PREVALENCE OF DEPRESSION IN ELDERLY PATIENTS FOLLOWING ACUTE CORONARY SYNDROME AT DISCHARGE FROM THONG NHAT HOSPITAL

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Abstract

Objectives: To estimate the frequency of depression among older adults with acute coronary syndrome (ACS) and identify relevant factors that are associated with depression at the time of discharge. ***Methods:*** A cross-sectional descriptive study was conducted on 117 elderly patients with ACS who were discharged from Thong Nhat Hospital between March 2024 and June 2024. Depression was assessed using the 30-item Geriatric Depression Scale (GDS-30), with a total score of ≥ 10 indicating the presence of depression. ***Results:*** The prevalence of depression at discharge among elderly ACS patients was 15.4% (95%CI: 8.7% - 22.0%). In the multivariate regression analysis, female gender, illiteracy, high-risk CCI, experiencing two or more stressful life events, and low perceived social support were significantly associated with a higher prevalence of depression. ***Conclusion:*** The prevalence of depressive symptoms at the time of discharge among elderly patients recovering from ACS was 15.4%. Early detection of depression is crucial, particularly in patients who are female, have illiteracy, present with multimorbidity, particularly type 2 diabetes mellitus, experience stressful life events, and have low perceived social support.

Keywords: Depression; Elderly; Acute coronary syndrome (ACS); Discharge; Geriatric Depression Scale (GDS-30).

INTRODUCTION

Vietnam is currently one of the fastest-growing aging populations in the world and is predicted to enter the aging population period by 2035. Depression is a mood disorder characterized by persistent sadness, loss of interest or pleasure, sleep and appetite disturbance, psychomotor agitation or retardation, and thoughts of self-harm.

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ACS is a severe medical emergency that includes three clinical forms: ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), and unstable angina (UA). It has been documented that after an ACS event, patients often experience psychological stress, with depression and anxiety being the most prevalent conditions. The bidirectional relationship between ACS and depression has been extensively studied [1, 2]. Given the limited data on the depression status among post-ACS elderly patients in Vietnam, this study aimed to: *Investigate the prevalence of depression in this population and analyze its associations with sociodemographic factors and clinical features.*

MATERIALS AND METHODS

1. Subjects

A sample size of 117 patients was estimated to be adequate for detecting differences in primary outcomes, utilizing convenient sampling methods from March 2024 to June 2024.

* *Inclusion criteria:* Aged ≥ 60 years; diagnosed with acute myocardial infarction (AMI) or UA based on the 2023 ESC criteria [3]; approved for discharge based on clinical stability, successful revascularization or optimal medical therapy, and adherence to guideline-recommended discharge criteria for ACS.

* *Exclusion criteria:* Patients who were unable to communicate effectively for interview completion, including those with impaired consciousness, dementia, or a history of psychiatric disorders that could affect the accuracy of the information provided.

2. Methods

* *Study design:* A cross-sectional descriptive study.

* *Variable definition:* Depressive status was assessed using the Vietnamese version of GDS-30. Participants were instructed to respond with "Yes" or "No" based on their experiences over the past 2 weeks. Depression is classified as none to minimal (0 - 9), mild (10 - 19), and severe (20 - 30). A cut-off score of ≥ 10 was chosen to maximize sensitivity without compromising specificity. The dependent variable was depression at discharge [4].

Comorbidity severity was assessed using the Charlson Comorbidity Index (CCI), with a score ≥ 3 indicating a high one-year mortality risk. Functional impairment in activities of daily living (ADL) was evaluated using the Katz ADL scale, with ≤ 4 points denoting significant impairment. Sleep disturbances were identified using the Pittsburgh Sleep Quality Index (PSQI), with a score ≥ 5 indicating poor sleep quality. Psychological stress was defined as experiencing two or more stressful

events within the past 12 months or significant life events. Perceived social support was measured with the MSPSS, with an average score < 5.1 indicating low support.

