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Prospective study on mortality predictors in acute exacerbations of chronic obstructive pulmonary disease

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Abstract

Introduction: Acute exacerbations of chronic obstructive pulmonary disease are frequent causes of hospitalization and mortality. Early identification of patients at risk of poor outcomes enables timely interventions and improves management.

Method: A prospective observational study was conducted at Tribhuvan University Teaching Hospital, Nepal from 20 Jul 2023 to 20 Jul 2024, among patients admitted with acute exacerbations of chronic obstructive pulmonary disease. Ethical approval was obtained. Demographic, clinical, and laboratory data were collected at admission. Patients were categorised into low, medium, high risk by DECAF score. Data were analysed using IBM SPSS. Categorical data were analysed using the Chi-square test/Fisher's exact test. Continuous data were analysed using the independent t-test/ANOVA. Multiple logistic regression analysis was conducted to identify predictors of mortality. A $p < 0.05$ was considered statistically significant.

Result: Among 111 participants, majority (56%) were low risk, 1/3rd (33.3%) intermediate risk, and minority (16.2%) high risk, with a mortality of 0%, 10.81%, and 38.89% respectively, p=0.001. Higher DECAF scores were significantly associated with the need for mechanical ventilation (p=0.008) and longer hospital stay (p<0.0001). The scoring system demonstrated good predictive ability for in-hospital mortality with an area under the curve of 0.806.

Conclusion: The DECAF score serves as a practical bedside tool to predict mortality, need for ventilation, and hospital stay in patients with acute exacerbations of chronic obstructive pulmonary disease. It aids clinical decision-making and resource allocation. Larger multicentre studies with extended follow-up are recommended to confirm its wider applicability and prognostic accuracy.

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Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive respiratory illness that, while preventable, remains incurable once established. Effective self-management improves quality of life.[1] Globally, COPD ranked as the second leading cause of death in 1990 and the third in 2019.[2] Between 2007 and 2017, global prevalence rose by 15.6%, despite a 10.1% age-standardized decline in men.[3] Prevalence increased from 7.6% in 2004 to 11.4% in 2014.[4,5] In 2019, COPD accounted for 212.3 million cases, 3.3 million deaths, and 74.4 million DALYs. About 25–45% of patients had never smoked, with 14% of the global burden linked to occupational exposure.[6]

In Nepal, COPD rates remained stable from 1990–2016, while mortality decreased. Smoking, biomass fuel, and air pollution are major contributors. In 2016, 27% of males and 6% of females smoked; 66% of households used solid fuels; and 31% were exposed to second-hand smoke. Vehicle numbers rose from 244,000 to 1.3 million between 1990 and 2013, worsening pollution. COPD is higher than the global but lower than the South Asian average, with females facing higher mortality.[7]

Acute exacerbations of COPD (AECOPD) involve worsening symptoms needing urgent care.[8] Clinical signs, pulse oximetry, CRP, and ABG help assess severity. Frequent exacerbations worsen lung function and increase mortality risk.[9-13] FEV_1 is not useful during exacerbations.[14] This study investigates predictors of in-hospital mortality in AECOPD using the DECAF score, analyzing its relationship with mechanical ventilation and hospital stay.[15]

Method

This was an observational, cross-sectional study conducted in the intensive care unit (ICU), high dependency unit (HDU), medical ICU, and wards of General Medicine at the Tribhuvan University Teaching Hospital (TUTH), Institute of Medicine, Nepal. The duration of the study was one year from 20 Jul 2023 to 20 Jul 2024.

Patients were diagnosed with COPD based on a combination of clinical history, physical examination, chest X-ray findings, and pulmonary function test (PFT) results, with a forced expiratory volume in 1 second/forced vital capacity (FEV1/FVC) ratio of less than 70% predicted for the given age and sex.[16]

Patients with a prior COPD diagnosis by a physician, presenting typical symptoms and risk factors, and with the exclusion of other lung pathologies (e.g., pulmonary tuberculosis, post-TB fibrosis/bronchiectasis, bronchial asthma, interstitial lung disease, and bronchogenic carcinoma), were considered as COPD cases.[17].

Patients with an event characterized by worsening Dyspnoea, cough, and sputum production over less than 14 days were also included in the study.

