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RESEARCH ARTICLE

Factors Predicting Hospital Readmission among Thais with Post Myocardial Infarction [version 1; peer review: 1 approved with reservations]

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v1 **First published:** 25 May 2021, **10**:415
https://doi.org/10.12688/f1000research.52374.1
Latest published: 25 May 2021, **10**:415
https://doi.org/10.12688/f1000research.52374.1

Abstract
Background: Readmission after an acute myocardial infarction is not only common and costly but can also impact patients' quality of life and mortality. This retrospective observational study was conducted to determine the impact of sociodemographic variables, clinical variables, and hospital readmission among post-myocardial infarction patients in Thailand. Few, if any, previous studies have investigated the factors predicting readmission rates over variable time periods. We aimed to provide such information to prevent readmission in the future.
Methods: Between October 1, 2014, to September 30, 2018 a total of 376 post-myocardial infarction patients of Roi-Et hospital were recruited for this study. The criteria of data collection concerned the rate of readmission, gender, comorbidities, anaemia, chronic kidney disease, complication, smoking, and type of myocardial infarction. A measurement period was seven-day, 30-day, six-month, and one-year of readmission. Data were analyzed using percentage, mean, standard deviation, and logistic regression analysis.
Results: The highest readmission rate at six-month, 30-day, seven-day, and one-year was 52.2%, 30.4%, 10.6%, and 6.8%, respectively. None of the predictors were significant for seven-day and one-year of readmissions. Meanwhile, hypertension comorbidity and anaemia were identified as the significant predictors for early 30-day readmission whereas atrial fibrillation complication, chronic kidney disease, and smoking were the significant predictors for late six-month readmission.
Conclusions: Multiple factors including HT comorbidity, anaemia, atrial fibrillation, chronic kidney disease, and smoking predict readmission among Thais with post myocardial infarction. This study

Open Peer Review

Approval Status ?

	1
version 1 25 May 2021	? view

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demonstrated that rates and predictors of readmissions in short-term and long-term periods are different. Therefore, various screening tools and interventions are required.

Keywords
Readmission, Risk factor, Myocardial infarction

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Author roles: Phemphul C: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Validation, Writing – Original Draft Preparation, Writing – Review & Editing; **Pansila W**: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Supervision, Validation, Writing – Original Draft Preparation, Writing – Review & Editing; **Vibulchai N**: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Validation, Writing – Original Draft Preparation, Writing – Review & Editing; **Wongvipaporn C**: Conceptualization, Investigation, Methodology, Supervision, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: Chuthaporn Phemphul was supported by the research grant from the Health Systems Research Institute (HSRI), Thailand (NO. 61-059).
The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

How to cite this article: Phemphul C, Pansila W, Vibulchai N and Wongvipaporn C. **Factors Predicting Hospital Readmission among Thais with Post Myocardial Infarction [version 1; peer review: 1 approved with reservations]** F1000Research 2021, **10**:415 https://doi.org/10.12688/f1000research.52374.1

First published: 25 May 2021, **10**:415 https://doi.org/10.12688/f1000research.52374.1

Introduction

Acute myocardial infarction (AMI) has become a significant health problem with high morbidity and mortality rates. Despite dramatic improvement in outcomes with medical therapy, admission rates following AMI hospitalization remain high. Previous studies have found that early readmission rates within seven-day of post-AMI discharge ranged from 4.8%[1] to 11%[2], while late readmissions rate of 30-day, six-month, and one-year readmissions ranged from 11% to 14%[3], 20.4%[1] to 33.8%[2], and 21.3[4] to 49.9%[5], respectively. The highest incidences of readmissions not only increase healthcare costs by 60%[6], but also expose patients to long-term hospitalisation-associated complications. Readmissions for AMI are typically preceded by a recurrent AMI and related cardiovascular conditions[1] in which are often assumed to indicate incomplete treatment in hospital, poor coordination of services or communication of discharge plans, or lack of healthcare access in early follow-up care[7]. As a consequence, readmission is of high interest, and considered as a quality indicator for hospital care[8].

