FACTORS PREDICTING MEDICATION ADHERENCE AMONG THAI POST MYOCARDIAL INFARCTION PATIENTS

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ABSTRACT: Medication adherence is vital for post myocardial infarction patients to maintain their health. Poor medication adherence often is ignored and linked to increased adverse outcome. The literatures in Thailand found that factors related to medication adherence remain unclear. Based on the theoretical and empirical literature, the World Health Organization's multidimensional adherence model can explain the relationships among proposed variables to medication adherence. A study conducted on factors predicting medication adherence is needed before developing the intervention for patients in this group to reduce morbidity and mortality, and improve quality of life. The aim of the study is to examine the predictive ability of education level, financial status, social support, symptom severity, depression, barriers, knowledge, and self-efficacy on medication adherence in Thai post myocardial infarction patients. A descriptive–correlational study was conducted to examine whether the potential factors can predict medication adherence among post myocardial infarction patients in Thailand. In all 233 post myocardial infarction patients were recruited from large teaching hospitals from all regions of Thailand. All research instruments were tested for psychometric properties and met the criteria for appropriate psychometric testing. Data were analyzed using multiple regression. The mean score of medication adherence ($\bar{x}$=18.39, SD=1.84) was close to the maximum score of 20. Only two variables were significant predictors. Self-efficacy had a significant positive effect on medication adherence (β=.34, p< .01). Depression was significantly negatively correlated with medication adherence (β= -.18, p< .01). These two variables accounted for 18% of the explained variance in medication adherence (p< .01). When designing effective nursing interventions, nurses should encourage self-efficacy on medication adherence. Additionally, nurses should identify or have awareness of depressive symptoms in this group in order to enhance medication adherence so as to decrease severity of disease and improve quality of life.

Keywords: Medication adherence, post myocardial infarction

INTRODUCTION

Myocardial infarction (MI) is one of the most prevalent causes of death in developed countries. Nonetheless, MI is also the leading cause of death and morbidity in Thailand, which is not considered a developed country [1]. After receiving acute treatment, post- MI patients must adhere to specific medication regimens because they play a crucial role in maintaining health. However, prior studies have found that as few as 8% take their medication exactly as prescribed in Western countries [2-4]. The literature shows significantly low rates of medication adherence in post-MI patients in the first three months after hospital discharge because clinical symptoms have improved [5, 6]. Various reasons are given for not adhering to prescription medications, such as the complexity of drugs and their dosages, lack of understanding of the purpose of the medication, poor communication and education at discharge about the importance of medication, and concerns about the possibility of adverse effects and medication costs [3, 7, 8].

Most studies on medication adherence have been conducted in the United States. In Thailand, one study examined medication self-care practice in patients with coronary artery disease (CAD) and reported that 16.7 % of patients stopped taking medicine because: a) they believed only patients who had symptoms took medication, b) patients did not know the purpose of the medication, and c) patients were concerned about the possibility of adverse effects from the medication [9]. Because Thai and American cultural characteristics are different, medication adherence remains unclear in Thai context, so a study of problem with medication

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adherence among Thai post-MI is needed to prove that research findings may also differ. Thus, the literatures in Thailand found that factors remain unclear related to medication adherence.

Based on the theoretical and empirical literature, the World Health Organization's multidimensional adherence model [10] can explain the relationships among proposed variables to medication adherence. A study conducted on factors predicting medication adherence is needed before developing the intervention for patients in this group to reduce morbidity and mortality, and improve quality of life. Thus, the aim of this study was to determine the predictive ability of social support, financial status, education, symptom severity, depression, barriers, knowledge, self-efficacy, and medication adherence in order to reduce morbidity and mortality among Thai post-MI patients.

MATERIALS AND METHODS

A descriptive–correlational study was conducted to examine whether the potential factors can predict medication adherence among post myocardial infarction patients in Thailand. In all 233 post-MI patients were recruited from tertiary care hospitals from all regions of Thailand which the rule of thumb of multiple regressions, the maximum ratio of observation to independent variable is 20:1 that reflect statistic power [11]. Subject's inclusion criteria were: (1) Thai post-MI patients who attend follow up at cardiology outpatient department during three months after discharge; (2) age $\geq$ 20 years old; (3) no cognitive impairment and no disease complications such as heart failure and heart attack; and (4) willingness to participate in this study.

MEASURES

Modified ENRICHD social support instrument (MESSI) assesses the four defining attributes of social support: emotional, instrumental, informational, and appraisal. The researchers modified the ESSI to assess social support specific to medication adherence among Thai post-MI patients. Item responses were rated on a Likert scale, ranging from 1 (none of the time) to 5 (all of the time) [12]. The total MESSI score was obtained by summing all four attributes of social support, with possible scores ranging from 12 to 60 points. A higher MESSI score indicated higher social support in medication adherence. The internal consistency (Cronbrach's alpha coefficient) was 0.92.

