Clinical depression among patients with post-acute coronary syndrome: a prospective single-tertiary centre analysis

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ABSTRACT

Introduction: Clinical depression is a known consequence of acute coronary syndrome (ACS), and carries an adverse outcome among these patients, although this is often under-recognised. We investigated the incidence of depression in post-ACS patients and its associated factors.

Methods: We conducted a prospective cohort study in 95 ACS patients admitted to University Malaya Medical Centre. Clinical depression was assessed during the index admission and at 30 days post discharge using the Patient Health Questionnaire-9 (PHQ-9). Data was analysed using IBM SPSS Statistics, and binary logistic regression was used to determine the independent factors associated with depression, after adjusting for significant demographic variables and clinical characteristics. The strength of this association was presented in odds ratio and 95% confidence interval, and the significance level was set at 0.05.

Results: Mean age of the study population was 60 years, and 72.6% were male. Symptoms of depression were present in 88.4% of patients at baseline. Depression at 30 days was more likely in women, diabetics and patients on dialysis (p = 0.024, p < 0.001, p = 0.008, respectively). Patients with baseline moderate to severe depression were more likely to have moderate to severe depression at 30 days (p < 0.001). Baseline depression was the strongest predictor of depression at 30 days. An increment of one unit of PHQ-9 baseline score increases the risk of developing severe depression at 30 days by 31%.

Conclusion: Depression was prevalent in our post-ACS patients. The associated factors were female gender, diabetes mellitus and dialysis treatment.

Keywords: ACS, depression, NSTEMI, screening outcome, STEMI
INTRODUCTION

The leading cause of death worldwide is cardiovascular disease. Out of 31% of all global deaths, it is estimated that 17.9 million people died from cardiovascular disease in 2016.\(^{(1)}\) Patients with coronary artery disease (CAD) may present with acute coronary syndrome (ACS) or stable angina. ACS include conditions such as ST-elevation myocardial infarction, non-ST-elevation myocardial infarction and unstable angina. Cardiomyocyte necrosis is seen in non-ST-elevation myocardial infarction, while myocardial ischaemia without cell loss is seen in unstable angina.\(^{(2)}\)

Depression among patients with cardiovascular disease is prevalent. It affects about 20% of patients with CAD,\(^{(3)}\) and has a significant negative impact on various outcomes in patients with cardiovascular disease. The association between ACS and depression has been extensively reported and studied. This relationship is bidirectional – cardiovascular disease has been shown to increase the risk of depression, while depression is found to be associated with higher rates of cardiovascular mortality and morbidity.\(^{(4)}\) The presence of depression in patients with coronary disease has been linked to lower rates of compliance with treatment and lifestyle modification; it is thus important to detect depression among patients in this group.\(^{(5)}\) However, recent data from the American College of Cardiology suggests that this is no benefit in detecting depression in these patients.\(^{(6)}\)

Following an ACS event, patients often experience psychological stress. This may account for the prevalence of depression in this patient group.\(^{(7)}\) However, depression is frequently under-recognised in patients with cardiac disease. Untreated depression can have a significant impact on patient’s quality of life and increases the burden on family members.\(^{(8)}\) In CAD patients who experience depression, the levels of cytokines and interleukin are found to be increased. Inflammatory cytokines cause atherosclerotic plaques to become unstable and subsequently rupture, resulting in thrombosis.\(^{(9)}\)
Due to the negative impact of depression on patient outcomes, professional societies have recommended screening of depression in patients with coronary heart disease and appropriate referral to specialty care.\(^{(10)}\) Early treatment and intervention in cardiac disease patient is crucial to prevent untoward cardiovascular outcomes. The current study investigated the incidence and effect of depression among patients admitted with ACS, with the aim of exploring whether the effects seen in other studies are demonstrated in our patient population.

**METHODS**

A prospective study was conducted on all patients with a diagnosis of ACS who were admitted to the cardiology ward of University Malaya Medical Centre, Malaysia from July 2017 to February 2019. We included both male and female patients aged > 18 years who presented with a diagnosis of ST-elevation myocardial infarction, non-ST-elevation myocardial infarction or unstable angina, and who were able to complete the validated English or Bahasa Melayu Patient Health Questionnaire-9 (PHQ-9). Exclusion criteria were patients who presented with type 2 myocardial infarction or heart failure, and those who had underlying depression or had previously been admitted for psychiatric illness. ACS patients who met the inclusion criteria were selected using the consecutive sampling technique.

