Functional Status Model: An Empirical Test among Discharged Acute Myocardial Infarction Patients

Sarinrut Sriprasong, Somchit Hanucharurnkul, Orasa Panpukdee, Rongroj Krittayaphong, Kanaungnit Pongthavornkamol, Thavatchai Vorapongsathorn

Abstract : Functional status is known to be adversely affected by an acute myocardial infarction (AMI), especially the first month after the event. Problems involved in restoration of the highest possible functional status level are complex and not well understood. To better understand these issues, the aim of this study was to test, one month post-hospitalization, the effects of discharge readiness, cognitive and emotional illness representation, problem- and emotion-focused coping and depressive symptoms on functional status of individuals who had experienced an AMI.

A sample of 180 post-AMI patients were recruited from five hospitals located in Bangkok and Nonthaburi Province. Participants completed two questionnaires, on the day of discharge, and three questionnaires, one month after discharge. The final model fit the data well, and explained 56% of the variance in functional status of the AMI patients.

Although illness representation, coping and depressive symptoms influenced the functional status of those who had experienced an AMI, discharge readiness was found to be the most influential predictor of functional status. Recommendations center on the importance of preparing AMI patients for discharge.

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Introduction

Each year more than 3,000 individuals who have experienced an acute myocardial infarction (AMI) are discharged from 16 tertiary cardiac centers, in Thailand.[1] Prior research has found their major concern, the first month after discharge from the hospital, is return of previous functional status, or ability to perform usual activities of daily living.[2-4] However, due to a lack of adequate information to guide their resumption of activities, some post-AMI patients

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are readmitted to the hospital and their rate of mortality increases.[2, 3]

Prior findings have shown that psychological factors, including discharge readiness,[5] illness representation,[6,7] coping[8-10] and depressive symptoms[11-12] are independently associated with functional status. Although these factors, conceptually, are correlated, researchers rarely have examined their mutual relationships and joint effects on functional status within an integrated framework. Moreover, previous studies have not explored, specifically, the direct or indirect effects of discharge readiness on functional status; or, association between illness representations, coping and functional status among individuals who have experienced an AMI.

Theoretical Framework and Review of the Literature

The Common-Sense Model (CSM) of Illness Representation[13] was used as the theoretical framework for this study. The CSM is an information processing model that describes an individual's responses, after the accumulation of information from diverse sources, to the illness threat. Such responses are believed to fit one of two parallel interaction pathways. One pathway consists of cognitive recognition of the illness threat and a coping response to manage the threat. The other pathway involves an emotional response to the illness threat and a coping response to manage the emotions. Feedback loops allow emotions and coping with emotions to influence how a patient deals with or addresses an objective problem. According to the CSM, there are seven components of cognitive illness representation: identity (symptoms); cause (attribution); timeline (how long the illness will last); consequences; controllability; curability; and, illness coherence (overall understanding of illness threat).

An AMI has been shown to stimulate patients to gather information, from health providers, other patients and relatives, as well as to question their own ongoing evaluation of their current state, especially prior to release from the hospital.[13] Processing of gathered information culminates in a comprehensively, formulated state, whereby discharge readiness consists of one's: personal status, knowledge, coping ability and expected support.[5] Thus, after formulating a response to the information presented, patients reorganize, reanalyze, reinterpret and reformulate recognition of their illness.[5,13]

Integrated reviews have shown that a well-designed educational program can increase knowledge and improve corresponding levels of activity.[14] Appropriately designed educational programs have been found to enable resumption, within one's tolerance level, of domestic, recreational and vocational tasks, with decreased risk of subsequent cardiac events and without posing a threat to others in the community.[15] In addition, the availability of self-care resources, the quality of one's self-care knowledge and physiological stability have been found to predict 35% of the variance in the functional ability of those who have experienced an AMI.[16] Social support, assessed one month after hospitalization, has been found to be independently and negatively associated with depressive symptoms.[17]

The mediating effect of illness representation, between discharge readiness and functional status, has been identified in prior research.[18,19] Lau-Walker found the greater one perceives the consequences of a heart condition, the lower the confidence available to the person to cope with the condition; and, the longer one perceives the duration of a heart condition, the greater his/her ability to cope with the condition, by maintaining a change of diet and/or exercise regime.[18] In addition, Wiles and Kinmonth[19] found the patients' knowledge, as well as the skills they learn from healthcare professionals, affect their cognitive processing system and leads them to a better and more rapid resumption of their pre-illness level of function. In addition, cognitive illness representations

has been linked to notions of identity, timeline, cause, consequences, control and cure, within the Thai context.[20, 21]

Prior studies also have documented that relationships exist between cognitive illness representations and functional status, except for the cause dimension.[6] Individuals who have experienced an AMI, but thought their illness only would last a short time, or had less serious consequences, have been found to return to work sooner than do those who have an AMI, but do not think their illness would last a short time or have less serious consequences.[6] In addition, those who have expressed negative illness representations, while hospitalized, have been found to have impaired functioning and increased dependence after discharge.[6]

Cognitive illness representations have been identified as influencing factors for depressive symptoms after one's first AMI.[6, 7] Having a stronger illness identity; more chronic timeline; weaker belief in cure/control; and, perception of graver consequences, have been found to be related to increased depressive symptoms.[7] Depressive symptoms also have been shown to have a direct correlation with poor physical functioning after an AMI.[11] Hospitalized elders, in Southern Thailand, revealed having depressive symptoms associated with a decline in their performance of activities of daily living (ADLs).[22]

Confrontation, optimism and self-reliance have been recognized to be positive coping strategies, one month post-hospital discharge, after experiencing an AMI.[10, 23] On the other hand, the use of evasive, emotive and fatalistic coping strategies, one month post-hospital discharge after an AMI, have been found to be associated with depressive symptoms.[9,10] In addition, the use of three particular coping strategies (mental disengagement, venting of emotions and denial) have been shown to be associated with physical limitations.[24] A causal relationship between illness representation and functional status, mediated by coping, also has been found to be partially supported in other clinical contexts (i.e. women with rheumatoid arthritis).[25] Mediating effects of depressive symptoms on the relationship of coping strategies to functional status of individuals, who have experienced an AMI, also have been found.[8] However, no studies, which have investigated the mediating role of coping between illness representation and functional status, could be located.

