The Relationship between Patient Readiness prior to Transfer and Recurrence of Heart Problems after Transfer from the CCU in Patients with Acute Coronary Syndrome*

Rungthip Pongcharoenwaranyu, Sauvaluck Lekutai, Suvimol Kimpee, Vorachai Kongsaerepong

Abstract:
Purpose: The purpose of this study was to investigate the readiness of patients with acute coronary syndrome (ACS) prior to transfer from the Coronary Care Unit (CCU), the recurrence of heart problems during the 72 hours after transfer, and the relationship of age, gender, readiness to transfer and recurrence.

Design: Descriptive research design.

Methods: The sample comprised 90 ACS patients who had received treatment in the CCU of Bangkok Metropolitan Administration Medical College and Vajira Hospital and who were later transferred to ordinary wards. Data were collected through observational methods. The statistical analysis used was Chi-square.

Main Findings: Male subjects constituted 67.8% of the sample, females 32.2%, and the major age group was 60-82 years (69%). The most prominent sign of readiness was good consciousness which was found in all patients, next was non heart failure (98.9%). The least prominent sign was normal hemodynamic system (67.8%). About 45.6% of the patients had readiness in all measures. There was an equal rate of recurrent ischemia and reinfarction 72 hours after transfer at 4.4%. Age and gender were not significantly associated with recurrence after transfer (p > .05). The total readiness and readiness of consciousness, hemodynamic system, signs and symptoms, ECG and cardiac markers were all significantly associated with recurrence after transfer (p < .05 and p < .01, respectively)

Conclusion and recommendation: These finding are beneficial for nurses to develop guidelines for nursing care patients with ACS to enable readiness of pathology and physiology prior to transfer from the CCU. Nurses should have increased awareness of patients’ readiness assessments prior to transfer; especially, consciousness, hemodynamic system, signs and symptoms, ECG and cardiac markers. In addition, closely observing patients for 72 hours after transfer from the CCU should be done in order to decrease the risk of recurrence.

Keywords: acute coronary syndrome, readiness, transfer, recurrent ischemia, reinfarction
ความสัมพันธ์ระหว่างความพร้อมก่อนย้ายกับการกลับซ้ำของโรคภายหลังย้ายออกจากหออภิบาลโรคหัวใจในผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลัน* รุ่งทิพย์ พงษ์เจริญวรัญญู เสาวลักษณ์ เล็กอุทัย สุวิมล กิมปี วรชัย คงเสรีพงศ์

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความพร้อมก่อนย้าย การกลับซ้ำของโรค และความสัมพันธ์ระหว่าง อายุ เพศ ความพร้อมก่อนย้ายกับการกลับซ้ำของโรคภายหลังย้ายออกจากหออภิบาลโรคหัวใจภายใน 72 ชั่วโมง ในผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลัน

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างเป็นผู้ป่วยจำนวน 90 ราย ที่รับการรักษาในหออภิบาลโรคหัวใจ วิทยาลัยแพทยศาสตร์กรุงเทพมหานครและวชิรพยาบาล เก็บข้อมูลโดยการสังเกต วิเคราะห์ข้อมูลโดยใช้สถิติ โคэрเรอ

ผลการวิจัย: พบว่ามีผู้ป่วยเพศชาย ร้อยละ 67.8 เพศหญิงร้อยละ 32.2 ส่วนใหญ่มีอายุ 60-82 ปี ร้อยละ 69 มีความพร้อมก่อนย้ายมากที่สุดคือ มีระดับความรู้สึกตัวดี รองลงมาไม่มีภาวะหัวใจล้มเหลว พยาธิและ 100 และ 98.9 ตามล่าด้วย มีความพร้อมก่อนย้ายน้อยที่สุดคือระบบการไหลเวียนโลหิตอยู่ในเกณฑ์ปกติพ่ร้อยละ 67.8 ผู้ป่วยที่มีความพร้อมก่อนย้ายทุกด้านพบร้อยละ 45.6 การกลับซ้ำของโรคภายหลังย้ายออกมาภายใน 72 ชั่วโมงพบเป็นการกลับซ้ำของโรคขาดเลือดออกและกล้ามเนื้อหัวใจขาดเลือดราวร้อยละ 4.4 เท่ากัน อายุและเพศไม่มีความเกี่ยวข้องกับการกลับซ้ำของโรคแต่มีความเกี่ยวข้องกับการกลับซ้ำของโรคขาดเลือดออกและกล้ามเนื้อหัวใจขาดเลือด (p < .05) ความพร้อมก่อนย้ายโดยรวมและความพร้อมด้านระดับความรู้สึกตัว การไหลเวียนโลหิต อาการและอาการแสดงของคลื่นไฟฟ้าหัวใจและสารชีวเคมีในเลือดที่บ่งบอกถึงการป่วยของหัวใจมีความเกี่ยวข้องกับการกลับซ้ำของโรค (p < .05 และ p < .01 ตามลำดับ)

