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Predictors of Coronary Revascularization Outcomes in Type 2 Diabetic Patients with Acute Coronary Syndrome

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Abstract

Patients diagnosed with type 2 diabetes mellitus (T2DM) who suffer from acute coronary syndrome (ACS) and subsequently undergo coronary revascularization treatments exhibit diverse outcomes. It is essential to identify the factors that can predict these outcomes in order to enhance patient management and treatment techniques. To identify and evaluate the predictors of outcomes following coronary revascularization in patients with type 2 diabetes mellitus (T2DM) who present with acute coronary syndrome (ACS). This is a retrospective study of patients with type 2 diabetes mellitus (T2DM), who underwent coronary revascularization procedures following an acute coronary syndrome (ACS) event. The study population included all adult patients diagnosed with T2DM and admitted to Zliten Medical Center, Libya and Alahrar Teaching Hospital, Egypt. Of 6524 patients with ACS, 1182 had diabetes mellitus type 2 and met our criteria to enter the final analysis. In the multivariable analysis, age, dyslipidemia, family history, chronic obstructive pulmonary disease, previous MI, low hemoglobin and a low left ventricular ejection fraction (LVEF) significantly increased the rate of in-hospital mortality. Age, dyslipidemia, family history, chronic obstructive pulmonary disease, previous MI, low hemoglobin and a low LVEF found to be strongly associated with a higher likelihood of in-hospital mortality in our diabetic patients with a confirmed diagnosis of ACS.

Keywords: Coronary Revascularization, Type 2 Diabetes, Acute Coronary Syndrome.

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1. Introduction

Individuals with diabetes mellitus frequently experience ischemic heart disease is responsible for almost 50% of deaths in this group. Multiple studies conducted globally have shown the superiority of coronary artery bypass grafting (CABG) over percutaneous coronary intervention (PCI) in diabetic individuals with coronary artery disease (CAD) [1], the current guidelines recommend Class IA as the recommended revascularization procedure, which considered the standard therapy of choice [2]. Diabetic individuals who experiencing acute coronary syndrome (ACS), such as non-ST-segment elevation myocardial infarction (NSTEMI) or unstable angina (UA), possess unfavorable outcomes because of several coexisting medical conditions. In addition, patients with unstable CAD necessitate revascularization at an earlier stage in comparison to individuals with stable coronary artery disease (CAD) [3]. There is a lack of prospective research specifically focused on revascularization methods in the context of ACS without ST-segment elevation. Consequently, the current guidelines for selecting which lesions to treat and the methods of treatment determined by similar findings obtained from individuals diagnosed with stable coronary artery disease (CAD) or ST-elevation myocardial infarction (STEMI) [4]. The current referral patterns and the prognosis of diabetic individuals admitted to the hospital with non-ST elevation myocardial infarction (NSTEMI) or unstable angina (UA) who referred for either coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) not known. Moreover, the evaluation of the two-revascularization techniques relies on aggregated data, which have shown incongruous outcomes in different studies [5-6].

2. Subjects and Methods

This retrospective study conducted on patients who diagnosed with type 2 diabetes mellitus (T2DM) and had coronary revascularization procedures following an acute coronary syndrome (ACS) event. The study population comprised all adult patients who received a diagnosis of Type 2 Diabetes Mellitus (T2DM) and admitted to Zliten Medical Center, Libya and Alahrar Teaching Hospital, Egypt. The criteria for inclusion in this study were adults individuals aged 18 years and above who have received a diagnosis of type 2 diabetes mellitus (T2DM) based on the criteria established by the American Diabetes Association (ADA). These individuals also had acute coronary syndrome (ACS), which encompasses unstable angina, non-ST-segment elevation myocardial infarction (NSTEMI), or ST-segment elevation myocardial infarction (STEMI), and underwent either percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) for coronary revascularization. Exclusion Criteria enrolled individuals who had type 1 diabetes mellitus, coronary revascularization performed within the past year, significant comorbid conditions that could affect outcomes regardless in individuals with acute coronary syndrome (ACS) and type 2 diabetic mellitus (T2DM), such as advanced cancer or end-stage renal disease, and incomplete medical records or insufficient follow-up data. The data collected from the hospital, including demographic information such as age, gender, race, and BMI. Clinical characteristics included the duration of T2DM, HbA1c levels, Assessments of lipid profile, blood pressure, and other relevant factors presence of comorbid conditions (hypertension, hyperlipidemia, chronic kidney disease), were also included. Additionally, details regarding the presentation of ACS collected, such as the type of ACS (unstable angina, NSTEMI, STEMI), initial troponin levels, and ECG findings.