In addition, the contents of emotional illness representations, proceeding in parallel with cognitive associations, has received limited attention and investigation.[26] Consequently, since the same strategy can serve as a mechanism for coping with either branch of illness representation, a clear distinction between the effects of cognitive and emotional processing on coping strategies has not been achieved.[27]

Thus, the aims of this study were to test the: (1) associations among discharge readiness, illness representation, coping and depressive symptoms, as predictors of functional status, when they are simultaneously present in a model; and, (2) patterns of mediated relationships among discharge readiness, illness representation, coping procedures and depressive symptoms to predict possible recovery mechanisms for Thais who have experienced an AMI.

In order to describe functional status among individuals who have experienced an AMI, two parallel information processing pathways, danger and fear control, were investigated through evaluation of the application of the Functional Status Model, guided by the CSM, one month post-hospitalization, among those who had experienced an AMI. In other words, this study tested, one month post-hospitalization, the direct and indirect effects of discharge readiness, cognitive and emotional illness representation, problem- and emotion-focused coping and depressive symptoms on functional status of individuals who had experienced an AMI (see **Figure 1**).

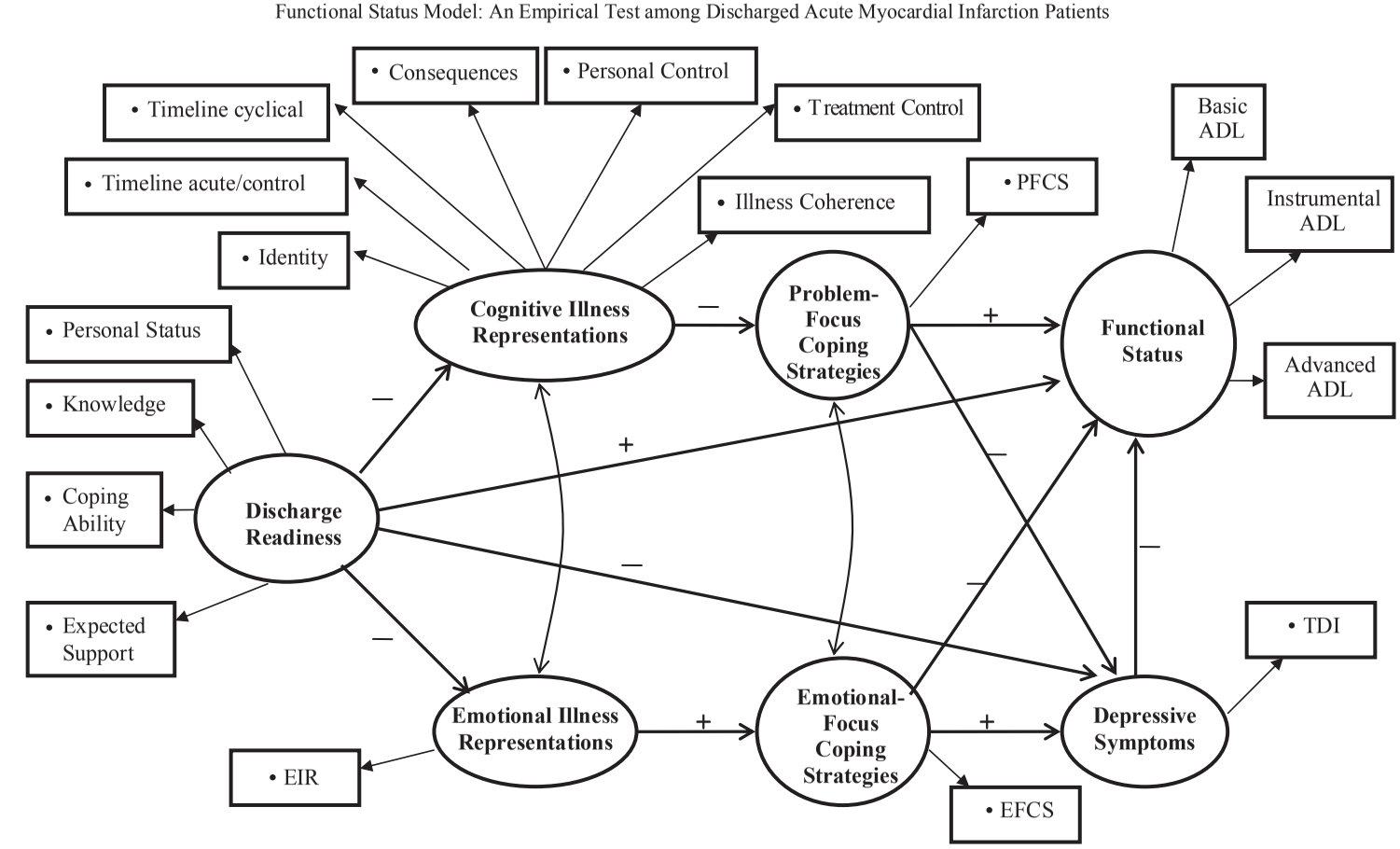


Figure 1 Hypothesized funcsional status model

Method

A descriptive research design was used. Approval to conduct the study was granted by the university and the ethics committees of the hospitals where data were gathered. Potential subjects were: provided an explanation of the study and the procedures of data collection, asked to sign an informed consent form, and assured their confidentiality and freedom to refuse to provide information, at any time without repercussions, would be maintained. If a participant had high scores in depressive symptoms, the researcher consulted the physician to obtain a special psychiatric assessment. This occurred with four participants with depressive symptom scores of 26 - 33, which suggested the presence of a moderate level of depressive symptoms.[28]