In order to reduce readmission rates in patients with AMI, the predictions on patients who are likely to be readmitted and the intervention should be taken into account. Nevertheless, due to inconsistency of risk-predictive models, and the performance of these models, the problem of readmission rate continues. Most existing models were developed in different settings and periods, thus may not be appropriate to be applied in other contexts. Previous studies[1–3,9–11] have identified that clinical and laboratory parameters, including atrial fibrillation, severity of AMI, and hypertension, confer a higher risk for an early period of cardiovascular admission, whereas smoking and the burden of comorbid non-cardiac illness, including chronic kidney disease, diabetes mellitus, hypertension, anaemia, and pulmonary disease, raises the risk for AMI–related complications in late readmission. These factors may potentially modify the target for future interventions.

In Thailand, it is suggested that readmissions have negative impacts on both hospitals and patients. Also, it is a huge economic burden to the nation. A prior study in a Thai hospital[12] revealed that the unplanned readmission rate at one year after hospital discharge was 13.5% and 7.8% in the group of patients with unstable angina and non-ST elevation MI (NSTEMI), respectively. Most patients had angina at presentation[12,13]. A recent study[14] has also revealed that one-third of coronary artery disease patients had been readmitted at one year after hospital discharge once (40.2%) whereas twice and three-time readmissions were found in 35.5% and 11.2% of patients, respectively. The most significant predictive factor for readmission was social support. Nonetheless, there were few studies investigating the factors predicting rates of rehospitalization, especially in AMI patients after hospital discharge over variable time periods. According to previous studies[15,16], it was indicated that different variables might have an influence on readmission period over different timescales. It is suggested that early rehospitalization is associated with clinical and laboratory parameters. On the contrary, late rehospitalization is associated with patients' behaviours and the burden of chronic diseases. To address this gap of knowledge, this study was designed to determine predictors of hospital readmissions among Thai AMI patients in early and late periods, in which early readmission were defined as readmissions within seven-day post discharge from index hospitalisation while late readmissions were defined as readmissions within 30-day, six-month, and one-year following hospital discharge.

Methods

Settings and study population

This study was a retrospective study using an electronic medical database (EMD) review at Roi-Et hospital, a tertiary care hospital in a large metropolitan area of Roi-Et province, Thailand. The 820-bed hospital serves as a referral centre and an excellent centre of heart diseases in the middle north-eastern part of Thailand. Data entry into the EMD concerned post myocardial infarction patients admitted between October 1, 2014, to September 30, 2018. Patients were identified based on qualifying diagnostic-related grouping codes (ICD I210-I213, ICD I214) indicating a primary diagnosis of myocardial infarction (MI) at discharge. Hospitalizations for patients aged ≥18 years were included. In alignment with the qualifying diagnostic-related grouping codes, all MI patients at discharge were eligible (N=484). We excluded hospitalizations during which a patient died (N=27), was transferred to another hospital (N=17), or was discharged against medical advice (N=8). Incomplete clinical data of the patients were excluded (N=56). Thus, a total of 376 patients met the selection criteria. Of those discharged with a primary diagnosis of MI during the designated time period, 161 were readmitted for MI and 215 were not readmitted (Figure 1).

For this study, a readmission was defined as the first admission to Roi-Et hospital within seven-day, 30-day, six-month, and one-year of being discharge. A readmission was only counted once as a readmission, relative to the prior index admission. All subsequent admissions then re-entered the cohort as a new index admission. All elective readmissions were excluded from the data set.

Patient and public involvement

This research did not involve any patients or public since its procedures included only retrospective data collection.

Potential predictors

Considered variables were retrieved from literature reviews[1–3,9–11] and selected from the existing database, as well as some that could be derived. The potential predictors of readmission among patients with AMI were gender, diabetes and hypertension comorbidities, anemia with hematocrit < 33 vol%, stage-3 chronic kidney disease with serum creatinine ≥ 2 mg/dL, atrial fibrillation, smoking, and type of myocardial infarction.