2.1. Procedural Data

- Specify the type of the revascularization treatment can performed using either percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG).
- The procedure's specifics include the number of arteries treated, the type of stents used (drug eluting or bare-metal), and the extent of revascularization achieved.
- Peri-procedural problems may include bleeding, infection, stroke, or a heart attack occurring during the surgery.

2.2. Follow-up Data

- Short-term outcomes: included in-hospital mortality, duration of hospitalization, and the requirement for subsequent revascularization procedures.
- Long-term outcomes: The study examines the mortality rate within one year, as Major adverse cardiac events (MACE) encompass all-cause mortality, myocardial infarction stroke.

Patients systematically monitored for clinical events at 30 days and for long-term mortality. Deaths classified into three categories: cardiovascular (CV), non-cardiovascular (non-CV), or of unknown etiology. CV death refers to mortality resulting from cardiovascular causes occurring within a period of 30 days following an acute myocardial infarction (AMI). This encompasses several cardiovascular conditions, including sudden cardiac death (SCD), congestive heart failure, stroke, cardiovascular operations, cardiovascular hemorrhage, as well as other cardiovascular causes such as pulmonary embolism and peripheral artery disease [7]. The determination of AMI established according to the third international definition of myocardial infarction. The study only included type 1 acute myocardial infarctions (AMIs). Which are AMIs that are typically The condition is a result of the rupture, erosion, ulceration, or dissection of plaque, which is then followed by the formation of a blood clot at the site or the movement of the clot to another location, leading to a lack of blood flow and subsequent death of heart muscle tissue [8]. An ischemic stroke characterized as a sudden occurrence of impaired function in the brain, spinal cord, or retina due to the death of tissue in the central nervous system (CNS) produced by an infarction [9].

2.3. Statistical design

Continuous variables expressed as either means and standard deviations or medians and interquartile ranges, depending on the specific situation. The categorical variables displayed in terms of frequencies and proportions. The statistical methods included in the analysis included The T test, chi square test, and univariate and multivariate analysis.

3. Results and discussion

3.1. Results

6524 patients with a confirmed diagnosis of ACS were identified between 1/2022 and 12/2023 in Zliten Medical Center, Libya and Alahrar Teaching Hospital, Egypt. 1182 patients with type 2 diabetes mellitus (DM) were incorporated into the ultimate analysis. There were no significant differences in demographic data among the studied groups, except for age, which was higher in the deceased group compared to the alive group (Table 1). There were no notable variations observed across the groups being evaluated in terms of comorbidities (Table 2). There was a notable disparity observed among the groups under investigation with respect to LVEF that the level of deterioration was greater in the deceased group compared to the living group. There was no discernible disparity between the studied groups regarding ACEI/ARB (Table 3). There was no discernible disparity observed among the groups under study with respect to the usage of aspirin, clopidogrel, and statin (Table 4). There was a notable disparity between the groups being evaluated in terms of HbA1C and creatinine levels, with both being higher in the deceased group compared to the group that survived and regarding hemoglobin that was decreased in dead group than alive group (Table 5). There was no notable disparity in the lipid profile between the groups that were examined (Table 6).

3.1.1. Multivariate analysis

The multivariable analysis revealed that age, dyslipidemia, family history, chronic obstructive pulmonary disease, previous myocardial infarction, low hemoglobin levels, and a low left ventricular ejection fraction (LVEF) were all significant factors contributing to an elevated likelihood of in-hospital death (table 7).