Sample: A non-probability convenience sample was drawn from five large public hospitals in Bangkok and Nonthaburi Province, Thailand, from January 2007 to January 2008. The hospitals were selected because of their high percentage of patients with AMIs.

After chart review, 234 potential participants were approached, during their initial hospitalization. However, only 180 met the eligibility criteria, which included having: (a) a diagnosis of AMI; b) medical treatment and/or coronary revascularization, by way of percutaneous transluminal coronary angioplasty; (c) stable vital signs (at the time of collecting data); (d) no known psychiatric disorder or cognitive dysfunction; (e) no co-morbid end-stage diseases (i.e. end-stage lung disease); (f) no conditions which precluded the ability to perform functional status activities, i.e. dementia, alcoholism, drug abuse, paralysis or stroke; and, (g) no hospital readmission for 30 days after discharge. Among the 54 determined not to be eligible, via telephone or mail 30 days after discharge, 22 (9.4%) had undergone cardiac surgery, 9 (4%) withdrew from the study, 3 (1.3%) had died and 20 (8.5%) others could not be contacted (see **Table 1**).

Table 1 Characteristics of the acute myocardial infarction patients (n= 180)

Variables	n	%	Range	M	SD
Age (years)			26 - 87	61.2	12.6
Gender					
Male	131	72.8			
Female	49	27.2			
Marital Status					
Single	11	6.1			
Married	128	71.1			
Other	41	22.8			
Employment Status					
None	80	44.5			
Yes	100	55.5			
Length of Stay (days)			3 - 38	8.23	4.9
Killip Class					
Class I	113	62.8			
Class II	22	12.2			
Class III	27	27.0			
Class IV	18	18.0			

Variables	n	%	Range	M	SD
Ejection Fraction					
≤ 30%	8	4.4			
31 – 50%	44	24.4			
> 50%	94	52.2			
No data	34	18.9			
Coronary Angiogram					
No data	52	28.9			
SVD	38	21.1			
DVD	36	20.0			
TVD	47	26.1			
Normal Coronary	7	3.9			
Receiving PCI					
No	134	74.4			
Yes	46	25.6			
Complications in Hospital					
None	119	66.2			
Yes	61	33.8			
Cardiac Rehabilitation					
None	169	93.9			
Yes	11	6.1			

Note: SVD = Single Vessel Disease; DVD = Double Vessel Disease; TVD = Triple Vessel disease; PCI = Percutaneous Coronary Intervention

Instruments: A researcher designed Personal Data Questionnaire, which contained 14 items, was used to obtain data regarding each subject's demographics (i.e. age, gender, marital status and employment status) and clinical information (i.e. length of hospital stay, Killip class, ejection fraction, coronary angiogram, percutaneous coronary intervention, hospital complications, cardiac rehabilitation, admission date, discharge date, and follow up date). Five standardized questionnaires were administered, including the: Functional Performance Inventory Short-Form (FPI-SF);[29] Readiness for Hospital Discharge Scale (adult form) (RHDS);[30] Revised Illness Perceptions Questionnaire (IPQ-R);[26] Jalowiec Coping Scale (JCS);[31] and, Thai Depression Inventory (TDI).[28] Permission was obtained to use all copyrighted instruments. The FPI-SF, RHDS and IPQ-R originally were written in English and, therefore, required translation and back translation prior to use. The JCS previously had been translated into Thai.[32] The TDI was developed in Thai.

Five experts in providing care to AMI patients evaluated the content validity of each instrument. The content validity index (CVI) score was: 1.0 for the RHDS and the FPI-SF; 0.87 for the IPQ-R; and, 0.97 for the JCS and TDI. All questionnaires were piloted for internal consistency reliability via

30 AMI patients, who were not part of the study. Cronbach's alphas were found to be: (a) 0.92 for the total scale, and 0.81 to 0.88 for the three types of activities of daily living (ADL), for the FPI-SF; (b) 0.81 for the total scale, and 0.62 to 0.90 for the subscales, of the RHDS; (c) 0.86 for the total scale, and 0.52 to 0.88 for the subscales, of the IPQ-R; (d) 0.85 for the total scale, 0.86 for the problem-focused coping subscale and 0.83 for the emotion-focused coping subscale, of the JCS; and (e) 0.88 for the TDI.

