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CLINICAL PROFILE AND OUTCOMES OF PATIENTS PRESENTING WITH ACUTE DYSPNEA TO THE EMERGENCY DEPARTMENT

Dr. Amit Gangwar[1*], Dr. Rajkumar Garg[2], Dr. Naziya Hamid[3]

[1*]Post Graduate Resident, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

[2]Professor and HOD, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

[3]Assistant Professor, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

Corresponding Author: Dr. Amit Gangwar

Post Graduate Resident, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

Email: singhamitgangwar@gmail.com

ABSTRACT

Background: Acute dyspnea is one of the most frequent and potentially life-threatening reasons for emergency department (ED) visits. Rapid identification of the underlying etiology and early risk stratification are essential for timely management and improved clinical outcomes.

Objectives: To evaluate the clinical profile, etiological spectrum, emergency management, and outcomes of patients presenting with acute dyspnea to the emergency department of a tertiary care teaching hospital and to identify factors associated with adverse clinical outcomes.

Materials and Methods: This hospital-based prospective observational study included 350 consecutive adult patients presenting with acute dyspnea over a 12-month period. Demographic characteristics, clinical presentation, comorbidities, vital signs, diagnostic investigations, emergency interventions, and patient outcomes were recorded using a predesigned case-record form. Statistical analysis was performed using appropriate parametric and non-parametric tests, with a p-value <0.05 considered statistically significant.

Results: The mean age of the patients was 58.4±16.2 years, and 61.1% were males. Acute exacerbation of COPD (29.4%) was the most common cause of dyspnea, followed by acute heart failure (22.6%) and pneumonia (19.4%). Oxygen therapy was required in 94.9% of patients, while 21.1% received non-invasive ventilation and 10.9% required mechanical ventilation. Nearly half of the patients (48.9%) were admitted to general wards, 23.4% required ICU admission, and the overall in-hospital mortality was 4.6%. Older age, COPD, heart failure, oxygen saturation below 90%, and reduced Glasgow Coma Scale scores were significantly associated with ICU admission, whereas advanced age, severe hypoxemia, mechanical ventilation, ICU admission, and septic shock were significant predictors of in-hospital mortality (p<0.05).

Conclusion: Acute exacerbation of COPD, acute heart failure, and pneumonia were the leading causes of acute dyspnea in the emergency department. Older age, cardiopulmonary comorbidities, hypoxemia, altered consciousness, and the need for ventilatory support were associated with poor clinical outcomes. Early recognition of high-risk patients and prompt emergency management may improve survival and optimize utilization of critical care resources.

Keywords: Acute Dyspnea, Emergency Department, Chronic Obstructive Pulmonary Disease, Acute Heart Failure, Pneumonia, Intensive Care Unit, Mechanical Ventilation, Clinical Outcomes.

INTRODUCTION

Acute dyspnea is one of the most common and potentially life-threatening reasons for presentation to the emergency department (ED), accounting for approximately 5–10% of all emergency visits worldwide.

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It represents a symptom rather than a diagnosis and encompasses a broad spectrum of underlying conditions involving the respiratory, cardiovascular, metabolic, neurological, and hematological systems. Rapid identification of the underlying etiology is essential because delayed diagnosis and treatment are associated with increased morbidity, mortality, prolonged hospital stay, and greater healthcare utilization. Early risk stratification in the ED therefore plays a pivotal role in improving patient outcomes [1, 2]. The differential diagnosis of acute dyspnea includes acute heart failure, exacerbations of chronic obstructive pulmonary disease (COPD) and asthma, pneumonia, pulmonary embolism, pneumothorax, sepsis, metabolic acidosis, and acute