สรุปและข้อเสนอแนะ: ผลการศึกษาครั้งนี้เป็นประโยชน์ในการพัฒนาแนวทางการดูแลผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันให้มีความพร้อมในด้านพยาบาลวิชาการก่อนย้ายออกจากหออภิบาลโรคหัวใจ และเพื่อความควรหนักในการประเมินความพร้อมโดยเฉพาะระดับความรู้สึกตัว การไหลเวียนโลหิต อาการและอาการแสดงของคลื่นไฟฟ้าหัวใจและสารชีวเคมีในเลือดที่บ่งบอกถึงการป่วยของหัวใจ ทั้งทั้งส่วนแยกอาการผู้ป่วยอย่างใกล้ชิดอาการหลังย้ายออกมาภายใน 72 ชั่วโมง เพื่อลดการกลับซ้ำของการดับใจของโรค

คำสำคัญ: กล้ามเนื้อหัวใจขาดเลือดเฉียบพลัน ความพร้อม การย้ายกล้ามเนื้อหัวใจขาดเลือด กล้ามเนื้อหัวใจขาดเลือดเฉียบพลัน

Corresponding author:
รุ่งทิพย์ พงษ์เจริญวรัญญู
E-mail: mam-cu@hotmail.com

Background and Significance of the Study

Coronary artery disease (CAD) is the most common cause of death in the worldwide population. In the United States of America, CAD was reported as the underlying cause of 459,841 deaths in 1998 and later in 2003, the incidence of death from CAD had increased to 479,305 deaths. In Thailand, the report of CAD mortality rate from the epidemic database of Public Health Ministry in 1998 showed that the rate was 3.35 per 100,000 persons and later in 2002, the incidence of CAD mortality rate had increased to 13.69 per 100,000 persons. This information shows a trend of increasing CAD mortality rate in both developed and developing countries. Especially for Acute coronary syndrome (ACS), there are high hospital admission and subsequent mortality rates. Death of ACS patients generally results from severe cardiac arrhythmias, with these patients requiring admission into the CCU where care includes rapid assessment and intervention by specialist health care teams to restore stability, prevent complications and maintain optimal response. If patients are stabilized and no longer requiring monitors, they will be considered for transfer from the CCU and assessed for readiness prior to transfer for safety and minimization of recurrence after the transfer from the CCU.

A patient readiness assessment prior to transfer from the CCU is useful for the ACS patients and the organization of health services. Several studies reported that assessing a patient’s readiness prior to transfer from the CCU could result in decreased hospital stay, lower unit cost, less complications occurring after transfer, and increased bed availability in the CCU. However, it was also found that if ACS patients were transferred from the CCU inappropriately, there could be risk of complications and death. The complications that occur within 72 hours after the transfer are recurrent chest pain, cardiac arrhythmias, congestive heart failure, and severe cardiovascular disturbance. In addition, ACS patients have a higher recurrence of the original illness within a 72 hour period after being transferred from the CCU, than those who were transferred after a 72 hour period. This effect on the patient readmission to the CCU, was due to recurrent ischemia and reinfarction. The incidence of mortality rate of ACS patients who were readmitted to the CCU was higher than those who were not readmitted.

Given the researcher’s background in healthcare teams and awareness of the importance of ACS patient care and for patient safety through appropriate transfer, this paper was undertaken to study the relationship between a patient’s readiness prior to transfer and recurrence of heart problems after the transfer from the CCU within 72 hours. The study was based on the conceptual framework of the Nursing Role Effectiveness Model, components of this model include: 1) structure, 2) process, and 3) outcomes.