The statistical power of the study was determined using the OpenEpi software (www.openepi.com). Based on our calculation, a sample size of 68 was required to provide 80% power to estimate an odds ratio of 10 for having depression at 30 days post discharge with 95% confidence.\(^{(11)}\) Taking a potential loss to follow-up of 20%, we would require at least 82 participants at the baseline of the study.

Data was collected using the PHQ-9, a diagnostic tool for assessing depression that is easy to administer and has good sensitivity and specificity. There were two sets of questionnaires – an English version and a validated Bahasa Melayu version. The questionnaire
was answered by participants in a face-to-face interview during the index admission and via telephone call at 30 days post discharge.\(^{(12)}\) To avoid bias, only one interviewer administered the questionnaire. Data was collected by a designated medical officer, and a pilot study was performed in five patients. The dependent variable was depression at baseline and at 30 days post discharge.

The PHQ assesses eight diagnoses, divided into threshold disorders and subthreshold disorders. Threshold disorders are those that correspond to specific diagnoses in the Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV): major depressive disorder, panic disorder, other anxiety disorder and bulimia nervosa. The PHQ-9 is the 9-item depression module from the full PHQ\(^{(13)}\) and the questions are based on the diagnostic criteria for depression from the DSM-IV.

For the current study, the PHQ-9 asked about the patient’s experience in the past two weeks. Major depression was defined as the presence of five or more of the nine depressive symptom criteria at least ‘more than half the days’ in the past two weeks, with one of the symptoms being depressed mood or anhedonia. The nine questions from the PHQ-9 were scored using a scale of 0 to 3: not at all (score: 0); several days (score: 1); more than half the days (score: 2); and nearly every day (score: 3). The total PHQ-9 score ranged from 0 to 27, and depression was classified as: none to minimal (score: 0–4); mild (score: 5–9); moderate (score: 10–14); moderately severe (score: 15–19); and severe (score: 20–27).\(^{(13)}\) Depression scores were dichotomised into two groups: none to mild depression (PHQ-9 < 10); and moderate to severe depression (PHQ-9 ≥ 10). For regression analysis, patients who scored < 10 were coded as ‘1’ and those who scored ≥ 10 were coded as ‘2’. In this study, we used a cut-off score of ≥ 10. This cut-off score was found to be optimal for maximising sensitivity without the loss of specificity.\(^{(13)}\)
The independent variables were sociodemographic characteristics (age, gender, ethnicity) and clinical characteristics (cardiovascular risks, smoking history, premorbid condition and diagnosis of ACS). Data was cleaned, coded and analysed using the IBM SPSS Statistics version 24 (IBM Corp, Armonk, NY, USA). Crude odds ratios with 95% confidence interval were estimated in the binary logistic regression analysis to assess the association between each independent variable and the outcome variable. Variables with a value < 0.25 in the bivariable logistic regression analysis were considered in the multivariable logistic regression analysis.(14) Adjusted odds ratios with 95% confidence interval were estimated to assess the strength of the association, and variables with a value < 0.05 were considered significant factors.

RESULTS

Of the 139 recruited patients, 95 met the inclusion criteria. Seven patients were lost to follow-up and seven patients died in the course of the study, leaving 81 patients for the PHQ-9 reassessment at 30 days post discharge. The mean age of the patients was 59.97 ± 11.28 (range 25–80) years. Patients were predominantly male (72.6%) and Malay (55.8%). The majority had hypertension and were non-smokers. Their cardiovascular risks were similar to those listed in the National Cardiovascular Disease Database Malaysia. The participants were distributed equally among three subgroups of ACS (Table I). Following an ACS event, at least 88.4% of patients reported depression, with 46.3% of patients having moderate to severe depression. (Table II).

Table I. Sociodemographic and clinical characteristics of recruited patients (n = 95).