Inclusion criteria, were patients who meet the criteria for the case definition, previous diagnosis of COPD by a physician, age ≥ 40 years.

Exclusion criteria were history of chronic respiratory disorders other than COPD (e.g., pulmonary tuberculosis, bronchial asthma, bronchiectasis, interstitial lung disease), comorbidities such as chronic liver disease, chronic kidney disease, malignancy, stroke, or ischemic heart disease, previous inclusion in the study, and who did not give consent.

Study variables included demographics (age, sex), duration of COPD, smoking history (measured in cigarette pack years), comorbidities (e.g., hypertension, diabetes mellitus), grade of dyspnoea, complete blood count and absolute eosinophil count, arterial blood pH, chest X-ray results, electrocardiogram (ECG) results, DECAF score.

Dyspnoea was quantified using the Medical Research Council Dyspnoea (MRCD) scale, with the extended MRCD (eMRCD) scale for greater

detail. The patient's dyspnoea grade for the past three months was considered for assessment.[18]

Eosinopenia was defined as an eosinophil count of less than 50/µL. The absolute eosinophil count was calculated using the formula: (WBC count × 10^3/µL × eosinophil %).[19]

Chest X-rays were performed using a postero-anterior view for stable patients and an antero-posterior view for critically ill patients in the ICU. If required, a CT scan of the chest was done for further assessment. The presence of consolidation was noted as airspace opacification and air bronchogram.

Arterial Blood Gas (ABG) analysis was performed upon admission, and acidaemia was defined as a pH level below 7.3 and a PCO2 measurement exceeding 50 mm Hg.[20]

Electrocardiogram (ECG) was conducted to detect atrial fibrillation (AF), characterized by irregularly irregular R-R intervals and the absence of distinct P waves.[21]

The DECAF score was computed by summing the following variables: dyspnoea MRCD 1-4=0, eMRCD 5a=1, eMRCD 5b=2; Eosinopenia

Score=1 if eosinophil count <50/µL; Consolidation: Score=1 if consolidation is present on chest radiograph; Acidaemia: Score=1 if pH <7.3; Atrial Fibrillation: Score=1 if AF is detected. The total DECAF score ranges from 0 to 6. A higher score correlates with a higher risk of in-hospital mortality: 0–1: Low risk, 2: Intermediate risk, ≥3: High risk.

During the study, patient follow-up was carried out in the hospital setting. As this was an observational study, no deliberate interventions were made that could potentially influence the treatment or outcomes.

Classification of clinical outcomes; Improved: noticeable symptom relief and an enhancement in functional capacity, as quantified by the Dyspnoea scale; Status Unknown: Assigned to patients for whom the clinical outcome could not be determined due to voluntary discharge or discharge against medical advice; Mortality: death occurring during hospitalization due to AECOPD.

The study used a convenience sampling method. Based on hospital medical records of previous year, a total of 384 patients were admitted with a diagnosis of AECOPD. The in-hospital mortality rate for AECOPD patients was found to be 11.5%, according to a study.[22] The sample size was calculated using the formula for a finite population: $n=[N*z^2*P(1-P)] / [d^2(N-1)+z^2*P(1-P)]$, where N=384 (finite population size), z=1.96, P=0.115 (expected mortality), and d=0.05 (precision). The calculated sample size was 111.

Data were entered and analysed using the IBM SPSS (Statistical Product and Service Solution) version 25. Frequencies, mean and standard deviation were computed. Categorical data were analysed using the Chi-square test/Fisher's exact test. Normality of data was checked and continuous data were analysed using the independent t-test/ANOVA. Logistic regression analysis was conducted to identify predictors of mortality. A $p<0.05$ was considered statistically significant.

Result

There was a total of 111 patients with Acute AECOPD. The mean age of the participants was 69.69±9.92 years, with a higher proportion of females (69.4%), hypertension (31.5%) was the most prevalent comorbidity, followed by diabetes mellitus (7.2%), Table 1.