* *Statistical analyses:* Data were analyzed using SPSS version 27.0. Modified Poisson regression with robust standard errors was used to estimate prevalence ratios. Multivariable Poisson regression was performed to identify independent risk factors for post-ACS depression.

3. Ethics

The study was approved by the Ethics Committee of Pham Ngoc Thach University of Medicine according to Decision No. 733/QĐ-TĐHYKPNT dated March 12th, 2024, and the Ethics Committee of Thong Nhat Hospital according to Decision No. 14/BB-BVTN dated April 19th, 2024. Thong Nhat Hospital granted permission for the use and publication of the research data. The authors declare to have no conflicts of interest in this study.

RESULTS

1. Baseline characteristics of the patient population

Table 1. Sociodemographic and clinical characteristics of the study population.

Variable	Total (n = 117)
Mean age, M ± SD	71.2 ± 7.4
Age group (year), n (%)	
60 - 69	53 (45.3)
70 - 79	46 (39.3)
≥ 80	18 (15.4)
Gender, n (%)	
Female	47 (40.2)
Male	70 (59.8)
Diagnosis of ACS, n (%)	
STEMI	28 (23.9)
NSTEMI	65 (55.6)
UA	24 (20.5)

Variable	Total (n = 117)
Living area, n (%)	
Rural	42 (35.9)
Urban	75 (64.1)
Education level, n (%)	
Illiteracy	9 (7.7)
Literate/basic education	71 (60.7)
Secondary education	25 (21.4)
Tertiary education	12 (10.3)
Marriage status, n (%)	
Married	83 (70.9)
Single	6 (5.1)
Separation/divorce	2 (1.7)
Widow	26 (22.2)
Living situation, n (%)	
Living with others	111 (94.4)
Living alone	6 (5.1)
Employment status, n (%)	
Employed	38 (32.5)
Unemployed/retired	79 (67.5)

The study included 117 patients with most being aged 60 - 69 years and a slightly higher proportion of males than females. The predominant clinical presentation of ACS was NSTEMI. Most patients came from urban areas, currently lived with family members, lived with a spouse, and were no longer employed. The widowhood rate was relatively high at 22.2%, while the illiteracy rate was low (7.7%).

2. Prevalence of depression following ACS events

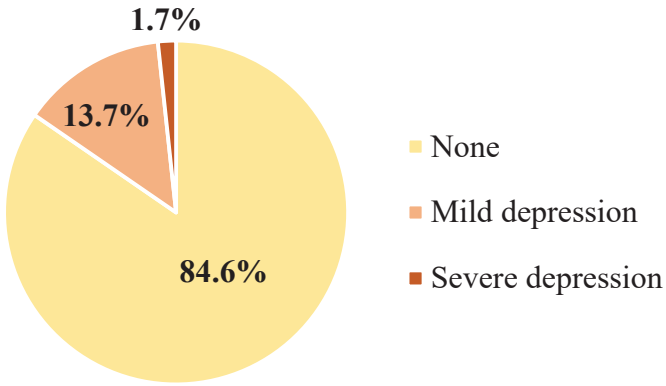

Figure 1. Prevalence of depression in post-ACS elderly patients at discharge.

Depression at discharge was observed in 15.4% of patients, mostly presenting as mild, while severe cases were rare.

Table 2. Univariate analysis of depression with sociodemographic characteristics of post-ACS elderly patients at discharge.

