ORIGINAL ARTICLE

Determinants of Sick Leave Duration Among Employees With the First Episode of Acute Coronary Syndrome

Sahrol Nizam Abu Bakar[1], Bachok Norsa'adah[2], Zurkurnai Yusof[3], Mansor Yahya[4], Mohd Nazri Shafei[1]

[1] Department of Community Medicine, Universiti Sains Malaysia, Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.
[2] Unit of Biostatistics and Research Methodology, Universiti Sains Malaysia, Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.
[3] Department of Medicine, Universiti Sains Malaysia, Health Campus, 16150 Kota Bharu, Kelantan, Malaysia.
[4] Department of Medicine, Hospital Raja Perempuan Zainab II, 15400 Kota Bharu, Kelantan, Malaysia

ABSTRACT

Introduction: Information on sick leave duration among employees with the first episode of acute coronary syndrome (ACS) throughout the world was limited. The aims of the study were to determine the sick leave duration and its predictive factors among employees diagnosed with the first episode of ACS. **Methods:** A cohort study was conducted among employees who were admitted to the cardiology centre in the public hospitals in northeastern Malaysia. Data was collected using a designed proforma. The respondents were interviewed, and their medical records were reviewed on the second day of hospital admission. Information on sick leave duration was obtained from sick leave book in the wards. Multiple linear regression analysis was applied to determine the predictive factors for sick leave duration. **Results:** A total of 78 respondents participated in this study. The mean (SD) age of the respondents was 47.5 (7.31) year old. The majority were male (92.3%), married (94.9%) and had a low level of education (62.8%). The sick leave duration ranged from 4 to 180 days with the median (IqR) of 35.5 (32) days. The predictive factors for sick leave duration were smoking (Adjusted b=20.1, 95% CI: 7.4, 32.8), not attending cardiac rehabilitation after discharge (Adjusted b=19.9, 95% CI: 6.7, 33.6) and presence of complication during admission (Adjusted b=28.6, 95% CI: 15.1, 42.0). **Conclusion:** The sick leave duration was relatively low and being a smoker, having a complication during admission and not attending cardiac rehabilitation after discharged predicts a longer sick leave duration.

Keywords: Acute Coronary Syndrome, Sick Leave, Malaysia

Corresponding Author:
Mohd Nazri Shafei, MPH
Email: drnazri@usm.my
Tel: +6019-9396949

INTRODUCTION

Acute coronary syndrome (ACS) is a spectrum of ischemic heart disease comprising of ST-segment elevation myocardial infarction (STEMI), Non ST-segment elevation myocardial infarction (NSTEMI) and Unstable Angina (UA) (1) . The prevalence of ACS from year to year is increasing throughout the world (2). The National Health Interview Survey 2008-2012 in the United States of America reported that 1.9% of employed adults who were less than 55 years old were having coronary heart disease. Services and blue-collar occupational categories had a higher prevalence of ACS compared to the white-collar category (2.2%, 2.6% and 1.6% respectively). The report also found that the highest prevalence of ACS was among employees in the public administration sector (2.8%), professional (1.5%) and services (1.5%) (3).

In Malaysia, it was reported that the number of ACS cases requiring invalidity pension benefit was increasing from 383 in the year 2000 to 624 cases in the year 2012 (4). Hence, prevention of the occurrence of ACS is of utmost importance in view of its devastating effect to the individual, family and country. As such more active intervention programmes namely screening programmes should be undertaken to detect the two major causes of ACS early which are diabetes mellitus and hypertension that tend to be diagnosed late, often with target organ damage such as ACS due to its asymptomatic or often atypical presentation (5, 6).

Pertaining to sick leave duration for ACS, it varies between countries. In European countries, the longest reported sick leave duration was two years in Sweden (7, 8). Meanwhile, in the United Arab Emirates, the maximum sick leave duration among the first episode of ACS patients was up to eight weeks (9). Among the reported predictive factors for sick leave duration were older age (10-12), female (12-14), had lower educational level (11, 12), lower income (12, 13) and living in rural areas (11).

Presence of risk factors for ACS such as smoking (12, 15), obesity (15, 16) and lack of physical activity (15, 16) as well as having diabetes mellitus (12, 13) and hypertension (12) also determines sick leave duration. Many studies also found that not attending rehabilitation and working in private sector (10, 12) as well as having disability pension (17) were more likely to have longer sick leave.