The structural component consists of patient, nurse, and organization variables, which perform the characteristic of valuables. The process component consists of nursing practice with nurses’ independent role in nursing interventions, nurses’ interdependent role in communication and coordination with health care teams, and nurses’ medical care-related role in medically directed care and expanded scope of nursing practice. The outcome component consists of the patients’ functional status, symptom frequency, symptom severity, and therapeutic self-care.

In this study, the researcher was interested in studying the patient structural variables and patient outcomes by using an observation method. The patient structural variables were defined as age and gender. The process variables meant the nurses’ role performance with independent, interdependent, and medical care-related role in the CCU. The researcher did not study these process variables. The patient outcomes were defined as the patient’s function status and symptom frequency. The patient’s function status meant the readiness prior to transfer from the CCU, measured from the following 6 patient indicators: consciousness, signs/symptoms, hemodynamic system, ECG/cardiac markers, monitoring, and complications. The symptom frequency referred to the recurrence of heart problems after transfer from the CCU within 72 hours such as recurrent ischemia and reinfarction (Figure 1).
1. To study the readiness prior to transfer of ACS patient and recurrence of heart problems after transfer from the CCU within 72 hours.

2. To study the relationship between age, gender, and readiness prior to transfer of ACS patient and recurrence of heart problems after transfer from the CCU within 72 hours.

Methods

Population and Sample

The population in this study included male and female ACS patients 20 years or older, who were admitted into the CCU of Bangkok Metropolitan Administration Medical College or Vajira Hospital. The sample in this study had the following inclusion criteria:

1. Age 20 and older
2. Admitted to CCU of Bangkok Metropolitan Administration Medical College or Vajira Hospital
3. Cognitively intact
4. Able to read, write and converse in Thai language
5. Considered for transfer from the CCU by the cardiologist

Exclusion criteria in this study: patients who were diagnosed to have cognitive or psychiatric disorders by the physician.

Instruments

1. Patient’s readiness observational form for ACS patient prior to transfer from the CCU, including two parts: Part I consisted of age and gender. Part II consisted of readiness observation in 12 items, observed in each item, if the patients had readiness, remarked “yes” and had not readiness, remarked “no” in this form. The 12 items were divided into 6 issues as follow:

1.1 Readiness of consciousness consisted of 1 item: good consciousness, could communicate and followed as commands.

1.2 Readiness of signs and symptoms consisted of 2 items: 1) non angina pain and 2) non breathlessness.

1.3 Readiness of hemodynamic system consisted of 2 items: 1) heart rate 60-100 beats/min and 2) systolic blood pressure 100-150 mmHg.

1.4 Readiness of ECG and cardiac markers consisted of 3 items: 1) non new ST segment changes/T wave inversion, 2) non ventricular...
arrhythmia, and 3) the CK-MB or troponin T level reduced from the previous value or normal value.

1.5 Readiness of monitoring consisted of 3 items: 1) non reliance on ventilator or oxygen T-piece, 2) non ongoing intervention for 24 hours, and 3) non venous drug receiving with ECG and vital sign monitoring.

1.6 Readiness of complication consisted of 1 item: non heart failure.

The total readiness issues remarked “yes” in total items. The content validity index was 0.75 and the inter-rater reliability was 0.85.

2. Recurrent recording form after transfer from the CCU, included two issues:

2.1 Recurrent ischemia consisted of 6 items, the criteria for recurrent ischemia was at least 2 conditions marked “yes” for at least 2 items: the first, angina pain and the second, new ST-segment changes at least 2 leads or new T wave inversion at least 2 leads or new hypotension, or new pulmonary edema, or new cardiac murmur.

2.2 Reinfarction consisted of 5 items, the criteria for reinfarction was at least 2 conditions marked “yes” in at least 2 items: the first, re-elevation of CK-MB above the upper limit of normal and increased by at least 50% from the previous value and the second, angina pain or new ST-segment changes with at least 2 leads or new T wave inversion with at least 2 leads or new Q wave with at least 2 leads.

This instrument was 0.72 and 0.92 for content validity index and inter-rater reliability respectively.