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coronary syndromes. Clinical assessment based solely on history and physical examination is often challenging because many of these conditions present with overlapping symptoms and signs. Consequently, emergency physicians frequently rely on a combination of clinical examination, pulse oximetry, arterial blood gas analysis, electrocardiography, chest radiography, laboratory biomarkers, and point-of-care ultrasonography to establish an early diagnosis and guide appropriate management [3, 4]. The prognosis of patients presenting with acute dyspnea varies considerably depending on the underlying cause, severity of illness, age, and associated comorbidities. Several studies have demonstrated that advanced age, cardiovascular disease, chronic lung disease, diabetes mellitus, renal dysfunction, hypoxemia, tachypnea, hypotension, and altered mental status are associated with increased risks of intensive care unit (ICU) admission, mechanical ventilation, and in-hospital mortality. Timely recognition of these high-risk patients facilitates prompt interventions and appropriate allocation of critical care resources [5, 6]. Despite advances in emergency medicine, acute dyspnea continues to impose a substantial burden on healthcare systems, particularly in low- and middle-income countries where delayed presentation, limited diagnostic facilities, and high prevalence of chronic cardiopulmonary diseases adversely affect outcomes. Local epidemiological data regarding the clinical profile, etiological spectrum, and outcomes of patients presenting with acute dyspnea remain limited in many tertiary care hospitals in India. Such information is essential for understanding disease patterns, optimizing emergency department protocols, and improving resource planning [7, 8].

Therefore, the present study was undertaken to evaluate the clinical profile, etiological spectrum, and outcomes of patients presenting with acute dyspnea to the emergency department of a tertiary care teaching hospital, and to identify factors associated with adverse clinical outcomes including ICU admission, need for ventilatory support, and in-hospital mortality.

MATERIALS AND METHODS

Study design and setting: This hospital-based prospective observational study was conducted in the Emergency Department of a tertiary care teaching hospital over a period of 12 months. A total of 350 adult patients presenting with acute dyspnea during the study period was screened consecutively for eligibility.

Inclusion Criteria

- Patients aged 18 years or older
- Present to the emergency department with acute-onset or acutely worsening dyspnea
- Patients undergo evaluation and treatment in the emergency department
- Patients provide written informed consent for the study

Exclusion Criteria

- Presented with breathlessness due exclusively to trauma
- Brought dead or die before initial clinical assessment
- Patients have isolated upper-airway obstruction requiring immediate surgical intervention
- Pregnant women
- Patients who not provide written informed consent for the study

Data collection: Data was collected using a predesigned and pilot-tested case-record form. Information regarding age, sex, residence, smoking status, alcohol use, duration of symptoms, mode and time of arrival, referral status, presenting complaints, previous similar episodes, and relevant comorbidities were recorded. A detailed clinical examination was performed at presentation. Initial physiological parameters, including heart rate, respiratory rate, systolic and diastolic blood pressure, body temperature, peripheral oxygen saturation, Glasgow Coma Scale score, and triage category, were documented. The severity of dyspnea may be graded using a standardized clinical scale, such as the modified Medical Research Council scale, wherever applicable. The presence of respiratory distress, cyanosis, accessory-muscle use, wheezing, crepitations, elevated jugular venous pressure, peripheral edema, altered sensorium, or signs of circulatory shock were also be recorded.

Diagnostic evaluation: Investigations were performed according to the clinical condition and institutional emergency protocols. These may include complete blood count, renal and liver function tests, serum electrolytes, blood glucose, arterial blood gas analysis, cardiac biomarkers, D-dimer, B-type natriuretic peptide, electrocardiography, chest radiography, echocardiography, point-of-care ultrasonography, and computed tomography of the chest or pulmonary angiography when clinically indicated.

Emergency management: Details of emergency interventions was recorded, including oxygen therapy, nebulization, intravenous medications, diuretics, antibiotics, vasopressors, non-invasive ventilation, invasive mechanical ventilation, cardiopulmonary resuscitation, and other disease-specific treatments. Time from arrival to triage, physician assessment, oxygen administration, and initiation of definitive treatment were documented wherever feasible.

Outcome measures: The primary outcome were the clinical disposition of the patient from the emergency department, categorized as discharge,

admission to a general ward, admission to a high-dependency unit or intensive care unit, referral to another centre, or death.

Secondary outcomes were requirement for non-invasive or invasive mechanical ventilation, intensive care unit admission and duration of emergency-department stay, total duration of hospitalization, in-hospital mortality, clinical improvement or deterioration and predictors of adverse outcomes.

