationship with the patients who met then inclusion criteria and invited them to participant in the study. The researcher introduced with patients about the objective of study, data collection procedure and asked for the research cooperation. After the patients volunteered to join in to the study and signed the consent form, the researcher collected some demographic data and some data related to treatment and surgical procedure from medical record form.

3.6.3 The researcher organized a private room to interview the patients or answer questionnaires by themselves. Then, the researcher used five questionnaires for data collection before patients discharge from the hospital. Questionnaires were 1)

General information of the patients (14 questions) 2) Information related to illness and treatment (13 questions) 3) NRS (1 question) 4) Surgical Apgar score (1 question) 5) The QoR- 15 (15 questions). Total questionnaire (44 questions) and the time used for data collection were about 30 - 40 minutes.

3.7 Protection of human rights

In this study, the researcher strictly concerned with human rights and ethical issues throughout the research process by:

3.7.1 The researcher collected the data after receiving approval from Institutional Review Board of Nursing faculty, Mahidol University and Institutional of Review Board of SMP, Hanoi National University.

3.7.2 The researcher introduced herself to the participants at Surgical Department, informed the patients about the research objective and all data collection process. The researcher explained the purpose of the study, the research procedure, benefits, risks, types of questionnaire, the length of time to complete the questionnaires and the right to refuse participation in the study anytime**.** During the research process, patients could withdraw at any time, and this would be not affected their treatment or care. After patients agreed to join in the research process, they were invited to sign their name in the consent form.

3.7.3 This research did not cause any risk to the physical health of patients. The data collection process took about 30 – 40 minutes. Although the patients did not get any benefit from this research, the results were used for other patients who had the same health care problem

3.7.4 All contents were kept confidential, only the researcher and the research team were able to get access to the data. Any content related to data that presented in the thesis or any publication would be anonymous. In case of ones who withdrawn themselves from the research, all data would be deleted from the database and would not be used as any part of the research. In this research, all patients who agreed to join in the study did not withdraw themselves.

3.7.5 In case of further questions or more explanation, the participants were told that they were able to ask the researcher at any time throughout the research process.

3.7.6 After participants clearly understood the research process and agreed to join in the research, they were invited to sign their name in the consent form.

3.8 Data analysis

The data was performed by using the computer program.

The significant level of the statistic test was set up at $\alpha = .05$.

1. Descriptive statistics was used to describe the general characteristics and medical data of the samples and expressed as numbers (%), frequency, percentage, mean (standard deviation, SD).

2. Descriptive statistics was presented for the study population and are expressed as number (%), frequency, percentage, mean (standard deviation, SD) and range of study variables including age, postoperative pain, co-morbidity, surgical APGAR, surgical incision and recovery in patients with abdominal surgery.

3. After testing the distribution of all variables, it was found that all variables were not in their normal distribution so that Spearman'rho was employed to test the relationship between independents and in dependent variables.

CHAPTER IV
RESULTS

This research aimed to study the relationship among age, postoperative pain, co- morbidity, surgical condition, and surgical incision with recovery in patients after abdominal surgery. Data were collected from patients underwent abdominal surgery before discharge at Surgical Department in Bach Mai hospital, Hanoi, Viet Nam, using data collection form. Data were collected from August 2016 to October 2016. The results are presented in the following topics:

4.1 General characteristics of the sample.

Total sample includes 191 patients underwent abdominal surgery. The patients were male (58.1%) and female (41.9%). Of 191 patients, 143 patients were less than 65 years (74.9%), 48 patients were more than 65 years (25.1%). Age ranged from 20 to 89. The average of age was 54.14 years (SD ± 14.94). The majority of the sample was married (83.3%), finished secondary school education (47.1%). The number of patients lived in other provinces was higher (73.7%) than in Ha Noi (25.7%). Almost their occupations were famer. Their mean incomes per month were 237.98 USD (SD ± 183.91). Most of the sample had governmental insurance but have divided to different levels (from under 50% to upper 80 %) and the sample did not have any kind of insurance (15%) and had to pay for the treatment expense by themselves. The average participants' index BMI was 20.93 (SD ± 31**.**59**).** The length in hospital ranged from 3 to 20 days**.** The mean of length hospital stay was 7.64 (SD ± 3.36).

Table 4.1 General characteristics of the sample (n=191)

Characteristics	Number (n = 191)	Percentage (%)
Gender		
Male	111	58.1
Female	80	41.9
Age (years)		
< 65 years	143	74.9
≥ 65 years	48	25.1
Min: 20		
Max: 89		
Mean ± SD: 54.14 ± 14.937		
Location of residence		
Hanoi Capital	49	25.7
Other provinces	142	73.3
Marital status		
Married	160	83.3
Single	13	6.8
Widowed	18	9.4
Educational Level		
Primary school	20	10.5
Secondary school	90	47.1
High school	57	29.8
Two year certificate	1	0.5
College	9	4.7
University	12	6.3
Others	2	1.0
Occupation		
Professional	7	3.7
Farmer	59	30.9
Industrial worker	28	14.7
Salesperson	7	3.7
Home worker	4	2.1
Retired	43	22.5
Other jobs	43	22.5

Table 4.1 General characteristics of the sample (n=191) (cont.)

Characteristics	Number (n = 191)	Percentage (%)
Income per month(USD)		
< 100 USD	26	13.6
101-200 USD	84	44
201-300 USD	33	17.3
>300 USD	48	25.1
Min: 45		
Max: 909		
Mean ± SD: 237.98 ± 183.91		
Insurance		
No	30	15.7
<50%	22	11.5
50-80%	72	37.7
>80%	67	35.1
BMI group		
Less than 18.5	35	18.3
18.5-24.9	143	74.9
More than 25.0	13	6.8
Min: 11.02		
Max: 31.59		
Mean± SD: 20.93 ± 31.59		
Length in hospital		
Less than 7 days	76	39.8
7-14 days	109	57.1
More than 14 days	6	3.1
Min: 3		
Max: 20		
Mean ± SD: 7.64 ± 3.36		

4.2 Information related to illness and treatment

Every information related to illness and treatment is reported in Table 4.2. Of 191 participants who had undergone abdominal surgery, the most frequent surgical diseases were the gastrointestinal disease in 114 cases (59.7%), followed by urological disease in 54 patients (28.3%) and the least other diseases in 23 patients (12.0%). The majority of surgical approach is performed with open surgery in 127 cases (66.5%) and laparoscopic surgical in 64 cases (33.5%). The elective operation patients were 59.7% and the patients undergoing emergency abdominal surgery were 40.3%. Of 191 patients, 39 patients (20.4%) underwent gastrointestinal operations that have a relationship with alcohol. General anesthesia combined with all body was used by a majority of 179 cases (93.7%). Location anesthesia with spinal was 6.3 %. Upper and lower abdominal incision were in 60 patients (31.4%). Lower abdominal incision was in 65 patients (34%). The patients with upper abdominal incision were 19.4%, and flank line incision was 15.2%. Minor incision was less than or equally 5 centimeters in 63 patients (33.0%). Incision size was range 6 - 15 centimeters in 88 patients (46.1%) and over 15 centimeters in 40 patients (20.9%). The average length of incision was 10.80 (SD ± 7.35). The incidence of previous surgery among patients has focused on 46 cases (24.1%). Postoperative complications were shown in this study including surgical incision infection which occurred in 3 patients with 1.6 %.

Table 4.2 Information related to illness and treatment (n= 191)

Characteristic	Number (n = 191)	Percentage (%)
Diagnosis		
Gastrointestinal disease	114	59.7
Urological disease	54	28.3
Others	23	12.0
Alcohol		
No	152	79.6
Yes	39	20.4
Method of surgery		
Laparoscopy	64	33.5
Open surgery	127	66.5
Condition operative		
Emergency	77	40,3
Elective	114	59.7
Anaesthesia		
All body	179	93.7
Spinal	12	6.3
Incision size (cm)		
≤5 cm	63	33.0
6-15 cm	88	46.1
>15 cm	40	20.9
Min: 2.5		
Max: 50.0		
Mean ± SD: 10.798± 7.3503		
Surgical incision		
Upper abdominal	37	19.4
Lower abdominal	65	34.0
Flank line	29	15.2
Upper and Lower abdominal	60	31.4
Previous surgery		
No	145	75.9
Yes	46	24.1
Complication		
No	188	98.4
Surgical site infection	3	1.6

Table 4.3 showed the frequency and percentage of pre-operation co-morbidity in postoperative abdominal patients. Of 191 samples, 73 patients had co-morbidity (38.2%) while including hypertension **(**n = 30**)** 61**.**8**%**, myocardial infarction **(**n = 2) 1.0%, heart failure **(**n = 4) 2.1%, diabetes **(**n = 10) 5.2%, COPD (n = 2) 1.0%, ulcer **(**n = 15) 7.9%, chronic liver disease (n = 4) 2.1%, kidney failure (n = 5) 2.6%, leukemia (n = 2) 1.0%, others (n = 22) 11.51%. Of the 73 patients had co-morbidity, 56 patients had 1 medical disease (29.3%), 11 patients had 2 medical disease (5.8%) and 6 patients had 3 (6.1%).

Table 4.3 Comorbidity of patients undergo abdominal surgery (n = 191)

Comorbidity	**Number (n = 191)**	**Percentage (%)**
No	118	61.8
Yes	73	38.2
Hypertension	30	15.7
Myocardial infarction	2	1.0
Heart failure	4	2.1
Diabetes	10	5.2
COPD	2	1,0
Ulcer	15	7.9
Chronic liver disease	4	2.1
Kidney failure	5	2.6
Tumor	0	0.0
Leukemia	2	1.0
Others	22	11.51
Number of co-morbidities		
0 COM	62,3118	61.8
1 COM	56	29.3
2 COM	11	5.8
3 COM	6	3.1

4.3 Pain, Surgical Apgar Scores and Functional Recovery

Characteristics regarding scales are described in Table 4.4. Mean and standard variation of surgical Apgar score, Pain score, QoR- 15 are reported in Table 4.5. This research used NRS for pain which measured pain intensity in patients undergoing abdominal surgery**.** Pain scores ranged from 0 - 5**.** Most of the patients suffered postoperative pain with 1 – 3 **(**mild pain**)** score in 162 patients **(**84**.**8**%)**, 4 - 6 **(**moderate pain**)** score in 9 patients **(**4**.**7**%).** No pain is shown in 20 cases **(**10**.**5**%).** The average pain score is 1.97 (SD ± 0**.**99**).**

In Table 4**.**4 and Table 4**.**5, surgical Apgar score for surgery includes the EBL, lowest HR, and lowest MAP which calculated during an operation**.** The surgical Apgar score ranged from 5 to 10. The average score was 7.65 (SD ± 1**.**12**).** Patients after abdominal surgery had 5 - 6 scores in 35 patients (18.3%), 7 - 8 scores in 103 patients (53.9%) and 9 - 10 scores in 53 patients (27.7%).

