EAS Journal of Pharmacy and Pharmacology
Abbreviated Key Title: EAS J Pharm Pharmacol
ISSN: 2663-0990 (Print) & ISSN: 2663-6719 (Online)
Published By East African Scholars Publisher, Kenya

Volume-7 | Issue-4 | Jul-Aug- 2025 | DOI: https://doi.org/10.36349/easjpp.2025.v07i04.001

OPEN ACCESS

Original Research Article

Assessment of Depression Diagnosis for Patients with Acute Myocardial Infarction (AMI): A Case Report

Dr. Neelesh Chaubey[1*], Ali Akbar Kolambil[2]

[1]Professor in Department of Pharmacy at Sri Satya Sai University of Technology & Medical Sciences-Sehore (M.P.)
[2]Research Scholar in Department of Pharmacy at Sri Satya Sai University of Technology & Medical Sciences-Sehore (M.P.)

Article History
Received: 22.05.2025
Accepted: 28.06.2025
Published: 01.07.2025

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Background:*** Individuals with acute myocardial infarction (AMI) or ischaemic heart disease are susceptible to anxiety and sadness. Depression is prevalent in individuals with ischaemic heart disease (IHD). Approximately 2.4 million patients are hospitalised annually in India with acute coronary syndrome (ACS). Post-ACS depression constitutes an independent risk factor for subsequent cardiac events and death, with a greater prevalence in women than in males. ***Aim:*** In present investigation was deals with depression diagnosis for patient with AMI. ***Method:*** This retrospective study focused on Medicare FFS enrolees having experienced their first AMI in 2017–2018 and were free of prior depression diagnoses. ***Result:*** The findings of the current analysis indicate that early identification and treatment of depression might alleviate some negative effects on healthcare expenses and utilisation by decreasing the probability of recurrence and adverse outcomes. Timely identification of depression may contribute to stabilising long-term expenses, however a delayed diagnosis might hinder the attainment of favourable outcomes.

Keywords: Acute myocardial infarction (AMI), depression, Medicare FFS enrolees & Variables.

INTRODUCTION

Depression exerts a considerable worldwide cost, impacting both people and entire communities. The World Health Organisation (WHO) reports that depression is a significant condition, impacting around 264 million individuals globally as of 2020 [1]. The phrases "depression" and "major depressive disorder" (MDD) are sometimes conflated, however they denote separate phenomena. Depression may present as a symptom in several illnesses and is a defining characteristic of some mental disorders. Major Depressive Disorder (MDD) is identified as a significant mental health problem necessitating professional intervention. The effects of depression are complex [2]. Comprehensive study on depression offers significant insights into its management, diagnosis, and epidemiology. Depression is not only a mental problem; it is often linked with other comorbid disorders. Diagnosing depression entails diverse testing regimens and inventory, each customised to distinct diagnostic methodologies. The absence of a uniform "gold standard" for diagnosing depression is well-documented. The most recent DSM-5 criteria stipulate that a diagnosis of major depressive disorder (MDD) necessitates the manifestation of a minimum of five specific symptoms, highlighting the intricacy of diagnosing depression [3]. This diagnostic challenge illustrates the dual aspect of depression, functioning as both a symptom and a separate clinical entity. Cardiovascular disease continues to be the primary cause of death globally, resulting in 17.6 million fatalities per year [4]. The prevalence of cardiovascular disease is notably substantial in low- and middle-income nations, raising concerns for both the WHO and healthcare officials in India. Although pharmaceutical therapy and dietary adjustments have proven key to alleviating the worldwide burden of cardiovascular disease, two essential components of management—rehabilitation and psychological care—are frequently neglected. These factors necessitate more scrutiny, especially considering the correlation between AMI and depression.