The associations of demographic factors with primary outcomes were analyzed. A non-significant trend of increasing mortality was observed with advancing age. Mortality rates were 0% in patients aged 41-50 (n=5) and 51-60 (n=14), 11.11% (5/45) in those aged 61-70, 15.63% (5/32) in those aged 71-80, and 6.67% (1/15) in patients over 80 years of age (p=0.527). The need for mechanical ventilation was highest in the 71-80 age group (12.5%, 4/32), though this association was also not statistically significant (p=0.678). Similarly, the length of

hospital stay did not vary significantly across age groups (p=0.198), with the longest mean stay observed in the 71-80 year group (8.69±6.53 days).

Analysis by gender revealed that female patients, who constituted the majority of the cohort (69.4%, 77/111), had a slightly higher but statistically comparable mortality rate to males (10.39% vs. 8.82%, p=0.905). Similarly, no significant differences were found between genders in the need for mechanical ventilation (5.19% in females vs. 11.76% in males, p=0.246) or the mean duration of hospitalization (7.34±4.83 days vs. 6.91±2.95 days, p=0.635).

The severity of Dyspnoea at admission, as quantified by the eMRCD scale, was a strong and statistically significant predictor of in-hospital mortality in patients with AECOPD. The analysis revealed a statistically significant association between the severity of dyspnoea and in-hospital mortality (p=0.003). A clear gradient was observed, where mortality was concentrated in patients with more severe dyspnoea. No deaths occurred in the mild dyspnoea group (eMRCD <4). In the moderate dyspnoea group (eMRCD grade 4), the mortality rate was 4.69% (3 out of 64). This rate increased markedly to 27.27% (9 out of 33) in the severe dyspnoea group (eMRCD grade 5a). This indicates that patients with the most severe grade of dyspnoea (5a) had a nearly six-fold higher mortality rate compared to those with moderate dyspnoea, Table 2.

The relationship between the individual components of the DECAF score and patient outcomes revealed that consolidation on chest radiograph and acidaemia were the most consequential factors, showing significant associations across multiple poor outcomes. Specifically, the presence of consolidation was significantly associated with higher mortality (0% vs. 15.7%, p=0.014), a strong trend towards greater need for mechanical ventilation (0% vs. 11.4%, p=0.050), and a significantly longer mean hospital stay (5.80±2.15 vs. 8.03±5.03 days, p=0.002). Similarly, acidaemia was a powerful predictor, associated with markedly higher mortality (2.7% vs. 24.3%, p=0.001), a significantly increased need for mechanical ventilation (2.7% vs. 16.2%, p=0.016), and a longer duration of hospitalization (6.45±2.82 vs. 8.73±6.13 days, p=0.008). In contrast, eosinopenia and atrial fibrillation did not demonstrate any statistically significant associations with mortality, need for mechanical ventilation, or length of hospital stay in this cohort (p>0.05 for all), Table 3.

The analysis demonstrated the powerful and graded prognostic utility of the DECAF score for stratifying risk in AECOPD patients. A higher DECAF risk category was strongly associated with worse outcomes across all three measures, of in-hospital mortality, need for mechanical ventilation, and longer hospital stay The in-hospital mortality rate showed a steep, significant gradient, rising from 0% in the low-risk group to 10.8% in the intermediate-risk group, and reaching 38.9% in the high-risk group (p<0.001). A similar graded relationship was observed for the need for mechanical ventilation, which increased from 1.8% in the low-risk group to 8.1% in the intermediate-risk group, and 22.2% in the high-risk group (p=0.008). Furthermore, the length of hospital stay was significantly correlated with the DECAF score, with the mean stay increasing from 6.19±1.91 days in the low-risk group to 7.03±2.89 days in the intermediate-risk group, and 10.83±8.65 days in the high-risk group (p<0.0001), Table 4.

The multiple logistic regression analysis confirmed that the DECAF score and the need for mechanical ventilation are strong, independent predictors of in-hospital mortality in patients with AECOPD, even after adjusting for other potential confounders, Table 7. The need for mechanical ventilation was the strongest independent predictor of mortality. Patients who required mechanical ventilation had 69.1 times higher odds of dying (Adjusted Odds Ratio, aOR=69.14; 95% CI: 1.82 - 2622.11; p=0.022) compared to those who did not, after controlling for all other variables in the model.

