

Field report

## Factors Related to the Improvement of Quality of Life at 6 Months after Discharge for Myocardial Infarction Patients Treated with Percutaneous Coronary Intervention

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### Abstract

**Objective:** The purpose of this study was to evaluate the relationship between improvement of health-related quality of life (QOL) and participation in self-care activities and coronary risk factor management at 6 months after discharge for acute myocardial infarction (AMI) patients treated with percutaneous coronary intervention (PCI).

**Methods:** A total of 118 patients were asked to complete the MOS 36-Item Short-Form Health Survey (SF-36) questionnaire at discharge and 6 months after discharge. The SF-36 consists of eight subscales: Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP), General Health Perception (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH). We examined self-care activities and coronary risk factor management and related factors from SF-36 scores to measure quality of life (QOL) at discharge and 6 months after discharge.

**Results:** The PF and BP scores at 6 months after discharge were significantly higher than those at discharge. Increasing PF and BP scores indicated improvement in ability to perform physical activities and absence of intense bodily pain that would interfere with activities of daily living or work. Improvement of PF in AMI patients treated with PCI was related to performing exercise after discharge and absence of diabetes mellitus. However, there were no related factors for BP.

**Conclusion:** Our results indicated that exercise, as a self-care activity after discharge, for AMI patients treated with PCI may be related to the improvement of QOL.

**Key words:** Acute Myocardial Infarction (AMI), Percutaneous Coronary Intervention (PCI), health-related QOL

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### Introduction

Percutaneous coronary intervention (PCI) has become the standard for reperfusion treatment in the early phase of acute myocardial infarction (AMI). AMI patients undergo PCI to rescue myocardial tissue, improve the prognosis and preserve cardiac function. Recent studies confirmed that at 6 months, patients who had PCI have decreased cardiac events and cardiac mortality rates when compared with patients who had intravenous coronary thrombolysis (IVCT)<sup>1,2</sup>. It has also been reported that AMI patients treated with IVCT do not have an improved quality of life (QOL); however, AMI patients treated with PCI have improved QOL. Shibayama<sup>3</sup> reported that the physical parameters of health-related QOL improved 6 months after discharge for AMI patients treated with PCI. Janzon<sup>4</sup> also reported that the physical QOL scores of patients with unstable angina treated with PCI were higher than for patients with unstable angina treated with IVCT.

These previous reports did not evaluate the relationship between QOL and the effect of self-care activities or coronary risk factor management. We have initiated education for AMI patients treated with PCI regarding methods of self-care activities (e.g., smoking cessation, diet and moderate exercise) and coronary risk factor management (e.g., medication and examination) in the general wards after discharge from the coronary care unit (CCU). Some studies reported an improved prognosis for AMI patients who practiced appropriate self-care activities and coronary risk factor management; however, previous nursing studies have not fully evaluated the effect on the QOL for AMI patients who practiced self-care activities and coronary risk factor management. The purpose of this study was to evaluate the relationship between the improvement of health-related QOL and participation in self-care activities and coronary risk factor management at 6 months after discharge among AMI patients treated with PCI.

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## Materials and Methods

### *Study population*

Between April 2007 and October 2009, a total of 118 patients were enrolled in this prospective study. These subjects were hospitalized in the CCU of A hospital due to AMI. They were treated with PCI, moved to an internal medicine ward and then discharged. All subjects who had stenting had a stenotic rate of less than 50% in the infarcted arteries. Patients were excluded from the study if they had coronary artery bypass grafting, if they were rehospitalized within 6 months of discharge or if they had psychosis, dementia or communication disturbances. All patients could independently perform activities of daily living (ADL) after discharge, and they received education about self-care activities (e.g., monitoring intake of salt and water, smoking cessation, moderate exercise and appropriate limitations for work or other activities) and coronary risk factor (hypertension, hyperlipidemia and diabetes mellitus) management (e.g., pathogenesis, symptoms, examination and treatment). We explained the need for moderate exercise such as walking and jogging 30 minutes or more per day, 3 times or more per week, in accordance with guidelines for secondary prevention of myocardial infarction of the Japanese Circulation Society to all subjects at discharge. They returned for follow-up appointments every 2–8 weeks after discharge.