Current Scenario of Depression in India

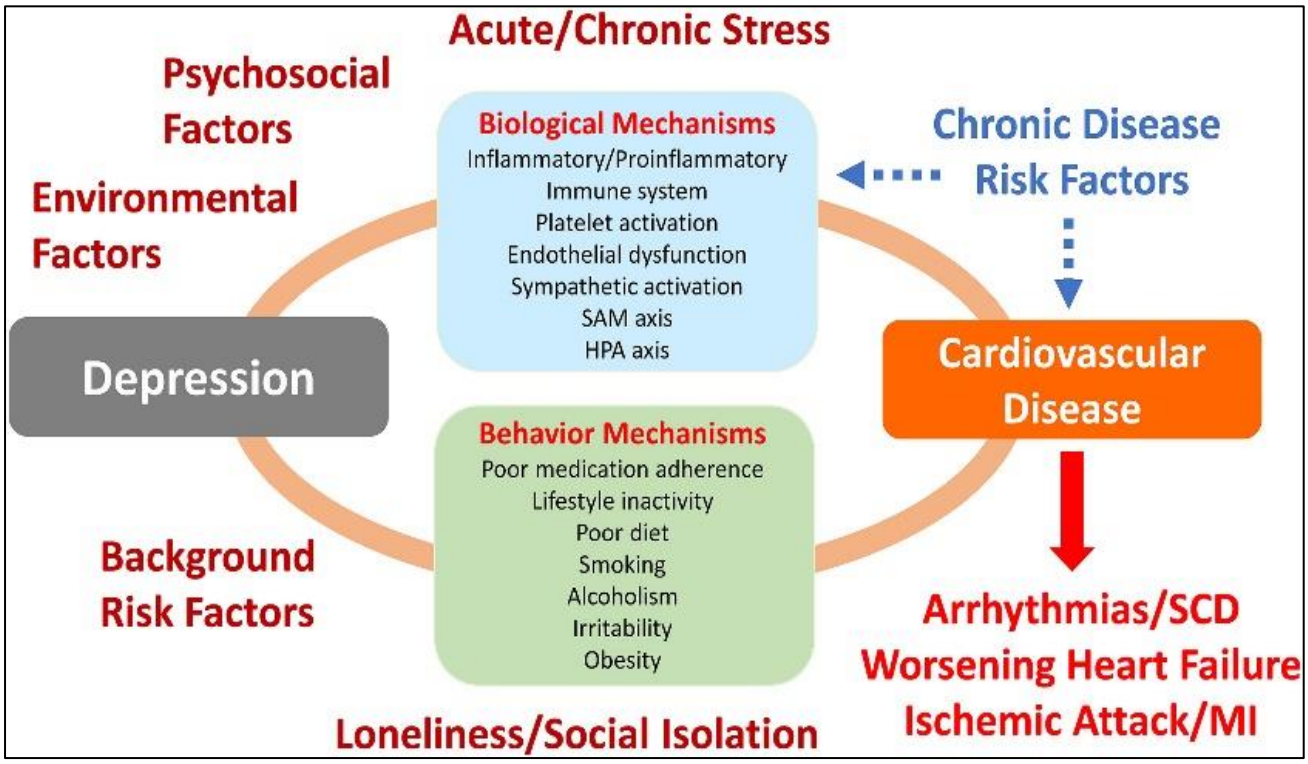
Indians often live in rural areas with a family structure comprising three or more generations under one roof. This extended family unit provides robust social and community support for many individuals. Such strong family ties are associated with better mental health

***Corresponding Author:** Dr. Neelesh Chaubey
Professor in Department of Pharmacy at Sri Satya Sai University of Technology & Medical Sciences-Sehore (M.P.)

outcomes and align with Maslow's hierarchy of needs, where community plays a crucial role in supporting other levels of need [5]. In the Indian context, these close-knit communities, which share common language, ethnicity, religion, or geographical ties, help alleviate the burden of disease. The strong integration with society fosters adaptability and resilience, where individuals with higher resilience tend to experience less severe symptoms of mental illness [6]. However, the burden of severe diseases is often shared by the broader community. For example, in a traditional Indian household, if a primary breadwinner suffers from acute myocardial infarction or stroke, the medical treatment, rehabilitation, and ongoing medical issues can lead to psychological distress for other family members [7]. The cost of depression extends beyond the individual, especially in India. If the head of a household suffers from depression and requires extensive medical care, the family may face impoverishment due to the loss of income [8]. The impact of disability on a community is magnified by the lack of infrastructure for rehabilitation, which increases disability rates and contributes to economic strain due to the loss of workforce [9]. The age of onset of cardiovascular pathology also affects community resilience. Older adults, classified as "old persons" by both the WHO and the Indian government, often experience less disruption because their declining health is anticipated [10]. In contrast, the impact of cardiovascular emergencies in younger or middle-aged individuals is more profound due to their pivotal role in family and community life [11]. Empathy, both as a cultural response and an individual trait, plays a significant role in this context. Increased depression rates can reduce individual and collective empathy, adversely affecting social cohesion, which is essential for community cooperation [12].