Quality of recovery -15 items ranged from 0 to 150 score which is used to measure recovery among patients after abdominal surgery. In this research, patients had recovery score ranging from 73 to 150. The average score was 128.91 (SD ± 12.82)

Table 4.4 Pain, Surgical Apgar Scores and Functional Recovery (n= 191)

Scale	Total (n)	Percent %
Numerical Rating Scale **(**NRS**)**		
0 = no pain	20	10.5
1-3 = mild pain	162	84.8
4-6 = moderate pain	9	4.7
Min: 0		
Max: 5		
Mean ± SD: 1.97 ± 0**.**986		

Table 4.4 Pain, Surgical Apgar Scores and Functional Recovery (n=191) (cont.)

Scale	Total (n)	Percent %
Apgar score		
5-6	35	18.3
7-8	103	53.9
9-10	53	27.7
Min: 5		
Max: 10		
Mean ± SD: 7.65 ± 1.122		
Quality of recovery – 15 item(QoR- 15)		
Mix: 73		
Max: 150		
Mean ± SD: 128.91± 12.822		

Table 4.5 Mean and Standard Variation of Pain score, Apgar score Quality of recovery 15 item (n= 191)

Variable	Possible Range	Observed Range	Mean	Std. Deviation
Apgar score	0-10	5-10	7.65	1.122
Pain	0-10	0-5	1.97	0.986
Quality of recovery	0-150	73-150	128.91	12.822

4.4 The correlation between Age, Pain, Co-morbidity, Apgar score, Surgical incision (cm) and Quality of recovery

Before using Pearson's Product Moment correlation, the assumption was tested. All variables were assessed for their normal distribution. The distribution of quality of recovery 15 - item was not normality. Therefore, Spearman's rho is used to test all variables' correlation with quality of recovery.

The correlation between Age, Pain, Co-morbidity, Apgar score, Surgical incision (cm) and QoR- 15 is shown in Table 4.6 as following:

- Age has negative correlation with quality of recovery ($r = -0.350$, $p < 0.01$).
- Age has positive correlation with comorbidity (($r = 0.215$, $p = 0.003$).
- Postoperative pain has negative correlation with quality of recovery ($r = -0.411$, $p < 0.01$).
- Co-morbidity has negative correlation with quality of recovery ($r = -0.428$, $p < 0.01$).
- Apgar score has positive correlation with quality of recovery ($r = 0.289$, $p < 0.01$).
- Surgical incision (cm) has negative correlation with quality of recovery ($r = -0.231$), ($p = 0.001$, $p < 0.01$).

Table 4.6 Correlation between Age, Pain, Co-morbidity, Apgar score, Surgical incision (cm) with Quality of recovery (n = 191)

	1	2	3	4	5	6
1.Age	1.00					
2. Pain	0.050	1.00				
3. Comorbidity	0.215**	0.013	1.00			
4. Surgical Apgar score	-0.264**	-0.020	-0.300**	1.00		
5. Incision size (cm)	0.170*	0.053	0.035	-0.001	1.00	
6. QoR- 15	-0.350**	-0.411**	-0.428**	0.289**	-0.231**	1.00

P < 0.01**Spearman's test

Characteristic of each domain of quality of recovery- 15item was reported in Table 4.7.

The reliability of quality of recovery 15 item was assessed by Intraclass Correlation Coefficient (ICC). Cronbach's Alpha = 0.90 (n = 191) for the QoR-15 was described in Table 4.8. Test reliability of quality of recovery was performed on 30 patients after abdominal surgery before discharge from hospital at Surgical department in Bach Mai hospital Cronbach's Alpha = 0.87 (n = 30). Therefore, Table 4.8 showed a significant reliability of QoR-15.

Table 4.7 Characteristic of each domain of quality of recovery- 15 item

QoR- 15 (n=191)	Min	Max	Mean	Std. Deviation
1. Able to breathe easily	4	10	9.75	0.81
2. Been able to enjoy food	3	10	7.36	1.65
3. Feeling rested	4	10	7.37	1.37
4. Have had a good sleep	3	10	6.95	1.73
5. Able to look after personal toilet and my hygiene unaided	0	10	8.74	2.34
6. Able to communicate with family or friends	10	10	10	0.00
7. Getting support from hospital doctors and nurses	10	10	10	0.00
8. Able to return to work or usual home activities	0	10	5.90	1.98
9. Feeling comfortable and in control	3	10	7.51	1.31
10. Having feeling of general well-being	3	10	7.38	1.31
11. Moderate pain	3	10	9.83	0.89
12.Severe pain	10	10	10	0.00
13. Nausea or vomiting	10	10	10	0.00
14. Feeling worried or anxious	2	10	9.01	1.46
15. Feeling sad or depressed	2	10	9.11	1.37

Table 4.8 Reliability of scales (n=191)

Scale	N of item	Cronbach's Alpha (n = 30)	Cronbach's Alpha (n = 191)
Quality of recovery	15	0.87	0.90

Mann-Whitney U-test was used to compare the QoR-15 scores between groups of each variable which associated with recovery in Table 4.9. To compare information related to illness and treatment among patients with quality of recovery Mann-whiney U Test, Kruskal-Wallis Test, Chi-square test or Fisher exact test were used as appropriate. $P < 0.05$ was considered statistically significant with the differences of each variable group.

Table 4.9 Correlation between variable group and Quality of recovery 15 item

Characteristics	SUM QoR- 15		
	n	Mean ± SD	p-value
Age group (years)			0.000< 0.01**
<65	143	131.43±11.19	
≥ 65	48	121.38±14.47	
Pain group			0.000<0.01*
0 = no pain	20	139.10±8.26	
1-3 = mild pain	162	128.56±11.90	
4-6 = moderate	9	112.44±18.04	
Comorbidity	73	122.32±14.68	0.002<0.01**
Hypertension	30	119.60±14.59	0.000<0.01**
Diabetes	10	119.10±19.47	0.026< 0.05**
COPD	2	104.50±17.68	0.039<0.05**
Other	22	119.50±17.69	0.007< 0.01**
01 co-morbidity	56	125.23±12.94	0.000<0.01*
02 co-morbidity	11	111.73±13.81	
03 co-morbidity	6	114.50±21.48	

Table 4.9 Correlation between variable group and Quality of recovery 15 item (cont.)

Characteristics	SUM QoR- 15		
	n	Mean ± SD	p-value
Surgical Apgar group			0.001<0.01*
5-6	35	122.57± 12.97	
7-8	103	129.50±11.48	
9-10	53	131.94±11.51	
Incision size (cm)			0.001<0.01*
≤5 cm	63	132.78±10.76	
6-15 cm	88	128.60± 12.94	
>15 cm	40	123.47± 12.82	
Method of surgery			0.001<0.01**
Laparoscopy	64	132.86± 10.70	
Open surgery	127	126.91±13.37	

** Mann-Whitney Test

* Kruskal-Wallis Test

CHAPTER V
DISCUSSION

In this chapter, discussion of research findings will be presented according to the objectives of the study.

5.1 Quality of recovery among patient had undergone abdominal surgery

The quality of recovery scores among the patients ranged from 73 to 150 with the average scores of 128.91 (SD ± 12.82). It indicated that overall quality of recovery scores was relatively in moderate to high level. However, when consider in each domain of recovery it showed that patients had problem about the recovery in their sleep pattern and their abilities to resume daily activities and work.

The explanation was that, majority of patients (61.8%) in this study did not have co morbid diseases, while ones who had co morbid diseases, the disease symptoms were well controlled prior to the surgery. Moreover, post -operative pain level among them was relatively low with the average scores of 1.97 (SD ± 0**.**986). Majority of patients (84.8%) had low level of pain (1 - 3 from 0 - 10 NRS), 10.5% did not experience postoperative pain and only 4.7% had mild pain (4 - 6 from 0 - 10 NRS). When postoperative pain was in proper control, patients would be able to ambulate and resume their pervious activities early (Corke, 2013).

More explanation on this finding was that, the technology of surgery, peri operative care and postoperative care in Bach Mai hospital has been improved. Patients were encouraged to early ambulate by walking to bathroom by themselves, cleaning body by themselves and performing self- care up to their optimum level (Dorcaratto, et al, 2013).

When evaluating each domain of QoR-15 among it was found that there were 2 items with relatively low scores. Those included “Have had a good sleep” with

mean score of 6.95 (SD ± 1.733) and "Able to return to work or usual home activities" with the mean score of 5.90 (SD ± 1.978). This result was similar to Stark et al patients without poor quality of recovery scores were also lower for the total score and all items except for items "feeling rested", "have had a good sleep", "feeling comfortable and in control", "having a feeling of general well-being" and "severe pain" (Stark, Myles, & Burke, 2013). The findings gave the message in that although the overall picture of recovery was in its good pace, some aspect had to be taken into consideration because it might affect health outcomes. Nurses should pay attention on patients' quality of sleep during postoperative phase because quality sleep would make patients recover from their illness. Likewise, what found in the study of Robleda and the others (Robleda, Roche-Campo, Sanchez, Gich, & Banos, 2015; Kleif, Vilandt, Gogenur, 2016), patients underwent abdominal surgery suffered with many discomfort symptoms affecting their sleep pattern and other daily live activities which led them to delayed recovery.