| Variable               | No. (%)       |
|------------------------|---------------|
| Mean age ± SD (yr)     | 59.97 ± 11.28 |
| Age (yr)               |               |
| < 60                   | 42 (44.2)     |
| ≥ 60                   | 53 (55.8)     |
| Ethnicity              |               |
| Ethnicity     | No. (%)  |
|--------------|----------|
| Malay        | 53 (55.8) |
| Chinese      | 14 (14.7) |
| Indian       | 28 (29.5) |

| Gender | No. (%)  |
|--------|----------|
| Male   | 69 (72.6) |
| Female | 26 (27.4) |

| Cardiovascular risk | No. (%)  |
|---------------------|----------|
| Diabetes mellitus   | 52 (54.7) |
| Hypertension        | 66 (69.5) |
| Dyslipidaemia       | 38 (40.0) |

| Smoking            | No. (%)  |
|--------------------|----------|
| Non-smoker         | 42 (44.2) |
| Ex-smoker          | 26 (27.4) |
| Active smoker      | 27 (28.4) |

| Premorbid condition | No. (%)  |
|---------------------|----------|
| Chronic kidney disease | 24 (25.3) |
| Stroke              | 5 (5.3)  |
| Pre-existing CAD    | 45 (47.4) |
| Dialysis            | 10 (10.5) |

| Diagnosis of ACS | No. (%)  |
|------------------|----------|
| STEMI            | 26 (27.4) |
| NSTEMI           | 34 (35.8) |
| Unstable angina  | 35 (36.8) |

**ACS:** acute coronary syndrome; **CAD:** coronary artery disease; **NSTEMI:** non-ST-elevation myocardial infarction; **PHQ-9:** Patient Health Questionnaire-9; **SD:** standard deviation; **STEMI:** ST-elevation myocardial infarction

**Table II.** Prevalence of depression in post-acute coronary syndrome patients on admission (n = 95).

| Severity of depression | PHQ-9 score | No. (%)  |
|------------------------|-------------|----------|
| None                   | 0           | 11 (11.6) |
| Minimal depression     | 1–4         | 17 (17.9) |
| Mild depression        | 5–9         | 23 (24.2) |
| Moderate depression    | 10–14       | 13 (13.7) |
| Moderately severe      | 15–19       | 12 (12.6) |
| Severe depression      | 20–27       | 19 (20.0) |

**PHQ-9:** Patient Health Questionnaire-9

Univariate analysis showed differences in characteristics between patients with and without depression. Using male gender as the reference group, female patients had a four-time increased risk of having depression. In terms of ethnicity, Malays had a higher rate of depression, although this was not statistically significant. Patients with diabetes mellitus had a five-time increased risk of developing depression. There was also an association between smoking status and the odds of depression; at baseline, active smokers were 82% less likely to
develop depression compared to non-smokers. In addition, dialysis patients were found to have significant depression. There was, however, no significant relationship between chronic kidney disease/stroke/dyslipidaemia and depression at baseline. There was also no significant association between the subgroups of ACS and depression at baseline (Table III).

Table III. Univariate analysis of depression with sociodemographic and clinical characteristics (n = 95) on admission.

| Variable                     | PHQ-9 total score* | Χ²  | p-value | OR  | 95% CI       |
|------------------------------|--------------------|-----|---------|-----|-------------|
| Gender                       |                    |     |         |     |             |
| Male                         | 44 (63.8)          | 25 (36.2) | 1.00  | 1.77–12.93 |
| Female                       | 7 (26.9)           | 19 (73.1) | 4.78  |         |
| Age (yr)                     |                    |     |         |     |             |
| < 60                         | 20 (39.2)          | 22 (50.0) | 1.00  | 0.29–1.46 |
| ≥ 60                         | 31 (60.8)          | 22 (50.0) | 0.65  |         |
| Race                         |                    |     |         |     |             |
| Malay                        | 23 (43.4)          | 30 (56.6) | 1.00  |         |
| Chinese                      | 10 (71.4)          | 4 (28.6)  | 0.31  | 0.09–1.10 |
| Indian                       | 18 (64.3)          | 10 (35.7) | 0.43  | 0.17–1.10 |
| Cardiovascular risk          |                    |     |         |     |             |
| Diabetes mellitus            | 19 (37.3)          | 33 (75.0) | 13.58 | < 0.001 | 2.08–12.27 |
| Hypertension                 | 32 (62.7)          | 34 (77.3) | 2.35  | 0.125  | 2.02–4.99  |
| Dyslipidaemia                | 20 (39.2)          | 18 (40.9) | 0.03  | 0.867  | 1.07–4.72  |
| Smoking                      |                    |     |         |     |             |
| Active smoker                | 21 (41.2)          | 6 (13.6)  | 0.18  | 0.06–0.53 |
| Ex-smoker                    | 14 (27.5)          | 12 (27.3) | 0.53  | 0.20–1.42 |
| Non-smoker                   | 16 (31.4)          | 26 (59.1) | 1.00  |         |
| Premorbid condition          |                    |     |         |     |             |
| Chronic kidney disease       | 11 (21.6)          | 13 (29.5) | 0.80  | 0.372  | 1.53–3.86  |
| Stroke                       | 2 (40.0)           | 3 (60.0)  | 0.40  | 0.528  | 1.79–11.25 |
| Pre-existing CAD             | 21 (41.2)          | 24 (54.5) | 1.69  | 0.193  | 1.71–3.87  |
| Dialysis                     | 1 (2.0)            | 9 (20.5)  | 8.58  | 0.003  | 12.86–106.12 |
| Type of ACS on admission     |                    |     |         |     |             |
| Unstable angina              | 15 (29.4)          | 20 (45.5) | 1.00  |         |
| Myocardial infarction†       | 36 (70.6)          | 24 (54.5) | 0.50  | 0.22–1.17 |