### *Measurement of health-related QOL*

We used version 2 of the SF-36 (SF-36) questionnaire to measure health-related QOL at discharge and 6 months after discharge. The 6-month data collection was conducted by mail.

The SF-36<sup>5, 6)</sup> is a questionnaire designed to measure health-related QOL. Health-related QOL was defined as quantitative evaluation of QOL and changes that affect physical and mental function (e.g., work, household tasks and business responsibilities) and social obligations (e.g., interacting with family and friends). It consists of eight subscales [Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP), General Health Perception (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH)].

### *Measurement of related factors in health-related QOL*

We examined self-care activities and coronary risk factor management and measured health-related QOL at 6 months after discharge. Self-care activities after discharge were defined as diet (eating more than 30 different kinds of food per day), smoking cessation (no smoking after discharge), exercise (moderate exercise such as walking and jogging 30 minutes or more per day, 3 times or more per week). The

data collection for self-care activities (diet, smoking cessation, exercise) was conducted by mail. Coronary risk factor management after discharge was defined as appropriate treatment (medication for hypertension, hyperlipidemia and diabetes mellitus), examination (regular measurement of blood pressure, body weight and blood sugar) and absence of control of coronary risk factors (no diagnosis of hypertension, hyperlipidemia and diabetes mellitus). The data collection for coronary risk factor management was conducted by reviewing the patients' charts.

### *Patient characteristics*

We examined patient characteristics using the patients' charts. The demographic items included age, sex, employment, treatment history [history of treatment for coronary risk factors (hypertension, hyperlipidemia and diabetes mellitus)], family, smoking history (smoking before the onset of AMI), alcohol intake history (alcohol intake before the onset of AMI), length of hospital stay, region of infarct (region of AMI), multivessel involvement, PCI and troponin I (Tn-I) levels (greatest increase in troponin I levels after the onset of AMI).

### *Statistical analysis*

We calculated mean scores and standard deviation for the eight subscales of the SF-36 at discharge and 6 months after discharge. In each of the eight subscales, higher scores indicated a better state of health-related QOL. The values at discharge and 6 months after discharge were compared using the paired Student's *t*-test. Using multiple regression analysis, we evaluated the relationship between self-care activities and coronary risk factor management at home and the eight subscales of the SF-36 at six months after discharge.

### *Ethical considerations*

All subjects received written descriptions of the purpose and methods and their right to refuse participation at any time. They were instructed to request clarification as needed and were reassured that their anonymity would be maintained and that refusal would not affect their treatment or nursing care. Written consent was obtained before the patients were examined. The protocol of this study was approved by the institutional review board of A University Hospital.

## Results

### *Patient characteristics*

The characteristics of the patients are summarized in Table 1. The mean age of the patients was 66.4 years, and 101 (85.6%) were male, 64 (54.2%) were employed, 60 (50.8%)

**Table 1** Patients' characteristics (n=118)

Age (years)		66.4 ± 10.3*	Smoking	48 (40.7%)
Sex	Men	101 (85.6%)	Alcohol intake	48 (40.7%)
	Women	17 (14.4%)	Length of hospital stay (days)	23.6 ± 8.2*
Employed		64 (54.2%)	Region	Inferior 57 (48.3%)
Treatment history	Hypertension	60 (50.8%)		Anteroseptal 45 (38.1%)
	Dislipidemia	49 (41.5%)		Other 16 (13.6%)
	Diabetes mellitus	34 (28.8%)	Multivessel	55 (46.6%)
Family	Three or more persons	60 (50.8%)	Tn-I levels (ng/ml)	99.7 ± 121.1*
	Two persons	45 (38.1%)	PCI	Coronary artery stent 118 (100.0%)
	Live alone	13 (11.1%)		

Data are presented as means ± SD\* or n (%). Treatment history: history of treatment for coronary risk factors. Smoking: smoking before the onset of acute myocardial infarction. Alcohol intake: alcohol intake before the onset of acute myocardial infarction. Region: region of acute myocardial infarction. Tn-I levels: greatest increase in troponin I levels after the onset of acute myocardial infarction. PCI: percutaneous coronary intervention.