It is important to note that the other concern of patients related with their concern about the future during their transition from hospital to home. They were afraid that they would not be able to resume their usual daily activities at home or at work. This concern might affect their psychosocial well being. In order to enhance postoperative patients during their health illness transition, continuing care program is required (Kleif, Vilandt, & Gogenur, 2016).

5.2 The relationship between age and quality of recovery

This study showed that age has a negative correlation with recovery in low level ($r = -0.350$) ($p < 0.01$). This result explained that there was a reducing in the recovery speed with increasing age in the patient. Therefore, the age is one of the factors influencing on postoperative recovery. It means that old age was significantly associated with poor recovery.

According to Jeong, Ryu, & Park, age was 65 years that were significant associated with a slower recovery intolerance of oral intake ($p < 0.049$) leading to delay completion of overall discharge criteria (Jeong, Ryu, & Park, 2016). Similarly, previous study, the increasing of complication with older patient was statistically

significant for abdominal surgery ($p < 0.05$) than younger patient (Massarweh et al.,2009; Ong, Guang& Yang, 2015; Fe vang et al., 2000; Hermans et al., 2010; Jakobson et al., 2014). Myles et al; Kleif, Vilandt, Gogenur showed that older age was associated with a lower quality of recovery ($p = 0.041$; $p = 0.028$), respectively (Myles et al., 1999; Kleif, Vilandt, Gogenur, 2016).

Table 4.6 also showed that age has positive correlation with co-morbidity ($r = 0.215$, $p = 0.003$). Elderly patients than 65 years and comorbidity increased the risk of poor recovery compared with younger patients (Fe vang et al., 2000**).** According to previous, older age, co-morbidity disease, are factors associated with increased risk (Jhanji et al., 2008; Pearse et al., 2006; Cullinane et al., 2003) of the incidence postoperative complication. Characteristics of elderly patients who had complications lead to poor recovery were explained that advancing age has a high risk with comorbidity because of reducing physiological reserve, poorer nutritional status (Kahokehr et al., 2010) cognitive impairment, change body physiology (Ong, Guang & Yang, 2015). Elderly patient may have more difficulty in recovering from the operation because of reducing physiologic reserve; therefore, many cases reported that older adult accepted adverse outcomes after abdominal surgical procedures. There was a statistically significant correlation between age and recovery (Kleif, Vilandt, Gogenur, 2016) as well as between age and co-morbidity were obtained. Previous study reported that although, co- morbid disease was associated with worse outcomes but older age was a factor which associated strongly and independently with worse outcomes (Massarweh et al., 2009). Previous research showed a significant associated between advanced age and post operation complication which can lead to poor recovery but in my study, this association is low. This is explained that the difference of design study, method and sample size leading to difference of the result. The results in my research have low correlation between age and recovery but the differences were statistically significant with $p < 0.05$.

Additionally, the researcher found that a difference of quality of recovery score between age groups. Patients were less than 65 years who have higher quality of recovery (mean = 131.43, SD ± 11.183) than patients were over or equally 65 years (mean = 121.38, SD ± 14.472) ($p < 0.01$, Wilcoxon-Mann-Whitney test). This difference was considered statistically significant with $p < 0.05$. Most of the previous

study showed that age is a negative correlation with quality of recovery. In contract, Sá et al; Stark, Myles & Burke reported that there were no significant relation between QoR-15 scores and patient age (r = -0.093, p = 0.232) (r = -0.02, p = 0.81), respectively (Sá et al., 2015; Stark, Myles & Burke, 2013), or Brandão et al found a positive correlation between age and quality of recovery-15 item (r = 0.19, 95% CI: 0.04 - 0.36, p = 0.03) (Brandão, Sousa, Veiga & Abelha, 2014). Authors explained about the difference of the result in comparison with other studies as could be the fact that older people generally under report their health status such as less pain, nausea, and vomiting, and satisfaction with health care (Costa-Santos, Antunes, Souto&Bernardes, 2010).

5.3 The relationship between postoperative pain and quality of recovery

This study showed that postoperative pain had a negative medium correlation with quality of recovery after surgery (r = -0.411, p < 0.01) (Table 4.6)
As expected, the researcher found a significant correlation between pain and recovery: 162 patients experienced postoperative pain with pain level from 1 to 3 score (84.8%), 9 patients with pain level from 4 to 6 score (4.7%) (Table 4.4). Postoperative pain was identified by using NRS scale, pain score showed the majority as 1 - 3 without any analgesics (84.8%) or 4 - 6 with intravenous analgesics or with oral analgesics only (4.7%) (Table 4.4). Similarly as results were reported in several studies such as by Grady et al., 2012; Good et al.2005; Robleda et al 2015; Corke,2013; Brandão et al., 2014; Schafheutle et al., 2001; Cassuto et al., Schafheutle, et al., 2003; Apfelbaum, Chen, Mehta, & Gan, 2000).

Postoperative pain is common after abdominal surgery which appears with high incidence. Pain is one of the symptoms discomfort and the most frequently after any abdominal surgical procedure which can affect patient satisfaction and delay recovery (Tilleul et al., 2012; Kleif, Vilandt, Gogenur, 2016). Robleda et al showed that 80% of patients were reported with pain after abdominal surgery (Robleda et al., 2015). According to Myles et al; Stark et al, Kleif, Vilandt, & Gogenur they confirmed that have a negative correlation between postoperative pain and quality of recovery (r

= - 0.55, p = 0.0001; r = -0.68, p < 0.0005; p = 0.003), respectively (Myles et al., 2000; Stark et al., 2013; Kleif, Vilandt, & Gogenur, 2016).

There is a difference of pain score in this research in comparison with the previous study. According to the previous study, pain score was measured at 6 - 8 hours or 24 hours after abdominal surgery or after using intravenous analgesia (Grady et al., 2012) showed that pain scores were was 3.5 (SD ± 3.1) (p = 0.02) and 1.6 (SD ± 2.4) between two studies group (Robleda et al., 2015) reported patients who received postoperative analgesia with morphine at 6 - 8 hours after surgery (T1), pain score was 5.1 (SD ± 2.9) vs 2.2 (SD ± 2.52) (p = 0.01), and at 24 hours after surgery (T2), pain score was 4.5 (SD ± 2.5) vs 2.7 (SD ± 2.2) (p = 0.01). Patients who received postoperative analgesia with paracetamol at T1, pain score was 4 (SD±3.1) vs 2 (SD ± 1.8) (p = 0.05). Table 4.4 showed that the majority of the patient has pain level as 1-3 score (84.8%). This research just only assesses pain score before discharge the hospital when the patients are regaining their independence with controlling of physical functions and returning to everyday life (Allvin et al., 2008). Therefore, the patients have lower pain level in comparison with pain level in previous studies. Nevertheless, postoperative pain is due to different components, inflammatory reaction, with tissue damage (Good et al., 2005) types of surgery and location of the incision. Therefore, the patient had a different pain level. The researcher found a different pain level and a correlation between pain level and recovery (Table 4.9). In 20 patients were no pain, the quality of recovery score was 139.10 (SD ± 8.258). The majority of patients (n = 162) have pain score from 1 to 3, the quality of recovery score was 128.56 (SD ± 11.901). Similarly, patients (n = 9) with pain score from 4 to 6 which have a lower quality of recovery score was 112.44 (SD ± 18.035). All of p < 0.01 was statistically significant with Kruskal-Wallis test. These results explained that patients suffered high postoperative pain score who has a low quality of recovery. This difference was considered statistically significant with p < 0.05.

5.4 The relationship between co-morbidity and quality of recovery

In this study, comorbidity was classified the researcher while one disease as similarly one score including COPD, myocardial-infarct, heart failure, hypertension, diabetes, chronic liver disease, kidney failure, leukemia, ulcer and other disease. Hence, the classification was performed by the researcher while one disease as similarly one score.

According to the results in Table 4.6, a negative correlation between co-morbidity and quality of recovery ($r = -0.428$, $p < 0.01$) was presented. This result explained that comorbidity impacted to quality of recovery.

This study reported that the quality of recovery score in 73 patients had comorbidity was lower in 118 patients had not a medical disease. The average quality of recovery score was 122.32 (SD ± 14.675, $p = 0.002$, Wilcoxon-Mann-Whitney test). On the other hand, the study found that patients with hypertension, diabetes, COPD and other disease had a lower QoR- 15 score than patients without medical disease. The average quality of recovery score with these diseases was 119.60 (SD ± 14.590, $p < 0.01$); 119.10 (SD ± 19.473, $p = 0.026$); 104.50 (SD ± 17.678, $p = 0.039$) and 119.50 (SD ± 17.690, $p = 0.007$, Wilcoxon-Mann-Whitney test), respectively.

This result was similar to the study of Sá et al in patients with COPD underwent surgery. It was found that those patients had lower QoR- 15 scores after surgery ($p = 0.047$). The patients with diabetes showed poor quality of recovery comparing with patients without diabetes (38% vs 18%, $p = 0.017$). Similar to patients with arterial hypertension (66% vs 45%, $p = 0.035$), after surgery they stayed longer in the hospital (Sá et al., 2015).

This result was similar to Fevang et al; Hermans et al, Fukuda et al they found an increase in complications and death rates with an increased co-morbidity in patients who had comorbidity ($p < 0.05$) which presented with poor recovery **(**Hermans et al., 2010**).** Patients with complications lead to poor recovery and longer length of hospital **(**Fukuda et al., 2012).

5.5 The relationship between Surgical Apgar score and quality of recovery

The researcher found surgical Apgar score has a positive correlation with quality of recovery ($r = 0.289$, $p < 0.01$) (Table 4.6). This presented that patients undergoing abdominal surgery who have high Apgar score as the quality of recovery as good. Table 4.5 presented Apgar score ranged from 5 to10. Table 4.3 showed that the majority of patients have Apgar score as 7 - 8 (53.9%), 9 - 10 (27.7%), and 5 - 6 (18.3%). We did not find patients with Apgar score range from 0 - 4 in my thesis.