The Functional Performance Inventory, Short-Form (FPI-SF),[29] is a 32-item, self report instrument, which uses six subscales (body care, household maintenance, physical exercise, recreation, spiritual activities and social activities) to measure functional status in individuals with a chronic physical illness. However, eight items, from the original version of the FPI, were added to the FPI-SF because these activities could induce patients with AMI to be at risk for myocardial ischemia.[3] The eight activities included: toileting; doing the laundry by hand; washing the car; driving a car; taking public transportation; engaging in a special activity or hobby; having sexual relations; and, working full time/part time. Participants respond to each item by indicating how difficult it is to perform each activity, on a scale ranging from 1 = activity can be performed easily to 4 = no longer performed for health reasons. The six subscales, subsequently, are grouped into three types of ADL: Basic ADL (BADL), which consisted of body care and physical exercise; Instrumental ADL (IADL), which includes household maintenance; and, Advanced ADL (AADL), which includes recreation, spiritual and social activities. Because not all items on the FPI-SF are relevant for everyone, subscale scores are based on a mean score across all items comprising the respective subscale. Participants must complete 80% of the items for a subscale score to be computed. The three total scores are the mean scores, across all respective subscale scores, comprising each of the three types of ADL. Higher scores indicate greater functional status. In this study, Cronbach's alpha for the three types of ADL varied from 0.78 - 0.86, with an overall value of 0.92.

The Readiness for Hospital Discharge Scale (adult form) (RHDS)[30] consists of 23 items within four subscales (personal status -7 items; knowledge - 8 items; coping ability - 3 items; and, expected support - 4 items), which measure one's perception of readiness for hospital discharge. Personal status is the physical-emotional state of the patient immediately prior to discharge, while knowledge is the perceived adequacy of information needed to respond to common concerns and problems during post-hospitalization. Coping ability refers to the perceived ability of the patient to self-manage personal and health care needs after discharge, while expected support is defined as the emotional and instrumental assistance anticipated following hospital discharge. The first item in the scale is a yes/no question as to whether the patient perceives being ready for discharge. This item does not count in the scale scores. The remaining 22 items are written as questions, such as: "How physically ready are you to go home?" and "How much do you know about caring for yourself, after you go home?" Each participant responds by circling a number from 0 to 10. Anchor words of "not at all" and "totally" are printed at the two ends of the scale to cue the subject to the numeric meaning of the scale. It takes about 5 to 10 minutes to complete the scale. To score the scale, two items (#3 and #6) are reverse scored, so that higher scores on each item reflect greater readiness for discharge. Total and subscale scores are obtained by summing the numeric responses to each of the 22 items. Total scores can range from 0 to 220. The higher the total score, the greater one's perception of discharge readiness. In this study, the Cronbach's alpha for the four subscales varied from 0.71 - 0.91, with an overall value of 0.85.

The Revised Illness Perception Questionnaire (IPQ-R), is a 53 item self-administered questionnaire used to assess how patients perceive illness representations.[26] The IPQ-R is divided into two sections: identity scale (15-items); and time line (acute/ chronic), time line (cyclical), consequences, personal control, treatment control, emotional representation, and illness coherence scale (38-items). The identity scale is comprised of 15 common experienced symptoms. Patients rate (yes/no) whether they have experienced each symptom since their illness began. Then they rate (yes/no) whether they believe the symptom to be specifically related to their illness. The sum of items rated "yes", on this second rating, forms the illness identity scale, which ranges from 0 - 14. High scores on the identity scale indicate a higher number of symptoms attributed to AMI. The second section contains seven scales: time line (acute/ chronic; 6-item), time line (cyclical; 4-item), consequences (6-item), personal control (6-item), treatment control (5-item), illness coherence scale (5-item), and emotional representation (6-item). Items in this section are rated on a five-point Likert-like scale, ranging from strongly disagree (1) to strongly agree (5). High scores on each the IPQ-R scales indicate: a longer expected duration of AMI (timeline-acute/chronic); stronger beliefs about the cyclical nature of AMI; greater severity of perceived consequences of AMI; stronger belief in the controllability of AMI; a personal understanding of AMI; and, negative emotional responses. The Cronbach's alpha for each scale, in this study, varied from 0.66 -0.86, with an overall value of 0.76 for the total score.

The Jalowiec Coping Scale (JCS) is a self-administered scale used to examine patients' coping methods. The JCS has a total of 40 items, including 15 problem-focused and 25 emotion-focused coping questions.[31] Problem-focused coping focuses on problem resolution strategies; whereas, emotion-focused coping is aimed at mitigation of emotional distress. Each item is rated on a 5-point Likert-like scale to indicate how often the respondent uses coping (never used, seldom used, sometimes used, often used or almost always). Possible raw scores of problem-focused coping can range from 1-75 and emotion-focused coping can range from 25-125. Total scores of each scale are transformed to percentages to compare problem-and emotion-focused coping. High percentage scores indicate frequent use of the coping strategies in that subscale. In this study, Cronbach's alphas were as follows: problem-focused coping = 0.85, emotion-focused coping = 0.72 and the total scale = 0.84.

The Thai Depression Inventory (TDI), developed by Lotrakul and Sukanich,[28] is a 20-item, self-rating instrument for measuring the severity of depression. Each item describes a specific behavioral manifestation of depressive symptoms and consists of a graded series of 4 self-evaluative statements. The statements are ranked to reflect the range of severity of symptom, from neutral to maximal severity. Numeric values of 0 - 3 are assigned to each statement to indicate the degree of severity. The total score of the TDI ranges from 0 - 60. Higher scores indicate severe depressive disorders. Raw scores are divided into 3 groups: no depression (less than 20), mild depression (21 - 34) and severe depression (more than 34). A low cutoff score of 20 was used, in this study, because minor depression also has an impact on one's functional status post-AMI.[28, 33] Cronbach's alpha for the instrument, in this study, was 0.88.

Procedure: Data were collected three times, including: 24 - 48 hours after admission (Time 1), on the day of discharge (Time 2), and 30 days after discharge (Time 3). Two research assistants (RAs), with previous research experience, were utilized to gather data during time one and time two. Prior to the gathering of data, inter-rater reliability, among the RAs and the primary research, was assessed via a sample of five subjects per RA. The researcher's work served as the standard against

which RA data were compared. Percent agreement ranged from 75% - 100%, with an average agreement of 86%.