**Table 2** SF-36 scores at discharge and 6 months after discharge in patients with AMI treated with PCI

Eight subscales	Discharge	6 months
PF	72.1 ± 20.8	79.5 ± 19.5*
RP	62.3 ± 35.1	63.6 ± 33.0
BP	63.0 ± 32.7	78.0 ± 22.8*
GH	55.8 ± 19.1	53.6 ± 16.9
VT	60.7 ± 24.0	63.2 ± 21.2
SF	76.6 ± 28.4	78.3 ± 23.8
RE	62.2 ± 38.1	65.3 ± 33.9
MH	66.0 ± 21.8	68.9 ± 20.6

Data are presented as means ± SD (n=118). Discharge: at discharge in patients with AMI treated with PCI. 6 months: at 6 months after discharge in patients with AMI treated with PCI. PCI: percutaneous coronary intervention. PF: physical functioning. RP: role physical. BP: bodily pain. GH: general health perception. VT: vitality. SF: social functioning. RE: role emotional. MH: mental health. \*P<0.05 vs. Discharge.

had a history of hypertension, 49 (41.5%) had a history of hyperlipidemia and 34 (28.8%) had a history of diabetes mellitus. Sixty (50.8%) had three or more persons in their family. The mean length of hospital stay was 23.6 days. Fifty-seven (48.3%) had an inferior AMI. The mean of the greatest increase in troponin I levels after the onset of AMI was 99.7 ng/ml.

#### *SF-36 scores at discharge and 6 months after discharge*

The scores at discharge and at 6 months after discharge are shown in Table 2. The PF and BP scores at 6 months after discharge were significantly higher than the scores at discharge. The scores for SF and MH at discharge were high, and these high scores continued 6 months after discharge. However, the scores for GH at discharge were low, and these low scores continued 6 months after discharge (Table 2). Our results were similar to those of previous reports<sup>3)</sup>.

#### *Related factors in health-related QOL*

The PF and BP scores at 6 months after discharge were significantly higher than the scores at discharge. We examined the relationship between PF and BP scores and self-care

activities and coronary risk factor management at 6 months after discharge in AMI patients who were treated with PCI. PF included diet (p=0.72), smoking cessation (p=0.20), exercise (p=0.05), appropriate treatment (p=0.20), examination (p=0.08), no hypertension (p=0.08), no hyperlipidemia (p=0.72) and no diabetes mellitus (p=0.01). BP included diet (p=0.36), smoking cessation (p=0.80), exercise (p=0.20), appropriate treatment (p=0.30), examination (p=0.10), no hypertension (p=0.36), no hyperlipidemia (p=0.49) and no diabetes mellitus (p=0.26). For PF, exercise and absence of diabetes mellitus had a P value of 5% or less. We recognized that improvement of PF in AMI patients was related to performing exercise after discharge and absence of diabetes mellitus. However, there were no related factors for BP (Table 3).

## **Discussion**

The purpose of this study was to evaluate the relationships between improvement of health-related QOL and self-care activities and coronary risk factor management at 6 months after discharge in AMI patients treated with

**Table 3** Factors related to Physical functioning and Bodily pain in SF-36 scores at 6 months after discharge in patients with AMI treated with PCI

Related factors	Physical functioning	Bodily pain
Self-care activities		
1) Diet	0.72	0.36
2) No smoking	0.2	0.8
3) Exercise	0.05*	0.2
Coronary risk factor management		
1) Appropriate treatment	0.2	0.3
2) Examination	0.08	0.1
3) Without coronary risk factors		
(i) No hypertension	0.08	0.36
(ii) No hyperlipidemia	0.72	0.49
(iii) No diabetes mellitus	0.01*	0.26

Each value represents a P value in the multiple regression analysis. PCI: percutaneous coronary intervention. PF: physical functioning. BP: bodily pain. Diet: eating more than 30 different kinds of foods per day. No smoking: no smoking after discharge. Exercise: moderate exercise, such as walking and jogging 30 minutes or more per day 3 times or more per week. Appropriate treatment: medication for hypertension, diabetes mellitus and hyperlipidemia. Examination: regular measurement of blood pressure, body weight and blood sugar.

PCI. The PF and BP scores in eight subscales of SF-36 at 6 months after discharge were significantly higher than those at discharge. Improvement of PF in AMI patients treated with PCI was related to exercise after discharge and absence of diabetes mellitus. However, there were no related factors for BP.

