

Factors Associated with Recovery among Patients after Abdominal Surgery*

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Abstract

Purpose: To examine the level of postoperative recovery and identify relationships among age, postoperative pain, co-morbidity, intra surgical condition, length of incision, and recovery in patients after abdominal surgery.

Design: Descriptive correlational design.

Method: Sample was 190 patients aged 18 years and older after abdominal surgery at Bach Mai Hospital, Hanoi, Vietnam. Data were collected by interviewing with questionnaires and obtaining demographic and medical data from patient's chart review. Patient's recovery was measured by the quality of recovery scale (QoR-15). Spearman's Rho correlation was employed for data analysis.

Main Findings: The average age of subjects was 54.14 years. The length of hospital stay ranged from 3 to 20 days. Main cause of surgery was gastrointestinal disease found in 114 subjects (59.7%), and 54 subjects with urological disease (28.3%). The surgical approach included laparotomy and laparoscopic surgery. There were 38.2% of subjects with one or more co-morbid diseases. The overall QoR scores were good with the mean of 128.91. Age, pain, co-morbidity, and length of incision were negatively correlated with recovery ($r_s = -.350$, $r_s = -.411$, $r_s = -.428$, $r_s = -.231$, $p < .05$ respectively). Surgical Apgar score was positively correlated with recovery ($r_s = .289$, $p < .05$).

Conclusion and recommendations: To enhance the patient's postoperative recovery and their optimum health outcomes, pain control has to be taken into action. Patients with long wounds have co-morbid diseases and show instability in their hemodynamic status during operation has to be closely monitored.

Keywords: recovery, postoperative pain, abdominal surgery, transition theory

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ปัจจัยที่มีผลต่อการฟื้นตัวของผู้ป่วยหลังผ่าตัดช่องท้อง*

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาระดับการฟื้นตัวของผู้ป่วยหลังผ่าตัดช่องท้อง และความสัมพันธ์ระหว่างอายุ โรคร่วม สภาพระหว่างการผ่าตัด ความยาวของแผลผ่าตัด และความเจ็บปวดหลังผ่าตัด กับการฟื้นตัวของผู้ป่วยหลังผ่าตัดช่องท้อง

รูปแบบการวิจัย: การวิจัยเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างเป็นผู้ป่วย จำนวน 190 คน ที่มีอายุ 18 ปีขึ้นไป ที่ได้รับการผ่าตัดช่องท้องที่โรงพยาบาลbcmay เมืองฮานอย ประเทศเวียดนาม เก็บข้อมูลด้วยการสัมภาษณ์โดยใช้แบบสอบถาม ระดับการฟื้นตัวประเมินด้วยแบบประเมินคุณภาพการฟื้นตัว (QoR-15) และเก็บข้อมูลบางส่วนจากแฟ้มข้อมูลของผู้ป่วย วิเคราะห์ข้อมูลด้วยสถิติเชิงบรรยาย และหาความสัมพันธ์ของตัวแปรด้วย Spearman's Rho

ผลการวิจัย: กลุ่มตัวอย่างมีอายุเฉลี่ย 54.14 ปี ระยะเวลาการรักษาตัวในโรงพยาบาลระหว่าง 3 ถึง 20 วัน กลุ่มตัวอย่างจำนวน 114 คน (ร้อยละ 59.7) ได้รับการผ่าตัดด้วยพยาธิสภาพที่เกิดจากกระเพาะอาหารและลำไส้ และร้อยละ 28.3 เกิดจากโรคในระบบทางเดินปัสสาวะ การผ่าตัดมีทั้งการผ่าแบบเปิดช่องท้องและแบบส่องกล้อง กลุ่มตัวอย่างร้อยละ 38.2 มีโรคประจำตัวอย่างน้อยหนึ่งโรคก่อนรับการผ่าตัด ระดับคะแนนการฟื้นตัวอยู่ในระดับค่อนข้างดี โดยมีค่าเฉลี่ยเท่ากับ 128.91 อายุของผู้ป่วย ระดับความเจ็บปวด และความยาวของแผลผ่าตัดมีความสัมพันธ์ทางลบกับการฟื้นตัว ($r_s = -.350$, $r_s = -.411$, $r_s = -.428$, $r_s = -.231$, $p < .05$ ตามลำดับ) คะแนนที่คำนวณได้จากสัญญาณชีพและการไหลเวียนเลือดระหว่างการผ่าตัด มีความสัมพันธ์ทางบวกกับการฟื้นตัว ($r_s = .289$, $p < .05$)