The DECAF score was also a significant independent predictor. For each one-point increase in the DECAF score, the odds of in-hospital mortality increased by more than 28 times (aOR=28.60; 95% CI: 1.29-635.45; p=0.034). It is important to note that while the point estimates for these odds ratios are very high, the associated confidence intervals are extremely wide. This indicates a considerable degree of uncertainty in the precise magnitude of the effect, which is often a consequence of a relatively small number of mortality events (n=11) in the study. Crucially, other factors such as age, gender, specific comorbidities (hypertension, diabetes), and individual DECAF components like acidaemia and atrial fibrillation were not independent predictors of mortality in this multivariate model (p>0.05 for all). This suggests that their influence on mortality is effectively captured and mediated through composite DECAF score and need for mechanical ventilation, Table 5.

A Receiver Operating Characteristic (ROC) curve analysis was performed to evaluate the predictive accuracy of the DECAF score for in-hospital mortality. The DECAF score demonstrated excellent discriminatory power, area under the curve (AUC) 0.865 (95% CI: 0.779-0.951; p<0.0001). For context, the predictive accuracy of other significant variables was also calculated. The need for mechanical ventilation had an AUC of 0.763, acidaemia an AUC of 0.769, consolidation an AUC of 0.705, and the eMRCD Dyspnoea scale an AUC of 0.797. The DECAF score outperformed all these individual components. Variables such as age, gender, hypertension, diabetes, eosinopenia, and atrial fibrillation showed no significant discriminatory power (AUC values not significantly different from 0.5, p>0.05). The ROC curve illustrated the superior performance of the DECAF score, Figure 1.

Table 1: Baseline characteristics of patients with chronic obstructive pulmonary disease, n=111

Baseline characteristics	Categories	n(%)
Age Group	Mean age	69.69±9.919
Gender	Male	34(30.6)
	Female	77(69.4)
Comorbidities	HTN	35(31.5)
	DM	8(7.2)
eMRCD grade	≤4	78(70.3)
	5a	33(29.7)
Eosinopenia	Yes	13(11.7)
	No	98(88.3)
Consolidation	Yes	70(63.1)
	No	41(36.9)
Acidosis	Yes	37(33.3)
	No	74(66.7)
Fibrillation	Yes	10(9)
	No	101(91)
DECAF Score	0–1 (Low risk)	56(50.5)
	2 (Intermediate risk)	37(33.3)
	3–6 (High risk)	18(16.2)
Length of Hospital Stay	Mean length of stay	7.21±4.33 days
Need of Mechanical Ventilation	Yes	8(7.2)
	No	103(92.8)
Outcome	Improved	95(85.6)
	Mortality	11(9.9)
	Status Unknown	5(4.5)

HTN, Hypertension; DM, Diabetes Mellitus; eMRCD, extended Medical Research Council Dyspnoea scale; DECAF, Dyspnoea, Eosinopenia, Consolidation, Acidaemia, and Atrial Fibrillation score.

Table 2: Association Between Dyspnoea Severity (eMRCD Scale) and Patient Outcomes

Parameters		Dyspnoea (eMRCD)			Chi Square/ Fischers' Exact	p-value
		<4	4	5a		
Need of Mechanical Ventilation	No	14	61	28	3.747	0.173
	Yes	0	3	5		
	Total	14	64	33		
Outcome	Mortality	0	3	9	13.599	0.003
	Improved	13	59	23		
	Status Unknown	1	3	1		
	Total	14	64	33		

Table 3: Association of Individual DECAF Components with Patient Outcomes

Variable	Category	Mortality n(%)	Improved n(%)	Status Unknown n(%)	p-value (Outcome)	Need for MV n(%)	p-value (MV)	Hospital Stay (d) Mean±SD	p-value (Stay)
Eosinopenia	No (n=98)	11 (11.2)	83 (84.7)	4 (4.1)	0.305	8 (8.2)	0.593	7.30±4.49	0.415
	Yes (n=13)	0	12 (92.3)	1 (7.7)		0		6.54±2.85	
Consolidation	No (n=41)	0	39 (95.1)	2 (4.9)	0.014	0	0.050	5.80±2.15	0.002
	Yes (n=70)	11 (15.7)	56 (80.0)	3 (4.3)		8 (11.4)		8.03±5.03	
Acidaemia	No (n=74)	2 (2.7)	69 (93.2)	3 (4.1)	0.001	2 (2.7)	0.016	6.45±2.82	0.008
	Yes (n=37)	9 (24.3)	26 (70.3)	2 (5.4)		6 (16.2)		8.73±6.13	
Fibrillation	No (n=101)	11 (10.9)	86 (85.1)	4 (4.0)	0.294	8 (7.9)	0.610	7.12±4.27	0.562
	Yes (n=10)	0	9 (90.0)	1 (10.0)		0		8.10±5.00	

MV, Mechanical Ventilation; SD, Standard Deviation.