*Data presented as no. (%) †Includes both ST- and non-ST-elevation myocardial infarction. ACS: acute coronary syndrome; CAD: coronary artery disease; CI: confidence interval; OR: odds ratio; PHQ-9: Patient Health Questionnaire-9

At 30 days post discharge, female patients had a three-time increased risk of developing depression. Diabetics and patients undergoing dialysis also had increased odds of having depression. Patients who had moderate to severe depression (PHQ-9 score ≥ 10) at 30 days
post discharge had a significantly higher baseline PHQ-9 score compared to those with none to mild depression at 30 days post discharge. In the moderate to severe depression group, an additional increase in one unit of PHQ-9 score from the baseline would lead to a 34% increased odds of developing worsening depression at 30 days post discharge (Table IV).

Table IV. Univariate analysis of depression at 30 days post discharge with sociodemographic/clinical characteristics and baseline PHQ-9 scores (n = 95).

| Variable                      | PHQ-9 total score* | χ²  | p-value | OR  | 95% CI       |
|-------------------------------|-------------------|-----|---------|-----|--------------|
|                               | < 10              | ≥ 10|         |     |              |
| Gender                        |                   |     |         |     |              |
| Male                          | 36 (85.7)         | 25 (64.1) | 5.08 | 0.024 | 1.00         |
| Female                        | 6 (14.3)          | 14 (35.9) | 3.36 | 1.14–9.93 |
| Age (yr)                      |                   |     |         |     |              |
| < 60                          | 17 (40.5)         | 20 (51.3) | 0.95 | 0.329 | 1.00         |
| ≥ 60                          | 25 (59.5)         | 19 (48.7) |     |       | 0.65 | 0.27–1.56 |
| Race                          |                   |     |         |     |              |
| Malay                         | 20 (47.6)         | 25 (64.1) |     |       | 1.00 |
| Chinese                       | 9 (21.4)          | 3 (7.7) | 0.27 | 0.06–1.12 |
| Indian                        | 13 (31.0)         | 11 (28.2) |     |       | 0.68 | 0.25–1.83 |
| Cardiovascular risk           |                   |     |         |     |              |
| Diabetes mellitus             | 15 (35.7)         | 29 (74.4) | 12.17 | < 0.001 | 5.22 | 2.01–13.59 |
| Hypertension                  | 27 (64.3)         | 30 (76.9) | 1.55 | 0.213 | 1.85 | 0.70–4.92 |
| Dyslipidaemia                 | 15 (35.7)         | 17 (43.6) | 0.53 | 0.469 | 1.39 | 0.57–3.40 |
| Smoking                       |                   |     |         |     |              |
| Active smoker                 | 16 (38.1)         | 8 (20.5) | 3.27 | 0.195 | 0.38 | 0.13–1.11 |
| Ex-smoker                     | 11 (26.2)         | 11 (28.2) |     |       | 0.75 | 0.26–2.19 |
| Non-smoker                    | 15 (35.7)         | 20 (51.3) |     |       | 1.00 |
| Pre-morbid condition          |                   |     |         |     |              |
| Chronic kidney disease        | 9 (21.4)          | 10 (25.6) | 0.20 | 0.655 | 1.26 | 0.45–3.54 |
| Stroke                        | 3 (7.1)           | 2 (5.1) | 0.14 | 0.707 | 0.70 | 0.11–4.45 |
| Pre-existing CAD             | 18 (42.9)         | 22 (56.4) | 1.49 | 0.223 | 1.725 | 0.72–4.16 |
| Dialysis                      | 0 (0)             | 6 (15.4) | 6.98 | 0.008 | UTC | UTC |
| Invasive PCI                  | 8 (19.0)          | 11 (28.2) | 0.95 | 0.331 | 1.67 | 0.59–4.72 |
| Type of ACS on admission      |                   |     |         |     |              |
| Unstable angina               | 15 (35.7)         | 15 (38.5) |     |       | 1.00 |
| Myocardial infarction         | 27 (64.3)         | 24 (61.5) |     |       | 0.89 | 0.36–2.19 |
| Total PHQ-9 score at baseline | 5.10±5.44         | 15.95±6.22 | < 0.001 | 1.34 | 1.19–1.52 |