Center for epidemiologic studies depression scale (CES-D) measures a current level of depressive symptomatology. It is a screening test to identify groups at risk of depression or in need of treatment. This instrument is a 20-item tool, on which respondents' rate answers on a 4-point Likert-type scale from 0 (nothing) to 3 (often). The total CES-D score was 60 in which a score of 16 or more is indicative of symptoms of depression [13]. The Cronbach's alpha coefficient was 0.72.

Barriers to medication adherence measures barriers to taking medication. It consists of 11 items, on which participants rate how much they agree or disagree with each item on a scale from 0 (strongly disagree) to 10 (strongly agree). Items are then summed for a total score, ranging from 0 to 110 [14]. A higher barrier to medication adherence score indicates barriers in medication adherence. Cronbrach's alpha coefficient was 0.86.

Coronary heart disease awareness and knowledge questionnaire (CHDAKQ) was used to measure cardiac knowledge. This instrument consisted of 20 items measuring knowledge on pathophysiology, causes, risk factors, symptoms and treatment of coronary artery disease (CAD). Each correct answer scored one point and each incorrect answer scored zero points. The total CHDAKQ score was ranging from 0 to 20 points [15]. A higher CHDAKQ score indicates greater CAD knowledge. The test –retest was used to test reliability which was r =0.86.

Self-efficacy for appropriate medication use scale was used to measure self-efficacy. Patients were asked about their level of confidence about taking medication correctly (1= not confident, 2= somewhat confident, and 3= very confidence). The potential score for the 13- item scale ranged from 13 to 39 [16]. Higher scores indicated higher levels of self-efficacy for medication adherence. Cronbrach's alpha coefficient was 0.90.

Morisky's self-reported measure of medication adherence assesses adherence to medication regimens. The rating is based on a Likert-type scale, 1 (nothing) to 4 (very often). Scores for each of the five items were summed to give a scale score ranging from 5 to 20 [17]. A higher score indicated a higher medication adherence. The test-retest was used to test reliability which was strong (r =1.0).

This study was approved by the ethics committee of large teaching hospitals from all regions of Thailand before data collection. All subjects agreed to participate and signed a consent form after being given a written description and further verbal

Table 1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.408[a]	.167	.163	1.68550
2	.432[b]	.187	.180	1.66864

a. Predictor: (Constant), self-efficacy
b. Predictor: (Constant), self-efficacy, depression

Table 2 ANOVA[c]

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	131.422	1	131.422	46.260	.000[a]
	Residual	656.252	231	2.841		
	Total	787.674	232			
2	Regression	147.271	2	73.635	26.446	.000[b]
	Residual	640.403	230	2.784		
	Total	787.674	232			

a. Predictors: (Constant), self-efficacy
b. Predictors: (Constant), self-efficacy, depression
c. Dependent Variable: Medication adherence

Table 3 Coefficients[a]

Model	Unstandardize Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	16.244	1.225		13.257	.000	13.829	18.658		
Education	.087	.092	.063	.943	.347	-.094	.268	.790	1.266
Financial status	.047	.065	.052	.727	.468	-.080	.175	.701	1.427
CCS	.006	.111	.003	.050	.960	-.213	.224	.926	1.080
Social support	-.014	.010	-.100	-1.471	.143	-.033	.005	.764	1.308
Depression	-.044	.017	-.182	-2.540	.012	-.079	-.010	.693	1.442
Barriers	-.005	.007	-.050	-.767	.444	-.019	.009	.848	1.179
CAD Knowledge	-.011	.053	-.013	-.209	.835	-.115	.093	.898	1.114
Self-efficacy	.101	.021	.336	4.880	.000	.060	.141	.746	1.340

a. Dependent Variable: Medication adherence

information about the research project.

Data analysis used the $p<0.05$ value for statistical significance. Descriptive statistics delineated characteristics of the sample and examined the distribution of demographic variables, and the predictive ability of potential factors were analyzed using multiple regression.

RESULTS

Characteristics of the participants

Most of the participants were males (65.2%) and the mean age was 61 years (SD= 11.7). Most of the participants were married (73.4%) and nearly half of participants were non working (41.2%). Among participants, most had the National Health Security (74.7%). Education levels were primary school (60.9%), high school (11.6%), and lower secondary school (9.9%), respectively. Most of the participants had no salary (35.2%). For symptom severity according to the Cardiac Canadian Society Classification [18], participants had severity class I (49.4%), class II (23.2%), class III (17.6%), and class IV (9.9%), respectively. All participants non-exhibited symptoms of depression.

