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Validation of a Thai version of the Hope Scale among patients with acute myocardial infarction

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Abstract

Background: Hope is essential for patients with acute myocardial infarction, which is often regarded as an active coping for those with life-threatening diseases. Higher hope consistently is related to better health outcomes. However, the instrument for assessing hope has not been previously tested among Thai patients.

Objective: This study aimed to assess the validity and reliability of the Hope Scale among Thai patients with acute myocardial infarction patients.

Methods: This was an instrument validation study conducted from March to December 2020. A total of 213 patients with acute myocardial infarction were included and selected using a simple random sampling. The back-translation method was used to translate an English version to a Thai version of the scale. Principal Component Analysis (PCA) and Cronbach's alpha were used for construct validity and reliability.

Results: The findings showed that the Cronbach's alpha of the Thai version of the Hope Scale was acceptable (.75), and the scale consists of four factors, which explained 63.36 % of the total variance. Communalities in each factor ranged from .45 to .84. Overall, the appearance of the factor structures was reasonable and understandable.

Conclusion: The reliability and validity of the Thai version of the Hope Scale were suitable for the measurement of hope in Thai patients. This scale can be used by nurses and others to assess hope in Thai patients with acute myocardial infarction.

Keywords

acute myocardial infarction; factor analysis; hope; instrument; nursing; Thailand

Acute myocardial infarction is one of the major causes of sudden death. It is estimated that 17.9 million people around the world die from acute myocardial infarction annually (World Health Organization, 2019). When patients are diagnosed with ST-Elevation Myocardial Infarction (STEMI) or acute myocardial infarction, they require emergency stenting therapy to return blood flow to the coronary artery (Harvard Medical School, 2019). After they have passed through this unexpected situation, patients typically feel as if they have a fresh start in life and perceive no chest pain as a clear sign that they will not get sick again, can return to work, and usually feel healthier (Snyder, 2002; Hsu et al., 2003).

Snyder (2002) stated that hope is a person's perceived capability to derive pathways to the desired goals and motivate oneself via agency thinking to use those pathways. Higher hope consistently is related to better outcomes in physical health. When a patient facing an initial diagnosis of acute myocardial infarction has hope, that patient will hope for better health, a return to work, and an improved lifelong routine (Kristofferzon et al., 2008; Benyamini et al., 2014). Therefore, hope is essential because it motivates patients with acute myocardial infarction to live longer and to be ready to change their behavior for improved health, which is a strong predictor of a good quality of life. These individuals also show a greater willingness to undertake lifestyle changes and be happier (Alarcon et al., 2013). On the other hand, there is an increased rate of mortality in acute myocardial infarction patients who are found to lack hope (Everson et al., 1996).

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Furthermore, these patients have been found to experience feelings of weakness and were less able to control pain and make adjustments that lead to better health-related quality of life (Bjornnes et al., 2018).

Previous studies about hope in Thailand have focused primarily on chronic illnesses such as cancer, HIV, stroke with rehabilitation phase, and end-stage renal disease. The hope in these patients with chronic illness is usually to stay alive longer and to be able to care for themselves and take care of their own daily activities. Studies on hope in patients with acute illness in other countries have centered on patients with acute myocardial infarction, hypertension, heart failure, and cancer, as well as patients who have undergone cardiac surgery. Findings in those studies have indicated that after patients with acute myocardial infarction had been through a critical situation and coronary artery stenting, they felt like having a new life because they did not feel any chest pain or because they were feeling better (Petrie et al., 1996; Snyder, 2002). Eriksson et al. (2013) found that 3.8% of patients diagnosed with acute myocardial infarction after 1-7 months still had low hope. However, it was also found that if a patient with acute myocardial infarction had hope, they tended to be healthier and were able to return to normal life activities (Kristofferzon et al., 2008; Alarcon et al., 2013; Eriksson et al., 2013). When patients have hope, the body releases endorphins and enkephalins that make the body feel relaxed (Groopman, 2005). As a result, heart rate, respiratory rate, and blood pressure are decreased (Chaudhry & Gossman, 2019), as does the level of cortisol, which is a cause of clotting in coronary arteries (Jutla et al., 2014).