*Data presented as no. (%) or mean ± standard deviation. †Includes both ST and non-ST elevation myocardial infarction. ACS: acute coronary syndrome; CAD: coronary artery disease; CI: confidence interval; OR: odds ratio; PCI: percutaneous coronary intervention; PHQ-9: Patient Health Questionnaire-9; UTC: unable to compute

There was no significant difference in mortality outcome between the group with none to mild depression (PHQ-9 < 10) and the group with moderate to severe depression (PHQ-9 ≥ 10). Severity of depression did not alter both the in-hospital and 30-day mortality outcomes of
patients, and it had no influence on readmission rates (Table V). After controlling for all covariates, baseline depression remained the strongest predictor of depression at 30-day follow-up, with the increase in PHQ-9 score of one unit raising the odds of depression by 31% (Table VI).

**Table V. Univariate analysis of depression with clinical characteristics and mortality outcome (in-hospital and 30-day all-cause mortality rates).**

| Variable       | PHQ-9 total score* | χ²    | p-value | HR    | 95% CI       |
|----------------|--------------------|-------|---------|-------|--------------|
|                | < 10 | ≥ 10 |        |       |              |
| Mortality      |       |      |         |       |              |
| 30-day         | 3 (5.9) | 4 (9.1) | 0.36 | 0.553 | 1.60 | 0.34–7.57 |
| In-hospital    | 1 (33.3) | 1 (25) | 0.06 | 0.810 | 0.67 | 0.03–18.06 |
| Readmission    | 3 (5.9) | 2 (4.5) | 0.09 | 0.772 | 0.76 | 0.12–4.78 |

*Data is presented as no. (%). CI: confidence interval; HR: hazard ratio; PHQ-9: Patient Health Questionnaire-9

**Table VI. Multivariate logistic regression of clinical predictors of depression 30 days post discharge.**

| Characteristic         | β       | p-value | OR    | 95% CI       |
|-----------------------|---------|---------|-------|--------------|
| Gender                | 0.126   | 0.904   | 1.13  | 0.15–8.70    |
| Race                  |         |         |       |              |
| Malay                 |         | 0.521   | 1.00  |              |
| Chinese               | −1.171  | 0.323   | 0.31  | 0.03–3.16    |
| Indian                | 0.354   | 0.664   | 1.43  | 0.29–7.03    |
| Diabetes mellitus     | 0.583   | 0.456   | 1.79  | 0.39–8.31    |
| Hypertension          | 0.047   | 0.957   | 1.05  | 0.19–5.73    |
| Smoker                |         |         |       |              |
| Non-smoker            |         | 0.900   | 1.00  |              |
| Ex-smoker             | 0.387   | 0.687   | 1.47  | 0.22–9.67    |
| Active smoker         | 0.020   | 0.985   | 1.02  | 0.13–7.79    |
| Pre-existing CAD      | 0.345   | 0.681   | 1.41  | 0.27–7.32    |
| Dialysis              | 19.719  | 0.999   | -     |              |
| Baseline PHQ-9 score  | 0.269   | < 0.001 | 1.31  | 1.15–1.49    |

CAD: coronary artery disease; CI: confidence interval; OR: odds ratio; PHQ-9: Patient Health Questionnaire-9

**DISCUSSION**

The association between depression and cardiovascular morbidity and mortality has been explored for many years. Several meta-analyses have usefully summarised the findings as a bidirectional association, whereby the presence of depression is an independent risk factor for
CAD and vice versa.\textsuperscript{(15)} The presence of depression was shown to confer a negative prognosis in patients with CAD.\textsuperscript{(16)} The mechanism of how depression affects outcome has been described on many levels, and these include the behavioural, hormonal and endothelial aspects.\textsuperscript{(17-19)} Depression is more likely to be associated with poor lifestyle modifications and lower compliance with therapies. On a more cellular level, various theories such as endothelial stress and platelet activation have been explored.\textsuperscript{(20)}