Table 4: Association between DECAF score risk categories and patient outcomes

DECAF Score Risk Category	Total n(%)	Mortality n(%)	Improved n(%)	Status Unknown n(%)	p-value (Outcome)	Need MV n(%)	p-value (MV)	Hospital Stay (Days) Mean±SD	p-value (Stay)
Low (0-1)	56 (50.5)	0 (0)	54 (96.4)	2 (3.6)	<0.001	1 (1.8)	0.008	6.19±1.91	<0.0001
Intermediate (2)	37 (33.3)	4 (10.8)	30 (81.1)	3 (8.1)		3 (8.1)		7.03±2.89	
High (3-6)	18 (16.2)	7 (38.9)	11 (61.1)	0 (0)		4 (22.2)		10.83±8.65	

MV, Mechanical Ventilation; SD, Standard Deviation.
The p-value for Hospital Stay was calculated using One-way ANOVA

Table 5: Multiple Logistic Regression Analysis of Predictors for In-Hospital Mortality

Variable	B	S.E.	Wald	Df	Sig.	Exp(B) Odds ratio	95% C.I for Exp(B) Lower	95% C.I for Exp(B) Upper
Age	-0.042	0.063	0.44	1	0.507	0.959	0.847	1.086
SEX	1.832	1.64	1.247	1	0.264	6.245	0.251	155.494
HTN	-0.121	1.335	0.008	1	0.928	0.886	0.065	12.116
DM	0.531	2.225	0.057	1	0.811	1.701	0.022	133.086
Eosinopenia	-19.757	9112.382	0	1	0.998	0	0	.
Acidaemia	-0.996	1.563	0.405	1	0.524	0.37	0.017	7.915
Fibrillation	-20.128	10209.98	0	1	0.998	0	0	.
Need of mechanical ventilation	4.236	1.855	5.215	1	0.022	69.137	1.823	2622.109
DECAF	3.353	1.582	4.492	1	0.034	28.597	1.287	635.45
Hospital stay (days)	0.002	0.104	0.1	1	0.987	1.002	0.816	1.229