Prevalence of Depression among AMI

Patients with recent acute myocardial infarction (AMI) have a heightened incidence of depression, which correlates with higher morbidity, death, and rehospitalisation rates. Depression is often inadequately recognised and managed in people with acute myocardial infarction (AMI). The scarcity of evidence about the management and therapy of depression in this group underscores the necessity for more research into the pathophysiological connection between depression and AMI. Depressive symptoms post-AMI may occur due to many causes, including immune system activation [13]. The precise function of inflammation in the aetiology of both depression and acute myocardial infarction remains little comprehended [14].



Relation between depression *verses* AMI

Experimental work

Research designing

This study used a retrospective cohort design based on Medicare claims data to examine the health and economic impact of diagnosing depression following a first episode of Acute Myocardial Infarction (AMI). By utilizing an intention-to-treat approach, this research sought to identify associations between post-AMI depression diagnosis and subsequent healthcare outcomes. The analysis involved innovative methods that leveraged alternative indicators to provide clear, segmented interpretations across patient groups.

Data Sources

Data was sourced from the Medicare Chronic Conditions Data Warehouse (CCW), encompassing both institutional and non-institutional claims, enrolment records, and health assessments. Key variables, including demographics, ZIP code, enrolment in Medicare Part A, B, and D, mortality data, chronic illness profiles, healthcare costs, and utilization rates, were obtained from the CCW beneficiary file. The cohort included all Medicare fee-for-service (FFS) beneficiaries who experienced their first AMI in 2017–2018.

Research Design

This retrospective study focused on Medicare FFS enrolees who experienced their first AMI in 2017–2018 and were free of prior depression diagnoses. By distinguishing between newly diagnosed (incident) and pre-existing (prevalent) depression post-AMI, the study provided insights into survival, costs, and healthcare utilization over a 1-year follow-up period. Data was collected for each participant until either one year post-AMI or death.

Study Population

In line with prior studies that examine healthcare utilization trends in cardiovascular conditions, such as the impact of COVID-19 on AMI (acute myocardial infarction) admissions detailed by Ramakrishnan *et al.,* (2020) in the Cardiological Society of India's study, our cohort was selected to analyzed outcomes following AMI in elderly patients.

Instruments

Estimators were used to analysed the impact of treatments on patients whose treatment decisions might be influenced by certain instrumental variables. In this context, an instrumental variable (IV) is a measurable factor that affects treatment choices without directly affecting outcomes. To be valid, an instrument must meet two essential criteria: first, it must strongly influence the decision to treat, and second, it should not correlate directly with unmeasured outcomes or confounders [15].

Control Variables

To assess the quality of the instruments (i.e., factors influencing depression diagnosis), the Chow F-test was employed to determine if the instruments explain a statistically significant portion of the variation in depression diagnosis. Additionally, to evaluate the relationship between instruments and potential unmeasured confounders, we used the Hansen over-identification test, which tests whether excluding certain instruments from the second stage of the two-stage least squares (2SLS) model is valid [16-17]. For the primary outcome variable, 1-year survival, we applied a two-stage residual inclusion (2SRI) model. This approach assesses the effect of depression diagnosis on patient survival, accounting for the robustness of the instruments [18].