The Apgar score is calculated from the EBL, lowest HR, and lowest MAPduring an operation. Therefore, a surgical Apgar score was a predictive of postoperative outcomes (Regenbogen et al., 2008). Similarly, Reynolds et al; Regenbogen et al; Dullo; Gawande et al, previous performed logistic regression analysis to find the relationship between major complications/death and the surgical Apgar score. They found that a lower surgical Apgar scores were associated to the risk of complication or death. In contract, the surgical Apgar score of 9 - 10 increased, postoperative quality of recovery was improved ($p < 0.0001$). This relationship explained that patients had undergone abdominal surgery with low scores (score ≤ 4) who had suffered various complication ($p < 0.0001$), and had significantly longer median length of stay ($p < 0.0001$). The researcher did not find a difference in comparison with the previous study (Reynolds et al., 2011; Regenbogen et al., 2008; Dullo, 2011; Gawande et al., 2007).

The study showed patients have a surgical score of 5 - 6 who had the quality of recovery lower (mean = 122.57, SD ± 12.973) than patients have a surgical score of 7 - 8 (mean = 129.50, SD ± 11.480) and score of 9- 10 (mean = 131.94, SD ± 11.505). These differences have statistically significant with $p = 0.009$ (Kruskal-Wallis Test**).** Higher Apgar score described a high quality of recovery**.**

5.6 The relationship between surgical incision and quality of recovery

The researcher found surgical incision (cm) has negative correlation with quality of recovery ($r = -0.231$) ($p = 0.001$, $p < 0.01$). Table 4.9 showed that quality of

recovery score in patients with incision length under or equally 5 cm (mean = 132.78, SD ± 10.764) were higher than patients with incision over 15 centimeter (mean = 123.47, SD ± 12.822) (p = 0.001, Kruskal-Wallis Test**).**

Similarly, Mimica et al, O'Dwyer et al and Assalia et al found an association of incision length on pulmonary function recovery after surgery as well as patients with minor (6cm) surgical incision had less severe pain, shorter hospital stay, lower morbidity and faster respiratory recovery as compared to the classical approach by long incision (15cm) (Mimica et al., 2007; O'Dwyer et al., 1993; Mariani & Slimb, 2016; Hiranyakas, Rathe, da Silva, Weiss, Wexner, 2013).

Alternatively, this study also found 64 patients with laparoscopic surgery had the quality of recovery score faster than 127 patients with traditionally open surgery. The mean quality of recovery score was 132.86 (SD ± 10.698) and 126.91 (SD ± 13.370) (p = 0.001, Wilcoxon-Mann-Whitney test), respectively (Table 4.9). Previous study showed that laparoscopic surgery had lesser postoperative pain level, quicker recovery, shorter hospital stay and decreased risk of postoperative complications as well as earlier return to normal activity than open surgery (Joshi, Bonnet & Kehlet, 2013; Richardson et al., 2000).

5.7 Conclusion

The findings of this study supported the hypothesis in that age, postoperative pain, comorbidity, surgical Apgar score and surgical incision length were correlated with quality of recovery after abdominal surgery. The results are essential in facilitating patients through their health illness transition process. Nurses can use nursing therapeutics to promote healthy transition by performing effective pain control. Moreover, nurses should pay more attention in patients who might develop delayed transition or delayed post-operative recovery process such as patients with old ages, patients who have comorbidity, patients who show abnormal surgical Apgar score and patients who had long incisional wounds. Although there were only 3 patients (1.6%) with surgical site infection, this was a very serious postoperative complication and should be taken in to serious consideration. Preventive measures should be performed to eradicate surgical site infection.

CHAPTER VI
CONCLUSION

6.1 Conclusion of the study

This descriptive co- relational study aimed to examine the relationship between age, postoperative pain, co-morbidity, surgical Apgar score surgical incision (cm) and recovery among patients undergoing abdominal surgery before discharge from the hospital. Patients who were enrolled in the study were adult patients who came for abdominal surgery in Surgical Department at Bach Mai hospital, Hanoi, Viet Nam. Data collection was performed from August to October 2016. Transition theory was utilized as a framework for this study. The sample size was calculated by using G*power version 3.1.9.2 which yielded the sample size of 191 patients.

After obtained approval from Institutional Review Board of Nursing Faculty, Mahidol University and Institutional of Review Board of SMP, Vietnam National University, Hanoi, Vietnam. The researcher used 5 instruments; the demographic data questionnaire, information related to illness and treatment questionnaire, NRS, surgical Apgar score or and QoR- 15 for collecting data. All instruments were tested for their validity and reliability as clearly the explained in Chapter 3. Cronbach's alpha coefficient of the QoR- 15 was 0.903.Total191 samples were selected according to the inclusion criteria. The researcher collected data by herself from 8.00 am to 4.00 pm every day until the sample reached the target of the studied sample size. For each sample the researcher spent 30 to 40 minutes on interviewing and collected some data from their patients' records.

SPSS software version 20.0 was used for statistical data analysis. The descriptive statistics were used to describe demographic and information related to illness and treatment and study variables, including age, pain, comorbidity, Apgar score and quality of recovery. Normality was tested using the One-Sample Kolmogorov Smirnov test. It was found that all variables were not normally

distributed so that Spearman's rho was used to examine the correlation between studied variables.

The findings are summarized as follows:

Of 191 patients undergoing abdominal surgery, there were 58.1% of male, 41.9% of female. Age patient ranged from 20 to 89. Mean-while, age group with less than 65 years in 143, patients were 74.9% and age group with over or equally 65 years in 48 patients were 25.1%. The average age was 54.14 years (SD ± 14.937). The average participants' index BMI was 20.93 (SD ± 31.59**).** The length in hospital less than 7 days were 39**.**8**%**, 7 to 14 days were 57**.**1**%** and more than 14 days was 3**.**1**%**

Within 191 participants who had undergone abdominal surgery, the majority of surgical disease was the gastrointestinal disease in 114 cases (59.7%), followed by urological disease in 54 patients (28.3%) and other diseases in 23 patients (12.0%). There were 127 cases operated with traditional open surgery and laparoscopic approach in 64 cases.

The minor incision was less than or equally 5 centimeters in 63 patients (33.0%). Incision size was range 6 - 15 centimeters in 88 patients (46.1%) and over 15 centimeters in 40 patients (20.9%). The average incision size was 10.798 **(**SD ± 7**.**3503**).**

Of 191 samples, 73 patients had co-morbidity (38.2%) while including 30 patients with hypertension **(**61**.**8**%)**, 2 myocardial infarction **(**1.0%), 4 heart failure **(**2.1%), 10 diabetes **(**5.2%) ; 2 COPD (1.0%), 15 ulcer **(**7.9%), 4 chronic liver disease (2.1%), 5 kidney failure (2.6%), 2 leukemia (1.0%), 22 others (11. 51%). Of the 73 patients had co-morbidity, 1 medical disease in patients (29.3%), 2 medical diseases in 11 patients (5.8%) and 3 medical diseases in 6 patients (6.1%).

NRS for pain with 11-point range from 0-10 to measure pain level in patients have undergone abdominal surgery**.** The average pain score is 1.97 (SD ± 0**.**986**).** Most of the patients after abdominal surgery suffered pain level from 1 to 3 score **(**162 patients**).** There were only 9 patients experienced with pain level from 4 to 6 score and 20 patients were no pain**.**

Surgical Apgar score for field operation was calculated during surgical process including the estimated blood loss, lowest heart rate, and lowest mean arterial

pressure**.** The surgical Apgar score ranged from 5 to 10. The average score was 7.65 (SD ± 1**.**122**).** The primarily of patients had surgical Apgar score as 7 - 8 scores in 103 cases. Patients after abdominal surgery had 5 - 6 scores in 35 patients (18.3%), 7 - 8 scores in 103 patients (53.9%) and 9 - 10 scores in 53 patients (27.7%).

The QoR- 15 ranged from 0 to 150 using NRS with 11 points indicated a minimum score (0- poor recovery) and a maximum score (150- excellent recovery). In this research, patients had recovery score ranging from 73 to 150. The mean of the quality of recovery score was 128.91(SD ± 12.822).

Age, co morbidity, length of surgical site incision and postoperative pain had negative correlation with quality of recovery ($r = -0.350$, $p < 0.01$; $r = -.428$, $p < 0.01$; $r = -0.231$, $p = 0.001$; $r = .41$, $p < 0.01$ respectively). Surgical Apgar score had positive correlation with quality of recovery ($r = 0.289$, $p < 0.01$).

The results of this study have complied with transition theory (Meleis et al., 2000). According to transition theory, the recovery process of patients undergoing abdominal surgery was explained by changing in health and illness which lead to a transition outcome. Recovery process depends on many factors can be facilitated or inhibited recovery. Recovery is a complex process that begins from the end of intra-operative care until the patient regains to his/her preoperative physiological state and emotional well- being. This thesis studied about late recovery phase of patients after abdominal surgery, when the patient can return normal physiological state such as performing daily activities and regains his/her preoperative wellbeing.

In conclusion, in overall picture, recovery of patients after abdominal surgery seemed to be in relatively good pace. However, when consider in each domain of recovery it showed that patients had problem about the recovery in their sleep pattern and recovery in their abilities to resume daily activities and work.Patients with old age showed delayed recover after abdominal surgery.Most of patient after surgery patients suffered from postoperative pain. Patients suffering from postoperative pain showed delayed recover after abdominal surgery. About 40% of patients come for surgery had one or more comorbid diseases. Patients with more comorbid diseases showed delayed recover after abdominal surgery.Patients who had hemodynamic instability during the operation showed delayed recover after abdominal surgery.

Patients who had long incisional wound showed delayed recover after abdominal surgery.

This study supported the concept as proposed in transition theory in that transition to desired health outcomes depending on conditioning factors among patients after abdominal surgery in acute phase the recover to good health is a transition process depending on many personal factors such as ages, comorbidity, pain, peri operative hemodynamic status and the length of surgical incision.