Variable	Depression		Unadjusted PR (95%CI)	p†
	Yes* (n = 18)	No (n = 99)		
Age group (year), n (%)				
60 - 69‡	5 (9.4)	48 (90.6)	1.00	-
70 - 79	8 (17.4)	38 (82.6)	1.84 (0.65 - 5.24)	0.251
≥ 80	5 (27.8)	18 (72.2)	2.94 (0.96 - 9.01)	0.058
Gender, n (%)				
Female	12 (25.5)	35 (74.5)	2.98 (1.20 - 7.38)	0.018
Male‡	6 (8.6)	64 (91.4)	1.00	-
Living area, n (%)				
Rural	7 (16.7)	35 (83.3)	1.14 (0.48 - 2.71)	0.773
Urban‡	11 (14.7)	64 (85.3)	1.00	-

Variable	Depression		Unadjusted PR (95%CI)	p†
	Yes* (n = 18)	No (n = 99)		
Religious practice, n (%)				
Yes	10 (16.1)	52 (83.9)	1.11 (0.47 - 2.61)	0.813
No‡	8 (14.5)	47 (85.5)	1.00	-
Illiteracy, n (%)				
Yes	4 (44.4)	5 (55.6)	3.43 (1.42 - 8.26)	0.006
No‡	14 (13.0)	94 (87.0)	1.00	-
Married status, n (%)				
Others[a]	9 (26.5)	25 (73.5)	2.44 (1.06 - 5.62)	0.036
Married‡	9 (10.8)	74 (89.2)	1.00	-
Living situation, n (%)				
Living alone	2 (33.3)	4 (66.7)	2.31 (0.68 - 7.83)	0.178
Living with others‡	16 (14.4)	95 (85.6)	1.00	-
Employment status, n (%)				
Unemployed/retired	14 (17.7)	65 (82.3)	1.68 (0.59 - 4.77)	0.327
Employed‡	4 (10.5)	34 (89.5)	1.00	-

*(PR: Prevalence ratio; CI: Confidence interval; *: Based on GDS-30 ≥ 10; †: Univariate Poisson regression with robust variance; ‡: Reference variable; [a]: Including single, divorced, separated, and widow status)*

As shown in table 2, the rate of depression was significantly higher among the female patients (p = 0.018), those who were illiterate (p = 0.006), and those who were currently living with their spouse (p = 0.036). Although we noted a greater prevalence of depression in patients aged 80 and older, as well as those living alone, these differences were not statistically significant.

Table 1. Univariate analysis of depression with clinical characteristics of post-ACS elderly patients at discharge.

Variable	Depression		Unadjusted PR (95% CI)	p[†]
	Yes[*] (n = 18)	No (n = 99)		
Diagnosis of ACS, n (%)				
STEMI	7 (25.0)	21 (75.0)	1.66 (0.39 - 7.15)	0.144
NSTEMI	9 (13.8)	56 (86.2)	3.00 (0.69 - 13.10)	0.495
UA[‡]	2 (8.3)	22 (91.7)	1.00	-
Complications of ACS, n (%)				
Yes	7 (20.0)	28 (80.0)	1.49 (0.63 - 3.53)	0.363
No[‡]	11 (13.4)	71 (86.6)	1.00	-
PCI treatment, n (%)				
No	7 (22.6)	24 (77.4)	1.77 (0.75 - 4.12)	0.192
Yes[‡]	11 (12.8)	75 (87.2)	1.00	-
Comorbidities[!], n (%)				
Hypertension	14 (14.9)	80 (85.1)	0.86 (0.31 -2.36)	0.764
History of heart failure	5 (20.8)	19 (79.2)	1.49 (0.59 - 3.77)	0.400
History of IHD	4 (28.6)	10 (71.4)	2.10 (0.80 - 5.49)	0.130
Type 2 diabetes mellitus	11 (27.5)	29 (72.5)	3.03 (1.27 - 7.20)	0.012
Chronic kidney disease	4 (26.7)	11 (73.3)	1.94 (0.74 - 5.13)	0.180
Dyslipidemia	12 (16.2)	62 (83.8)	1.16 (0.47 - 2.87)	0.745
GERD	7 (17.1)	34 (82.9)	1.18 (0.50 - 2.81)	0.709
History of CVA	2 (18.2)	9 (81.8)	1.21 (0.32 - 4.57)	0.784
CCI risk, n (%)				
High-risk	12 (33.3)	24 (66.7)	4.50 (1.83 - 11.05)	0.001
Low-risk[‡]	6 (7.4)	75 (92.6)	1.00	-