RESULT AND DISCUSSION

Anxiety and depression symptoms correlate with worse cardiovascular outcomes following an acute myocardial infarction (MI). Nevertheless, the majority of research examining anxiety or depression have employed rating scales or self-report methodologies instead of professional diagnoses. This study utilised observational data to evaluate the precision of depression diagnosis rates in elderly patients with acute myocardial infarction (AMI) by instrumental variable (IV) estimators. The study examined the significant correlation between depression diagnosis and cardiovascular outcomes in an aged cohort of AMI patients by employing these methodologies. Table 1 presents the count of AMI patients diagnosed with depression at 30, 60 and 90 days post-AMI. The frequency of depression diagnoses rises with an extended observation period, indicating a cumulative recognition of the condition. This research elucidates the mental health burden in post-AMI patients and the possible correlation between depression and future outcomes. Figure 1 illustrates an AMI patient of varying age and duration of depression diagnosis. Figure 2 illustrates the percentage of various mental illnesses that emerged 30-90 days following acute myocardial infarction (AMI), indicating a greater prevalence of Alzheimer's disease during this period. The healthcare utilisation of patients diagnosed with depression following Post AMI (30-90 days) is illustrated in Figure 3, which indicates that the percentage of prescription claims is greater than that of other healthcare facilities. IV estimators elucidate marginal treatment effects, especially for persons whose depression diagnosis may fluctuate due to extrinsic influences (e.g., ADR-based diagnostic instruments) rather than only their underlying clinical condition. The IV analysis in this study indicated that, for patients diagnosed with depression using ADR-based techniques, a greater diagnosis rate correlated with elevated healthcare expenses and physician visits, but less emergency department visits and prescription claims. This investigation underscores the possibility of varied treatment responses among patients contingent upon diagnostic determinants, indicating that certain diagnostic methodologies may inadvertently influence healthcare utilisation trends, perhaps due to disparities in care planning and follow-up procedures.

Table 1: AMI patients diagnosed with depression within 30, 60, and 90 days after AMI

Variables	30 days after AMI	30-60 days after AMI	60-90 days after AMI	Chi-Square test	Total (%)
N	9,199	2,894	2,166		14,259
Age					
66-70	17.2	16.2	16.5	0.2823	2,407 (16.9%)
71-75	16.0	18.1	16.9	0.0693	2,362 (16.6%)
76-80	19.3	21.4	20.9	0.0206	2,847 (20%)
81-85	21.1	20.8	21.2	0.9930	3,002 (21.1%)
85+	26.4	23.5	24.5	0.0062	3641 (25.5%)
Pre-index medical conditions					
Charlson Comorbidity Scores					
0	32.3	26.8	27.7	<0.0001	4.335 (30.5%)
1	23.9	23.0	23.4	0.4068	3,373 (23.7%)
2	15.5	14.9	15.7	0.9656	2,199(15.4%)
3	11.4	11.7	11.4	0.8337	1,634 (11.5%)
4+	16.9	23.6	21.7	<0.0001	2,708 (12.5%)
Mental illness					
Anxiety	12.7	12.0	12.3	0.4528	1,784 (12.5%)
Bipolar Disorder	1.8	1.5	1.2	0.0413	235 (1.6%)
Schizophrenia	1.3	0.9	0.9	0.9896	163 (1.1%)
Alzheimer's Disease	18.7	15.0	15.1	<0.0001	2,824 (17.4%)
Substance use disorder	1.6	1.9	1.9	0.1850	246 (1.7%)
1-Year Outcome					
Survival	72.9	67.4	27,963.0		
Total Healthcare Cost	20,488.1	26,048.7	12,257.7		
Part A	11,987.4	16,167.9	7,78		
Part B	5,669.3	7,150.3			
Outpatient	1,716.8	2,148.7			
Physician fee Schedule	2,595.9	3,305.5			
Others	1,356.6	1,696.0			
Part D	2,831.4	2,730.6			
Healthcare Utilization					
# of hospitalizations	1.2	1.4	1.2	0.0003	1.2
# of ED visits	1.6	1.7	1.6	0.2914	1.6
# of outpatient visits	7.0	7.1	6.7	0.2590	7.0
# of physician visits	24.5	26.6	23.9	<0.0001	24.8
# of prescription claims	61.8	56.3	53.4	<0.0001	59.4

