

## Predictors of emergency abdominal surgery postoperative recovery in Hai Duong, Viet Nam

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### Abstract

Emergency Abdominal Surgery (EAS) is performed under critical life-threatening conditions that require operation as soon as possible. In such cases, the preparation of the patient for surgery may be less than optimal. The risk of post-surgical complications in EAS patients is high and, as a result, postoperative recovery in this group can be longer and poorer. The purpose of this predictive correlation study was to examine the effects of postoperative complications, comorbidity, social support, and perceived postoperative nursing care on postoperative recovery among EAS patients in Vietnam. Simple random sampling was used to recruit 92 patients who had undergone EAS. Research instruments were a Personal Demographic and a Health Information Record, the Charlson Comorbidity Index, the postoperative quality of recovery, the social support questionnaire, and the short form of the caring behavior inventory. Data analysis consisted of descriptive statistics and multiple regression analysis.

Results revealed that mean score of total postoperative recovery was 95.69 (SD = 11.05) of a possible 150. Postoperative complications, comorbidity, social support, and perceived postoperative nursing care accounted for 56.2 % of the variation in postoperative recovery ( $R^2 = .56$ ,  $F_{(4, 87)} = 27.95$ ,  $p < .001$ ). The strongest predictor of postoperative recovery among EAS patients was postoperative complications ( $\beta = -.41$ ,  $p < .001$ ).

The findings suggest that nurses should take a holistic approach, including focusing on comorbidity awareness and treatment, preventing postoperative complications, providing social support, and improving perceived postoperative nursing care. This should enhance postoperative recovery among emergency abdominal surgery patients. Further research should focus on the efficacy of these and other nursing interventions.

**Key words:** postoperative recovery, emergency abdominal surgery, complications, predictors

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## Background

Emergency abdominal surgery (EAS) creates challenges and burdens for the health care system and patient alike with high rates of complications, mortality and morbidity. A global review reported that post-EAS death and disability rates are higher than many other global health conditions receiving considerable attention and investment.<sup>1</sup> Researchers asserted that EAS is a significant independent risk factor for mortality and postoperative morbidity. In their study, 24,068 out of 66,665 patients underwent EAS with a mortality rate of 12.50% while 42,597 underwent Non-EAS (NEAS) with a mortality rate of 2.66%. ( $p < 0.0001$ ). Major complications were found in 32.80% of EAS patients vs. 12.74% of NEAS patients ( $p < 0.0001$ ).<sup>2</sup> Notably, a study investigating postoperative complications in emergency laparotomies reported that postoperative complications were found in 287 out of 320 patients (89.7%).<sup>3</sup>

Nowadays, surgery is an increasingly common procedure in Viet Nam. With the rate of surgical treatment rising over time, surgery becomes a greater burden for both patient and health care system. For example, according to data from Ho Chi Minh City University of Medicine and Pharmacy, surgeries requiring anesthesia rose 244% (from 5,500 to 13,400 cases) from 2003 to 2005, with abdominal surgery accounting for 48% of all surgeries in 2005. A study about clinical service costs in a district hospital in northern Viet Nam found that inpatient surgery is the most expensive service (US\$ 40.43), followed by daily costs of US\$ 7.66, whereas average daily cost of a non-surgical inpatient is only

US\$ 4.40.<sup>4</sup> More recently, a study reported that the daily cost of a surgical inpatient was 3.6 times more than that of a non-surgical patient (US\$ 47.50 vs. US\$ 12.87).<sup>5</sup> In Vietnam the cost for surgical and post-surgical service is higher than other health care services.

A standard, holistic, patient-centered definition of postoperative recovery is difficult to find in the literature. It can be argued that deep understanding of and insight into the course of post-surgical events requires consideration of biological, physical, psychological, social and physical functioning factors<sup>6-7</sup>. In this study postoperative recovery refers to a state of returning to the preoperative level of normality and wholeness regarding physical (physical comfort, physical independence and pain), psychological (emotional state), social and habitual functions (psychological support and physical independence).<sup>6</sup> Understanding predictors of postoperative recovery and incorporating them into designing postoperative care will help clinicians more quickly recognizing post-surgical problems and give patients appropriate recovery-promoting help. Consequently, patients' physical health and well-being, cost-effectiveness and resource utilization will be optimized.<sup>7</sup> Most EAS postoperative recovery studies have been conducted in Western countries in different health care systems and with patients of different cultures and backgrounds compared to Viet Nam. Thus there is little if any knowledge about postoperative recovery in the health care system of Viet Nam. Therefore this study should add to the knowledge about post-surgical recovery characteristics.

### Objectives

1. To describe characteristics of postoperative recovery;
2. To determine the significance of comorbidity, postoperative complications, social support and perceived postoperative nursing care for predicting postoperative recovery among EAS patients in Hai Duong, Viet Nam.