Many studies have used the Herth Hope Index to assess hope in patients, such as hope assessment among the elderly with coronary artery disease (Sriwirun et al., 2019), Buddhist practice, health perception, and hope in persons with HIV infection/AIDS (Rakhab et al., 2007), and Hope among breast cancer patients receiving chemotherapy (Kaewnil et al., 2015). Moreover, it has already been translated into Thai with psychometric properties of the Thai Herth Hope Index in patients with stroke (Tantisuvanitchkul et al., 2020).

In this study, the researchers set out to investigate another specific tool to evaluate hope in patients with acute myocardial infarction; the assessment tool should be coherent, easily understood, and comprehensive. The Hope Scale was developed and analyzed by Snyder (1995) to assess hope using 12 items, and it has been used in studies of acute illnesses such as spinal cord injury (Blake et al., 2018). For nurses, tools such as these are important for evaluating each patient's level of hope and helping patients stay healthy and live longer. After assessing the level of hope, the nurse should be able to provide guidance as to specific areas of lowered hope and then recommend or make use of particular interventions (Herth & Cutcliffe, 2002).

To assess the level of hope in patients with acute myocardial infarction, a highly valid and reliable instrument with the appropriate format and number of questions is needed. To date, no such instrument for Thai acute myocardial patients has been developed and tested. The purpose of this study was to validate a Thai version of the Hope Scale among Thai patients with acute myocardial infarction in order to assess whether it would be valid in a new population.

Methods

Study Design and Study Participants

This was an instrument validation study, which involved 213 patients with an initial diagnosis of acute myocardial infarction and measured the validity and reliability of the Hope Scale. The participants were selected from three central Thai hospitals with the approval of the Institutional Review Board of each hospital. There were 213 STEMI patients from the cardiology outpatient department recruited using a simple random sampling. In exploratory factor analysis, the sample size had to be 200 cases to meet the statistical power (Hair et al., 2010).

The inclusion criteria of the sample were (1) Thai patients with a first diagnosis of acute myocardial infarction and post percutaneous transluminal coronary angioplasty who had come for follow up at the outpatient of cardiac center within 1-7 months; (2) Aged between 30 – 59 years; (3) no cognitive impairment and no disease complications based on the current medical records; (4) willingness to participate in the study; and (5) good reading and writing skills in the Thai language. The exclusion criteria were applied to subjects who had acute symptoms such as dyspnea on exertion or those with acute heart failure or other unstable conditions.

Ethical Considerations

Ethical approval was obtained from the Ethics committee of the Faculty of Medicine, King Chulalongkorn Memorial and Siriraj Hospitals (IRB NO.063/63, 221/2563, and from the Ethic committee of the Police General Hospital (IRB NO. Nq09011120/63). The purpose of the study, the benefits, risks, and duration of the study were communicated to all patients. All participants signed informed consent forms before completing the questionnaires.

Instrument Translation and Validation Process

In this study, hope is the perception of the person of internal motivation for the desired goal. The Hope Scale was developed by Snyder (1995). Twelve items were selected by consensus that constituted the face validity of the scale and then structured on a Likert scale from 1 to 4 for a range of responses on a self-rating questionnaire (Snyder, 1995). Of these twelve items, four were positive items, four were negative items, and four items served as distracters to make the content of the scale less obvious. These distractor items were not calculated into the hope score.

Participants were asked to respond to each item from 1 (definitely false) to 4 (definitely true) with a total score ranging from 8.00 to 32.00 (Snyder, 1995, 2002). Analysis

indicates that the Hope Scale has acceptable internal reliability. More specifically, the item-remainder coefficients for each item are significant (ranging from .23 to .63), and the coefficient alpha is acceptably high (Cronbach's alphas of .74 to .84) (Snyder, 1995).

Translation process

The back-translation method was used in this study (Dhamani & Richter, 2011). The tool was translated from English into Thai by two instructors at the Chulalongkorn University Language Institute who are experts in both Thai and English languages, and by an independent translator who is a nurse instructor with expertise in cardiovascular nursing and who studied abroad for more than five years. The investigators compared both versions in the original language, checked with the translators and advisors, discussed the differences, and produced a final consensus version. The translation process results indicated that the original version and the Thai version of the scale had a similar interpretation. The researchers did not find any misunderstanding in the translation.