Statistical analysis: Data were analysed using an appropriate statistical software package. Continuous variables were expressed as mean with standard deviation. Categorical variables were presented as frequencies and percentages. The independent-samples *t*-test or Mann–Whitney *U* test was used to compare continuous variables while chi-square test or Fisher's exact test was used to assess associations between categorical variables. A two-sided *p*-value below 0.05 was considered statistically significant.

RESULTS

A total of 350 patients were included. The mean age was 58.4±16.2 years, with 43.1% aged ≥60 years. Males predominated (61.1%), while 59.4% were from rural areas. Nearly half (47.1%) had a history of smoking.

Table 1: Baseline Demographic Characteristics of the Study Population (N = 350)

Variable		Frequency (N)	Percentage (%)
Age (Years)	18–39	78	22.3
	40–59	121	34.6
	≥60	151	43.1
	Mean Age (Years)	58.4 ± 16.2	
Gender	Male	214	61.1
	Female	136	38.9
Residence	Urban	142	40.6
	Rural	208	59.4
Smoking History	Yes	165	47.1
	No	185	52.9

Cough was the commonest presenting symptom (66.3%), followed by fever (33.7%) and chest pain (28.9%). Hypertension (38.9%) and COPD (32.0%) were the most frequent comorbidities.

Table 2: Clinical Presentation and Comorbidities

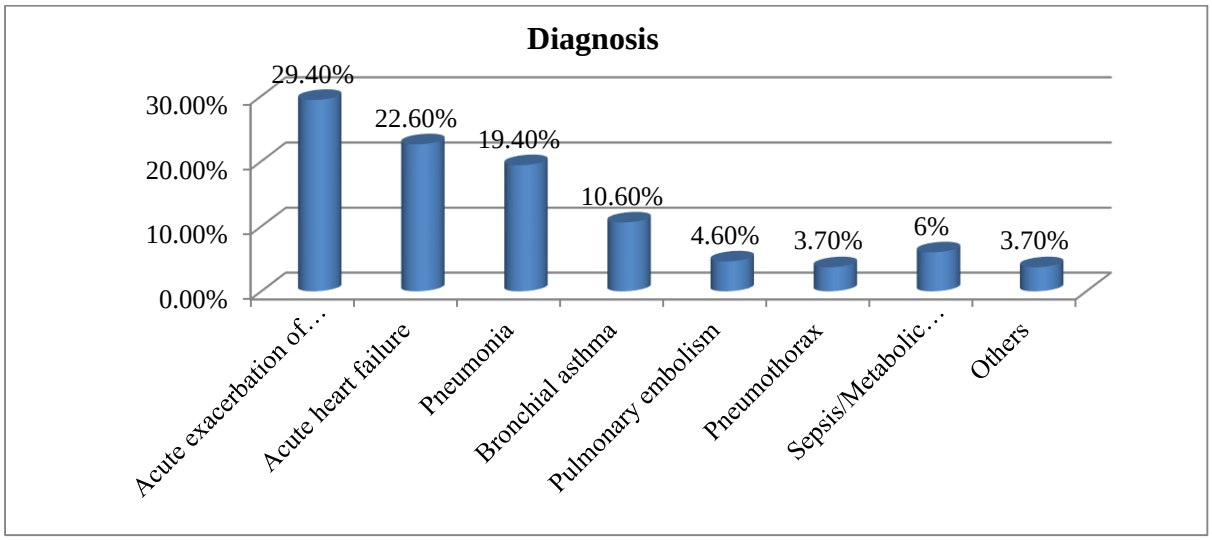
Variable		Frequency (N)	Percentage (%)
Presenting Symptoms	Cough	232	66.3
	Chest Pain	101	28.9
	Fever	118	33.7
	Wheeze	96	27.4
	Orthopnea	89	25.4
	Pedal Edema	64	18.3
Comorbidities	Hypertension	136	38.9
	Diabetes Mellitus	104	29.7
	COPD	112	32.0
	Chronic Heart Failure	74	21.1
	Chronic Kidney Disease	32	9.1

Patients commonly presented with tachycardia, tachypnea and hypoxemia. The mean oxygen saturation was 86.8%, indicating significant respiratory compromise at presentation.