6.2 Implications of Research Findings

6.2.1 Implications for nursing practice

In order to enhance the quality of recovery among patients undergoing abdominal surgery, the following measures have to be performed by nurses:

1) Nurses should promote postoperative recovery of patients in particular promotion of patients sleep pattern and encourage them to resume their previous daily activities and work.

2) Pain control has to be taken into serious consideration after surgery in particular, during the acute phase.

3). Nurses should assess every patient who have plan for surgery for their co morbid disease. All co morbid disease has to be well controlled prior to the surgery

4) Nurses should pay more attention to the elderly patients undergoing surgery and give support during their transition after the surgery. Family members should be included in patients' recovery plan.

5) A comprehensive recovery program should be developed to enhance patients recover after surgery.

6) Nurses should be trained to use recovery scale to assess recover among patients after surgery in acute phase.

7) The continuous program to enhance recover from hospital to home should be developed and utilize in this group of patients.

6.2.2 Implications for further study

1) The pre and post test observational study can be conducted to test the effectiveness of the recovery guidelines.

2). Pain control guidelines should be used in further study to test the effect on recovery process among patients undergoing surgery.

3) Multi sites research should be conducted to give more comprehensive picture of the recovery process among abdominal surgery patients.

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APPENDICES

APPENDIX A
LIST OF THE EXPERTS

1. Prof Dr. Tran Hieu Hoc, MD, PhD

Dean of Surgical Department, Bach Mai Hospital, Vietnam

2. Dr. Nguyen Minh Tuan, MD

Doctor of Surgical Department, Bach Mai Hospital, Vietnam

3. **Mrs Dang Thi Loan, MA**

Lecturer, Faculty of Nursing &Midwifery, Hanoi Medical University

Staff of Surgical Department, Bach Mai Hospital, Vietnam

4. **Mrs. Ngo Minh Hong, BN**

Head nurse of Surgical Department, Bach Mai Hospital, Vietnam

5. **Mrs. Duong Hong Ngoc, BN**

Head nurse of surgical abdominal unit of Surgical Department, Bach Mai Hospital, Vietnam

APPENDIX B
CERTIFICATE OF APPROVAL

CERTIFICATE OF APPROVAL
From
Institutional Review Board Faculty of Nursing Mahidol University

COA No.IRB-NS2016/351.0205

Title of Project:	**FACTORS ASSOCIATED WITH RECOVERY AMONG PATIENTS AFTER ABDOMINAL SURGERY**
Project Number:	**IRB-NS2016/26.0703**
Principle Investigator:	**Mrs. Nguyen Thi Thu Trang**
Name of Institution:	**Faculty of Nursing Mahidol University**
Approval includes	1) IRB-NS Submission form version received date 2 May 2016 2) Participant Information sheet version date 2 May 2016 3) Consent form version date 2 May 2016 4) Questionnaire version received date 2 May 2016

Institutional Review Board Faculty of Nursing Mahidol University is in full compliance with International Guidelines for Human Research Protection such as Declaration of Helsinki, The Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

Date of Approval: **02 May 2016**

Date of Expiration: **01 May 2017**

Signature of Chair:

(Associate Professor Dr. Fongcum Tilokskulchai)

Chair

Signature of Dean, Faculty of Nursing

(Associate Professor Dr. Yajai Sitthimongkol)

Dean, Faculty of Nursing

Office of Institutional Review Board Faculty of Nursing Mahidol University Room 503 Faculty of Nursing, Mahidol University 999 Phuttamonthon 4 Road, Salaya, Nakhon Pathom 73170, THAILAND Tel: (662)-441-5333 Ext. 2531, 2532

Guideline for the research conduct post approval

The Institutional Review Board, Faculty of Nursing, Mahidol University

1. Use only documents with the stamp from the Institutional Review Board, Faculty of Nursing, Mahidol University (IRB-NS) for conducting the research (e.g., Instruments/ Questionnaires, Informational letter, Informed consent form)

2. If the investigator wishes to make any changes on the research protocol, the "Protocol Amendment Form" and all amended documents are required to submit to the IRB-NS for considerations before continuing the research.

3. If the serious adverse events or the suspected unexpected serious adverse events occur to the research participants, the "Adverse Event Report Form" is required to submit to the IRB-NS for considerations before continuing the research.

4. IF the research project is completed within 1 (one) year, the "Study Closure Form" is required to submit to the IRB-NS. If the project is needed to extend, the "Progress Report Form" is required to submit to the IRB-NS 1 (one) month in advance of the expiry date.

5. If the report for data collection is required, report as follows:

☑ Normal (Report at the renewal of the COA or at the project closure)

☐ Report at 25% of the data collection

☐ Report at 50% of the data collection

Date May 2, 2016

APPENDIX C
PARTICIPANT INFORMATION SHEET

= 2 MAY 2016
26.0703

IRB-NS Form No. 3

Participant Information Sheet (English version)

In this document, there may be some statements that you do not understand. Please ask the principal investigator or his/her representative to give you explanations until they are well understood. To help your decision making in participating the research, you may bring this document home to read and consult your relatives, intimates, personal doctor or other doctor.

Title of Research Project:

Factors associated with recovery among patients after abdominal surgery.

Name of Researcher: Nguyen Thi Thu Trang

Research Site-Office and its telephone number available for contact both in and out of the office hours:

Bach Mai hospital, No 78 Giai Phong Street, Dong Da District, Hanoi Capital, Vietnam.

Code: 100000. Phone number: (+84) 438683731 Fax: (+84). 438691607

Source of Fund: No research funding

This research project aims to identify the prevalence of abdominal surgery, to identify the recovery level among patients after abdominal surgery and to study the relationship among age, postoperative pain, comorbidity, surgical condition, surgical incision with recover in patients after abdominal surgery_which expects the following benefits:

1) Providing basic data about factors related recovery among patients after abdominal surgery.

2) In the future, developing program by using this data to promote recovery among patients after abdominal surgery

Approved by Institutional Review Board
Faculty of Nursing Mahidol University
Project Number IRB-2016/26.0703
Date of Approval 2 MAY 2016

IRB-NS Form No. 3

However, in this study, the sample doesn't get any benefit directly but patients after abdominal surgery will get benefit in the future

You are invited to participate in this research project because you have been undergone surgical abdominal patients and being age 18 years old or above

There will be 191 participants and the research will last for 30 -40 minutes for answer questionnaire

To participate in this research is completely VOLUNTARY.

If you decide to participation the research project, you will go through the following procedure:

1. The researcher asks you to sign consent form.

2.The researcher will collect some demographic data from medical record form.

3. The researcher will organize private room to interview you or ask you to answer questionnaires by yourself. The researcher will use five questionnaires for data collection before you discharge from the hospital. Questionnaires are 1) General information of the patients (14 questions) 2) Information related to illness and treatment (13 questions) 3) Numerical rating scale (NRS) (1 question) 4) Surgical APGAR score (1 question) 5) Quality of recovery score -The QoR 15 score (15 questions). Total questionnaire (44 questions) and the time will be used for data collection is about 30-40 minutes.

During interview or use answering the questionnaires, if you feel uncomfortable, you will stop the process until you feel comfort to continuous or withdraw yourself from the study.

During data collection, if you develop unexpected conditions from the unpleasant symptoms or complications after surgery for example severe pain, severe abdominal discomfort. The researcher will stop data collection process and will immediately contact with doctors who have responsibility to take care of you about the

IRB-NS Form No. 3

your condition. You will receive the treatment and the researcher will take care until patients are stable.

If you do not participate in this research project, you will receive a standard assessment and treatment.

If you have any questions about this research please feel free to contact the researcher, Mrs Nguyen Thi Thu Trang via telephone: (+84)985501364

You do not get any money or payment for participating in this research.

If relevant information arises about benefits and risks of the research project, the researcher will inform the participant immediately and without concealment.

Your information will be kept confidential, it will not be subject to an individual disclosure, but will be included in the research report as part of the overall results. Individual information may be examined by a researcher, the ethics committee, etc.

You have the right to withdraw from the project at anytime without prior notice. And the refusal to participate or the withdrawal from the research project will not at all affect the proper service or treatment that you will receive.

This research project is approved by The Institutional Reviews Boards, Faculty of Nursing (IRB-NS) at the office of IRB-NS room 503 5th floor, Faculty of Nursing, Mahidol University, 999 Phuttamonthon 4 Road, Salaya, Nakhon Pathom 73170 Thailand Tel 66 2 441 5333 ext 2531, 2532 Fax 66 2 441 5333 ext 2531, Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Then submit document and the result to SMP- IRB institutional review board of Vietnam National University, 144 Xuan Thuy Street, Cau Giay District, Ha Noi City, Vietnam. Code: 100000, Telephone number: (+84)437450118, Fax: +84-4-37450146

Name of IRB Chair - SMP: Associate Professor Le Thi Luyen, MD, PhD

Address: Y1 Building, No.144 Xuan Thuy street, Cau Giay district, Hanoi, Vietnam.

Mobile phone of IRB chair: +84 91 359 7423

Approved by Institutional Review Board
Faculty of Nursing Mahidol University
Project Number IRB-NS 2016/26.0703
Date of Approval 2 MAY 2016

IRB-NS Form No. 3

Telephone of SMP: +84-4-37450188

On the condition that I am not treated as indicated in the information sheet distributed to the subjects, I can contact the Chair, or the representative of the IRB-NS at the contact address presenting above.

I thoroughly read the details in this document.

Signature..... Participant

(.....)

Date.....

PARTICIPANT INFORMATION SHEET (Version Vietnamese)

Thông tin dành cho đối tượng nghiên cứu *Phiên bản 2/ ngày 09 tháng 08 năm 2016*

THÔNG TIN DÀNH CHO ĐỐI TƯỢNG NGHIÊN CỨU

Tài liệu này sẽ có một số vấn đề Ông/bà có thể không hiểu. Hãy hỏi người nghiên cứu hoặc người đại diện của cô ấy để đưa cho Ông/Bà lời giải thích cho đến khi Ông/Bà hiểu rõ ràng vấn đề. Để giúp cho việc quyết định có tham gia vào chương trình nghiên cứu hay không, Ông/Bà có thể mang tài liệu này về nhà để đọc hoặc hỏi ý kiến người thân và các bác sĩ.