Content validity

The validity of the content of the final Thai version was assessed by five experts: a cardiologist, a psychiatrist, and three nursing educators to ensure that it was acceptable and that the meaning of each item was correctly translated. The experts were asked to assess the level between the items and the definition of the concepts as presented. A four-point Likert-type scale ranging from 4 (definitely true) to 1 (definitely false) was used to rate each item, and the content validity index (CVI) was calculated for the Hope Scale. The average level of relevance of the questionnaire items used was 100%, which showed that the Thai version of the Hope Scale accurately reflected the English version. The CVI was found to be 1.0, indicating a good level of validity of the content for the Thai version.

Construct validity and reliability

Before testing the scale with a large sample size, pilot testing was conducted among 30 samples (Hair et al., 2010), Thai acute myocardial infarction patients at the outpatient medical center and outpatient post-cardiac angioplasty center at Police General Hospital, in order to finalize the Thai version of the Hope Scale. It is noted that these 30 samples were not included in the main study. The results indicated that internal consistency was acceptable (DeVellis, 2012), with Cronbach's alpha of the Thai version of the Hope Scale of .75. The item-total and inter-item correlation factors were also acceptable (r = .09 to .56, r = .00 to .75, respectively). According to Hair et al. (2010), item-total correlation with coefficients between .3 and .7 was considered acceptable.

After the pilot testing, Exploratory Factor Analysis (EFA), especially Principal Component Analysis (PCA) extraction, was applied with varimax rotation for the extracted factors. For extraction and conceptual consideration, factors with eigenvalues greater than one were extracted, a screen plot was prepared, and the cumulative percent of variance was extracted. Factor loadings ≥ .4 were set as sufficient to establish a factor (Hair et al., 2010).

Data Collection

The data were collected from March to December 2020. After obtaining permission to access the subjects, the investigator conducted the study in the external cardiology departments. The researchers explained the advantages and risks of intervention and protection of human rights in non-technical terms and then obtained patient approval to participate in the study. If patients met the inclusion criteria and accepted the invitation to participate, they had to sign a consent form. Participants were then encouraged to complete the Hope Scale; however, during the data collection, participants were able to refuse or leave with no consequences. Each process lasted about 10-15 minutes.

Data Analysis

Statistical analysis was performed with the SPSS Statistics software package version 22 (license by Chulalongkorn University). The level of statistical significance was assigned a p-value of .05. Descriptive statistics and exploratory factor analysis were used to examine the construct validity of the Hope Scale. The data met the significant assumptions of factor analysis.

Results

Characteristics of the Participants

The characteristics of the 213 cardiac patients in Thailand who met the study's inclusion criteria are shown in **Table 1**. Participants were between the ages of 33 and 59. The proportion of men was 87.3%, whereas the proportion of married persons was 78.4%. With regards to education, the largest proportion of participants (53.1%) had a higher education, followed by those with a secondary school education (35.7%) and a primary school education (10.8%). Most participants (41.3%) earned between 15,000 and 30,000 Baht monthly (~ 500 – 1,000 USD). The Cardiac Canadian Society Class was used to categorize the severity of patient symptoms: class I (62.4%), class II (8.0%), class III (13.2%), and class IV (16.4%).

Factor Analysis Results

Prior to the exploratory factor analysis, the assumptions required for the factor analysis were tested. The linearity of the variables and the factorization characteristics of the variables were analyzed. The correlation coefficients were .75. In the present study, the Kaiser-Mayer-Olkin measure of sampling adequacy was .71, which is considered a good value. The Bartlett's test of sphericity of the 12 items showed statistical significance (x^2 = 647.08, DF = 66, p-value = .000), indicating that the population correlation matrix was not an identity matrix.