Predictors of medication adherence

The mean score of medication adherence ($\bar{x}$=18.39; SD=1.84) was close the maximum score which was 20. Only two variables were significant; self-efficacy had a significantly positive association with medication adherence (r =.40; p< .01). Depression and barriers were significantly negatively correlated to medication adherence (r = -.28 and -.157; p< .01 respectively). The overall regression model is shown in Table 1. Multiple R (.432) and R^2 (.187) are presented, followed by the adjusted R^2 (.180) and the standard error of estimate (1.668). The table shows that both self-efficacy and depression were correlated with medication

adherence (R^2=.187), two variables explaining 18% of the variance (p< .01). The overall test for the significance of the regression is presented in Table 2. Results show that the overall *F* ratio for this analysis was 26.446; p< .000. Thus of all, independent variables, self-efficacy and depression, were significantly correlated with the dependent variable, medication adherence. Upon further examination, only the coefficient for self-efficacy and depression were significant beyond the .05 level. Education level, financial status, social support, symptom severity, barriers, and knowledge were not significant. This study indicated no multicollinearity in this sample where the lowest tolerance was .693 and the variance inflation factor (VIF) was 1.080 to 1.442 (VIF less than 10) as shown in Table 3.

DISCUSSION

According to current findings**,** two predictors – self-efficacy and depression- explained medication adherence among Thai post-MI patients. Self-efficacy had a positive correlation with medication adherence because the participants had confidence in taking medication, even though they had a lot of work to do or to travel a long distance from home. This result supports other studies in that self-efficacy had a positive correlation with medication adherence [19, 20]. Additionally, Molloy [21] showed that high level of self-efficacy is related to adherence to medication in patients with coronary heart disease. Moreover, Barclay [22] and Liang et al. [23] found that self-efficacy was an important predictor and had a significant positive relationship to medication adherence both in asthma and cancer patients. Regarding depression, that was a predicting factor of medication adherence in this study, the participants might not take medication if they feel hopeless or give up when they know the hazard of the disease or have to restrict some activities. The result is supported by a previous study which found that depression has been associated with failure to adhere to medication prescriptions [21]. Likewise, Cohen [24] investigated adherence in the context of cardiovascular risk reduction and demonstrated that poor adherence occurs when patients do not take their medication correctly due to depression.

Other variables- social support, financial status, education, symptom severity, barriers, and knowledge unpredicted medication adherence. Social support unpredicted medication adherence because most of the participants were elderly people which mean age of 61 years. Because Thailand had an extended family, most of the participants live with family members, it is possible that family members participated in care and supported medication adherence in these patients [25, 26]. This result contrasts other studies in that social support had a positive correlation with medication adherence because they need family member to help them for medication taking [25]. Additionally, social support was shown to have a marked factor impact on the progression of MI and was positively linked with medication adherence across different chronic illnesses [21, 27]. Regarding financial status, the result contrast with a previous study [28] because Thai health care covers all citizens, therefore they have got access to medication without paying [21]. Education did not predict medication adherence. Even though more than half of the participants had primary education (60.9%), they all trust the doctors who are taking care of them [29]. Thus, the participants believed that if they obey the doctor, it will be good for their health. As for symptom severity, nearly half of the participants had class I (49.4%): angina only during strenuous or prolonged physical activity and the participants can do any activities because they do not have clinical symptoms [18]. This is in contrast to previous studies, where symptom severity was consistently related to medication adherence, and higher severity of symptoms related to poor medication adherence [27]. Regarding barriers, that included poor communication and education at discharge about the importance of medications, complexity of medication regimen, medication costs, adverse side effects, and lack of knowledge about possible adverse effects [9]. The results show unpredictable medication adherence in this study because Thai health care policy guarantees coverage for all citizens, so the participants can get the access to health care service without pay for medication [24]. For the other barriers do not predict medication adherence because the participants remember the time, number of medication, bring medication when they go outside, and they belief that if they take medication, it will decrease severity of disease and no chest pain [24, 28]. These results differ from previous studies which demonstrated that barriers were related to medication adherence among cardiovascular patients [27]. Regarding knowledge, the results show that there is no prediction to medication adherence. The result contrasted with previous studies which showed that better knowledge is related to medication adherence [18, 27].

CONCLUSION

Self-efficacy and depression were found as the

significant predictive factors of medication adherence. This is a cross sectional study. Future studies are needed with an experimental/quasi experimental design with intervention and control groups that promote self-efficacy and anti depression intervention to show that the two variables are effective in increasing medication adherence in this group in order to enhance medication adherence so as to decrease adverse effects of disease and improve quality of life.

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