During the 24 - 48 hours after admission, the RAs had the participants verbally respond to the Personal Data Questionnaire. This took approximately 5 minutes. On the day of discharge, discharge readiness and illness perception were assessed, by way of face-to-face interviews, using the RHDS[30] and the IPQ-R.[26] In addition, the remainder of the information on the Personal Data Questionnaire was obtained (i.e. discharge date, follow-up date and any complications during hospitalization). This took about 30 to 45 minutes. Participants also were asked to provide their home address and telephone number, so that they could be contacted 30 days after discharge.

Thirty days after discharge, the primary researcher, using the JCS,[31] the TDI,[28] and the FPI-SF,[29] collected data on coping, depressive symptoms and functional status. Data were obtained either by way of: telephone (n = 46); a follow up visit with the participants' cardiologist (n = 52); a face-to-face home visit (n = 34); or, completion of the mailed questionnaires (n = 48). Each face-to-face and telephone interview took approximately 30 minutes.

Participants were interviewed in the out-patient clinic, at the time of their follow-up visit with their cardiologist, because their appointment coincided with the 30 day, post-discharge data gathering cycle. In order to decrease the likelihood of measurement error, and the possibility of anxiety, data were collected only after participants saw their cardiologist and were ready to answer questions. Participants were interviewed at home because: (a) their follow-up visit was scheduled either less than or more than 30 days after their hospital discharge; (b) they were over 70 yrs of age; or, (c) they were not fluent in reading Thai. Prior to each interview, the participant's clinical status was assessed to assure his/her ability to complete the interview process. The mailing of questionnaires only occurred when a participant did not have a telephone, lived in a distant province or preferred to respond to the questionnaires in writing.

Prior to questionnaires being mailed, the respective participant, while hospitalized, was evaluated regarding his/her ability to understand the instructions and that only the participant was to answer the questionnaires. The questionnaires, instructions and a stamped self-addressed envelope, for returning the completed questionnaires, were mailed 23 days after the respective participant's hospital discharge. Participants were asked to return the mailed questionnaires within 1 week. It took approximately 15-20 minutes to complete the questionnaires.

Data Analysis

The descriptive statistics were used to analyze the demographic data, while the inter-correlations among the variables were determined through use of Pearson's correlation. Structural equation modeling (SEM), with LISREL 8.54, was used to test the relationships among the model variables, which contributed to the functional status of those who had experienced an AMI. The statistical assumptions were tested, to assess the violations of both the univariate and multivariate assumptions, using PRELIS.

Given that SEM consists of two steps (measurement model testing and theoretical model testing),[34] goodness of fit indices, including: Chi-square tests (χ^2); root mean square error approximation (RMSEA); comparative fit index (CFI); goodness-of-fit index (GFI); and, adjusted fit index (AGFI) were used as indication of model fit. In addition, Chi-square tests were used as an index of the significance of the discrepancy, between observed data and the restricted structure, resulting in the full measurement of the theoretical model.[35]

Results

The subjects' demographic and medical characteristics (see **Table 1**) revealed they: had an average age of 61.2 years; primarily were married; were male; and, were not currently employed. The scores of their functional status, discharge readiness, cognitive and emotional illness representation, problem and emotion-focused coping, and depressive symptoms (see **Table 2**) show the subjects had an overall functional status average score of 1.81±0.58. Their various subscale scores varied from 1.35 to 2.4, with IADL being lowest and BADL highest.

A Pearson's product moment correlation coefficient was computed to detect high multicollinearity between each pair of study variables (see **Table 3**). The bivariate correlations among studied variables did not exceed 0.85 (r = − 0.49 to + 0.42), indicating there was no high correlation, or multicollinearity, between the study variables.[35]

Table 2 Characteristics of the study variables (n = 180)

Variables	Possible Range	Actual Range	Mean	SD	Meaning
Discharge Readiness					
Total Scores	0 – 220	72 – 220	177.6	30.9	High
Personal Status	0 – 70	2 – 70	60.5	9.8	High
Knowledge	0 – 80	0 – 80	57.4	21.5	High
Coping Ability	0 – 30	8 – 30	26.1	4.7	High
Expected support	0 – 40	0 – 40	33.6	9.9	High
Cognitive Illness Representations					
Identity	0 – 14	0 – 13	5.1	2.7	Low
Timeline (acute/chronic)	6 – 30	7 – 28	16.8	4.6	Chronic
Timeline (cyclical)	4 – 20	6 – 20	12.4	3.3	Cyclical
Consequences	6 – 30	9 – 30	20.2	5.6	Serious
Personal Control	5 – 25	10 – 25	20.3	3.0	Controllable
Treatment Control	5 – 25	11 – 25	21.9	2.4	Controllable
Illness Coherence	5 – 25	5 – 25	15.2	4.9	Understandable
Emotional Representation	6 – 30	6 – 30	14.1	6.4	Negative
Problem-Focused	20 – 100	20 – 89	49.1	16.1	Moderate
Emotion-Focused	20 – 100	20 – 63	41.8	7.9	Moderate
Depressive symptoms	0 – 60	0 – 33	9.2	6.91	Mild depressive symptoms
Functional Status	0.0 – 3.0	0.4 – 3.0	1.81	0.58	Moderate
Basic ADL	0.0 – 3.0	0.6 – 3.0	2.40	0.46	High
Instrumental ADL	0.0 – 3.0	0.1 – 3.0	1.35	0.84	Moderate
Advanced ADL	0.0 – 3.0	0.2 – 3.0	1.60	0.68	Moderate