3.2. Discussion

Individuals diagnosed with diabetes mellitus (DM) have a firmly documented elevated likelihood of encountering cardiovascular complications morbidity and mortality. The macro vascular consequences of diabetes, namely coronary artery disease (CAD), cerebrovascular disease, and peripheral arterial disease, are significant contributors to death. 32.2% of people with type 2 DM experience cardiovascular problems. The primary cause of higher mortality rates and shorter lifespans in those with DM is an elevated potential for cardiovascular problems. Individuals who have diagnosed with type 2 diabetic mellitus at the age of 40 should expect to live 8 years less than individuals without diabetes did. Diabetes is a distinct risk factor that augments the probability of getting coronary artery disease (CAD) [10]. Individuals diagnosed with diabetes mellitus (DM) make up approximately 25-30% of the individuals admitted with acute coronary syndrome (ACS) who have diabetes mellitus (DM) had a poorer outcome compared to individuals without DM [11]. The main aim of this study was to identify and evaluate the characteristics that can forecast the results of coronary revascularization in patients with type 2 diabetes mellitus (T2DM) who have diagnosed with acute coronary syndrome (ACS). This study retrospectively analyzed individuals diagnosed with type 2 diabetes mellitus (T2DM) who underwent coronary revascularization procedures following an episode of acute coronary syndrome (ACS).

The study cohort consisted of adult patients who had diagnosed with Type 2 Diabetes Mellitus (T2DM) and admitted to Zliten Medical Center, Libya and Alahrar Teaching Hospital, Egypt. The study included 1182 patients who diagnosed with both Type 2 Diabetes Mellitus (T2DM) and ACS. Among these patients, there was a mortality rate of 3.55%, resulting in the death of 42 individuals out of the total 1182. Ram et al. [4] reported that the 5-year death rate was 21.7% for those who underwent revascularization with percutaneous coronary intervention (PCI), whereas those who underwent coronary artery bypass grafting (CABG) had a 5-year mortality rate of 17.9%. Farkouh et al. [12] reported a 5-year mortality rate of 26.6% in diabetic patients who received percutaneous coronary intervention (PCI). Contini et al. [13] reported a 5-year mortality rate of 24.5%, Kappetein et al. [14] reported a 5-year mortality rate of 19.5%, and our study demonstrated a lower mortality rate compared to a similar population cohort, with a reported 5-year mortality rate of 22.3% [15]. Furthermore, Marui et al. [16] shown a rise in death rates for both the 3-year and 5-year periods (11% compared to 9.7% and 19.6% compared to 16.2%, respectively), and Koshizaka et al. [17] observed a substantial disparity in the 5-year death rates differ significantly between people with diabetes (15.5%) and those without diabetes (8.5%). Wit et al. [18] reported that there was a notable increase in the mortality rates over a span of 3 years among patients with diabetes, those, who received insulin treatment exhibited a distinct contrast in comparison to those who did not receive insulin treatment, as well as people without diabetes. The mortality rates were 16.7% for insulin-treated diabetes patients, 8.7% for the prevalence of diabetes among patients not receiving insulin treatment was 6.3%, while it was 6.3% for patients without diabetes. The mean age of the dead cohort in our study was much greater than that of the surviving group (69.92 ± 12.48 vs. 57.49 ± 6.15 years, p<0.001). This discovery is consistent with multiple studies that have repeatedly demonstrated age as a key indicator of death in individuals with ACS. For example, a study conducted on a population-based cohort by Alabas et al. [19] who revealed that older age linked to a higher rate of death during hospitalization in individuals with diabetes who had acute coronary syndrome (ACS). Savonitto et al. [20] evaluated a cohort of 645 elderly individuals, aged 75 years or older, diagnosed with acute coronary syndrome (ACS). The mean age of the patients was 81.6 years and the occurrence of diabetes mellitus (DM) was 35.9%.

Diabetes mellitus (DM) linked to a greater incidence of other health conditions and poorer levels of ejection fraction and hemoglobin. In a more recent study, a comprehensive analysis conducted on a significant cohort of 12,792 individuals diagnosed with ST-elevation myocardial infarction (STEMI) who received primary percutaneous coronary intervention (PCI). Out of the patients, 3,023 people (23.6%) were 75 years old or above. Elderly individuals exhibited a greater incidence of concurrent medical conditions, a more widespread occurrence of coronary artery disease, and experienced a notable delay in receiving reperfusion treatment. DM correlated with elevated 30-day death rates in both young and older individuals [21]. The greater death rate observed in older individuals with DM may mostly result from their increased prevalence of comorbidities, rather than being directly caused by Direct message (DM) itself, as mentioned in previous studies. Remarkably, our investigation revealed no notable disparities in the distribution of gender, hypertension, dyslipidemia, family history, or smoking status between the groups of individuals who survived and those who did not. This aligns somewhat with Wijkman et al. [22]; the study found there is no notable association between systolic blood pressure (SBP) and death in people with type 2 diabetes who have recently had an acute coronary syndrome (ACS).