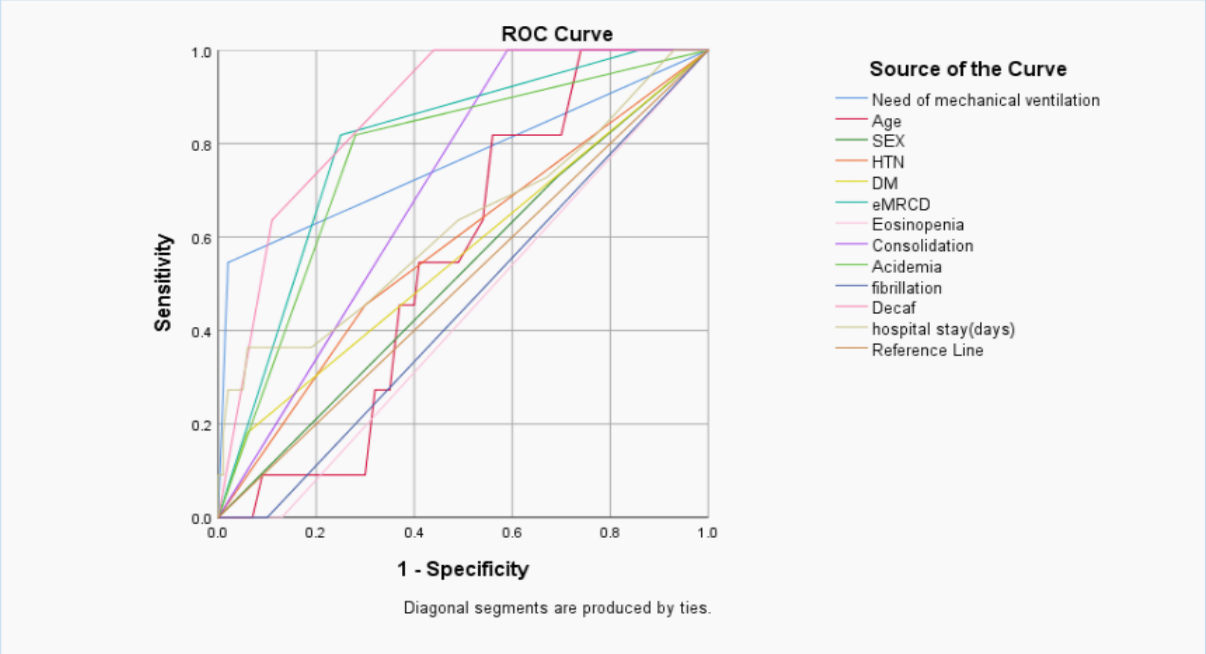

Figure 1. Receiver Operating Characteristic (ROC) curve for prediction of in-hospital mortality

Discriminatory accuracy of DECAF score (solid blue line, AUC=0.865, p<0.0001). Performance of the DECAF score compared to other selected predictors and the line of no discrimination (diagonal dashed line, AUC=0.5).

Discussion

The objective of this prospective cross-sectional observational study was to evaluate the DECAF score as a predictor of in-hospital mortality in patients with AECOPD. A total of 111 patients who met the inclusion criteria and showed signs of an acute exacerbation of COPD were included in the study. The mean age of the study population was 69.69±9.92 years, with the highest number of patients in the 61-70 age group, followed by the 71-80 age group. This high-risk age group is consistent with findings from other studies.[23],[24] A systematic analysis also showed the highest prevalence of COPD in the 70-74 age group globally.[25] In terms of gender distribution, our study had a predominance of female patients, contrasting with other studies where males were more commonly affected.[23],[26] In Nepal, factors such as smoking, firewood use, post-tuberculosis sequelae, and air quality contribute significantly to the higher prevalence of COPD in women. Comorbidities were also assessed, with

hypertension present in 31.5% and diabetes in 7.2% of patients. These findings align with recent studies showing that conditions like hypertension, dyslipidaemia, cardiovascular diseases, and type 2 diabetes frequently coexist with COPD, contributing to increased mortality risk.[27]

For assessing the severity of Dyspnoea, we used the extended Medical Research Council Dyspnoea scale. In our study, 70.3% of patients were classified into grades 1-4, while 29.7% were graded as 5a. This distribution is similar to a study which showed 45.5% of patients in grades 1-4 and 34.5% in grade 5a.[25] Notably, no patients were classified as grade 5b, which may be due to unclear distinctions between grades 5a and 5b. Eosinopenia, defined as an absolute eosinophil count of less than 50/µL, was observed in only 11.7% of our patients, which is consistent with findings from other studies.[27] Eosinopenia has been associated with bacterial infections, particularly in AECOPD patients.[28]

In terms of chest radiography, consolidation was present in 63.1% of patients in our study, a higher incidence than the 30% observed by another study.[23] This suggests a higher prevalence of infectious exacerbations in our population. Additionally, acidaemia was seen in 33.3% of patients, a finding consistent with a study where the incidence was 26%.[23] Atrial fibrillation was detected in 9% of our patients, but this was not statistically significant in relation to mortality outcomes. In contrast, other studies found a significant association between AF and mortality.[23,13]

The DECAF score, a tool for risk stratification, was used to assess the likelihood of in-hospital mortality. In our study, 50.5% of patients were classified as low risk, 33.3% as intermediate risk, and 16.2% as high risk, which is similar to findings from other studies.[13,29] The mean duration of hospital stay in our study was 7.21±4.33 days, which is longer than in other studies, where the average hospital stay ranged from 3.4 to 6.42 days.[23]

Regarding clinical outcomes, most patients (85.6%) improved, while 9.9% died, and 4.5% had status unknown. These findings align with studies though the mortality rate in our study was slightly higher, likely due to resource limitations.[23,29] In terms of the factors predicting clinical outcomes, the association between Dyspnoea grade and mortality was statistically significant (p=0.003), with grade 5a patients having a higher mortality rate compared to grade 4 patients. Consolidation on chest X-ray was also significantly associated with mortality (p=0.014). Similarly, acidaemia was significantly associated with mortality (p=0.001), as seen in other studies. [29] However, there was no significant association between atrial fibrillation and mortality in our study (p=0.294).