สรุปและข้อเสนอแนะ: พยาบาลควรส่งเสริมการฟื้นตัวของผู้ป่วยหลังผ่าตัดช่องท้อง โดยการควบคุมความเจ็บปวดหลังผ่าตัด ควรเน้นการเฝ้าระวังผู้ป่วยสูงอายุ ผู้ป่วยที่มีแผลผ่าตัดยาว มีโรคประจำตัว และมีภาวะสัญญาณชีพและการไหลเวียนระหว่างการผ่าตัดไม่คงที่ เพราะเป็นกลุ่มเสี่ยงต่อการฟื้นตัวล่าช้า

คำสำคัญ: การฟื้นตัว ความเจ็บปวดหลังผ่าตัด การผ่าตัดช่องท้อง ทฤษฎีการเปลี่ยนผ่าน

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Background and Significance

Abdominal surgery is a surgical procedure aimed to solve many different diseases in abdomen with a variety of causes such as infection, tumors, or ileus obstruction. The surgical approach included laparotomy or laparoscopic surgery¹. Laparoscopic surgery is a technique that has developed rapidly and has been being considered the gold standard to solve many diseases of gastrointestinal tract.¹ 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; fluid and electrolyte imbalance; nutritional impairment; kidney dysfunction; or respiratory disorders.² Abdominal diseases and systemic disorders often affect health recovery after surgery, postoperative length of hospital stay, and hospital readmission.

There are millions of patients all over the world undergoing surgical procedures per year. The number of abdominal surgeries varies among age groups, mostly in adulthood and older people.³ The statistics from the Bach Mai Hospital, Hanoi, Vietnam, showed that there were approximately 4,550 cases of abdominal surgeries in the year 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).

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 including physical, psychological, social, and habitual functions.⁴ Therefore, enhanced postoperative recovery will diminish the stress response to trauma from operation and minimize length

of stay and potentially complications.⁵

The recovery process after abdominal surgery can be well described by transition theory.⁶ Recovery is the natural transition process of patients who undergo abdominal surgery. It reflects a patient's ability to gain normal physiological functions after surgery.⁴ There are many factors influenced recovery of patients who are undergoing abdominal surgery such as age, pain, co-morbidity, surgical incision, and peri-operative condition. These factors are considered as the conditioning factors that influence the transition process and outcomes. They can facilitate or inhibit a transition outcome.⁶ Transition theory was used as a framework for this study because it can properly describe the process of patients' postoperative recovery.⁶ It reflects patients' ability to gain normal physiological functions throughout the continuum of recovery trajectory.⁴

Therefore, the researcher is interested to study factors related to recovery ability among patients after abdominal surgery. This study results can be used and applied in nursing care to enhance postoperative recovery. Consequently, nurses can make better care plans to improve postoperative outcome and patient's satisfactions.

Objectives

1. To examine the recovery level among patients after abdominal surgery.
2. To study the relationship among age, postoperative pain, co-morbidity, surgical condition, surgical incision, and recovery in patients after abdominal surgery.

Hypothesis

1. Age, postoperative pain, co-morbidity, surgical incisions were negatively related to recovery among patients after abdominal surgery.
2. Peri-operative conditions (surgical Apgar score) were positively related to recovery among patients after abdominal surgery.

Methodology

Population and Sample

The study population included patients aged 18 years and older, both males and females, who had abdominal surgery both laparotomy and laparoscopic in Surgical Department at Bach Mai Hospital, Hanoi, Vietnam.