Statistical analysis

Model assumptions and strategy for analysis. In order to measure the significance of the potential variables predicting the dichotomous response variable of readmission among the population in this study, the logistic regression statistic was employed. All variables studied were binary (yes/no response) and the observations were independent. We explored missing data for patterns of missingness and associations between missing and observed data; cases with missing data for

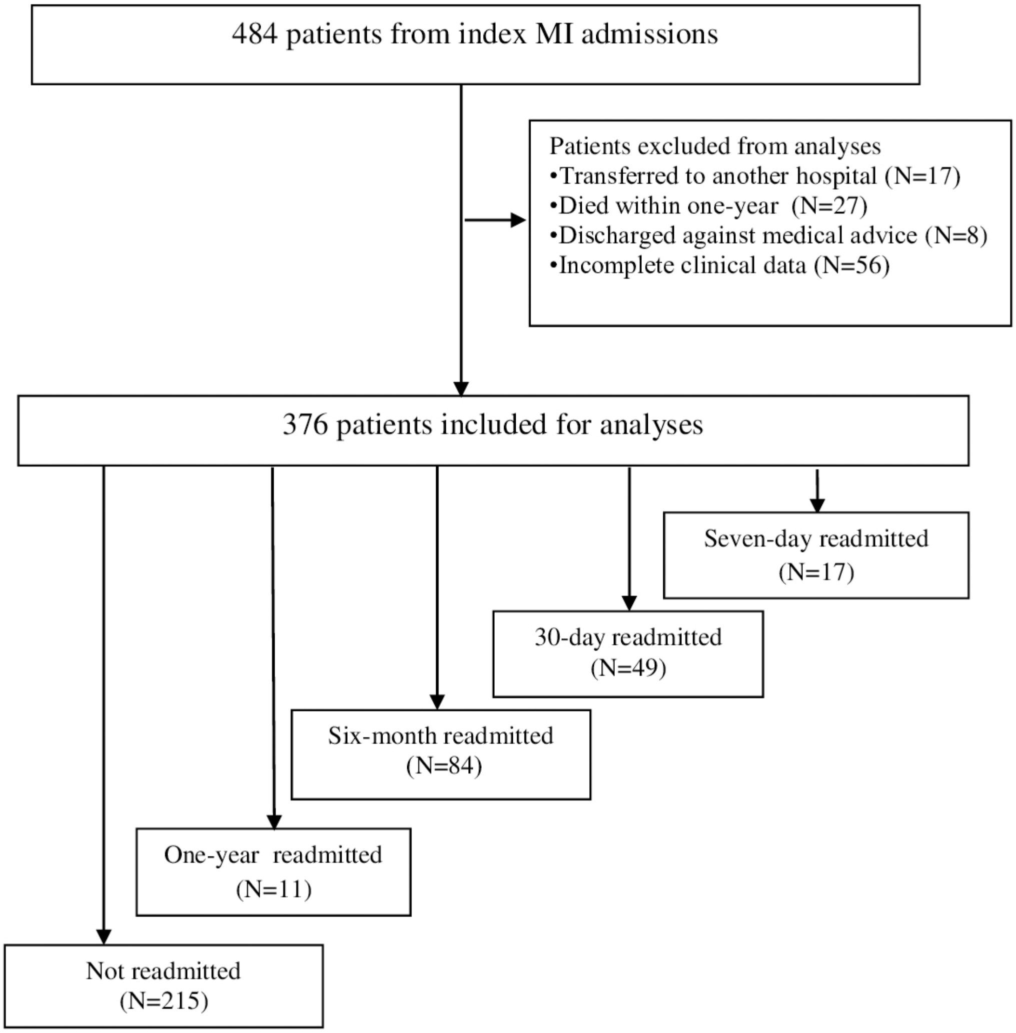

Figure 1. Patients' flow diagram.

variables of interest were excluded from analyses involving those variables.