Variable	Depression		Unadjusted PR (95% CI)	p†
	Yes* (n = 18)	No (n = 99)		
Health behaviors!, n (%)				
Smoking	7 (11.3)	55 (88.7)	0.57 (0.24 - 1.36)	0.200
Alcohol consumption	8 (13.8)	50 (86.2)	0.81 (0.35 - 1.92)	0.637
Physical activity	9 (14.1)	55 (85.9)	0.83 (0.35 - 1.94)	0.663
Geriatric conditions!, n (%)				
ADL impairment	8 (57.1)	6 (42.9)	5.89 (2.80 - 12.38)	< 0.001
Urinary incontinence	6 (46.2)	7 (53.8)	4.00 (1.82 - 8.84)	< 0.001
Sleep disorders	14 (25.0)	42 (75.0)	3.81 (1.34 - 10.90)	0.013
Stressful life events, n (%)				
≥ 2 events	12 (23.5)	39 (76.5)	2.59 (1.04 - 6.43)	0.040
< 2 events‡	6 (9.1)	60 (90.9)	1.00	-
Perceived social support, n (%)				
Low	4 (5.1)	74 (94.9)	7.00 (2.47 - 19.86)	< 0.001
High‡	14 (35.9)	25 (64.1)	1.00	-

*(PR: Prevalence ratio; CI: Confidence interval; GERD: Gastroesophageal reflux disease; CVA: Cerebrovascular accident; CCI: Charlson comorbidity index; IHD: Ischemic heart disease; *: Based on GDS-30 ≥ 10; †: Univariate Poisson regression with robust variance; ‡: Reference variable; !: Reference category for each condition is "No")*

Depression was predominantly observed in patients with AMI, particularly those with STEMI, and was more common than in patients with UA, but this difference was not statistically significant. Depression was more common among patients with type 2 diabetes, high multimorbidity risk, ADL impairment, urinary incontinence, and sleep disturbances. Those experiencing multiple stressful events were also at higher risk. Conversely, higher perceived social support (MSPSS scores 5.1 - 7) was associated with a lower prevalence of depression.

3. Factors associated with outcomes

Table 4. Multivariate modified Poisson regression of predictors of depression in post-ACS elderly patients at discharge.

Factors	Adjusted PR (95%CI)†	p
Female gender	4.36 (1.36 - 13.97)	0.013
Illiteracy	3.76 (1.61 - 8.76)	0.002
Unmarried status	0.64 (0.25 - 1.65)	0.355
Type 2 diabetes mellitus	0.92 (0.3 - 2.86)	0.891
High-risk CCI	3.60 (1.07 - 12.11)	0.038
ADL impairment	1.60 (0.58 - 4.43)	0.367
Urinary incontinence	2.42 (0.7 - 8.33)	0.160
Sleep disorders	1.48 (0.56 - 3.9)	0.426
Experienced ≥ 2 stressful life events	3.69 (1.58 - 8.59)	0.003
Low Perceived Social Support	3.67 (1.73 - 7.82)	< 0.001

(†: Multivariate Poisson regression with robust variance)

We selected 10 statistically significant variables for the multivariate regression model. After controlling for the influence of other covariates, we identified the following factors as significantly associated with post-ACS depression: Female gender, illiteracy, high-risk CCI, experiencing ≥ 2 stressful life events, and low perceived social support.

DISCUSSION

1. Prevalence of depression

The study found that the prevalence of depression at the time of discharge among elderly patients recovering from ACS was 15.4% (95%CI: 8.7% - 22.0%) as measured by the GDS-30 (*Figure 1*). A systematic review by Dong Z et al. (2024), derived from 28 studies, reported a pooled depression rate of 28.5% among ACS patients [5]. When analyzing studies with similar elderly populations, we observed a gradual decline in depression rates over time. Specifically, Hayajneh et al. (2021) reported that 65.7% of elderly patients with AMI exhibited depressive symptoms at the time of emergency admission [6]. In

contrast, Romanelli (2002) and Nguyen Van Tan (2021) found depression rates of 22.9% and 26.4%, respectively [7]. Our study revealed a significantly lower rate of depression at discharge, possibly due to patients feeling more reassured about their medical condition. Additional research is warranted to substantiate these psychological improvements relating to the admission phase.