Tên đề tài nghiên cứu: Các yếu tố liên quan đến sự phục hồi của người bệnh sau phẫu thuật ổ bụng

Người thực hiện nghiên cứu: Nguyễn Thị Thu Trang

Địa chỉ và điện thoại liên hệ trong và ngoài giờ hành chính (Đại diện của người nghiên cứu): Bệnh viện Bạch Mai: 78 đường Giải Phóng, Quận Đống Đa, Hà Nội, Việt Nam. Mã bưu chính: 100000. Số điện thoại: (+84) 438683731. Fax: (+84). 438691607.

Nguồn hỗ trợ: Tự túc

Mục đích của nghiên cứu: Nghiên cứu này nhằm xác định mối liên quan giữa tuổi, đau sau phẫu thuật, bệnh kèm theo, tình trạng phẫu thuật, vết thương với sự phục hồi của người bệnh sau phẫu thuật ổ bụng và xác định mức độ phục hồi của người bệnh sau phẫu thuật ổ bụng, với các lợi ích được kì vọng, bao gồm:

1) Nghiên cứu này cung cấp dữ liệu cơ bản về các yếu tố liên quan đến sự phục hồi của người bệnh sau phẫu thuật ổ bụng

2) Trong tương lai, chương trình này phát triển giúp cải thiện sự phục hồi của người bệnh sau phẫu thuật ổ bụng thông qua sử dụng dữ liệu nghiên cứu.

Tuy nhiên, trong nghiên cứu này, người tham gia nghiên cứu có thể không thu được các lợi ích trực tiếp, nhưng những người bệnh sau phẫu thuật ổ bụng sẽ thu được các lợi ích trong tương lai

Ông/Bà được mời tham gia chương trình nghiên cứu bởi vì Ông (bà) vừa trải qua phẫu thuật ổ bụng và trên 18 tuổi

Sẽ có 191 người tham gia, và và cuộc phỏng vấn sẽ kéo dài trong khoảng từ 30 đến 40 phút nhằm trả lời các câu hỏi nghiên cứu

* Việc tham gia nghiên cứu này của Ông/Bà là hoàn toàn TỰ NGUYỆN.

Nếu Ông/Bà quyết định tham gia nghiên cứu này, Ông/Bà sẽ trải qua các bước sau:

1. Người nghiên cứu sẽ yêu cầu Ông/Bà ký tên vào bản chấp thuận tham gia nghiên cứu.

2. Nghiên cứu viên sẽ thu thập thông tin của Ông/Bà từ hồ sơ bệnh án.

3.Nghiên cứu viên sẽ sắp xếp một phòng riêng để phỏng vấn Ông/Bà hoặc Ông/Bà tự trả lời các câu hỏi đó. Sau đó, nghiên cứu viên sẽ thu thập số liệu trước khi Ông/Bà ra viện bằng bộ câu hỏi gồm 5 phần với tổng số câu hỏi là 44 câu và thời gian thu thập số liệu là khoảng 30 – 40 phút. Cụ thể như sau: 1) Thông tin chung với 14 câu hỏi 2) Thông tin liên quan đến bệnh và điều trị có 13 câu hỏi 3) Thang điểm đánh giá đau có 1 câu hỏi. 4) Thang điểm Apgar với 1 câu hỏi 5) Thang đo chất lượng phục hồi với 15 câu hỏi.

4.Trong suốt quá trình phỏng vấn nếu Ông/Bà cảm thấy không thoải mái Ông/Bà có thể dừng lại và nghỉ ngơi cho đến khi Ông/ Bà cảm thấy dễ chịu trở lại và có thể tiếp tục phỏng vấn. Nếu Ông/Bà không muốn tham gia nghiên cứu nữa, Ông/Bà có thể

rút khỏi nghiên cứu bất kỳ lúc nào. Việc dừng này không ảnh hưởng đến quá trình chăm sóc và điều trị thông thường ở bệnh viện. Ông/Bà vẫn nhận được sự chăm sóc theo đúng tiêu chuẩn chăm sóc thường quy sau khi rút khỏi nghiên cứu.

5.Nếu Ông/Bà xuất hiện tình trạng sức khỏe không tốt như đau bụng nghiêm trọng, hãy nói với người nghiên cứu. Nghiên cứu viên sẽ dừng phỏng vấn ngay lập tức và sẽ liên hệ trực tiếp với các bác sỹ để chăm sóc cho Ông/Bà đến khi ổn định.

Nếu Ông/Bà không muốn tham gia vào quá trình nghiên cứu, Ông/Bà vẫn nhận được sự chăm sóc và điều trị theo đúng quy định.

Nếu Ông/Bà có bất cứ thắc mắc nào, vui lòng liên hệ người thực hiện nghiên cứu Nguyễn Thị Thu Trang. Số điện thoại: +84 985501364

Ông/Bà không được nhận và cũng không phải trả bất cứ một khoản chi phí nào khi tham gia nghiên cứu này.

Nếu có thêm thông tin gì về các lợi ích và rủi ro của nghiên cứu, nghiên cứu viên sẽ thông báo cho Ông/Bà ngay lập tức.

Thông tin của Ông/Bà sẽ được bảo mật tuyệt đối và không được tiết lộ dưới dạng thông tin cá nhân, tuy nhiên nó sẽ được thể hiện trong báo cáo tổng thể như là kết quả của một đề tài nghiên cứu khoa học. Thông tin cá nhân của Ông/Bà sẽ được kiểm tra bởi người nghiên cứu và Hội đồng đạo đức trong nghiên cứu y sinh học.

Ông/Bà có quyền rút khỏi nghiên cứu bất cứ khi nào mà không cần thông báo trước. Việc Ông/Bà rút khỏi chương trình nghiên cứu sẽ không ảnh hưởng đến chất lượng dịch vụ y tế mà Ông/Bà thụ hưởng.

Đề tài nghiên cứu này được chấp nhận bởi Hội đồng Đạo đức trong nghiên cứu y sinh, Khoa Điều dưỡng, Đại học Mahidol đặt văn phòng tại tầng 5 phòng 503, đường Phuttamonthon 4, Salaya, Nakhonpathom 73170 Thái Lan. Điện thoại: 66 2 441 5333 số máy lẻ 2531, 2532. Fax 0066 2 441 5333. Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Đề tài nghiên cứu này cũng được chấp thuận bởi Hội đồng Đạo đức trong nghiên cứu Y sinh học, Khoa Y Dược, Đại học Quốc Gia Hà Nội. Địa chỉ: Tòa nhà Y1, số 144 phố Xuân Thủy, quận Cầu Giấy, Hà Nội, Việt Nam. Điện thoại: 04-37450188. Fax: +84437450146. Email: smp@vnu.edu.vn.

Nếu tôi không được hưởng sự điều trị như trong bản thông tin đưa ra, tôi có thể liên lạc với Hội đồng đạo đức, Khoa Điều Dưỡng, Đại học Mahidol Thái Lan, hoặc Hội đồng đạo đức trong nghiên cứu Y sinh học, Khoa Y Dược, Đại học Quốc Gia Hà Nội với các thông tin liên lạc như đã nêu ở trên.

Tôi đã đọc kỹ và hiểu toàn bộ chi tiết nêu trong bản thông tin này.

Ngày….. tháng …..năm……

Họ tên, Chữ kí của người tham gia nghiên cứu

……

APPENDIX D
INFORMED CONSENT FORM

- 2 MAY 2016
26.0103

IRB-NS Form No. 4

Consent form for informed and voluntary participation in research

Date...../...../.....
My name is....., aged.....years old, now living at the address no.....road/street.....
subdistrict/tambon.....District/amphur.....province.....Postal code.....Tel. No.....

I give my consent to participate as a subject in the research project entitled factors associated with recovery among patients with abdominal surgery.

In so doing, I am informed of the background and purpose of research project; its procedural details to carry out or to be carried out; its expected benefits and risks that may occur to the subjects, including methods to prevent and handle harmful consequences; and payment/ incentives, and expense. I thoroughly read the detailed statements in the information sheet given to the research subjects, I was also given explanations and my questions were answered by the head of the research project.

I consent to participate as a subject in this research project.

On the condition that I have any questions about the research procedures, or on the condition that I suffer from an undesirable side effect from this research, I can contact Mrs Nguyen Thi Thu Trang via telephone (+84)985501364 or email thutrangbm1981@gmail.com

On the condition that I am not treated as indicated in the information sheet distributed to the subjects, I can contact the Chair of The Institutional Reviews Boards, Faculty of Nursing (IRB-NS) at the office of IRB-NS room 503 5th floor, Faculty of Nursing, Mahidol University, 999 Phuttamonthon 4 Road, Salaya, Nakhon Pathom 73170 Thailand Tel 66 2 441 5333 ext 2531, 2532 Fax 66 2 441 5333 ext 2531 , Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Approved by Institutional Review Board
Faculty of Nursing Mahidol University
Project Number IRB-NS 2016/26/0103
Date of Approval - 2 MAY 2016

IRB-NS Form No. 4

I am aware of my right to further information concerning benefits and risks from the participation in the research project and my right to withdraw or refrain from the participation anytime without any consequence on the service or health care I am to receive in the future, I consent to the researcher's use of my private information obtained in this research, but do not consent to an individual disclosure of private information. The information must be presented as part of the research results as a whole.

I thoroughly understand the statement in the information sheet for the research subjects and in this consent form. I thereby give my signature.

Signature..... .....Participants/Proxy/
(.....) Date.....
Signature.....Person in Charge of Informing and Requesting a Consent/Head of (Mrs Nguyen Thi Thu Trang) Research Project/Date.....

In case that the participant is not literate, the reader of all the statements for the participant is (Mr./Mrs./Ms.....), who gives his/her signature as a witness.

Signature.....Witness
(.....) Date.....

INFORMED CONSENT FORM (Version Vietnamese)

Bản chấp thuận tham gia nghiên cứu *Phiên bản 2/ ngày 09 tháng 08 năm 2016*

BẢN CHẤP THUẬN THAM GIA NGHIÊN CỨU

Ngày...../...../.....