In the initial stage of analysis, all study variables were tested in a univariate regression (with a p-value<0.25) aimed at looking for statistically significant factors influencing rehospitalization. After these factors were identified and concluded, a multiple logistic regression procedure was employed by using a stepwise selection method. The IBM SPSS Statistics for Windows, Version 23 (IBM Corp., Armonk, NY, USA) was used to generate indicator variables for the levels of each categorical predictor. Moreover, reference groups were selected for each predictor as well. Then, firstly, all explanatory variables of interest were tested for finding possible interactions. The highest insignificant term of each predictor was eliminated until the significance level of all variables was at 0.05 as required. Parameter estimates and odds ratio probabilities that were not above 0.05 were considered to have statistical significance and were kept in the model. For individual parameter estimates, Wald statistics were applied. Goodness-of-fit and model assumptions, as well as multicollinearity among the predictor variables, linearity of the predictor variables and log odds, Hosmer and Lemeshow goodness-of-fit test, and likelihood ratio tests were examined as well.

Ethics approval and reporting

The study was approved by the Human Research Ethics Committee of the Roi-Et Hospital and Mahasarakham University Institutional Review Board for use of deidentified data from existing hospital database. The need for consent from the participants was waived by the ethics committee due to the retrospective nature of the analysis. This study is reported following Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (S1 Checklist)

Results

Characteristics of the populations

The data of the total of 376 MI patients were extracted from a database of myocardial infarction patients. A slight majority of the patients were male (57.4%) and the mean age of all samples was 66.80 ±12.02 years. Most patients were married (81.9%) and had National Health Security support (71.3%). One-third (37.2%) were agriculturalists and a further third (35.4%) were unemployed. The majority of patients had primary school education (73.9%). For treatment types, more than half of the patients (63%) received only medication, whereas one third (30.6%) received percutaneous coronary intervention [PCI], and a small number (6.4%) received coronary artery bypass surgery [[CABG] Table 1].

Table 1. Patients summary data.

Data	Total (n=376)	Non-Readmission (n=215)	Readmission (n=161)			
			seven-day	30-day	six-month	one-year
Gender						
Males (n[%])	216(57.4%)	133(61.9%)	9(5.6%)	23(14.3%)	44(27.3%)	7(4.3%)
Females (n[%])	160(42.6%)	82(38.1%)	8(4.9%)	26(16.2%)	40(24.9%)	4(2.5%)
Age (mean [±SD])	66.5(±11.67)		66.8(±12.02)			
Marital status						
Single	15(3.9%)	5(2.3 %)	1(0.6 %)	5(3.1 %)	3(1.9 %)	1(0.6 %)
Married	308(81.9%)	174(80.9 %)	15(9.3 %)	39(24.3 %)	70(43.5 %)	10(6.2 %)
Widowed	50(13.4%)	33(15.4 %)	1(0.6 %)	5(3.1 %)	11(6.8 %)	0(0.0 %)
Divorce	3(0.8%)	3(1.4 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)
Education level						
Primary school	278(73.9%)	153(71.2%)	10(6.2%)	39(24.3 %)	69(42.8%)	7(4.4 %)
High school	41(10.9%)	27 (12.5 %)	1(0.6 %)	4(2.5 %)	5(3.1 %)	4(2.5 %)
Higher education	57(15.2%)	35(16.3 %)	6(3.7%)	6(3.7%)	10(6.2%)	0(0.0 %)
Occupation						
Agriculturalists	140 (37.2 %)	91(42.3%)	7(4.3 %)	17(10.6 %)	20(12.5 %)	5(3.1 %)
Unemployed	133 (35.4 %)	62(28.8 %)	6(3.7 %)	23(14.3%)	39(24.3 %)	3(1.9 %)
Government official	45 (12.0%)	24(11.2 %)	2(1.2 %)	4(2.5 %)	13(8.1 %)	2(1.2 %)
Business	26 (6.9 %)	18(8.4 %)	2(1.2 %)	1(0.6 %)	5(3.1 %)	0(0.0 %)
Employee	21 (5.6%)	16(7.4 %)	0(0.0 %)	2(1.2 %)	3(1.9 %)	0(0.0 %)
State enterprise	11(2.9%)	4(1.9 %)	0(0.0 %)	2(1.2 %)	4(2.5 %)	1(0.6 %)
Type of healthcare coverage						
Universal Coverage Scheme (30-Baht Scheme)	268(71.3 %)	162 (75.3 %)	14(8.7 %)	32(19.9 %)	53(32.9 %)	7(4.3 %)
Social security	9(2.4 %)	1(0.5 %)	0(0.0 %)	2(1.2%)	6(3.7 %)	0(0.0%)
Pay for themselves	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)
Government coverage	99(26.3 %)	52(24.2 %)	3(1.9 %)	15(9.3 %)	25(15.6 %)	4(2.5 %)
Health insurance	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)	0(0.0 %)
History of diagnosis						
STEMI	86(22.9%)	57(26.5 %)	3(1.9 %)	8(4.9 %)	16(9.9 %)	2(1.2%)
NSTEMI	290(77.1%)	158(73.5 %)	14(8.7 %)	41(25.6 %)	68(42.2 %)	9(5.6 %)
Treatment						
Medication only	237(63.0 %)	147(68.4 %)	11(6.8 %)	30(18.6%)	47(29.2%)	2(1.2%)
PCI	115(30.6 %)	63 (29.3%)	4(2.5%)	14(8.7 %)	25(15.6 %)	9(5.6%)