### Research hypothesis

Comorbidity, postoperative complications, social support and perceived postoperative nursing care are able to predict postoperative recovery among patients underwent EAS.

### Methodology

This study used a predictive correlational design

#### Population and sample

The population for this study were Vietnamese adults who underwent emergency abdominal surgery at Hai Duong General Hospital in Viet Nam. To be included in the study, a subject needed to be at least 18 years old, have undergone emergency major abdominal surgery with general anesthesia, be able to communicate in Vietnamese, be fully conscious, have been admitted to the general surgical ward after receiving EAS, have received treatment in that ward until discharge. Patients with vascular disease or trauma were excluded.

#### Sample size and sampling

A power analysis was conducted using G\* Power software to determine a minimally acceptable sample size for this study. With an estimated moderate effect size ( $r = 0.3$ ),

(as demonstrated in previous studies), 92 subjects were needed for this study. The samples were selected by simple random sampling method to increase the odds of sample representativeness. Data were collected on the day of patient discharge, to assess patients' recovery status at the day of discharge and reflect the postoperative nursing care.<sup>8</sup> The researcher obtained the daily list of discharged patients and eliminated those who did not meet the inclusion criteria. Then the researcher wrote the patients' names on pieces of paper, put the paper in a box, mixed the papers well, and then drew out 50% of the day's total patients. The researcher asked the selected patients to participate in the study. Patients who agreed were briefed on the study, and each patient signed a consent form. The researcher then began that day's data collection. This process was repeated daily until the desired sample size was reached. Data were collected between July and September, 2015 from the ninety-two patients who met inclusion criteria.

#### Ethical considerations

This study was approved by the Institutional Review Board (IRB; No 05 - 06 - 2558) of the Faculty of Nursing, Burapha University, Thailand. The researcher clearly explained the purpose of the study, identity protection, and any risks and benefits to the participants. Then, if the patient agreed to participate in the study, the informed consent form was signed.

#### Research instruments

A Personal Demographic and Health Information Record (PDHIR) was developed by the researcher. It

included social-demographic and health information data such as age, gender, admission diagnosis, length of hospital stay, and postoperative complications.

The Charlson Comorbidity Index (CCI) was used to collect data on 19 comorbidity conditions, with increasing point totals indicating increasing severity of comorbidity. Severity of comorbidity was classified as:  $\leq 2$  = mild; 3 = moderate;  $\geq 4$  = severe.<sup>9</sup>

The Social Support Questionnaire (SSQ) is a modification of the Multi-Dimensional Support Scale to measure perceived social support in postoperative abdominal surgery patients.<sup>10-11</sup> The SSQ has two dimensions: family and healthcare provider supportive behaviors. Family supportive behaviors has six items, score of each item ranges from 0 (never) to 3 (usually or often), resulting in a range of 0-18. The five-item healthcare provider support dimension is similarly scored, resulting in a 0-15 point range. The range for the total of the two dimension scores is thus 0-33, with higher scores representing higher levels of perceived social support.<sup>10</sup> The Content Validity Index (CVI) of the Vietnamese version of this instrument is 0.81, and Cronbach's alpha is 0.74. In this study, the Cronbach's alpha of the SSQ was 0.8.

The postoperative Quality of Recovery (QoR-15),<sup>12</sup> a brief version of the QoR-40,<sup>13</sup> has 15 items covering five dimensions (physical comfort, physical independence, pain, psychological support, and emotional state). Each item is scored from 0-10, resulting in a range of 0-150, with higher scores indicating better quality of recovery. Construct

validity was indicated by negative correlations with duration of surgery ( $r = -.49$ ,  $p < .0005$ ) and duration of hospital stay ( $r = -.53$ ,  $p < .0005$ ). Internal consistency (.85), split-half reliability (.78), and test-retest reliability ( $r = .99$ ), all  $p < .0005$ , were also acceptable. In this study, the CVI of the Vietnamese version of the QoR-15 is 0.85, with Cronbach's alpha of 0.83. Patients whose QoR-15 score more than 75 were judged to have good/satisfactory postoperative recovery; scores below 75 indicated poor/unsatisfactory recovery.<sup>12</sup>

The 24-item Caring Behavior Inventory (CBI-24) is a modification<sup>14</sup> of the original CBI.<sup>15</sup> Each item is measured on a six-point Likert Scale, ranging from 1 (never) to 6 (always), resulting in a range of 24-144, with higher scores indicating greater frequency of caring behaviors.<sup>14</sup> The CBI-24 has demonstrated convergent validity, good test-retest reliability ( $r = .88$ ), and has a Cronbach alpha of .92. In this study, the CVI of the instrument's Vietnamese version is 0.88, and Cronbach's alpha is 0.81.