Tên tôi là....., Tuổi: .....

Mã ID (Người nghiên cứu ghi):.....

Địa chỉ: .....

Mã vùng: .....Số điện thoại: .....

Trước tiên, tôi xin bày tỏ sự đồng ý tham gia vào đề tài nghiên cứu có tên là: ***Các yếu tố liên quan đến sự phục hồi của người bệnh sau phẫu thuật ổ bụng.***

Trước khi tham gia nghiên cứu, tôi đã được thông báo về mục đích của nghiên cứu, chi tiết quá trình thực hiện nghiên cứu, các lợi ích và rủi ro có thể xảy ra đối với người tham gia nghiên cứu, các phương pháp ngăn ngừa và giải quyết các tác dụng không mong muốn có thể xảy ra cho người tham gia nghiên cứu, cả về chi phí tham gia nghiên cứu. Tôi đã đọc kỹ toàn bộ thông tin trong bản thông tin dành cho đối tượng nghiên cứu. Bên cạnh đó, các câu hỏi của tôi cũng đã được giải đáp bởi người thực hiện nghiên cứu.

Trong trường hợp có bất cứ câu hỏi nào hoặc có vấn đề mới phát sinh trong quá trình nghiên cứu, tôi có thể liên hệ với chị Nguyễn Thi Thu Trang số điện thoại : 0985501364 Email: thutrangbm1981@gmail.com (Số điện thoại liên lạc trên được kết nối 24/24 h).

Nếu tôi không được điều trị và chăm sóc như những gì đề cập đến trong bản thông tin dành cho đối tượng nghiên cứu, tôi có thể liên hệ với Hội đồng Đạo đức, Khoa Điều dưỡng, Đại học Mahidol Thái Lan, đặt văn phòng tại tầng 5 phòng 504, Đại học Mahidol, đường Phuttamonthon 4, Salaya, Nakhon Pathom 73170, Thái Lan. Điện thoại: 66 2 441 5333 số máy lẻ 2531, 2532. Fax 0066 2 441 5333 số máy lẻ 2531. Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Tôi cũng có thể liên lạc với Hội đồng Đạo đức trong nghiên cứu Y sinh học, Khoa Y Dược, Đại học Quốc Gia Hà Nội. Địa chỉ: Tòa nhà Y1, số 144 phố Xuân Thủy, quận Cầu Giấy, Hà Nội, Việt Nam. Điện thoại: 04-37450188. Fax +84437450146, Email: smp@vnu.edu.vn.

Tôi nhận thức được quyền của mình để tiếp tục nhận thông tin liên quan đến lợi ích và rủi ro từ việc tham gia vào các dự án nghiên cứu và tôi có quyền rút khỏi nghiên cứu hoặc từ chối không tiếp tục tham gia nghiên cứu bất cứ lúc nào mà không cần lý do, tôi bằng lòng để nghiên cứu viên sử dụng thông tin cá nhân cho việc nghiên cứu, nhưng không đồng ý việc tiết lộ thông tin cá nhân. Các thông tin phải được trình bày như là một phần của kết quả nghiên cứu.

Tôi hoàn toàn hiểu được tuyên bố trong bản thông tin dành cho đối tượng nghiên cứu và trong phiếu chấp thuận tham gia nghiên cứu này. Sau đây là chữ ký của tôi.

Ngày..... tháng..... năm.....

Chủ nhiệm đề tài
(Ký và ghi rõ họ tên)

Người tham gia nghiên cứu
(Ký và ghi rõ họ tên)

APPENDIX E
INSTRUMENTS

INSTRUMENT (English version)

Part 1 General information of the patients

The following questions related to your personal information. Please tick (√) or fill in blanks in the following questions:

1.ID No.....

2.Age .....**years**

3.Gender: 1☐ Male 2☐Female

4. Weight (Kg) ..... **Height (m)** .....**BMI (kg/m^2)**.....

5. Location of residence:.....

6. Marital status: 1☐ Married 2☐ Single

3☐ Separated 4☐Divorced 5☐ Widowed

7. What is your highest education level?

1☐ Primary school (level 1 to 5) 2☐ Secondary school (level 6 to 9)

3☐ High school (level 10 to 12) 4☐ Two years certificate

5☐ College (3 years) 6☐ Bachelor (University)

7☐ Postgraduates 8☐Others (please specify)

8. What is your occupation?

1☐ Professional 2☐ Farmer

3☐ Industrial worker 4☐Salesperson

5☐ Home worker 6☐ Retired

7☐Other jobs (please specify).....

9. How much of your income and your family income per month?

- Your income per month: .....VND
- Your family income per month: .....VND

10. Do you have your health insurance? 1☐Yes 0☐ No

If yes, please indicate how much it covers for your treatment? ..... (percent)

11.Date in hospital:.....

12.Date of surgical:.....

13.Length in hospital :.....

14.Date of discharge:

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Part 2 Information related to illness and treatment

1. Diagnosis :

2.Do you drink alcohol? 1☐ Yes 0 ☐ No

3.Which co-morbidity do you have?

3.1 Hypertension 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.2 Myocardial infarct 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.3 Heart failure 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.4 Diabetes 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.5 COPD 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.6 Ulcer 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.7 Chronic liver disease 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.8 Kidney fairlure 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.9 Tumor 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

3.10 Leukemia 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

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3.11 Other 0 ☐ No 1☐ Yes ……..for how long?

Treatment: Always☐ ; Sometime ☐ ; No ☐

4. Surgical method:

1☐ Laparoscopy 2☐ Open surgery

5. Surgical condition : 1☐ Emergency 2 ☐ Elective

6. Method of Anesthesia : 1☐ All of body 2 ☐Spinal

7. Surgical incision: (Location and length)

1☐ Upper abdominal 2☐ Lower abdominal 3 ☐ Flank line

Length of incision :…… …… cm

8. Do you have previous surgeries?

1☐ Yes 0☐ No .

If yes ;Diagnosis.....

When ?.....

Where ?.....

9. Distance between previous surgeries 1☐ <6 month 2 ☐ > 6 month

10. Current health status

10.1 Do you feel abdominal distention	1 ☐ Yes	0 ☐ No
10. 2 Vomiting? Or nausea?	1 ☐ Yes	0 ☐ No
10.3. Do you cough very often?	1 ☐ Yes	0 ☐ No
10.4. Do you have sore throat?	1 ☐ Yes	0 ☐ No
10.5. Do you have sputum?	1 ☐ Yes	0 ☐ No

11. Complication after surgery: 1 ☐ Yes 0 ☐ No

12. Note of any complications after surgery ……

……..

……

……

13. Have knowledge about illness? 1☐ Yes 0☐ No

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Part 3 Numerical Rating Scale (NRS)

I would like you to rate your pain on a scale from zero to ten. 'Zero' means you have no pain at all. 'Ten' means the worst possible pain you can image. What number would you give to your pain?

0	1	2	3	4	5	6	7	8	9	10

No pain **The worst possible pain**

Part 4 Surgical APGAR score

*Assess MAP

*10 point surgical APGAR score

	0	1	2	3	4
Estimated blood ,ml	>1000	601-1000	101-600	<=100	
Lowest mean arterial pressure ,mmHg	<40	40-50	55-69	>=70	
Lowest heart rate /min	>85b	76-85	66-75	56-65	,=55b

MAP= (Systolic - Diastolic)+ Diastolic

3

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5

Part 5 Quality of Recovery Score -The QoR 15 score

PART A (0-10)

0 = none of the time [poor].

10 = all of the time [excellent]

N	How have you been feeling in the last 24 hours?	0	1	2	3	4	5	6	7	8	9	10
1	Able to breathe easily											
2	Been able to enjoy food											
3	Feeling rested											
4	Have had a good sleep											
5	Able to look after personal toilet and hygiene unaided											
6	Able to communicate with family or friends											
7	Getting support from hospital doctors and nurses											
8	Able to return to work or usual home activities											
9	Feeling comfortable and in control											
10	Having a feeling of general well-being											

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PART B (10 ---0)

10 = none of the time [excellent]

0 = all of the time [poor]

N	Have you had any of the following in the last 24 hours?	10	9	8	7	6	5	4	3	2	1	0
11	Moderate pain											
12	Severe pain											
13	Nausea or vomiting											
14	Feeling worried or anxious											
15	Feeling sad or depressed											

Total score 150

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INSTRUMENTS (VERSION VIETNAMESE)

BỘ CÂU HỎI NGHIÊN CỨU

TÊN ĐỀ TÀI: CÁC YẾU TỐ LIÊN QUAN TỚI SỰ PHỤC HỒI CỦA NGƯỜI BỆNH SAU PHẪU THUẬT Ổ BỤNG

Phần 1. Thông tin chung của người bệnh

Số thứ tự: ..... **Mã bệnh án:** .....

Dưới đây là 14 câu hỏi liên quan đến thông tin cá nhân của người bệnh và thông tin liên quan đến bệnh tật của người bệnh. Làm ơn hãy sử dấu ✓ để điền vào ô trống

1. ID:.....

2. Tuổi:.....

3. Giới tính 1☐ Nam 2☐ Nữ

4. Cân nặng:..... Chiều cao:.....BMI :.....

5. Nơi cư trú:.....

6. Tình trạng hôn nhân

1☐ Đã kết hôn 2 ☐ Độc thân

3☐Ly thân 4☐Đã ly hôn 5☐ Góa chồng ,vợ

7. Trình độ học vấn

1☐ Tiểu học (từ lớp 1 đến lớp 5) 2☐ Cấp hai (từ lớp 6 –lớp 9)

3☐ Phổ thông trung học (từ lớp 10 -lớp 12) 4☐ Chứng chỉ 2 năm

5☐ Cao đẳng (3 năm) 6☐ Cử nhân đại học

7☐ Sau đại học 8☐Khác (ghi cụ thể .....)

8. Ông/Bà làm nghề gì?