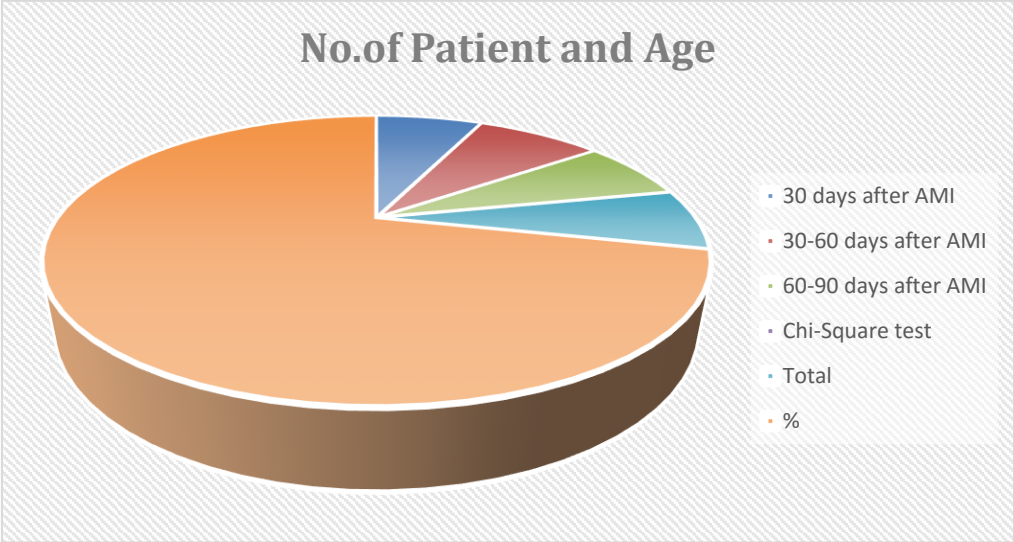


Fig. 1: AMI patient with different age and no. of days diagnosis depression

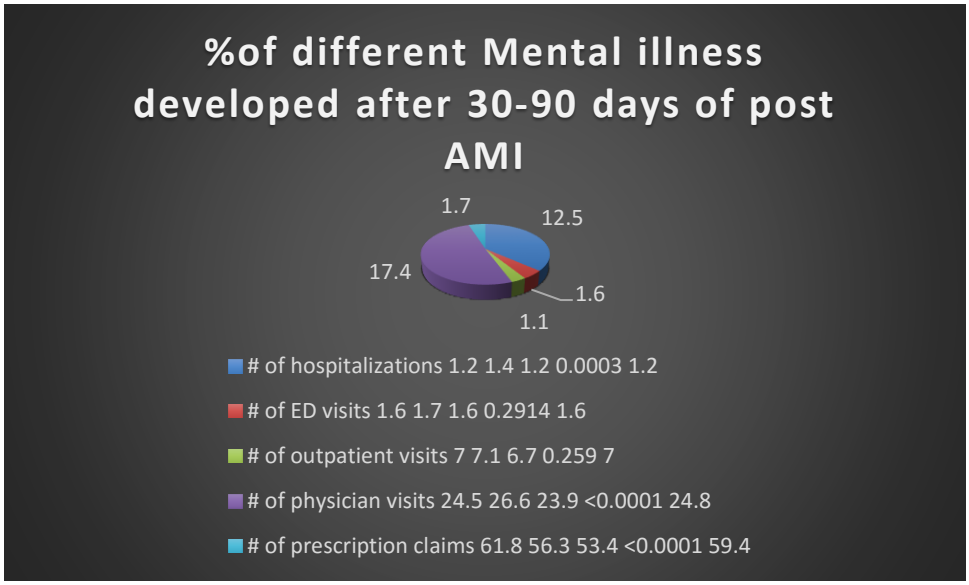


Fig. 2: % of different Mental illness developed after 30-90 days of post AMI

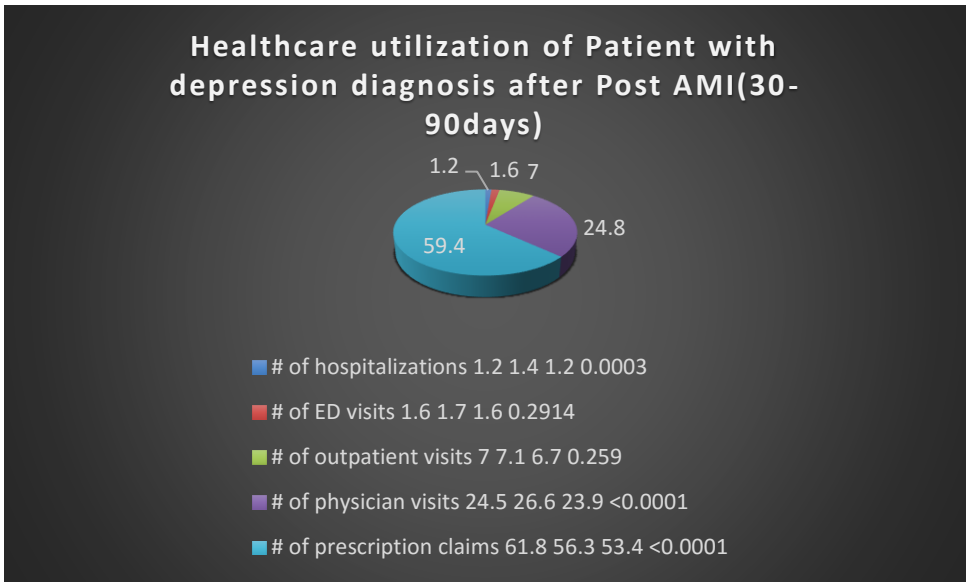


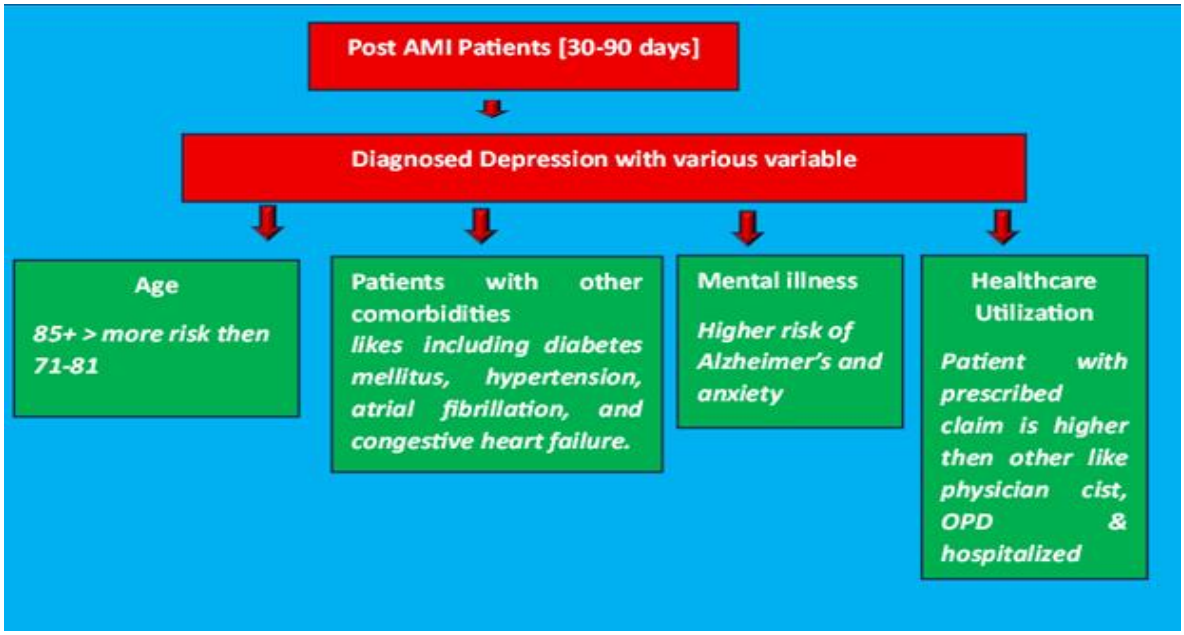
Fig. 3: Healthcare utilization of patient with depression diagnosis after Post AMI (30-90days)

SUMMARY & CONCLUSION

This study employed Medicare claims data and chart-abstracted patient records to derive instrumental variable estimates of the impact of depression diagnosis on survival and healthcare costs/utilization. Recognising treatment-effect heterogeneity is essential, as therapy effects differ among patient subgroups. The IV estimations indicated the impact of depression diagnosis on individuals whose chance of diagnosis was affected by the instrument. Patient characteristics in Medicare claims data were compared across groups to evaluate potential biases. Research indicated that diagnosed individuals frequently had worse health metrics—such as problems in activities of daily living and more comorbidity—relative to undiagnosed patients, thereby skewing rheumatoid arthritis estimations towards diminished survival and elevated healthcare costs/utilization results.