The DECAF score demonstrated strong predictive value for in-hospital mortality. The mortality rates for low, intermediate, and high-risk groups were 0%, 10.81%, and 38.89%, respectively (p<0.001), confirming the predictive power of the DECAF score. These results are consistent with another study, where mortality rates in high-risk patients were significantly higher.[25] Furthermore, the DECAF score was significantly associated with the need for mechanical ventilation, with a higher need for mechanical ventilation as the score increased. In our study, 1.78% of low-risk, 8.1% of intermediate-risk, and 22.22% of high-risk patients required mechanical ventilation (p=0.008). The length of hospital stay was also positively correlated with the DECAF score, with low-risk patients having a mean stay of 6.19 days, intermediate-risk patients staying 7.03 days, and high-risk patients staying 10.83 days (p<0.0001). These findings support those of previous studies, which showed that longer hospital stays are associated with higher DECAF scores.[30]

Multiple logistic regression analysis confirmed that only the DECAF score and the need for mechanical ventilation were significant predictors of mortality in our study (p<0.05). These findings are consistent with the study highlighting the critical role of the DECAF score

in predicting mortality outcomes in AECOPD patients.[29] Finally, the receiver operating characteristic (ROC) curve analysis showed that the DECAF score had a cut-off value of 2.50 with an area under the curve (AUC) of 0.806, further validating its predictive accuracy for in-hospital mortality. These findings are in agreement with other studies, which demonstrated that the DECAF score outperforms other prognostic scores for predicting in-hospital mortality in AECOPD patients.[23]

The findings of this study underscore the potential utility of the DECAF score as a bedside tool for predicting in-hospital mortality in patients with acute exacerbations of chronic obstructive pulmonary disease. By providing a reliable, straightforward method for risk stratification, the DECAF score can assist clinicians in identifying high-risk patients who may benefit from early care escalation, such as more intensive monitoring or early initiation of palliative care. Additionally, the DECAF score can guide decisions on the need for mechanical ventilation and help predict the length of hospital stay, which can be crucial for managing hospital resources effectively. These implications could lead to better patient outcomes by targeting interventions based on individual risk. The study demonstrated that the DECAF score is a significant predictor of in-hospital mortality, mechanical ventilation requirements, and length of hospital stay in AECOPD patients. The observed relationship between the DECAF score and mortality, mechanical ventilation, and length of stay highlights its importance in clinical practice for risk stratification. This can potentially improve decision-making in the management of AECOPD patients, optimizing healthcare resource allocation, and reducing unnecessary interventions for low-risk individuals.

Several limitations need to be acknowledged in this study. Firstly, it is a single-centre study with a small sample size, which may limit the generalizability of the findings to a broader population. The study's results may not fully reflect the outcomes in different healthcare settings or larger, more diverse populations. Secondly, the study revealed an uneven gender distribution, with a predominance of female patients, which might have influenced the generalizability of gender-specific outcomes. Thirdly, the Dyspnoea scale used in the DECAF score, the eMRCD scale, is not commonly used in regular clinical practice, which may limit its applicability in routine healthcare settings. Finally, the study only assessed short-term outcomes, and long-term outcomes were not studied. Therefore, the impact of the DECAF score on long-term prognosis and post-discharge management remains uncertain. These limitations suggest that further research with a larger, more diverse sample size, as well as long-term follow-up, is necessary to validate the clinical utility of the DECAF score in different settings and over extended periods.

Conclusion

The DECAF score is a practical and reliable bedside tool for assessing mortality risk and guiding early management in patients admitted with acute exacerbations of chronic obstructive pulmonary disease. Its use can support timely clinical decisions and improve allocation of care resources. Further multicentre studies with larger cohorts and extended follow-up are needed to validate its broader applicability and prognostic utility.

Author contribution

Concept design: NB,SD; Data collection: ALL; Data analysis: NB,SD; Draft manuscript: ALL; Final manuscript and accountability: All

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Conflict of interest

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Supplementary material

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