At present, there is no guideline on optimal sick leave duration. In Malaysia, the practice of sick leave prescription is based on the type of ACS. Studies on sick leave duration and its predictive factors were scarce in Malaysia as well as in other South East Asia region. Hence, the present study was designed to identify sick leave duration and its predictive factors among employees with first episode of ACS.

MATERIALS AND METHODS

A cohort study was conducted among employees who were admitted into two public hospitals in Northeastern Malaysia. The duration of the study was 12 months. ACS was diagnosed by a cardiologist. Malaysian employees whose aged less than 60 years old and entitled for sick leave were selected. On the other hand, those who were intubated or died during admission were excluded from the study.

A designed proforma consisting of socio-demographic data, occupational history, past medical and family history of heart disease, clinical symptoms and signs, result of investigations, type of ACS and type of treatment including cardiac rehabilitation and sick leave duration was used as a research tool. Those who completed up to primary school were considered as having a low educational level and others were considered as having a high educational level. Respondents with a body mass index of more or equal to 25 kg/m2 were considered as overweight. Record review and interview methods were performed to obtain data. Information on sick leave duration prescribed by the treating physician was obtained from the sick leave book in the ward after they were discharged from the hospitals. The sick leave duration was calculated from the day of admission. The total duration of sick leave was counted as consecutive days with no breaks in between. Meanwhile, information on admission was obtained from the registration book in the ward. The respondents were approached on the day two of admission to ensure good rapport with the respondents during the interview session.

Data was entered and analysed using SPSS version 22.0 (18). For descriptive analysis, numerical variables were presented as the mean and standard deviation (SD) for normally distributed data or median and interquartile range (IqR) for skewed data. The categorical data was presented as frequency and percentage. Multiple linear regression analysis was applied to determine the predictive factors for sick leave duration. Backward and forward stepwise methods were used for variables selection. The selected predictors were checked for the possible two-way interaction term. Multicollinearity was checked by Variance Inflation Factors. The results were presented with an adjusted beta coefficient with 95% CI and P-value. P-value of less than 0.05 was considered as statistically significant.

The study was approved by the Malaysian Research Ethic Committee (NMRR-13-874-17125) and from the Human Ethics Committee, Universiti Sains Malaysia [USM/JEPeM/272.4 (1.6)]. A written consent was obtained from the selected respondents. Confidentiality was well kept throughout the study by using the anonymous technique so that only researchers were able to access personal details of the respondents.

RESULTS

A total of 78 employees participated in this study. The mean (SD) age of the respondents was 47.5 (7.31) years old. Majority of the respondents were male employees (92.3%). The majority had low educational level (62.8%) and 94.9% of them were married. Majority of them worked in the public sector. Among the main risk factors for ACS suffered by the respondents were overweight (65.4%) and smoking (60.3%). Almost 31% of the respondents had a complication during hospitalization. Table I shows the socio-demographics characteristics and clinical presentation of the respondents.

Table I: Socio-demographic characteristics and clinical presentation among employees with the first episode of ACS in Northeastern Malaysia (n=78)

Variables	Mean (SD)	n (%)
Age (year)	47.5 (7.31)	
Gender		
Male		72 (92.3)
Female		6 (7.7)
Educational Level		
Low		49 (62.8)
High		29 (37.2)
Marital status		
Single		4 (5.1)
Married		74 (94.9)
Employment sector		
Public		46 (59.0)
Private		32 (41.0)
ACS risk factors		
Overweight/obese		51 (65.4)
Smoking		47 (60.3)
Hypertension		30 (38.5)
Family history of heart disease		27 (34.6)
Diabetes Mellitus		18 (23.1)
Dyslipidaemia		11 (14.1)
Echocardiogram (LVEF%)	52.9 (10.72)	
Complication during admission		
No complication		54 (69.2)
Cardiogenic shock		23 (29.5)
Arrhythmia		1 (1.3)
Attending cardiac rehabilitation program		22 (28.2)

Table II shows the sick leave duration prescribed by the cardiologists to the respondents with the first episode of ACS in Northeastern Malaysia. The sick leave duration ranged from 4 to 180 days with the median (IqR) of 35.5 (32.0) days.

Table III shows the predictive factors for sick leave duration among the respondents. The significant predictive factors for sick leave duration were smoking (Adjusted b=20.1, 95% CI: 7.4, 32.8), not attending cardiac rehabilitation after discharge (Adjusted b=19.9, 95% CI: 6.7, 33.6) and presence of complication during admission (Adjusted b=28.6, 95% CI: 15.1, 42.0).