The sample was selected with inclusion criteria: 1) able to verbally communicate with the researcher in Vietnamese language, 2) undergo abdominal surgery 3) had hemodynamic stability at the time of interview. The exclusion criteria: 1) patients has the result of pathologies post- operation as severe cancer metastasis, 2) had severe post operative infection, 3) had hypovolemic shock from massive postoperative bleeding as indicated by the physician's diagnosis.

The sample size was calculated with G*power analysis⁷, with the level of significance = .05, the power of the statistical test = .90. For the effect size, since there was no similar study found in Vietnam, therefore the researcher used conventional medium effect size = .3 ($f^2 = .0989$).⁸ For 5 independent variables, the calculated sample size was 173 subjects. To ensure enough studied subjects, the researcher add 10% missing value, therefore the total subjects were 190.

Research Instruments

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

Part 1: Demographic data included age, gender, education, marital status, occupation, income, type of health care insurance, and length of hospital stay.

Part 2: Questionnaire related to illness and treatment contained information regarding patient's diagnosis, type of surgery, history of alcohol drink, co-morbid diseases, method of anesthesia, length and site of surgical incision, previous operations, the period after previous surgery, current health status, and complications after surgery.

1) Co-morbidity was recorded by assigning a score of 1 for each disease.

2) Length of incision was measured with the sterile tapeline made from cotton fabric when wound dressing was removed (average = 3-5 days after surgery).

Part 3: Surgical Apgar Score. Surgical Apgar score was calculated based on the following parameters; the estimated blood loss, lowest mean arterial pressure, and lowest heart rate during the surgical procedure. Surgical Apgar score ranged from 0 to 10. A lower score indicated risk on post operative complications and mortality.⁹ Surgical Apgar score was calculated and recorded on the first day after surgery.

Part 4: Numerical Rating Scale (NRS). Pain level of patients was measured by Numerical Rating Scale (NRS).¹⁰ NRS was developed by McCaffery¹¹ in the year 1968, it was a rating scale with number from 0 to 10 in a horizontal line, reflecting the severity of pain. Patients were asked to verbally rate their pain level on this scale with "0" equal to no pain and "10" equal to worst possible 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. Pain level was assessed on the first day after surgery.

Part 5: Quality of Recovery Scale (QoR-15). Quality of recovery-15 items (QoR-15)¹² was a short-form version of postoperative recovery scale for measuring patient's postoperative recovery.¹³ The QoR-15 score ranged from 0 to 150 with a high score referred to a good quality of recovery and a low score referred to a poor quality of recovery. Cronbach's alpha co-efficiency of the QoR-15 in previous studies was higher than .8.¹²⁻¹³ Cronbach's alpha of QoR-15 in this study (n = 190) was equal to .90. Recovery was assessed on the day of hospital discharged.

Protection of Human Subjects

This project was approved by the Institutional Review Board (IRB) of Faculty of Nursing, Mahidol University, Thailand (COA No.IRB-NS2016/351.0205) and IRB of Vietnam National University, Vietnam. The

researcher recruited subjects as standard process specified by the IRB. The issues of independently to make decision to consent, anonymity, and confidentiality were warranted.

Data Collection Process

The data collection was conducted in the following sequences:

1. After getting permission to collect data from the director of the hospital, the researcher informed head of the surgical department and head nurse of surgical department regarding details of the research project and asked permission to select the subjects according to the inclusion criteria.

2. On the first day after surgery, the researcher self-introduced, made relationship with the subjects, read and explained to them using the participation information sheet. After they volunteered to join the study, they were asked to sign the consent form. The researcher collected data Part 1, Part 2, and Part 3 from the patients' hospital records. Then, the subject was asked to verbally rate their pain level on the Numerical Rating Scale.

3. On the day of hospital discharged, the researcher interviewed the subject with the Quality of Recovery Scale (QoR-15).

Data Analysis

The data analysis was performed by using the computer statistical package. The statistical significant level was set up at .05. Descriptive statistic, frequency, percentage, mean, standard deviation, was used to describe the general characteristics, medical data of the subjects, and studied variables. After testing the distribution of the variables, they were not normal distributed, so that Spearman's Rho Correlation was employed to test the relationship between independent and dependent variables.