### Data collection

Data were collected on the day of patient discharge. Data for the PDHIR were collected via patient self-administration and supplemented by patient medical records available to the researcher. The CCI was completed by a researcher from each patient's medical record and confirmed by the patient. The QoR-15, the SSQ, and the CBI-24 were hand-delivered to the participants. Participants completed these questionnaires themselves, taking about 20 minutes.

### Data analysis

Data were analyzed using the Statistic Package for the Social Sciences (SPSS). Descriptive statistics, including frequency, percentage, range, mean, and standard deviation were used to examine characteristics of the sample, postoperative recovery, and the independent variables. Multiple regression was used to determine the predictive ability of comorbidity, postoperative complications, social support, and perceived postoperative nursing care on postoperative recovery.

### Results

The modal age category of the samples was the oldest age group ( $\geq 60$  years old,  $\bar{X} = 53.17$ ,  $SD = 16.47$ ), accounting for 38.05% of the sample. There were more females (54.35%) than males (45.65%). Three quarters of the samples (75.00%) had an admission diagnosis of GI tract problems. A majority of the samples (60.90%) had been in the hospital more than seven days. Postoperative complications were reported for 42.40% of the patients (Table 1).

**Table 1 Characteristics of the samples (n = 92)**

Variable	Number (n)	%	Range	$\bar{X}$	SD
Age (in years)			19-83	53.17	16.47
19-39	21	22.82			
40-49	14	15.21			
50-59	22	23.91			
$\geq 60$	35	38.05			
Gender					
Male	42	45.65			
Female	50	54.35			
Admission diagnosis					
Liver and biliary system problems	19	20.65			
GI tract problems	69	75.00			
Urinary tract problems	4	4.35			

**Table 1 (continue) Characteristics of the samples (n = 92)**

Variable	Number (n)	%	Range	$\bar{X}$	SD
Length of hospital stay (days)			5-18	9.03	3.26
< 8	36	39.13			
8 - 14	48	52.17			
15 +	8	8.70			
Postoperative complications					
No	53	57.60			
Yes	39	42.40			

The data also show that nearly the entire sample had a postoperative recovery greater than 75, with a mean score of 95.69 (SD = 11.05). With a range of 0-150, the observed range was 74-131. Four-fifths (80.43%) of the sample had a mild level of comorbidity. The moderate and severe comorbidity rates were 15.22% and 4.35%, respectively. The mean comorbidity score was 1.32 (of a possible 35 and observed range of 0-4, SD = 1.21). The mean score for

perceived postoperative nursing care was 98.51 (of a possible 144 and observed range of 74-120, SD = 8.44). The mean score of total social support was 27.3 (of a possible 33 and observed range of 21-33, SD = 2.61). The mean score of family support was 15.00 (of a possible 18, SD = 1.70) and of healthcare provider support was 12.30 (of a possible 15, SD = 1.60) (Table 2).

**Table 2 Postoperative recovery, comorbidity, social support, and perceived postoperative nursing care (n = 92)**

Variables	Possible range	Actual range	$\bar{X}$	SD	Number	%
<b>Postoperative recovery</b>						
Total postoperative recovery	0-150	74-131	95.69	11.05	92	100.00
<b>Total comorbidity</b>						
Mild comorbidity	0-35	0-4	1.32	1.21	92	100.00
Moderate comorbidity		0-2			74	80.43
Severe comorbidity	3				14	15.22
	4-35				4	4.35

**Table 2 (continue) Postoperative recovery, comorbidity, social support, and perceived postoperative nursing care (n = 92)**

Variables	Possible range	Actual range	$\bar{X}$	SD	Number	%
<b>Perceived postoperative nursing care</b>						
Total perceived postoperative nursing care	24-144	74-120	98.51	8.44		
<b>Social support</b>						
Total social support	0-33	21-33	27.30	2.61		
Family/ friends	0-18	11-18	15.00	1.70		
Healthcare provider	0-15	9-15	12.30	1.60		

Stepwise multiple regression analysis indicated that postoperative complications, comorbidity, social support, and perceived postoperative nursing care accounted for 56% of the variation in predicted postoperative recovery ( $R^2 = .56$ ,  $F_{(4,87)} = 27.95$ ,  $p < .001$ ). The strongest predictor of

postoperative recovery among emergency abdominal surgery patients was postoperative complications ( $\beta = -.41$ ,  $p < .001$ ); comorbidity was also highly significant ( $p < .001$ ) (Table 3).

**Table 3 Results of multiple regression analysis (n = 92)**

Predictors	B	SE	Beta	
Postoperative complications	-9.23***	1.72	-.41***	Intercept = 51.25
Comorbidity	-2.93***	.75	-.29***	$R^2 = .56$ , $F_{(4,87)} = 27.95***$
Perceived postoperative nursing care	.27**	.09	.21**	
Social support	.90**	.31	.22**	

\*\*  $p < .01$ , \*\*\*  $p < .001$ .