2. Factors associated with depression in elderly patients post-AMI

Female patients had a 2.98 times higher rate of depression compared to male patients (*Table 2*). It is believed that older females may have a higher risk of depression, possibly due to hormonal imbalances after menopause and increased psychological stress from family and societal responsibilities, which may contribute to a greater likelihood of depression following ACS [8].

Depression was more common among individuals with lower educational attainment, particularly among illiterate patients, who had a 3.43 times higher prevalence rate than other groups (*Table 2*). Illiteracy may create barriers to social communication, leading to feelings of inferiority and difficulty integrating into daily life [9]. Additionally, patients without spouses reported a statistically higher prevalence of depression (PR = 2.44; p = 0.036). However, marital status lost its significance in the multivariate regression model. This finding aligns with numerous surveys on depression in older adults [9].

Although AMI is often associated with greater psychological stress due to its severity and risk of complications, the difference in depression prevalence between AMI and UA was not statistically significant (*Table 2*). This suggests that factors beyond disease severity, such as persistent health concerns and anxiety about recurrent events, may contribute to depression in both groups despite the better short-term prognosis of UA.

Type 2 diabetes mellitus was the only chronic condition showing a statistically significant association with depression (PR = 3.03; 95%CI: 1.27 - 7.20). Furthermore, we found no association between a history of heart failure and depression, which differs from Nguyen Van Tan's findings [7]. This discrepancy may be attributed to population characteristics and the timing of the research.

Chronic multimorbidity has a strong correlation with depression, which is consistent with previous studies. Patients with ≥ 2 chronic conditions are 1.59 times more likely to have depression compared to those without any chronic diseases (adjusted OR = 1.595; 95%CI: 1.01 - 2.52; p = 0.045)

[9]. In our study, high-risk patients had significantly higher depression rates than low-risk individuals (33.3% vs. 7.4%, PR = 4.50; p < 0.001) (*Table 3*). Multivariate analyses confirmed that multimorbidity is an independently associated factor, with a 3.6-fold increased risk of depression in the high-risk group (95%CI: 1.07 - 12.11; p = 0.038) (*Table 4*). Chronic health conditions may lead to dissatisfaction with quality of life, contributing to psychological stress and increasing the risk of depression.

The multivariate analyses suggest that geriatric conditions are not statistically significant in predicting depression. These findings align with the study by Nguyen Van Tan et al. (2021), which reported significant associations with ADL impairment and urinary incontinence but found that these conditions did not remain risk factors after conducting multivariate logistic regression [7].

Patients who reported experiencing two or more stressful life events were 3.69 times (95%CI: 1.58 - 8.59; p = 0.003) more likely to suffer from depression (*Table 4*). According to Do Van Dieu et al. (2018), individuals who have experienced at least one "major life event in the past 12 months" or "major life event in their lifetime" are independent risk factors that lead to a higher likelihood of developing depression, with adjusted OR of 1.9 (p < 0.001) and 2.4 (p < 0.001), respectively [10]. Those identified as having low perceived social support are 3.67 times more likely to have depression (95%CI: 1.73 - 7.82; p < 0.001). This is understandable since social support is an important protective factor in maintaining mental health among elderly patients after an ACS event.

CONCLUSION

This study highlights the significant prevalence of depression among elderly patients recovering from ACS, with a rate of 15.4% at the time of discharge. The findings suggest that patients who are female, have illiteracy, present with multimorbidity, particularly type 2 diabetes mellitus, experience stressful life events, and have low perceived social support are more likely to suffer from depression.

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