Findings

General characteristics and health information

Of 190 subjects, 74.7% were younger than 65 years while 25.3% were older than 65 years. The average age was 54.14 years (SD = 14.94 years). The most frequent surgical diseases were gastrointestinal disease (59.7%), followed by urological disease (28.3%). The majority of surgical approach was laparotomy (66.5%). Surgical incision length was ranged from 6 to 15 centimeters in 88 subjects (46.1%) and over 15 centimeters in 40 subjects (20.9%). Seventy-three subjects (38.2%) had co-morbidity diseases. Among these subjects, 56 had 1 co-morbid disease, 11 subjects had 2 co-morbid diseases and 6 had 3 co-morbid diseases. Hypertension was the most frequent co-morbid disease (n = 30). Length of hospital stay ranged from 3 to 20 days with the average of 7.64 days (SD = 3.36 days).

Pain, surgical Apgar scores and recovery

Pain scores ranged from 0 to 5 (Mean = 1.97, SD = .99). Most of subjects (84.8%) had mild postoperative pain while 4.7% reported moderate pain. The Surgical Apgar score ranged from 5 to 10 with the average score of 7.65 (SD = 1.12). Quality of recovery scores ranged from 73 to 150 with the average score of 128.91 (SD = 12.82).

The correlation between age, pain, co-morbid diseases, surgical Apgar score, length of surgical incision, and recovery

Spearman's Rho was used to test correlation between age, pain, co-morbid diseases, surgical Apgar score, and length of surgical incision with quality of recovery. Age, postoperative pain, co-morbidity, length of surgical incision had statistically significant negative correlation with recovery ($r_s = -.35$, $r_s = -.41$, $r_s = -.43$, $r_s = -.23$, $p < .05$, respectively); while surgical Apgar score had statistically significant positive correlation with recovery ($r_s = .30$, $p < .05$). (Table 1)

Table 1: Correlation between age, pain, co-morbid diseases, surgical Apgar score, length of surgical incision with recovery (n = 190)

	1	2	3	4	5	6
1. Age	1.00					
2. Pain	.05	1.00				
3. Co-morbidity	.22*	.02	1.00			
4. Surgical Apgar score	-.26*	-.02	-.30*	1.00		
5. Incision size (cm.)	.17*	.05	.04	-.001	1.00	
6. Recovery	-.35*	-.41*	-.43*	.29*	-.23*	1.00

* $p < .05$, Spearman's Rho (r_s)

Discussion

Recovery among patients after abdominal surgery

The quality of recovery scores among the subjects ranged from 73 to 150 with the average score of 128.91 (SD = 12.82). It was indicated that overall quality of recovery scores was relatively in moderate to high level. The possible explanation was that 61.8% of subjects 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 score of 1.97 (SD = .99), so it might enable subjects to ambulate and resume their previous activities early.^{14,15} More explanation of this finding might be 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 the bathroom by themselves, cleaning body and performing self-care up to their optimum level.¹⁶ In term of each domain of QoR-15, it was found that there were 2 items with relatively low scores included "have had a good sleep" (Mean = 6.95, SD = 1.73) and "able to return to work or usual home activities" (Mean = 5.90, SD = 1.98). This result was similar to some studies which found patients underwent abdominal surgery suffered with many discomfort symptoms affecting their sleep pattern and other daily live activities which led them to delayed recovery.^{13,17-19}

Therefore, enhance postoperative patients during their health-illness transition, continuing care program is required.¹⁹

Hypotheses testing

Hypothesis 1: Age, postoperative pain, co-morbidity, surgical incisions were negatively related to recovery among patients after abdominal surgery.

The results supported the hypothesis 1 that there was a reducing in the recovery speed with increasing age of subjects ($r_s = -.350$, $p < .05$). Similar to previous studies, the increasing of postoperative complications was found in the aged patients more than the younger patients ($p < .05$).²⁰ Accordingly, the aged patients were more likely to demonstrate delayed recovery.^{19,21} In fact, older patients may have more difficulty in recovering from the operation because of reducing physiologic reserve, therefore, they became less vitality, more exhaust during ambulation, and showed delayed recovery.