Increasing PF and BP scores indicate improvement in ability to perform physical activities (e.g., bathing or dressing) and absence of intense bodily pain that would interfere with activities of daily living (ADL) or work<sup>7</sup>). It has been reported that the benefits of regular exercise training in patients with AMI and heart failure include the improvement of exercise capacity, an increase in HDL, weight loss, decrease of symptoms and improvement of QOL<sup>8, 9</sup>). These findings suggest that exercise relieved symptoms such as chest pain and chest discomfort in AMI patients. Cheuk-Man Y<sup>10</sup>) reported an increase in seven subscale scores (PF, RP, BP, VT, SF, RE and MH) of the SF-36 in convalescence AMI patients who performed cardiac exercise and participated in education programs (including modification of coronary risk factors, nutritional counseling and medication teaching) for 8 weeks. These patients were gradually able to extend their activity range to improve their health-related QOL after exercise and education for several weeks. However, these previous studies were conducted with AMI and heart failure patients who performed exercise training under nurse and/or physician supervision within hospital settings. There were no studies that evaluated the QOL in AMI patients who performed moderate exercise at home after discharge for several consecutive months. The results of the present study indicated that regular moderate exercise in AMI patients treated with PCI may be related to improvement of QOL, as self-care activities are performed after dis-

charge at home.

However, in the present results, we did not recognize improvement in 6 subscales of the SF-36; improvement was only seen in PF and BP. Particularly, GH scores at discharge were low, and GH scores at 6 months after discharge were decreased compared with at discharge. A low score for GH indicates that people feel unwell and gradually experience ill health. Most of the subjects were male, most were in their 50s or 60s and 50% were employed. They were required to change their daily lifestyles and to continue treatment for a long time after discharge from the care of doctors and nurses. Based on the above factors, we considered that they might feel uncertain about their health and life, and therefore their GH scores were low.

Improvement of PF in AMI patients treated with PCI was also related to absence of diabetes mellitus. AMI patients with diabetes mellitus have an unfavorable prognosis and a high incidence rate of angina and heart failure in the post-AMI period compared with AMI patients who do not have diabetes mellitus. Diabetes mellitus is considered a major coronary risk factor and a factor that is associated with worsening QOL. Several studies<sup>11, 12</sup>) reported that patients with diabetes mellitus have poorer QOL than patients without diabetes mellitus. Miyashita<sup>13</sup>) reported that AMI patients with diabetes mellitus had significantly worse QOL scores one year after discharge compared with AMI patients without diabetes mellitus. Peterson<sup>14</sup>) also reported that AMI patients with diabetes mellitus had limitations in daily life, high frequency of chest pain and worse QOL scores compared with AMI patients without diabetes mellitus. AMI patients without diabetes mellitus have a lower frequency of ischemic symptoms, such as chest pain, compared with AMI patients with diabetes mellitus. AMI patients with dia-

betes mellitus have to consciously limit activities of daily life (e.g., severe dietary restrictions, insulin management and regular measurement of blood sugar), and they have visual disturbances, and more ischemic symptoms compared with AMI patients without diabetes mellitus. We considered that there was a possibility that limitations of daily life and occurrence of symptoms might have an influence on PF.

Improvement of PF in AMI patients treated with PCI was related to performing exercise after discharge and absence of diabetes mellitus. To improve QOL of AMI patients treated with PCI, nurses should teach patients about the need for and benefits of moderate exercise such as walking and jogging 30 minutes or more per day, 3 times or more per week, after discharge. The results of the present study demonstrated that there are unknown related factors for BP. We considered that there was a possibility that BP has related factors other than self-care activities or coronary risk factor management. In the future, we plan to identify and evaluate related factors for improvement of BP among AMI patients treated with PCI.

The limitations of the present study included possible bias because the sample included more males than females. Furthermore, patients rehospitalized for AMI within 6 months of discharge were excluded. Further investigation of the health-related QOL of larger groups of AMI patients is required in order to generalize our results. However, our findings contribute to improving nursing interventions for the health-related QOL of patients with AMI.

## Conclusion

AMI patients treated with PCI at 6 months after discharge had improved health-related QOL (PF and BP) compared with at discharge. Improvement of PF in AMI patients treated with PCI was related to performing exercise after discharge and absence of diabetes mellitus. However, related factors for BP are unknown.

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