Divulgence of Investigation

Our findings demonstrate that post-myocardial infarction patients have a significant risk of developing new diagnoses of anxiety and depressive disorders within 30 to 90 days of follow-up. Moreover, individuals with post-myocardial infarction alzheimer's and anxiety disorders exhibit an elevated risk of recurrent myocardial infarction. To avert negative cardiac outcomes, individuals with acute myocardial infarction should undergo prompt evaluation to detect post-MI psychological distress and get age- and sex-specific treatment. The results of the IV investigation are presented as follows:



REFERENCE

1. World Health Organization, "Depression: Key facts," 2020. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/depression.
2. B. Gelaye *et al.*, "Validity of the Patient Health Questionnaire-9 for depression screening and diagnosis in East Africa," *Psychiatry Research*, vol. 210, no. 2, pp. 653-661, 2014.
3. American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*. Washington, DC: American Psychiatric Publishing, 2013.
4. World Health Organization, "Cardiovascular diseases (CVDs) fact sheet," 2017.
5. A. H. Maslow, "A theory of human motivation," *Psychological Review*, vol. 50, no. 4, pp. 370-396, 1943.
6. Vashistha, R. Srivastava, and A. Kumari, "Resilience and mental health: An overview of community-based factors," *Journal of Community Psychology*, vol. 49, no. 2, pp. 247-263, 2021.
7. M. Gupta, R. Patel, and N. Singh, "Economic impact of cardiovascular diseases in rural India," *International Journal of Health Economics*, vol. 23, no. 1, pp. 55-64, 2018.
8. R. Chowdhury, S. Ghosh, and S. Roy, "Socioeconomic impact of depression on Indian families," *Indian Journal of Social Psychiatry*, vol. 32, no. 1, pp. 24-30, 2016.
9. K. S. Reddy and S. Sharma, "Infrastructure challenges for rehabilitation in rural India," *Journal of Rural Health*, vol. 35, no. 4, pp. 487-495, 2019.
10. M. Singh, N. Reddy, and A. Kumar, "Cardiovascular diseases and aging: A comprehensive review," *Journal of Aging Research*, vol. 2021, Art. no. 8856910, 2021.
11. S. Chakraborty and V. Kumar, "Acute myocardial infarction in young adults: Impact and management," *Indian Heart Journal*, vol. 70, no. 4, pp. 510-517, 2018.
12. R. Rao and V. Patel, "The burden of depression in India: Challenges and opportunities," *Global Mental Health*, vol. 5, no. 2, pp. 102-110, 2018.
13. Himesh Soni1, Richa Swarnkar and Jitender K. Malik. Ascorbic Acid: A Prophylaxis Drug Therapy for Depression in Female Dam Rats. Asian Journal of Research in Nephrology. 3(1): 9-16, 2020.
14. Emma A. Mensour, Kiera Liblik, Laura E. Mantella, Amer M. Johri. Depressive symptoms and inflammatory markers following acute myocardial infarction: A scoping review. Health Sciences Review, Volume 2, 2022:100020.
15. J. D. Angrist and J.-S. Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press, 2008.
16. Y. Wu and D. O. Scharfstein, "Causal inference in observational data: Methods, assumptions, and practical considerations," *Statistical Methods in Medical Research*, vol. 29, no. 9, pp. 1-24, 2020.
17. C. F. Baum, M. E. Schaffer, and S. Stillman, "Enhanced routines for instrumental variables/generalized method of moments estimation and testing," *The Stata Journal*, vol. 7, no. 4, pp. 465-506, 2007.
18. J. V. Terza, A. Basu, and P. J. Rathouz, "Two-stage residual inclusion estimation: Addressing endogeneity in health econometric modeling," *Journal of Health Economics*, vol. 27, no. 3, pp. 531-543, 2008.

Cite This Article: Neelesh Chaubey & Ali Akbar Kolambil (2025). Assessment of Depression diagnosis for Patients with Acute Myocardial Infarction (AMI): A Case Report. *EAS J Pharm Pharmacol, 7*(4), 83-88.