This contrasts with some previous studies, such as the work by Bohm et al. [23], a study discovered that hypertension and smoking were separate factors that could assess the probability of mortality in diabetic patients with acute coronary syndrome (ACS). The disparity could attributed to variations in population demographics or approaches to management. Additional observational studies including people diagnosed with type 2 diabetes and cardiovascular risk factors have established associations between reduced blood pressure levels and adverse outcomes [24]. Our investigation discovered that the prevalence of rheumatoid factor (RF) positive was substantially greater among the deceased individuals (26.2% vs. 12.3%, p=0.008). This discovery contributes to the expanding collection of research indicating a connection between rheumatoid arthritis and heightened increased cardiovascular risk in individuals diagnosed with diabetes. A study conducted by a nationwide population-based cohort Kang et al. [25] confirmed comparable results documented, emphasizing the necessity for enhanced cardiovascular surveillance in persons with a combination diagnosis of diabetes and rheumatoid arthritis. Our study found that the group of people had a considerably decreased left ventricular ejection fraction (LVEF) who died.

Specifically, 42.9% of the deceased group had a severe decline in LVEF, compared to just 22.8% in the group of individuals who survived (p=0.006). This is consistent with other studies that have the importance of left ventricular ejection fraction (LVEF) as a crucial prognostic factor in acute coronary syndrome (ACS) has firmly established. For example, Shin et al. [26] discovered that a decrease in left ventricular ejection fraction (LVEF) independently linked to a greater rate of mortality during hospitalization in diabetic individuals with heart failure. This agrees with Ye et al. [27] whose objective was to assess if a decreased left. The ventricular ejection fraction (LVEF) is a risk for patients after undergoing percutaneous coronary intervention (PCI). Based on their research, patients with an ejection fraction (EF) of 50% or greater had a considerably lower mortality rate during their hospital stay compared to individuals with an EF below that threshold 50% (0.12% vs. 3.68%, P<0.001). An observational study conducted in Iran enrolled a total of 293 There were 268 patients with left ventricular dysfunction and an ejection fraction (EF) between 41 and 49%, while 1,469 patients had an EF of 50% or higher.

Table 1: Demographic data among studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
Age (years)	**Mean ± SD**	57.49± 6.15	69.92±12.48	**0.001**
	Range	44-69	1-84	
Sex	**Male**	640 (56.1%)	23 (54.8%)	0.86
	Female	500 (43.9%)	19 (45.2%)	
Hypertension	**Yes**	800 (70.20%)	25 (59.50%)	0.14
	No	340 (29.80%)	17 (40.50%)	
Dyslipidemia	**Yes**	760 (66.70%)	24 (57.10%)	0.2
	No	380 (33.30%)	18 (42.90%)	
Family history	**Yes**	120 (10.50%)	4 (9.50%)	0.835
	No	1020 (89.50%)	38 (90.50%)	
Smoking	**Yes**	840 (73.70%)	32 (76.20%)	0.717
	No	300 (26.30%)	10 (23.80%)	

Table 2: Comorbidities among studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
COPD	**Yes**	40 (3.50%)	2 (4.80%)	0.667
	No	1100 (96.50%)	40 (95.20%)	
CABG	**Yes**	200 (17.50%)	8 (19.00%)	0.802
	No	940 (82.50%)	34 (81.00%)	
Previous MI	**Yes**	200 (17.50%)	7 (16.70%)	0.883
	No	940 (82.50%)	35 (83.30%)	
RF	**Yes**	140 (12.30%)	11 (26.20%)	0.008
	No	1000 (87.70%)	31 (73.80%)	

COPD: chronic obstructive pulmonary disease, CABG: Coronary artery bypass grafting, MI: Myocardial infarction, RF: Rheumatoid factor.

Table 3: LVEF and ACEI/ARB among studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
LVEF	**Normal**	240 (21.10%)	5 (11.90%)	**0.006**
	Mild reduction	220 (19.30%)	5 (11.90%)	
	Moderate reduction	420 (36.80%)	14 (33.30%)	
	Severe reduction	260 (22.80%)	18 (42.90%)	
ACEI/ARB	**Yes**	560 (49.10%)	15 (35.70%)	0.088
	No	580 (50.90%)	27 (64.30%)	

LVEF: Left ventricular ejection fraction, ACEI: Angiotensin-Converting Enzyme Inhibitors, ARB: Angiotensin receptor blockers.