Data	Total (n=376)	Non-Readmission (n=215)	Readmission (n=161)			
			seven-day	30-day	six-month	one-year
CABG	24(6.4 %)	5(2.3 %)	2(1.2%)	5(3.1%)	12(7.5 %)	0(0.0 %)
DM comorbidity						
DM	175(46.5%)	98(45.6 %)	8(4.9%)	22(13.7%)	43(26.7 %)	4(2.5 %)
Non-DM	201(53.5%)	117(54.4 %)	9(5.6 %)	27(16.8%)	41(25.5 %)	7(4.3 %)
HT comorbidity						
HT	222(59.0%)	176(81.8 %)	5(3.1 %)	13(8.1 %)	28(17.4 %)	0(0.0 %)
Non-HT	154(41.0 %)	39(18.2 %)	12(7.5 %)	36(22.4 %)	56(34.8 %)	11(6.8 %)
AF complication						
AF	19(5.1 %)	6(2.7%)	1(0.6%)	3(1.9 %)	8(4.9%)	1(0.6 %)
Non- AF	357(94.9 %)	209(97.3 %)	16(9.9 %)	46(28.6%)	76(47.3 %)	10(6.2 %)
Hct						
Hct < 33vol%	113(30.1%)	52(24.2 %)	8(4.9 %)	24(14.9%)	27(16.8 %)	2(1.2%)
Hct ≥ 33vol%	263(69.9 %)	163(75.8 %)	9(5.6 %)	25(15.5%)	57(35.5%)	9(5.6%)
Serum creatinine						
Creatinine ≥2.0	67(17.8 %)	27(12.6%)	3(1.9 %)	15(9.3%)	21(13.0%)	1(0.6 %)
Creatinine <2.0	309(82.2%)	188(87.4%)	14(8.7 %)	34(21.2%)	63(39.1 %)	10(6.2%)
Smoking						
Current smoking	47(12.5%)	23(10.7%)	1(0.6%)	7(4.4 %)	16(9.9 %)	0(0%)
Non smoking	329(87.5%)	192(89.3%)	16(9.9%)	42(26.2 %)	68(42.2 %)	11(6.8%)
Readmission	376(100%)	215 (100%)	17(10.6%)	49(30.4%)	84(52.2%)	11(6.8%)
Causes of readmission						
Heart failure			0(0.0%)	17(10.7%)	45(27.9%)	6(3.7%)
NSTEMI			2(1.2%)	20(12.5%)	25(15.6%)	0(0.0%)
Unstable angina			11(6.9%)	8(4.9%)	7(4.4%)	0(0.0%)
Stroke			0(0.0%)	0(0.0%)	3(1.9%)	4(2.5%)
Arrhythmias			2(1.2%)	2(1.2%)	0(0.0%)	0(0.0%)
STEMI			1(0.6%)	1(0.6%)	2(1.2%)	0(0.0%)
UGI bleeding			1(0.6%)	1(0.6%)	2(1.2%)	0(0.0%)
Depression			0(0.0%)	0(0.0%)	0(0.0%)	1(0.6%)
Symptomatic of readmission						
Chest pain			14(8.7 %)	10(6.2%)	31(19.3%)	0(0.0%)
Orthopnea			0(0.0%)	19(11.9%)	24(14.9%)	6(3.7%)
Chest pain with Orthopnea			0(0.0%)	15(9.4%)	23(14.3%)	0(0.0%)
Dizziness with Nausea			0(0.0%)	2(1.2%)	1(0.6%)	1(0.6%)
Spastic dysarthria with hemiparesis			0(0.0%)	0(0.0%)	3(1.9%)	4(2.5%)
Palpitation			2(1.2%)	2(1.2%)	0(0.0%)	0(0.0%)
Dyspepsia			1(0.6%)	1(0.6%)	2(1.2%)	0(0.0%)