## Discussion

The results revealed that nearly all EAS patients in this study experienced good postoperative recovery as measured at discharge. At this “intermediate” postoperative time, patients had already attained good levels of post-EAS discharge criteria as named by Neville et al,<sup>8</sup> such as stability

of vital signs, good orientation to person, place and time, ability to retain orally administered fluids and normalization of intestinal function, and absence of nausea and vomiting, excessive pain, and bleeding. Three dimensions of postoperative recovery—physical comfort, physical independence and less pain—seemed more consistently

related to the postoperative recovery concept than the remaining two dimensions: psychological support and emotional state. This indicates the primacy of physical concerns in postoperative recovery.

More than half of the participants (60.9%) stayed in hospital more than seven days, 38.1% in the oldest age (60+) group, having completion in general education. Age, length of stay, and education can be important factors affecting a patient's desire to actively participate during recovery and to deal more effectively with the challenges involved, which has also been demonstrated by Alvinet al.<sup>6</sup>

This study found both positive and negative predictors of postoperative recovery, with comorbidity being the strongest of the independent variables.

#### **Predictors negatively related to EAS postoperative recovery**

Postoperative complications were the strongest predictors of postoperative outcome. This is not surprising, as postoperative complications can lead to increased severity of postoperative symptoms and increase risk of reoperation and readmission. Complications also make for a longer period of postoperative physical dysfunction, emotional status fatigue, and reduced perception of recovery progress, which has also been reported by others.<sup>3,16</sup> Moreover, Lawrence et al. reported that postoperative complications were a consistent and independent predictor of poorer recovery (OR=0.37, p = .01) and prolonged recovery time (OR=0.26, p = 0.004).<sup>17</sup>

Comorbidity, too, is negatively and significantly related to postoperative recovery ( $\beta = -.29$ ,  $p < .001$ ).

Comorbidity could lead patients to experience more postoperative symptoms, by delaying regaining functional status (basic and instrumental activities of daily living), reducing social functional roles, as well as self-perception of their recovery. These findings are in accordance with a recent study, confirming that comorbidity was an independent risk factor for deteriorated outcome of patients undergoing emergency surgery for perforated peptic ulcer.<sup>18</sup> Additionally, a study in 186,013 patients with major laparotomy reported that comorbidity is a significant predictor of both length of hospital stay and readmission.<sup>19</sup>

#### **Predictors positively related to EAS postoperative recovery**

In our study, social support and perceived postoperative nursing care were significant and positive predictors of postoperative recovery. Social support, whether from health care providers or family/friends, help patients successfully navigate the disability period after surgery by aiding the min various ways: activities in daily living, ambulation, adherence to postoperative pain management directives, and adherence to prescribed ways of preventing postoperative complications. Most of our patients received aid from family members and friends (as vs. paid caregivers). In Vietnamese culture, it is a strong norm-a “natural responsibility”- for family members and friends to support the post-discharge patient, providing care, supplying information, and lending emotional support. Social devotion has been documented as an independent predictor of pain

relief after surgery,<sup>20</sup> and of shortening length of hospital stay.<sup>21</sup>

Perceived postoperative nursing care can affect postoperative recovery by promoting patients' positive feelings, increasing ability of coping with stress caused by surgery, proactively controlling postoperative pain, and motivating activity in the early postoperative period. This finding is consistent with previous observations from Swan et al. who found, that among postoperative patients, perceived nursing care contributed to the variance of postoperative distress, functional and mental status, social activities, and social interaction.<sup>22</sup> Similar results have been published by Larrabee et al.<sup>23</sup>

### Conclusion

The majority of the study patients experienced good recovery on the day of discharge from hospital. Postoperative complications, comorbidity, social support, and perceived postoperative nursing care were significant predictors of postoperative recovery. Including a single hospital and a number of only 92 patients does not allow generalization of our findings. In addition, using a cross-sectional design and collecting data only on the day of discharge limits the understanding of the postoperative recovery progress, as postoperative recovery could be affected by family-based social support. Further studies about EAS postoperative recovery would benefit from a longitudinal design that could track the recovery trajectory and note the waxing and waning of the recovery effectiveness of various factors.

### Implications

The results of this study could help to improve nurses' understanding of postoperative recovery after emergency surgery, particularly at the time of discharge. This study may provide evidence for nursing practice to develop appropriate nursing interventions and care plans to improve management for this group of patients. Nursing care plans have to focus on comorbidities, preventing postoperative complications, improving postoperative nursing care, and providing social and emotional support. Thus, nurses enhance postoperative recovery, with benefits for the patient and the health care financial burden. As a consequence, we suggest integrating these findings in nursing curriculum.

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