Table 4: Treatment among the studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
Aspirin	**Yes**	1080 (94.70%)	39 (92.90%)	0.595
	No	60 (5.30%)	3 (7.10%)	
Clopidogrel	**Yes**	960 (84.20%)	31 (73.80%)	0.072
	No	180 (15.80%)	11 (26.20%)	
Statin	**Yes**	1040 (91.20%)	36 (85.70%)	0.22
	No	100 (8.80%)	6 (14.30%)	

Table 5: Laboratory data among studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
Hemoglobin (mg/dL)	**Mean ± SD**	12.74±0.79	12.31±0.85	**0.001**
	Range	10.7-13.9	10.4-13.7	
HbA1C	**Mean ± SD**	8.74±0.89	9.11±0.81	**0.009**
	Range	7.1-10.7	8-10.9	
Creatinine	**Mean ± SD**	1.04±0.21	1.14±0.28	**0.004**
	Range	0.7-1.4	0.7-1.6	

HbA1C: Glycated hemoglobin.

Table 6: Lipid profile among studied groups

		Alive group (n=1140)	Dead group (n=42)	P value
Total cholesterol	**Mean ± SD**	171.63±20.49	177.45±17.73	0.07
	Range	123-237	144-221	
Triglyceride	**Mean ± SD**	139.57±24.32	145.92±17.00	0.094
	Range	95-222	110-174	
HDL	**Mean ± SD**	38.98±6.63	38.16±5.40	0.431
	Range	30-57	30-54	
LDL	**Mean ± SD**	104.73±23.69	110.1±16.59	0.146
	Range	45.2-180	80.8-155.2	

TC = total cholesterol, TG = triglyceride, HDL_C = High-density lipoprotein cholesterol, LDL-C = low-density lipoprotein cholesterol.

Table 7: Multivariate analysis of the risk factors predicting mortality

	Exp(B)	95% C.I. for EXP(B)		P value
		Lower	Upper	
Age (years)	1.741	1.445	2.096	**0.001**
Hypertension	0.439	0.057	3.367	0.428
Dyslipidemia	0.132	0.019	0.909	**0.04**
Family history	0.023	0.002	0.287	**0.003**
COPD	1269.083	6.792	237122.1	**0.007**
CABG	7.097	0.621	81.1	0.115
Previous MI	13.38	1.819	98.437	**0.011**
Smoking	3.567	0.402	31.673	0.254
LVEF	1.571	1.131	2.181	**0.007**
Hemoglobin (mg/dL)	0.064	0.014	0.296	**0.001**
HbA1C	2.594	0.875	7.689	0.086

The study revealed that patients suffering from left ventricular dysfunction or a diminished ejection fraction (EF) experienced elevated incidence of significant adverse cardiac events and cardiac death compared to patients with EF of 50% or higher [28]. Furthermore, an independent investigation carried out to analyze the relationship between the left ventricular ejection fraction (LVEF) and the outcomes of patients with acute ST-segment elevation myocardial infarction (STEMI) during their hospital stay. This study utilized a prospective cohort design and included 304 patients who had undergone primary percutaneous coronary intervention (PCI). The findings revealed that a decrease in LVEF is linked to a greater occurrence of adverse events during the hospital stay ($P < 0.05$) [29]. The results of our investigation demonstrated notable disparities in many laboratory parameters between the groups of individuals who survived and those who did not. The deceased group exhibited reduced hemoglobin levels (12.31 ± 0.85 vs. 12.74 ± 0.79 mg/dL, $p<0.001$), while HbA1c (9.11 ± 0.81 vs. 8.74 ± 0.89, $p=0.009$) and creatinine levels (1.14 ± 0.28 vs. 1.04 ± 0.21, $p=0.004$) were higher. These findings are consistent with previous research. For instance, a study by Huynh et al. [30] discovered that there is a link between anemia and negative outcomes in diabetic people with acute coronary syndrome (ACS). Multiple studies have identified a positive link between elevated levels of HbA1c and creatinine and higher death rates.