1☐ Chuyên nghiệp 2☐ Nông dân

3☐ Công nhân 4☐Buônbán

5☐Nội trợ 6☐ Về hưu

7☐Công việc khác .....

9. Thu nhập hàng tháng của Ông/Bà và gia đình là bao nhiêu?

-Thu nhập của Ông/Bà hàng tháng :.....VND

- Thu nhập của gia đình Ông/Bà hàng tháng :.....VND

10. Ông/Bà có bảo hiểm y tế không? 1☐Có 2 ☐ Không

Nếu có thì bảo hiểm sẽ chi trả cho việc điều trị là bao nhiêu phần trăm ..... (Percent)

11.Ngày vào viện :.....

12. Ngày phẫu thuật:.....

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13.Ngày ra viện:.....

14. Thời gian nằm viện:.....

Phần 2 Thông tin liên quan đến bệnh tật và điều trị

1. Chẩn đoán:.....

2. Ông/Bà có uống rượu không 1☐Có 0☐Không

3. Ông/Bà có bệnh gì kèm theo không? 1☐Có 0☐ Không

3.1 Cao huyết áp 0 ☐ Không 1☐Có Bao nhiêu năm:.....

***Điều trị*:** Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.2 Nhồi máu cơ tim 0 ☐ Không 1☐Có Bao nhiêu năm.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐ ; Không điều trị ☐

3.3 Suy tim 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.4 Đái tháo đường 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnhthoảng ☐; Không điều trị ☐

3.5 COPD 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.6 Loét dạ dày 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.7 Bệnh gan mãn tính 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.8 Suy thận 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.9 Ung thư 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.10 Bệnh máu 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

3.11 Bệnh khác 0 ☐ Không 1☐Có Bao nhiêu năm:.....

Điều trị: Thường xuyên ☐; Thỉnh thoảng ☐; Không điều trị ☐

4. Phương pháp phẫu thuật

1☐ Nội soi 2☐ Mổ mở

5. Tình trạng phẫu thật : 1☐ Cấp cứu 2☐ Mổ phiên

6. Gây mê: 1☐ Toàn thân 2☐ Tủy sống

7. Vết mổ : (Vị trí và chiều dài)

1☐Bụng trên 2☐ Bụng dưới 3☐ Sườn lưng

Chiều dài :..... cm

8. Ông/Bà đã từng mổ gì trước đây chưa?

1 Có ☐ 0 Không☐.

Nếu có; Chẩn đoán:.....

Khi nào ?.....

Ở đâu?.....

Ông/Bà mổ bao nhiêu lần ?.....

9. Khoảng cách giữa các lần mổ : 1☐ dưới 6 tháng 2☐ trên sáu tháng

10. Tình trạng sức khỏe hiện tại

10.1 Ông/Bà có cảm thấy chướng bụng không ? 1☐ Có 0 ☐ Không

10.2 Ông/Bà có nôn hoặc buồn nôn không ?

1☐ Có 0☐ Không

10.3 Có ho không?1☐ Có 0☐ Không

10.4 Có đau họng không?1 ☐ Có0 ☐ Không

10.5Có đờm không1☐Có 0☐Không

11. Biến chứng sau mổ: 1 ☐ Có 0☐ Không

12. Những biến chứng nào xảy ra sau mổ .....

.....

.....

13. Ông/Bà có kiến thức về bệnh không ?

1☐ Có 0☐ Không

Phần 3: Thang mức độ đau (NRS)

Tôi muốn Ông/Bà đánh giá mức độ đau của Ông/Bà trên thang điểm từ số không đến mười. 'Không' có nghĩa là Ông/Bà không có cơn đau nào cả. 'Mười' có nghĩa là cơn đau tồi tệ nhất Ông/Bà có thể hình dung ra.Ông/Bà sẽ cung cấp chỉ số đau của Ông/Bà là số mấy?

0	1	2	3	4	5	6	7	8	9	10

Không có cơn đau nào cả có thể hình dung ra.

Phần 4: Điểm số phẫu thuật APGAR

Đánh giá Áp lực động mạch trung bình (MAP)

Bảng điểm số phẫu thuật 10 điểm Apgar

	0	1	2	3	4
Lượng máu ước tính ,ml	>1000	601-1000	101-600	<=100	
Huyết áp tối thiểu ,mmhg	<40	40-50	55-69	>=70	
Nhịp tim tối thiểu /min	>85b	76-85	66-75	56-65	,=55b

Áp lực động mạch trung bình = (HA tối đa – HA tối thiểu)+ HA tối thiểu

3

Phần 5: Điểm đánh giá chất lượng hồi phục– QoR-15 Khảo sát người bệnh

Phần A **0 = Không lúc nào (kém)**

10 = Tất cả thời gian(rất tốt)

TT	Ông/Bà thấy thế nào trong 24 tiếng đồng hồ vừa qua?	0	1·	2	3	4	5	6	7	8	9	10
1	Có thể thở dễ dàng											
2	Có thể thưởng thức món ăn											
3	Cảm giác được nghỉ ngơi											
4	Có giấc ngủ ngon											
5	Có thể vệ sinh cá nhân và đi vệ sinh mà không cần trợ giúp											
6	Có thể giao tiếp với gia đình và bạn bè											
7	Nhận được hỗ trợ của y tá và bác sỹ											
8	Khả năng trở lại làm việc và các hoạt động thông thường ở nhà											
9	Cảm thấy thoải mái và điều khiển được mọi việc											
10	Có cảm giác khỏe khoắn											

Phần B **10 = không lúc nào (rất tốt)**

0 = Tất cả thời gian (kém)

N	Ông/Bà có điều gì dưới đây trong 24 giờ qua?	10	9	8	7	6	5	4	3	2	1	0
11	Đau vừa											
12	Đau nghiêm trọng											
13	Buồn nôn và nôn											
14	Cảm giác lo lắng bồn chồn											
15	Cảm giác buồn và trầm cảm											

Tổng =150 điểm

APPENDIX F
PERMISSION FOR USING INSTRUMENTS

1. APGAR score

Nguyễn Trang <thutrangbm1981@gmail.com>

A Vietnam student asks your permission

2 thư

Trang <thutrangbm1981@gmail.com> 00:38 Ngày 19 tháng 12 năm 2015

Tới: agawande@partners.org

Dear Dr Gwande

My name is Nguyen Thi Thu Trang . I'm working at Surgical department in Bach Mai Hospital, Hanoi, Vietnam. I am participating second year Master nursing at Mahidol, Thai lan. I'm going to do a study about " Factors associated with recovery among patients after abdominal surgery. Surgical Apgar Score is one of factors that I want to focus among patient after abdominal surgery .I read about your Surgical Apgar score , I see that SAS is useful for the field of surgery . I am really exciting its content. So, I want to ask your permission about using this instrument. Please, help me ! I promise that I only use it for reference, not for any commercial purposes.

Extremely grateful for your support! Wish you have a happy time!

Best regards,

Nguyen Thi Thu Trang

Đã gửi từ iPhone của tôi

Gawande, Atul,M.D.,M.P.H. <AGAWANDE@partners.org> 01:36 Ngày 19 tháng 12 năm 2015

Tới: Trang <thutrangbm1981@gmail.com>

No permission needed! You just have to cite the article.

[Ẩn văn bản trích dẫn]

The information in this e-mail is intended only for the person to whom it is addressed. If you believe this e-mail was sent to you in error and the e-mail contains patient information, please contact the Partners Compliance HelpLine at http://www.partners.org/complianceline . If the e-mail was sent to you in error but does not contain patient information, please contact the sender and properly dispose of the e-mail.

2. Quality of recovery-15 item

Gmail **Nguyễn Trang <thutrangbm1981@gmail.com>**

A Vietnam Student asks your permission

2 thư

Trang <thutrangbm1981@gmail.com> 00:50 Ngày 19 tháng 12 năm 2015

Tới: p.myles@alfred.org.au

Dear Dr Myles

My name is Nguyen Thi Thu Trang . I'm working at Surgical department in

Bach Mai Hospital, Hanoi, Vietnam. I am participating second year Master nursing at Mahidol, Thai lan. I'm going to do a study about " Factors associated with recovery among patients after abdominal surgery. Quality of recovery 15 items is very good . I want to focus this QoR 15 items to assess recovery among patients after abdominal surgery . I am really exciting its content. So, I want to ask your permission about using this instrument. Please, help me ! I promise that I only use it for reference, not for any commercial purposes.

Extremely grateful for your support! Wish you have a happy time!

Best regards,

Nguyen Thi Thu Trang

Đã gửi từ iPhone của tôi

Myles, Paul <P.Myles@alfred.org.au> 10:06 Ngày 21 tháng 12 năm 2015

Tới: Trang <thutrangbm1981@gmail.com>

Dear Nguyen

Yes, I am happy for this.

Regards, Paul

Professor Paul Myles

Director, Dept of Anaesthesia and Perioperative Medicine

Alfred Hospital and Monash University, Melbourne, Australia

From: Trang [mailto:thutrangbm1981@gmail.com]

Sent: Saturday, 19 December 2015 4:50 AM

To: Myles, Paul

Subject: A Vietnam Student asks your permission

[Ẩn văn bản trích dẫn]

APPENDIX G
ADDITIONAL STATISTICAL ANALYSIS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Age	.057	191	.200*	.989	191	.126
Pain	.280	191	.000	.877	191	.000
Sum Apgar	.197	191	.000	.894	191	.000
Sum QoR15	.117	191	.000	.920	191	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction.

BIOGRAPHY

NAME	Nguyen Thi Thu Trang
DATE OF BIRTH	13 October 1981
PLACE OF BIRTH	Hanoi capital, Vietnam
INSTITUTIONS ATTENDED	Bach Mai Medical College, 2000 - 2003 Diploma of Nursing Hanoi Medical University, 2006 - 2010 Bachelor of Nursing Mahidol University, 2015 -2016 Master of Nursing Science (Adult nusing)
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EMPLOYMENT ADDRESS	2004 – present, Nursing Surgical Department, Bach Mai hospital, Vietnam Tel. (+84) 8686982- (2408) Email. thutrangbm1981@gmail.com