Table II: Sick leave duration received by employees with the first episode of ACS in Northeastern Malaysia (n=78)

Variables	Mean(SD)	Range
Sick Leave Duration (day)	35.5 (32.00)*	Min: 4, Max: 180
Sick leave duration based on the type of ACS		
UA/NSTEMI (n=27)	10.3 (7.80)	
STEMI (n=51)	45.8 (4.94)	

*Median (IQR)

Table III: Predictive factors for sick leave duration among employees with the first episode of ACS in Northeastern Malaysia using linear regressions analyses (n=78)

Variable	SLR[a]		MLR[b]		
	b (95%CI)	P value	Adjusted b (95%CI)	t-stat	P value
Age	0.9 (-0.15, 2.01)	0.092	-		
Gender Male vs Female	25.4 (-0.53, 51.29)	0.055	-		
Marital status: Unmarried vs Married	-7.4 (-41.78, 26.97)	0.669	-		
Educational level: Lower vs higher	-3.1 (-18.81, 12.58)	0.694	-		
Diabetes Mellitus	-12.8 (-30.59, 4.96)	0.155	-		
Hypertension	-14.8 (-30.01, 0.46)	0.057	-		
Echocardiography (LVEF%)	-0.4 (-1.09, 0.29)	0.253			
Not attending cardiac rehabilitation	19.9 (5.05, 34.71)	0.009	19.9 (6.86, 33.61)	2.91	0.005
Smoking	24.8 (10.36, 39.24)	0.001	20.1 (7.42, 32.83)	3.13	0.002
Having complication during admission	31.9 (17.18, 46.66)	<0.001	28.6 (15.11, 42.03)	4.06	<0.001

[a] Simple linear regression   [b] Multiple linear regression
Adjusted regression coefficient, R^2= 0.362
The model is reasonably fit. There is no interaction and multicollinearity problem.

DISCUSSION

In this study, the sick leave duration for ACS was relatively short compared to other developed countries such as Sweden, Finland and Switzerland (8). However, it is almost similar with other Asian countries such as in Iran (19). There is also a different pattern in prescribing sick leave among the cardiologists. For instance, few cardiologists prescribe sick leave by the severity of illness and some may be influenced by the request from the patients. On top of that, the cardiologists may also prescribe the sick leave based on the entitlement of sick leave from the company where the patient work. Prescribing sick leave also depends on the country's employee social security act and insurance claim (20).

In the present study, employees who smoke and do not attend cardiac rehabilitation as well as having complication during admission are the determinants for prolonged sick leave duration. This is consistent with a study by Maeland and Havik (1986) and also finding from a study by Fors et al. (2014) (21, 22). This is also supported by a study in the Netherlands which found that employees who smoke had a higher likelihood for an increased number of sick leave compared with non-smokers (23). The reason could be due to the fact that smokers tend to choose high risk activities such as gardening and lifting heavy objects even though they were sick compared to non-smokers. This is supported by Viscusi and Hersch (2001) who found that smokers are exhibiting a consistent pattern of risk taking behaviour (24).

In the present study, not attending cardiac rehabilitation is also a determinant for longer sick leave duration among the employees. Many studies also found that by attending cardiac rehabilitation post ACS, it reduces the number of sickness absence (25, 26) and also improves quality of life (27, 28). A review in the United Kingdom found that employees who attended cardiac rehabilitation programs had better motivation, improved blood cholesterol and glucose profile (29).

It is also found that having complications during hospital admission is another determinant for sick leave duration. This is consistent with a study in Sweden that reported employees with no complication return to work earlier than those with complication (14). The common complication occurred among employees with first episode of ACS was cardiogenic shock and the finding is in line with it by Khalid and Dhakam in 2008 (30).

Other factors such as age, gender, marital status and educational level, the presence of comorbidities like diabetes mellitus and hypertension and Left ventricular ejection fraction percentage (LVEF%) were not significant in the present study. This could be due to the small sample size that limits the number of significant predictive factors as explained by VanVoorhis and Morgan (2007) (31). As sample size limits the present study, it is recommended to conduct a multicentre study to get a bigger sample to determine the predictive factors for sick leave duration in the future.

CONCLUSION

Sick leave duration among employees with the first

episode of ACS was relatively low in northeastern Malaysia. Being a smoker, having a complication during admission and not attending cardiac rehabilitation after discharged predicts longer sick leave duration. Hence, the cardiologist is recommended to look at those determinants in prescribing the sick leave to his patients. We also recommend the families as well employers to facilitate and motivate the patients to attend cardiac rehabilitation after being discharged from the hospital.

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