This emphasizes the significance of maintaining proper glycemic management and kidney function in this group of patients. Cakar et al. [31] whose objective was to evaluate the impact of slightly higher creatinine levels in individuals with acute myocardial infarction (AMI) on one-year mortality, indicated that the mortality rate in the raised group (n = 7, 25.9%) is greater than that in the normal group (n = 9, 6.8%). There is a notable rise in the death rate within one year, which is also evident (P=0.02). Our investigation revealed that there was no statistically significant disparity observed among the studied groups in terms of the utilization of Aspirin, Clopidogrel, and Statin medicines. Extensive clinical trials have demonstrated that the administration of lipid-lowering statin therapy successfully reduces the occurrence of cardiovascular morbidity and mortality in individuals with chronic and acute coronary syndromes [32]. Ulvenstam et al. [9] reported that lipid-lowering medication strongly linked to a decreased risk of recurring incidents in the end. Curiously, our study did not discover any noteworthy disparities in lipid profiles among the groups, which contradicts certain prior data [33].

These findings indicate that in our community, the influence of dyslipidemia on immediate mortality may be less significant compared to other risk factors. The multivariate analysis identified numerous factors that independently predict the likelihood of fatality while in the hospital. Age (OR 1.741, 95% CI 1.445-2.096, p=0.001) and LVEF (OR 1.571, 95% CI 1.131-2.181, p=0.007) were confirmed as significant risk factors. Interestingly, dyslipidemia (OR 0.132, 95% CI 0.019-0.909, p=0.04) and family history (OR 0.023, 95% CI 0.002-0.287, p=0.003) Seemed to exhibit a defensive impact. This surprising discovery necessitates additional research and may be linked to treatment protocols or other unquantified variables that can influence the results. Chronic obstructive pulmonary disease (COPD) has recognized as a substantial indicator of death. (OR 1269.083, 95% CI 6.792-237122.1, p=0.007). Although the large confidence interval indicates some uncertainty in this estimate, it is consistent with increasing evidence of the harmful effects of COPD on cardiovascular outcomes. Previous myocardial infarction (MI) also significantly increased mortality risk (OR 13.38, 95% CI 1.819-98.437, p=0.011), this supports the accepted concept that a previous myocardial infarction (MI) raises the likelihood of negative outcomes in future acute cardiac episodes.

Confirmation obtained that low hemoglobin levels are an independent risk factor. (OR 0.064, 95% CI 0.014-0.296, p=0.001), reinforcing the importance of addressing anemia in this patient population. Ulvenstam et al. [9] An analysis revealed that advanced age, diabetes mellitus, previous ischemic stroke, heart failure (with diuretic treatment upon discharge), and confirmed coronary heart disease (previous PCI, CABG, or angina) were identified as separate factors that independently predicted a higher likelihood of experiencing the primary outcome. However, the process of restoring blood flow during revascularization the initial The act of being admitted to a hospital and receiving treatment to reduce cholesterol levels in the blood were linked to a positive result. The main recognized risk factors for cardiovascular events encompass a familial history of cardiovascular disease, tobacco use, sedentary lifestyle, hypertension, elevated cholesterol levels, diabetes, and abdominal obesity. As per Johansson, et al. [34] advancing age is associated with a higher likelihood of experiencing recurring cardiovascular events. Lin et al. [35] A study found that the The Cox proportional hazard model identified age, chronic kidney disease (CKD), previous myocardial infarction (MI), and stroke history as risk variables associated with all-cause mortality in individuals diagnosed with coronary artery disease. The odds ratios for these risk factors were 1.05, 1.89, 2.87, and 4.12, respectively.

4. Conclusion

Significant risk variables that identified include advanced age, dyslipidemia, family history, COPD, prior MI, low hemoglobin levels, and reduced left ventricular ejection fraction. These findings emphasize the significance of conducting a thorough risk evaluation of this particular group that is very susceptible to risks. Healthcare practitioners should give priority to these elements when handling diabetic individuals with ACS. It is essential to prioritize the aggressive management of modifiable risk factors, such as maintaining glycemic control and addressing anemia. Furthermore, individuals who have already diagnosed with chronic obstructive pulmonary illness (COPD) or a past myocardial infarction (MI) may have advantages from increased surveillance and therapy. Future research should prioritize the designing and verifying technologies to assess and categorize risks that include these variables. These tools will help guide therapeutic decision-making and enhance outcomes in this vulnerable patient population. Furthermore, it is necessary to do additional research to explore the potential underlying processes or confounding factors that may explain the apparent protective effects of dyslipidemia and family history.

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