Note: ADL = Activities Daily Living

Table 3 Correlations among functional status, depressive symptoms, problem-focused coping, emotion-focused coping, cognitive illness representation, emotional illness representation and discharge readiness (n = 180)

Variables	1	2	3	4	5	6	7
1. Functional status	1.00						
2. Depressive symptoms	−0.49**	1.00					
3. Problem -focused coping	0.33**	−0.02	1.00				
4. Emotion-focused coping	−0.15*	0.42**	0.43**	1.00			
5. Cognitive illness representation	−0.01	0.15	0.30**	0.19**	1.00		
6. Emotional illness representation	−0.08	0.26**	0.15	0.29**	0.28**	1.00	
7. Discharge readiness	0.29**	−0.24**	0.21**	−0.13	−0.06	−0.11	1.00

Note: **p = 0.01 (2-tailed); *p = 0.05

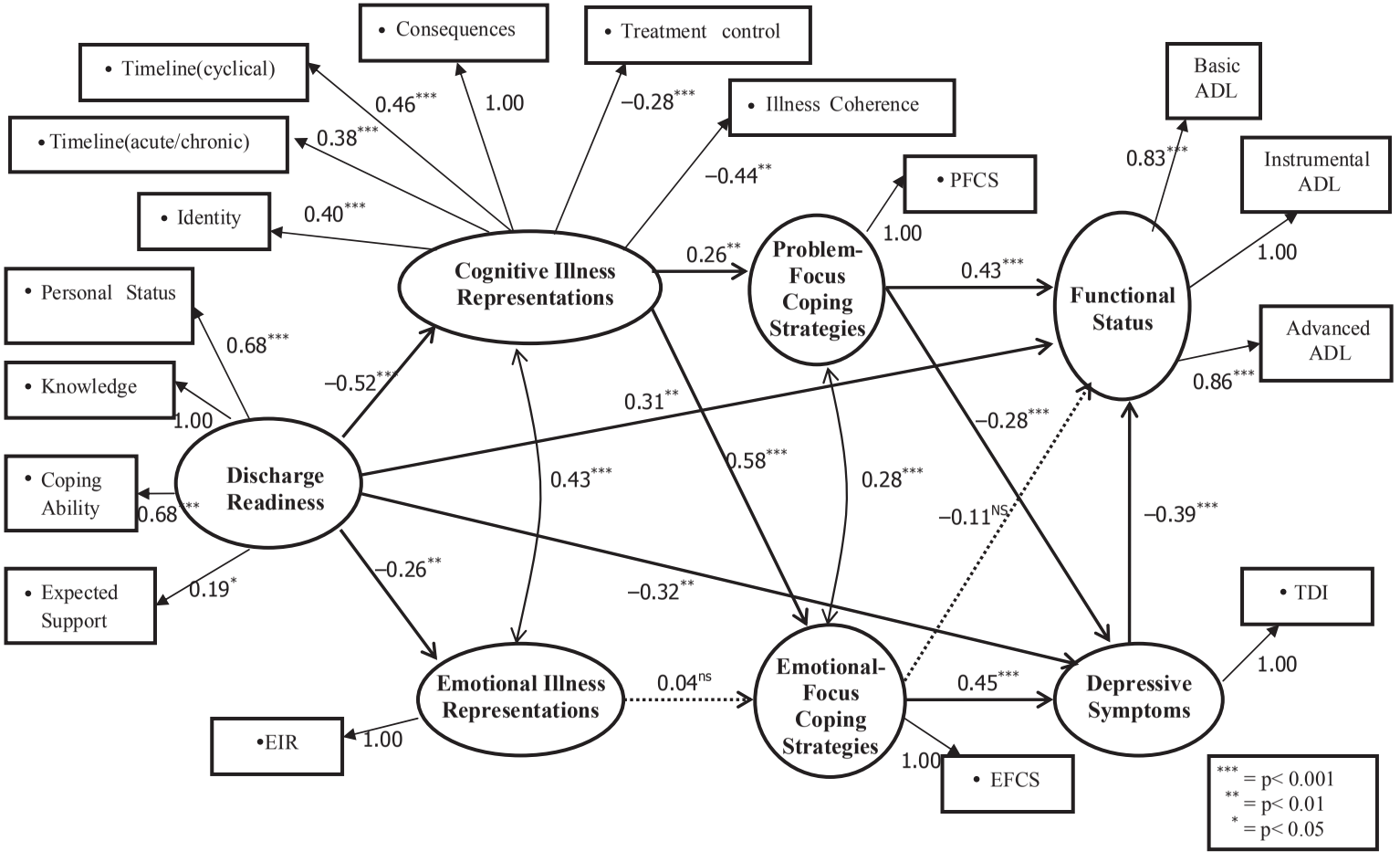
Nearly all variables had a non-normal distribution, except for emotion-focused coping, identity and timeline (acute/chronic). This was due to the fact that the univariate skewness was greater than 3.0, and the univariate kurtosis was greater than 20.0.[34]

The test for multivariate normality, of all variables performed by the PRELIS program in LISREL 8.54, yielded a Z-score of skewness, and kurtosis equal to 19.1 and 5.69 (χ^2 = 396.9; p- value = 0.00), respectively, which showed extreme non-normality. Thus, all variables were transformed by applying the normal score in PRELIS. The new Z score, from the multivariate test, presented skewness and kurtosis at 2.03 and 2.78 (p-value = 0.04 and 0.006) (χ^2 = 11.8; p-value = 0.003), respectively, resulting in a mildly, non-normal distribution.