Table 1 Demographic and clinical characteristics

Characteristics	*N* = 213	Percent (%)
Sex		
Male	186	87.3
Female	27	12.7
Age, min-max, (mean ± SD*)	33-59, (51.88±5.12)	
Financial status, monthly income		
< 15,000 Baht	38	17.8
15,000–30,000 Baht	88	41.3
30,001–45,000 Baht	60	28.2
> 45,000 Baht	27	12.7
Marital status		
Single	25	11.7
Widowed	7	3.3
Divorced	9	4.2
Separated	5	2.3
Married	167	78.4
Education level		
No education	1	0.5
Primary school	23	10.8
Secondary school	76	35.7
Higher education	113	53.1
Cardiac Canadian Society Class		
Class 1	133	62.4
Class 2	17	8.0
Class 3	28	13.2
Class 4	35	16.4

*SD = standard deviation

The principal component analysis extraction method was used for extracting the factors. The Hope Scale had an orthogonal rotation of varimax factors (**Table 2**). Four factors that explained 63.36 % of the total variance were identified. Communalities in each factor ranged from .45 to .84. Factors 1 through 4 explained 21.26 %, 15.99 %, 15.31 % and 10.80 %, of the variance, respectively (**Table 2**).

Table 2 Total variance explained and communalities (*N* = 213)

Item	Initial Eigenvalues			Rotation Sums of Squared Loadings			Communalities
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
Hope 1	3.143	26.195	26.195	2.551	21.255	21.255	.597
Hope 2	1.983	16.523	42.718	1.919	15.996	37.251	.642
Hope 3	1.476	12.297	55.015	1.837	15.306	52.557	.585
Hope 4	1.001	8.342	63.357	1.296	10.800	63.357	.683
Hope 5	.813	6.775	70.132				.680
Hope 6	.786	6.547	76.679				.446
Hope 7	.679	5.659	82.338				.711
Hope 8	.602	5.019	87.357				.580
Hope 9	.506	4.214	91.571				.450
Hope 10	.425	3.538	95.109				.838
Hope 11	.323	2.695	97.804				.575
Hope 12	.264	2.196	100.000				.817

Scoring

The maximum total score is thirty-two, and a higher score means higher hope (Snyder, 1995, 2002). Previous research did not mention grade levels associated with scoring; however, the authors divided the evaluation scale into three levels: low, moderate, and high hope. A score of 8.00 – 15.99 is identified as low hope, 16.00 - 24.99 as moderate hope, and 25.00 - 32.00 as high hope.

Factor Loading

The Thai version of the Hope Scale had four factors, with a total of 12 items. Based on factor loading in **Table 3**, Factor 1 had six pathway items (Items 1, 2, 4, 6, 8, and 9), Factor 2 had two “agency” items (Items 10 and 12), Factor 3 had two “worry” and “fatigue” items (Items 3 and 7), and Factor 4 had two “emotional” items (Items 5 and 11).

Table 3 Factor loading

Rotated Component Matrix	Factor			
Item	**1**	**2**	**3**	**4**
1. I can think of many ways to get out of a jam	**.732**	.176	-.025	.172
2. I energetically pursue my goals	**.548**	.153	-.420	.376
3. I feel tired most of the time	-.070	.012	**.754**	.108
4. There are lots of ways around any problem	**.786**	.202	.152	-.024
5. I am easily down in an argument	.048	-.029	.082	**.818**
6. I can think of many ways to get the things in life that are important to me	**.469**	.129	-.407	.209
7. I worry about my health	.106	-.016	**.819**	.172
8. Even when others get discouraged, I know I can find a way to solve the problem	**.703**	-.254	-.063	-.131
9. My past experiences have prepared me well for my future	**.569**	.354	.005	-.017
10. I've been pretty successful in life	.129	**.905**	-.042	.029
11. I usually find myself worrying about something	-.005	.054	.469	**.593**
12. I meet the goals that I set for myself	.149	**.892**	-.004	.000

Factor loading > .40 are in boldface

Discussion

In this study, the reliability and validity of the Hope Scale were found to be acceptable for the evaluation of hope in Thai patients with acute myocardial infarction. The overall ranges of the item-total and inter-item correlation coefficients were appropriate. Cronbach's alpha showed that the questionnaire is sufficiently reliable (α = .75). Most of the items seemed worth keeping, as deletion resulted in a decrease in the alpha.

While removal of some items that had $r < .30$, Cronbach's alpha was not different from retention of all items. Furthermore, all the items used to measure hope matched with the original version. These results were consistent with Hair et al. (2010) which indicated that an item-total correlation coefficient of > .30 was found to be acceptable. For inter-item correlations, coefficient < .30 indicated that items were not present in the tool, whereas a coefficient > .70 showed repetition.