STEMI= ST-elevation myocardial infarction; NSTEMI= Non ST-elevation myocardial infarction;

PCI = Percutaneous coronary intervention; CABG= Coronary Artery Bypass Grafting; DM= Diabetes Mellitus ; HT= Hypertension; Hct= Hematocrit; AF= Atrial fibrillation; UGI bleeding= Upper gastrointestinal bleeding

Description of predictive variables

Nearly half of the patients were female (42.6%). Nearly one-quarter of the patients had a STEMI diagnosis (22.9%). The highest proportion of comorbidity was hypertension comorbidity (59%), followed by diabetes (46.5%). More than half of the patients (30.1%) had anaemia with hematocrit < 33 vol%. About 17.8% of the patients had stage-3 chronic kidney disease with serum creatinine ≥ 2 mg/dL and 5.1% of the patients had atrial fibrillation complication. For risk behaviour, 12.5% of the patients were smokers [Table 1].

Predictors of readmission

The highest readmission rate at six-month, 30-day, seven-day, and one-year was 52.2%, 30.4%, 10.6%, and 6.8%, respectively. The causes of readmission were classified into two categories: (a) cardiovascular causes: cardiac causes including heart failure, non ST-elevation MI, ST-elevation MI, unstable angina, and arrhythmias were vitally important reasons associated with readmission, which accounted for 92.6% of all causes after AMI; (b) non-cardiovascular causes: the non-cardiac caused including stroke, upper gastrointestinal bleeding, and depression leaded to readmission after AMI, which accounted for 7.4% of all causes after AMI. Chest pain and other cardiovascular reasons were regarded as the principal symptomatic of readmission [Table 1].

Predictors of readmission

From univariate analysis of association between potential predictors and readmissions among all study populations, the results showed that statistically significant factors for readmission among post MI patients were AF complication (OR_{adj}=4.541, 95%CI =1.608 to 12.827] and smoking (OR_{adj}=2.662, 95%CI =1.326 to 5.344]. Thus, they were significant predicting factors of readmission [Table 2].

A logistic model for predictors of readmission according to four time periods (seven-day, 30-day, six-month, and one-year) was carried out. After adjusted analysis, this found that none of the predictors were significant for seven-day and one-year readmissions. Meanwhile, two predictors were found to be significant for 30-day readmission, these were HT comorbidity (OR_{adj}= 2.264; 95% CI =1.098 to 4.668) and anemia with Hct < 33vol% (OR_{adj}= 2.171; 95% CI =1.160 to 4.064). For six-month readmission, AF complication, chronic kidney disease with serum creatinine ≥2 mg/dL, and smoking were the significant predictors (OR_{adj}=3.494; 95% CI = 1.315 to 9.284; OR_{adj}=2.026; 95% CI = 1.103 to 3.722; OR_{adj}=2.849; 95% CI =1.366 to 5.944, respectively) [Table 3].

Discussion

The results of this study highlight the predictors of readmissions in early (seven-day) and late (30-day, six-month, and one-year) periods following hospital discharge in Thai healthcare settings. As with previous studies, we found that comorbidities, health, and illness were associated with readmission. For 30-day readmission, a significant finding is that HT comorbidity was identified as the significant predictor. This finding is congruent with previous study, revealing that HT is highly prevalent in Thailand. One out of four of Thai people had HT but less than one out of three had their blood pressure under control[17], even

Table 2. Univariate analysis of association between potential predictors and readmissions (N=376).