Pain had negative correlation with recovery after surgery ($r_s = -.41$, $p < .05$). Patients who experienced postoperative pain would have more severe pain on movement so that they were less likely to move their body leading to abdominal discomfort and delayed return of bowel movement.^{22,23} Similar to the results in several studies such as by Stark, Myles and Burke¹³, Robleda et al.¹⁸, Kleif, Vilandt and Gogenur¹⁹, and Sousa et al.²⁴, found that pain was one of the discomfort symptoms most frequently found after abdominal surgical

procedures leading to patient dissatisfaction and delayed recovery.

A negative correlation between co-morbidity and recovery ($r_s = -.428, p < .05$) was found. This result explained that co-morbidity affected recovery process. Around 40% of subjects in this study had one or more co-morbid diseases such as hypertension, heart disease and diabetes. These co-morbidities could lead to delayed surgical wound healing because of the alteration of blood circulation.²⁴ Similarly to the previous studies which found an increase in postoperative complications and mortality rate in patients who had co-morbid diseases ($p < .05$)²⁵, led to poor recovery and longer length of the hospital stay.^{17,21,24}

The length of surgical incision (cm.) had negative correlation with quality of recovery ($r_s = -.23, p < .05$). Subjects in this study had average length of incision wounds = 10.8 centimeters (SD = 7.35 cm.) which was relatively long. Around 20% had incision wound longer than 15 cm. which led them to difficulty to ambulate.^{4,5} Similar to previous study, patients who had small surgical incision from laparoscopic surgery had less severe pain, shorter hospital stay, faster respiratory recovery, lower morbidity, decreased risk of postoperative complications as well as earlier return to normal activity than open surgery with long incision.³

Hypothesis 2: Peri-operative conditions (surgical Apgar score) were positively related to recovery among patients after abdominal surgery.

Surgical Apgar score had a positive correlation with recovery ($r_s = .289, p < .05$). This demonstrated that hemodynamic status during operative procedures is very vital and had effects on postoperative recovery. The present study was relevant to previous studies in that patients with low surgical Apgar scores in which demonstrated that patients who had hemodynamic instability during operation showed higher risk on complications or increased mortality rate.^{9,25} Hemodynamic

status during operation was a crucial factor because it indicated sufficiency of oxygenation and circulation. Patients who had massive blood loss during operation required blood transfusion and had long duration of operation with hemodynamic instability during operation. Those studies also reported that they had longer length of hospital stay and low speed in resuming previous activities.^{9,25}

Conclusion and Implication for Nursing Practice and Further Study

The findings of this study supported the hypothesis that age, postoperative pain, co-morbid diseases, 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 management to promote healthy transition by performing effective pain control; pay more attention to patients who might develop delayed transition or delayed post-operative recovery process such as patients with old ages, co-morbid diseases, abnormal Surgical Apgar score during surgery, and long incision wound. In the overall picture, recovery of patients after abdominal surgery seemed to be in relatively good place. However, when considering 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. The finding supported the ideology of transition theory that patients who received abdominal surgery were in their transition to resume their postoperative recovery. The transition conditions affected postoperative recovery comprised of patients' age, co-morbid diseases, hemodynamic stability during surgery, length of surgical incision, and postoperative pain. The finding emphasized the roles of nurses to perform nursing therapeutics to facilitate patients' transition throughout their illness trajectory.

Implications for Nursing Practice

In order to enhance the quality of recovery among patients undergoing abdominal surgery, 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. Pain control has to be taken into serious consideration after surgery in particular, during the acute phase. Nurses should assess every patient who have plan for surgery for their co morbid disease. Moreover, all co-morbid disease has to be well controlled prior to the surgery. Nurses should also pay more attention to the older patients undergoing abdominal surgery and give support during their transition after the surgery. The continuous program to enhance recovery from hospital to home should be developed and utilize in this group of patients.

Implications for further study

Recovery program including pain management along with patients risk identification should be developed and test for its effective on recovery process among patients undergoing surgery. Moreover, multi-sites research should be conducted to give more comprehensive picture of the recovery process among abdominal surgery patients in Vietnam.

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