Measurement model testing was undertaken, using LISREL 8.54, to indicate measured items reflecting three latent constructs (functional status, cognitive illness representations and discharge readiness). Results indicated that both the FPI-SF and RHDS had acceptable construct validity (χ^2 = 0.41, p-value = 0.52, χ^2/df = 0.41 and RMSEA = 0.00 for FPI-SF; and, χ^2 = 2.04, p-value = 0.36, χ^2/df = 1.02 and RMSEA = 0.01 for RHDS). However, the initial measurement model analysis of cognitive illness representation indicated personal control and fixing consequence, as reference variables, should be deleted. Consequently, acceptable construct validity (χ^2= 12.3, p-value = 0.20, χ^2/df = 1.36 and RMSEA = 0.045) was obtained.

The hypothesized model (Functional Status Model), which consisted of an exogenous variable (discharge readiness) and six endogenous variables (cognitive illness representations, emotional representation, problem-focused coping, emotion-focused coping, depressive symptoms and functional status), was tested, by comparing a theoretical model against a data set, using maximum likelihood estimation in SEM, with LISREL. Results showed, due to miss specified parameters and poor goodness-of-fit indexes (χ^2 = 256.58, df = 110, p-value = 0.00, RMSEA = 0.09, CFI = 0.87, GFI = 0.86, and AGFI = 0.80), the functional status model did not fit the sample data. Therefore, based on the modification indices and theoretical reasoning to achieve the best goodness-of-fit (χ^2 = 91.79, df = 91, p-value = 0.46, RMSEA = 0.007, CFI = 1.00, GFI = 0.94, and AGFI = 0.90), the original model was modified.

As shown in **Figure 2,** most of the coefficients for paths in the Functional Status Model demonstrated statistical significance. The exceptions were: 1) emotion-focused coping to functional status; and, 2) emotional representation and emotion-focused coping. Problem-focused coping was found to exert the highest influence on functional status, with a coefficient of total effect of 0.54.



Note: EIR = Emotional Illness Representation; EFCS = Emotion-Focused Coping Strategies; PFCS = Problem–Focused Coping Strategie s; ADL = Activity Daily Living
Chi-Square = 97.79; df = 91; *p*-value = 0.45707; RMSEA = 0.007; CFI = 1.00; GFI = 0.94; AGFI = 0.90

Figure 2 Modified functional status model

Discussion

This study outlined the pattern of association between illness stimuli (discharge readiness) and two parallel interacting pathways of cognitive and emotional illness representation and health outcomes (depressive symptoms and functional status), in a Thai population, using SEM. The results partially verified the proposed Functional Status Model in individuals who have experienced an AMI, with functional status being found to influence discharge readiness, problem-focused coping and depressive symptoms. Even though complex relationships exist among the psychological variables, the final model was found to explain 56% of the variance in the subjects' functional status.

Results of the path analysis revealed that the subjects' discharge readiness directly affected their functional status, and were congruent with prior findings.[14,16] In addition, findings, of this study, indicated that discharge readiness can indirectly affect one's functional status, through complex paths of cognitive illness representations and depressive symptoms. Brummett et al[17] also concluded, though use of path analysis, that negative cognitive illness representation was an indirect predictor of post discharge depressive symptoms, by way of its negative relation with social support. These results support the conclusion, based on the CSM, that cognitive illness representation, when informed by a robust level of discharge readiness, reduces depressive symptoms and increases one's level of functional status.[13,36]

Although previous studies[36] have proposed linking parallel pathways of illness representations to illness outcomes, through coping, the results, of this study, revealed only an indirect effect of cognitive illness representation on depressive symptoms. The lack of congruence between these findings, and those of prior studies, regarding the accuracy of the CSM, may be due to variations in the studies' methodologies. The use of SEM, in this study, permitted simultaneous evaluation of the effects of the parallel pathways of illness representation on latent variables (functional status and depressive symptoms) within the model. One also needs to recognize that the use of multiple regression analysis, in previous studies, was restricted to an additive model, with a high risk of producing spurious results.[37] Due to the mixed complementary points of view, regarding cognitive illness representation; the results of the analysis are unclear. Thus, the effects of positive and negative points of view, in cognitive illness representation, need to be further tested.

Finding that those who had experienced an AMI usually relied more on emotion-focused coping, rather than on problem-focused coping, to reduce the AMI threat (β_{35} = 0.58 and β_{26} = 0.26, respectively) is consistent with prior findings.[10, 38] As has been previously reported, greater use of emotion-focused coping is associated with increased levels of uncertainty or ambiguity, while greater use of problem-focused coping is linked to decreased uncertainty.[38]

Although the path analysis findings, which reveal when subjects engaged more in problem-focused coping they were more likely to have lower levels of depressive symptoms and higher levels of functional status, correspond with those of Bennett and Connell,[24] they do not correspond with the findings of Shen, McCreary and Myers.[8] Such differences may be due to the ceiling effect of the scale and the lack of variability, which limited the predictive utility of problem-focused coping in Shen, McCreary and Myers' study.[8]

The finding that emotion-focused coping, in this study, did not influence functional status directly, but rather indirectly, through depressive symptoms, is consistent with findings of Shen, McCreary and Myers.[8] It should be noted, however, that emotion-focused coping did not decrease depressive symptoms, leading to deterioration of functional status. This suggests that one's emotion-focused coping should be monitored and addressed as needed by the nursing staff to facilitate patients' functional status.