Characteristics	Non-readmission (N=215)	Readmission (N=161)	OR	95%CI	*p*-value
Females Males	82 133	78 83	1.412 1	.868-2.297	.165
STEMI NSTEMI	57 158	29 132	.760 1	.433-1.334	.339
DM comorbidity Non-DM comorbidity	85 130	90 71	1.622 1	1.008-2.609	.46
HT comorbidity Non-HT comorbidity	109 106	113 48	1.682 1	1.027-2.754	.39
AF complication Non-AF	6 209	13 148	4.541 1	1.608-12.827	.004
Hct < 33vol% Hct ≥ 33vol%	52 163	61 100	1.309 1	.769-2.228	.322
Creatinine ≥2 mg/dL Creatinine <2 mg/dL	27 188	40 121	1.732 1	.945-3.177	.076
Smoking Non-smoking	23 192	24 137	2.662 1	1.326-5.344	.006

Table 3. Multivariate logistic model of association between potential predictors and 30-day and 6-month (n=376).

Data	Readmission 30-day			Readmission six-month		
	OR	95%CI	*p*-value	OR	95%CI	*p*-value
HT	2.264	1.098-4.668	.027			
Non-HT	1					
AF				3.494	1.315-9.284	.012
Non-AF				1		
Hct <33vol%	2.171	1.160-4.064	.015			
Hct ≥33vol%	1					
Cr ≥2 mg/dL				2.026	1.103-3.722	.023
Cr <2 mg/dL				1		
Smoking				2.849	1.366-5.944	.005
Non smoking				1		

with the expanded use of antihypertensive medications. The HT is a well-known cardiovascular risk factor associated with increased cardiovascular events[18]. An empirical study supports that 84.4% of readmitted MI patients had additional hypertension comorbidity[19]. Furthermore, we also found that another significant predictor for 30-day readmission was anaemia with hematocrit < 33 vol%. Patients who were malnourished with anaemia during the index of hospitalisation had a high risk of being readmitted. Several studies revealed that malnutrition is associated with adverse health outcomes for patients and leads to increased healthcare costs[20,21]. A recent study[2] also supported the hypothesis that malnutrition status is a strong predictor of rehospitalisation.

For six-month readmission, we also found that atrial fibrillation (AF) was a predictor that is widely known as a common complication of AMI and contributes to high rates of in-hospital adverse events[22]. The overall incidence of AF complicating AMI was 10.8%. Patients developing new-onset AF following AMI were at higher risk for in-hospital stroke[22]. In this study, there was a new-onset AF following AMI in up to 5 cases. In addition, we also found that patients who had chronic kidney disease with creatinine serum level ≥2 mg/dL admission were likely to have late readmissions at six-month after discharge. The relevant finding is that the mildly elevated admission serum creatinine markedly increased one year mortality in patients with AMI[23].

A significant and interesting finding of this study is that smoking predicts six-month readmission after hospital discharge. This study validates the findings of a previous study which found that smoking increases the risk of readmissions among CAD patients across all specialties. The relevant finding showed that only 33.2% of the patients underwent smoking cessation counseling during hospital admission, which highlights that a significant proportion of patients missed smoking cessation counseling. Studies indicated that smoking cessation intervention has a beneficial effect in improving clinical outcomes and preventing complications and readmission. Tan and *et al.*[24] conducted a meta-analysis involving 1,607 patients and found that readmission rate was significantly reduced in patients who received smoking cessation counseling, and that the prolonged abstinence rate of the gradual cessation was significantly lower than that of the abrupt cessation (relative risk, RR=0.77). However, intervention effects of smoking cessation were not significant at long term follow-up[25] and need to further examination, especially in primary care setting[26]. Therefore, this is a window of opportunity to target smoking cessation among hospitalised patients and continue the intervention in patients after discharge to help reduce readmissions.

In conclusion, multiple factors including HT comorbidity, anemia, atrial fibrillation, chronic kidney disease, and smoking predict readmission among Thais with post myocardial infarction. Moreover, this study demonstrates that rates and predictors of readmissions in short-term and long-term periods are different. Therefore, various screening tools and interventions are required.