Data Collection

Approval for data collection was sought from the Committee on Human Rights Related to Human Experimentation at Mahidol University and the Ethics Committee for Research Involving Human Subjects of the Bangkok Metropolitan Administration. Following approval the researcher met the study subjects and advised them on research objective, time line, benefit of the research project, and data collecting procedure. The researcher observed subjects’ readiness after the cardiologist had considered transfer from the CCU according to the patient’s readiness observational form. Each subject was observed prior to transfer for at lest one hour. Then again following any events of recurrent ischemia or reinfarction after the transfer at intervals of 24, 48, and 72 hours, respectively. The researcher recorded conditions of the recurrence based on physician diagnosis and medical records. The researcher discontinued observations, once it was found a subject had experienced at least 2 episodes of recurrent ischemia or reinfarction.

Data Analysis

The age of ACS patients was analyzed by percentage, arithmetic mean, and standard deviation. The gender, readiness prior to transfer and recurrence of heart problems after CCU within 72 hours were analyzed by percentage. The relationship between age, gender, and readiness prior to transfer and recurrence of heart problems after transfer were analyzed by Chi-square test.

Results

The characteristics of subjects. A total number of 90 ACS patients were admitted to the CCU of Bangkok Metropolitan Administration Medical College and Vajira Hospital during the study period. Of these, 61 were male (67.8%) and 29 female (32.2%). The major age group of subjects was 60-82 years (69%) and the mean age was 64.43 years (S.D. = 10.89).

The readiness prior to transfer from the CCU. The most prominent sign of readiness was good consciousness which was found in all patients (100%), next was non heart failure (98.9%), followed by non signs and symptoms of ACS (88.9%), nil need for monitoring (83.3%), and nil ECG changes or cardiac marker level reduced from the previous value or normal value (81.1%). The least prominent sign was normal hemodynamic system (67.8%). About 45.6% of the patients had readiness in all measures.

The recurrence of heart problems after transfer from the CCU within 72 hours. There was an equal rate of recurrent ischemia and reinfarction at 4.4% each in the 72 hours after transfer. Angina pain was the most common symptom of the recurrence, occurring within 0-24 hours (10%), >24-48 hours (4.4%), and > 48-72 hours (8.8%). Next was new hypotension experienced within 0-24 hours (3.3%), >24-48
hours (1.1%), and > 48-72 hours (3.3%), reelevation of CK-MB within 0-24 hours (1.1%), >24-48 hours (1.1%), and > 48-72 hours (2.2%), new T wave inversion during > 24-48 hours (1.1%) and > 48-72 hours (1.1%), ST segment changes were found at 2.2% during > 48-72 hours, and the least, new pulmonary edema was found at 1.1% during > 48-72 hours.

The relationship of age, gender, and readiness to recurrence of heart problems after transfer from the CCU within 72 hours. The total readiness was significantly associated with recurrence of heart problems ($\chi^2 = 5.469$, p < .05). The readiness in each issue found impaired consciousness, hemodynamic system, signs and symptoms, ECG and cardiac markers were significantly associated with recurrence after transfer ($\chi^2 = 60.844, 9.664, 9.471$, and $8.000$, respectively, p < .01), while monitoring and heart failure were not significant ($\chi^2 = 1.345$, and 0.000, respectively, p > .05). Age and gender were not significantly associated with recurrence following transfer ($\chi^2 = 0.000$, and 0.004, respectively, p > .05). (Table 1).

Table 1  Relationship between age, gender, and readiness prior to transfer and recurrence of heart problems after transfer from the CCU within 72 hours

<table>
<thead>
<tr>
<th>Variables</th>
<th>Recurrence of heart problems</th>
<th>Yes (n)</th>
<th>No (n)</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37-59</td>
<td></td>
<td>2</td>
<td>26</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>60-82</td>
<td></td>
<td>6</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>6</td>
<td>55</td>
<td>0.004</td>
<td>.951</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>2</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consciousness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>8</td>
<td>82</td>
<td>60.844</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Hemodynamic system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>1</td>
<td>60</td>
<td>9.664</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>7</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs and symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>4</td>
<td>76</td>
<td>9.471</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECG and cardiac markers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>3</td>
<td>70</td>
<td>8.000</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>5</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>5</td>
<td>70</td>
<td>1.345</td>
<td>.246</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>3</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complication (Heart failure)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>8</td>
<td>81</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total readiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>0</td>
<td>41</td>
<td>5.469</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Non readiness</td>
<td></td>
<td>8</td>
<td>41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

The relationship of age to recurrence of heart problems.