The current study found that female cardiac patients were four times more likely to have at least moderate depression during the index admission compared to males. This female preponderance is also seen in other studies.\textsuperscript{(21)} A meta-analysis has shown that the prevalence of major depression in female patients with CAD is higher than in males.\textsuperscript{(22)} It has also been reported that the incidence of depression is two times greater in women compared to men.\textsuperscript{(23)} Postulated explanations for gender differences include psychosocial factors (e.g. role overload) and biological factors (e.g. hormones).\textsuperscript{(22)} One study found that women more often present with internalising symptoms, whereas men present with externalising symptoms.\textsuperscript{(24)} Females who are depressed have also been found to have poorer outcomes than depressed males.\textsuperscript{(25)} Less social support compared to males and an older average age of event in females have been put forward as the causes.

The association between diabetes mellitus and depression is bidirectional.\textsuperscript{(26)} Studies have also shown that overweight and obesity are associated with depression. These patients have an approximately 40\% higher risk of developing type 2 diabetes mellitus.\textsuperscript{(27)} Diabetes mellitus has a considerable impact on patients’ quality of life, with possible limitations in physical activities, family relations, social life and leisure activities. Thus, diabetics have an increased risk of developing depression.\textsuperscript{(28)} A meta-analysis reported an 11\% prevalence of major depression among patients with diabetes mellitus.\textsuperscript{(29)}
Depression is also common in patients with end-stage renal failure. Patients undergoing dialysis experience a wide range of somatic symptoms and have significantly less involvement in occupational, social and recreational activities. The combination of psychological distress and disturbing physical symptoms results in significantly reduced quality of life, contributing to the development of depression.\(^{(30)}\)

In our study, patients who were active smokers at baseline had an 82% lower odds of developing significant depression. This might be due to smoking being a coping mechanism. Following a cigarette puff, nicotine enters the cerebral circulation and binds to the neuronal nicotinic acetylcholine receptors.\(^{(31)}\) Hence, nicotine stimulates dopamine receptors in the brain, causing patients to feel less depressed. However, at 30 days post discharge, smoking was no longer associated with less depression. It is possible that active smokers might have quit smoking after they were discharged from the hospital.

Patients who had significant baseline depression were found to have an increased risk of developing significant depression at 30 days post discharge. However, depression in our ACS patients was not significantly associated with an increase in in-hospital or out-of-hospital mortality and morbidity. We also did not see an increase in readmission rates. Our findings contrasted with those of other studies,\(^{(32\text{-}34)}\) which have shown positive associations for all. Our follow-up period was only 30 days compared to most studies, which showed a mortality difference at six months.\(^{(35,36)}\) Despite these differences, we feel that this study should be treated as a pilot to a larger study with a longer follow-up duration. This will allow us to ascertain whether depression is a negative prognostic factor in our population. Larger or definitive studies will also enable us to determine whether screening of depression will help our population like it has in Western practice.

There were some limitations to our study. An important confounding factor that may limit the generalisability of our study findings was the exclusion of patients with language
barriers, i.e. patients who were unable to read or write English and Malay. Communication problems faced by patients have been found to be a barrier to seeking and accessing mental health services, which could subsequently impact the outcomes that are measured.\(^{(37,38)}\)

Additionally, the mean age of our patients was lower (60 years) compared to those in developed countries (63.4–68.0 years). However, as the mean age of our cohort was comparable to that of ACS patients (55.9–59.1 years) in Malaysia (based on the Malaysian National Cardiovascular Disease Database), we opine that this would have little impact on generalisability.\(^{(39)}\) Another limitation of the study was its small sample size, resulting in possible selection bias. Also, we recognise that factors such as socioeconomic status, social support, alcohol intake and substance abuse are important confounders that may have an impact on depression;\(^{(34)}\) unfortunately, these factors were not explored in our study.

In conclusion, depression was prevalent in our cohort of post-ACS patients. Factors associated with the presence of depression were female gender, diabetes mellitus and dialysis treatment. In addition, we found that severity of depression had no impact on in-hospital and 30-day outcomes in our cohort. Most of our results did not reach statistical significance, possibly due to the short duration of follow-up. Hence, our findings should be replicated in a larger study with a longer follow-up period, to guide future screening for depression in ACS patients.

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