This exploratory analysis of the Hope Scale in the Thai version revealed four subscales of hope: the agency, the pathway, the worry and fatigue, and the emotional. The Thai version was found to be inconsistent with the original version, but there was a difference between the articles in each sub-scale. Due to the major cultural and linguistic differences between Thailand and Western countries, it is important to take this into consideration in the points that discuss agency, pathway, and distraction. Additionally, one-third of participants had secondary school education (35.7%). They were able to seek out information about cardiovascular disease, so they understood and had an awareness of the symptoms and the consequence of cardiac disease (Rustøen et al., 2005; Wang et al., 2006). Once they had gotten past the critical situation and no longer felt chest pain, it signaled to the patients that they had survived and were recovering from the disease. As a result, patients have hope consistent with the study of Sriwirun. et al. (2019), which found that the elderly with coronary artery disease tend to have a high hope score.

Furthermore, many of the participants were married (78.4%), so they had someone to take care of them. In Thailand, people usually have close relationships with their extended families, and most participants lived with family members, so it was possible for family members to participate in the care and support of these patients (Polsook & Aungsuroch, 2021).

In the subscales of all items of the Thai version, there were differences from the original version with regard to agency, pathway, and distraction. However, all elements reflected and presented hope in patients with myocardial infarction. Therefore, for Thai patients with acute myocardial infarction, the Thai version of the Hope Scale has proven to be a reliable and valid measure of hope.

For nurses, the term of hope is related to nursing activities; it is because nurses are seen as a source of hope for empowerment and encouragement for patients to survive, which fills the patients with confidence in the treatment and promotes improved outcomes (Stephenson, 1991; Herth & Cutcliffe, 2002). Thus, the nurses can evaluate the patients' hope in order to plan appropriate interventions for patients with a low level of hope.

This study was, of course, subject to some research limitations. Participants were diagnosed with an acute myocardial infarction, which is a group of heart diseases. Therefore, the conclusion cannot be generalized to patients diagnosed with other medical conditions like non-communicable diseases or cardiac surgery. Future studies are necessary to evaluate the use of the Hope Scale among other groups of patients with cardiovascular, non-communicable disease, and other conditions in Thailand. A sample size of 300 or more, according to the rule of thumb, is also needed for good power factor analysis (Williams et al., 2010).

However, the study can contribute to knowledge development and strengthen nursing science to improve care for patients with acute myocardial infarction. Based on the finding of the study, hope's assessment should be promoted to enhance the care of acute myocardial infarction patients because low levels of hope can be linked to the recurrence of coronary artery stenosis. It would be beneficial for patients with acute myocardial infarction to be screened for hope so appropriate intervention can be

provided in an effort to decrease the readmission rate among patients in this group. Future experimental studies are needed in order to demonstrate genuine effects: decreasing readmission in this group, improving quality of life, living longer, and decreasing the cost of admission.

It seems clear that nurses should promote hope as part of the care of acute myocardial infarction patients. As part of the multidisciplinary care team, nurses can screen the level of hope and discuss available options with the health care team to provide appropriate intervention for each patient. For policymakers, it should be better if they can pass the screening tool of hope to help patients deal with the severity of the disease to improve quality of life and decrease the readmission rate.

Conclusion

The reliability and validity of the Thai version of the Hope Scale were suitable for the measurement of hope in Thai patients with acute myocardial infarction. However, information on the reliability and validity of the instrument should be confirmed in larger populations. Although there were differences in the components of the items of the factor analysis between the Thai version of the Hope Scale and the original version, the items of the Thai version of this questionnaire were the same as those in the original version and based on hope. This tool and the knowledge contained in this article can be used by nurses and others to assess hope in Thai patients with acute myocardial infarction.

Declaration of Conflicting Interest
There are no potential conflicts of interest to declare.

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Authors' Contributions
All authors participated and contributed equally to the study. AT and RP designed the study, collected data, analyzed the data, wrote and revised the manuscript. All authors agreed with the final version of the article to be published.

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Data Availability Statement
Data sets generated and/or analyzed during the current review are available from the corresponding author upon reasonable demand.

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