According to the results of this study, age was not significantly associated with recurrence of heart problems after transfer from the CCU within 72 hours. In other studies, patients with age > 70 years were associated with greater incidence of reinfarction, patients with age > 75 years were shown to be the significant baseline predictor of recurrent ischemia, patients with age > 65 years had significantly higher incidence of restenosis lesions. The discordance of this study to those just mentioned may be explained by the difference in sample size, the studies mentioned above had a larger sample size so that testing hypotheses were clearer than found in this study.

The relationship of gender to recurrence of heart problems.

This study found that gender was not significantly associated with recurrence of heart problems after transfer from the CCU within 72 hours. This finding is in accordance with other studies which have also reported that the incidence of recurrent ischemia and reinfarction were not significantly different between male and female. However there have also been studies which have reported that recurrent ischemia occurred more frequently in females and was associated with an increased rate of reinfarction. A possible explanation for this may be the difference of subject enrollment, these studies included ST elevation patients with age > 70 years who had a high severity of disease and more complications than subjects in this study.

The relationship of readiness prior to transfer to recurrence of heart problems.

In this study, it was found that 45.6% of subjects had readiness prior to transfer from the CCU in total issues, while subjects without readiness in total issues was found at 54.4%. The finding that the total readiness was significantly associated with recurrence of heart problems after transfer may due to the fact that the number of subjects without readiness in total issues was higher than half the total of subjects. They had received assessment and consideration for transfer by the cardiologist. The transfer criteria for each cardiologist were different and some cases were in an unsuitable condition for transfer. This was because of more severely ill patients that required intensive treatment in the CCU at the same time. Following up the recurrence of heart problems after transfer in subjects without readiness, recurrent ischemia and reinfarction were both recorded during the first 72 hour period. While the subjects with readiness in total issues, were found to not have experienced these events.

For readiness in each issue, impaired consciousness, hemodynamic system, signs and symptoms, ECG and cardiac markers were significantly associated with recurrence after transfer. Monitoring and heart failure were not associated. This result supports previous studies that assessed the readiness of transfer based on patient clinical characteristics, ECG, and cardiac markers such as no chest pain, no loss of consciousness or arrest with episode of chest pain, no breathless, no life threatening arrhythmia, no reelevation of cardiac markers, or hypotension.

Therefore, the CCU nurses should consider and pay attention to the assessment of consciousness, hemodynamic system, signs and symptoms, ECG and cardiac markers for transfer to prevent recurrent ischemia and reinfarction. While ordinary ward nurses should have awareness in close observation of conditions of recurrent ischemia and reinfarction during 72 hours after transfer from the CCU. Of special importance is an awareness of angina, which was the most significant and commonly experienced symptom, angina was the most significant baseline predictor of in-hospital recurrent ischemia and angina events were one of the risk scores that were associated with restenosis lesions. These findings are beneficial for nurses to develop guidelines for nursing care of patients with ACS to enable readiness of pathology and physiology prior to transfer from the CCU.

Implementations and Recommendations

For nursing practice: The readiness observational form should be used as a clinical
instrument in ACS patient’s readiness assessment prior to transfer from the CCU. This form can provide significant results. It is not too complicated in detail for observation, does not disturb activity of nurses and can used to observe patients during care. However, this form may have limitations for use in the clinic and needs consideration from cardiologists in the CCU.

For nursing research: Future research should investigate age and gender variables in larger sample sizes to provide clearer results. Research into the relationships between other factors such as co-morbidity, infection and recurrence of heart problems after transfer from the CCU are also recommended.

Limitation
The study was limited to cognitively intact patients therefore the recurrent ischemia and reinfarction rate may be different from other studies with wider populations that included those with cognitive deficits. Although all subjects were cognitively intact, the major group did have co-morbidities and some subjects had infections since they were admitted into the CCU.

References
14. Donges, K., Schiele, R., Gitt, A.,