Limitations

The results of this study were interpreted in the context of the existing data using medical record reviews. Information about other important factors such as social support, functional status, and psychiatric illnesses, which is considered critically important and may lead to adverse events after discharge, was not discussed. Lastly, the data in this study was gathered from only one hospital, which could limit generalisability. For further research, the inclusion of larger sample sizes, investigation of causality for selected predictors, and different hospitals' readmission data are suggested in order to produce more robust and clinically meaningful outcomes.

Conclusions
This study developed potential factors to identify seven-day, 30-day, six-month, and one-year readmissions in Roi-Et hospital. Among patients discharged, multiple factors predicting readmission in short-term and long-term periods are different. Therefore, various screening tools and appropriate preventive interventions are required.

Data availability
Underlying data
Figshare: Dataset factors predicting hospital readmission. https://doi.org/10.6084/m9.figshare.14406596.v4[27]

- Dataset characteristic of subjects.xlsx. (All underlying data gathered in this study.)

Extended data
Figshare: Data Dictionary. https://doi.org/10.6084/m9.figshare.14406995.v3[28]

This project contains the following data:

- Data Dictionary Factors Predicting Readmission.docx

Reporting guidelines
Figshare: S1 STROBE Checklist. https://doi.org/10.6084/m9.figshare.14573532.v1[29]

This project contains the following reporting checklist:

- S1 STROBE Checklist.pdf

Acknowledgement
The authors would like to thank the targeted hospital for facilitating for data collection process.

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Open Peer Review

Current Peer Review Status: ?

Version 1

Reviewer Report 30 June 2021

https://doi.org/10.5256/f1000research.55644.r88008

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I think this paper is good and is an important addition to the literature.

Abstract

1. The abstract is not clear about comorbidity and kidney disease.

2. Please change the aim of the study to match the study design. It does not match with the aim stated in the Introduction.

Introduction

1. Need references for the two sentences at the beginning of the first paragraph.

2. The authors should conduct a comprehensive literature review related to readmission in this group to fulfill the gap of knowledge.

3. For this study, the authors collected data from just only one province in the north-eastern part of Thailand and used secondary sources. Thailand has 77 provinces. I suggest the title of the study should be: "Factors Predicting Hospital Readmission among Post Myocardial Infarction: A retrospective study."

4. Please restate the gap of knowledge.

5. Factors were selected, based on literature reviews, please clarify comorbidity and kidney disease. Why did the authors separate kidney disease from comorbidity? To the best of my knowledge, comorbidity refers to the presence of additional conditions co-occurring with acute myocardial infarction which means kidney disease is comorbidity.

6. Please use MI or post-AMI or AMI consistently - which one is correct.

Method

1. In *Ethics approval and reporting*, do you need to add an approval number? If yes, please add the approval number.

2. In *Patient and public involvement*, if the authors add the process to retrieve data after approval from the ethics committees, it will be better and clearer for data collection.

Results

1. Please check the results in *Characteristics of the populations*. "National Health Security support" does not appear in Table 1. Symptomatic of readmission does not appear in Table 1. It will be better if the authors report each datum such as nearly one-third of the causes of readmission at six-month (27.9%) is heart failure.

2. In *Predictors of readmission*, the authors stated that "the causes of readmission were classified into two categories", so when reporting in Table 1 it should be divided into two categories too.

3. Please check the results in a table and those described in the Results section are the same thing.

Discussion

1. Please revise the Discussion into four sections: seven-day, 30-day, 6-month, and one-year. Then describe the strongest predictor readmission in each period of time, seven-day, 30-day, 6-month, and one-year, with rationale, and if the result is consistent with previous studies or contrasts with previous studies.

Conclusion

1. This part is the same as the last paragraph of the Discussion. Please revise.

2. The conclusion should report the result of the strongest predictor readmission on seven-day, 30-day, 6-month, and one-year.

3. The authors conclude that various screening tools and appropriate preventive interventions are required. What is a screening tool? Can the authors give an example? What is the kind of intervention? The answer to this question should be based on the results.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.