In this study, the original hypothesized path (emotional illness representations effect functional status through emotion-focused coping) was rejected after data analysis. This may have been due to the moderate correlation effect that existed between emotional and cognitive illness representations. Emotional illness representations, of AMI patients, have been reported as the reactions to an AMI and act as a source of information for constructing cognitive illness representation.[13]

Limitations

As with all studies, this study has limitations. Since the sample was obtained from 5 specific public tertiary hospitals, subjects may not have been representative of the total population of Thais who have experienced an AMI. In addition, the generalizability of the findings is limited, since only 180 individuals participated in the study. Therefore, further investigation, with broader, stratified, random sampling of the community (i.e. rural and urban primary, secondary and tertiary hospitals throughout Thailand), is recommended in order to gain more complete data for a structural equation model.

The results show that some subjects did not return to their previous level of functioning. Thus, the functional status model remains questionable, with doubtful predictive utility for use regarding three to six months post discharge. A prospective study to test the functional status model guided by the CSM, in the following months, is needed to further explore factors which affect one's return to prior levels of functional status after experiencing an AMI.

Conclusions

Discharge readiness reveals itself as an important source of information related to perceived illness threat, and can help create illness representations which, subsequently, indirectly, affect illness outcomes through the processing systems. In addition, discharge readiness directly contributes to one's illness outcomes, i.e. functional status and depressive symptoms. Thus, nurses need to assess and take measures, in the form of protocols, to prepare patients and their families for discharge readiness, throughout an individual's hospitalization. One's illness representations also should be evaluated during an individual's hospitalization, so as to better identify those who are likely to experience depressive symptoms with delayed resumption of functional status. While it takes time to conduct a client-focused assessment, the information obtained enables more complete and appropriate individualized care.

Problem-focused coping strategies are recognized as potentially constructive efforts to deal with health threats, when emotion -focused coping strategies are employed depressive symptoms tend to be elevated. Thus, nurses should facilitate the patient's use of problem-focused coping by way of providing coping skill techniques unique to confronting and dealing with problems related to having an AMI, i.e. specific information about how to sequentially handle their problems.

In conclusion, a Functional Status Model, consisting of interacting information processing pathways, was proposed and tested with a specific cohort of Thais who had experienced an AMI. In order for health care professionals to fully comprehend and make use of knowledge regarding the functional status of persons who have experienced an AMI, it may be best to start with an evaluation of their information parallel interaction pathways based on such a model. Comprehensive interventions then need to be initiated, from each dimension, to assure nursing care is integrated, rather than focused on less significant aspects, as the traditional model of general health education has done.

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การทดสอบเชิงประจักษ์รูปแบบจำลองการทำหน้าที่ในกิจวัตรประจำวันในผู้ป่วยกล้ามเนื้อหัวใจตายภายหลังออกจากโรงพยาบาล

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บทคัดย่อ: ภาวะกล้ามเนื้อหัวใจตายเป็นภาวะที่ส่งผลกระทบอย่างมากต่อการทำหน้าที่ในกิจวัตรประจำวัน โดยเฉพาะภายใน 1 เดือนแรกหลังผู้ป่วยออกจากโรงพยาบาล การวางแผนฟื้นฟูและช่วยเหลือผู้ป่วยให้กลับสู่การทำหน้าที่ตามกิจวัตรประจำวันได้อย่างเต็มความสามารถของแต่ละคนเป็นเรื่องที่ซับซ้อนและยังไม่ชัดเจน การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์เชิงสาเหตุระหว่างความพร้อมก่อนออกจากโรงพยาบาล การให้ความหมายเกี่ยวกับโรค การเผชิญปัญหา และ อาการซึมเศร้า ที่มีผลต่อการทำหน้าที่ในกิจวัตรประจำวันของผู้ป่วยกล้ามเนื้อหัวใจตายภายหลังออกจากโรงพยาบาล

กลุ่มตัวอย่างเป็นผู้ป่วยกล้ามเนื้อหัวใจตาย จำนวน 180 คน ที่มารับการรักษาในโรงพยาบาล 5 แห่งในกรุงเทพมหานครและจังหวัดนนทบุรี กลุ่มตัวอย่างทำการตอบแบบสอบถามรวม 5 ชุด ในระยะก่อนออกจากโรงพยาบาล และระยะหลังออกจากโรงพยาบาลแล้ว 1 เดือน ผลการศึกษาพบว่า การให้ความหมายเกี่ยวกับโรค(โดยผู้ป่วย) การเผชิญปัญหา และ อาการซึมเศร้าสามารถทำนายความแปรปรวนของการหน้าที่ในกิจวัตรประจำวันได้ 56% รูปแบบจำลองสุดท้ายที่ปรับแก้มีความสอดคล้องกับข้อมูลเชิงประจักษ์

จากการศึกษาครั้งนี้ ถึงแม้การให้ความหมายเกี่ยวกับโรค การเผชิญปัญหา อาการซึมเศร้า จะมีอิทธิพลทั้งโดยตรงและโดยอ้อมต่อการทำหน้าที่ในกิจวัตรประจำวัน แต่ ความพร้อมก่อนออกจากโรงพยาบาลมีอิทธิพลมากที่สุด ดังนั้น บุคลากรในทีมสุขภาพ ควรเน้นถึงการเตรียมผู้ป่วยให้พร้อมก่อนออกจากโรงพยาบาล

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คำสำคัญ: กล้ามเนื้อหัวใจตายเฉียบพลัน แบบจำลองเชิงสาเหตุ การเตรียมความพร้อมก่อนออกจากโรงพยาบาล การให้ความหมายเกี่ยวกับโรค การทำหน้าที่ในกิจวัตรประจำวัน

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