Table 3: Vital Signs at Presentation

Parameter	Mean ± Sd
Heart Rate (Beats/Min)	108.6 ± 21.5
Respiratory Rate (Breaths/Min)	30.8 ± 7.1
Systolic Bp (Mmhg)	124.7 ± 25.6
Diastolic Bp (Mmhg)	76.4 ± 14.3
Oxygen Saturation (%)	86.8 ± 8.4
Glasgow Coma Scale	14.1 ± 2.2

Acute exacerbation of COPD (29.4%) was the leading cause of acute dyspnea, followed by acute heart failure (22.6%) and pneumonia (19.4%).



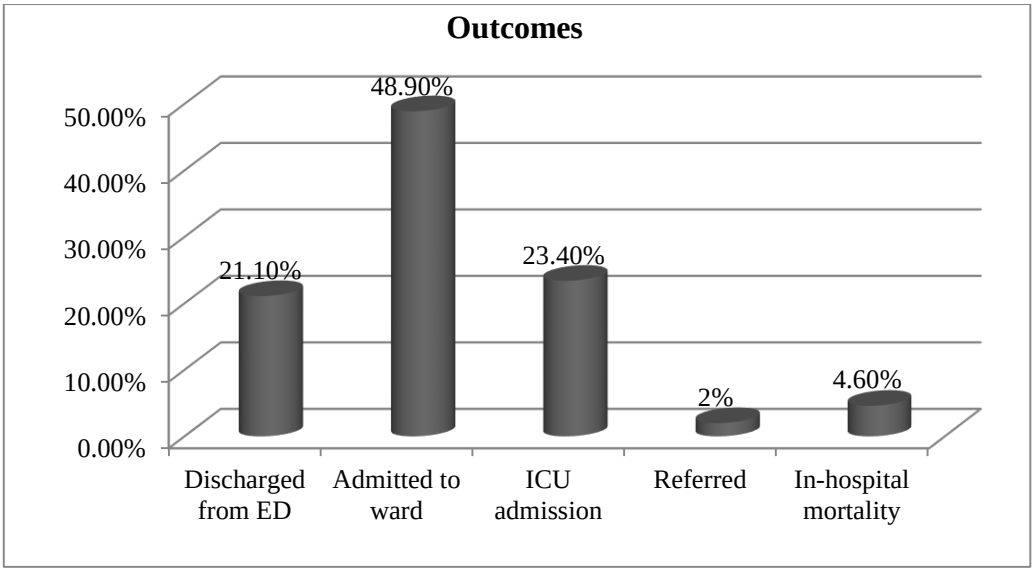
Graph 1: Etiological Diagnosis of Acute Dyspnea

Almost all patients required oxygen therapy (94.9%). Nebulization (42.6%) and intravenous antibiotics (37.7%) were commonly administered, while 21.1% required non-invasive ventilation.

Table 4: Emergency Interventions

Intervention	Frequency (N)	Percentage (%)
Oxygen Therapy	332	94.9
Nebulization	149	42.6
Intravenous Antibiotics	132	37.7
Diuretics	85	24.3
Non-Invasive Ventilation	74	21.1
Mechanical Ventilation	38	10.9
Vasopressors	29	8.3
CPR	12	3.4

Nearly half of the patients (48.9%) required ward admission, whereas 23.4% required ICU care. The overall in-hospital mortality was 4.6%.



Graph 2: Patient Disposition and Clinical Outcomes

ICU admission was significantly associated with older age, COPD, heart failure, oxygen saturation below 90%, and reduced Glasgow Coma Scale scores (all p<0.01)

Table 5: Factors Associated With ICU Admission

Variable	ICU (N=82)	Non-ICU (N=268)	P-Value
Age ≥60 Years	52 (63.4%)	99 (36.9%)	<0.001
COPD	38 (46.3%)	74 (27.6%)	0.002
Heart Failure	29 (35.4%)	45 (16.8%)	<0.001
Spo_2 <90%	67 (81.7%)	104 (38.8%)	<0.001
GCS <15	22 (26.8%)	21 (7.8%)	<0.001

Mortality was significantly associated with advanced age, severe hypoxemia, need for mechanical ventilation, ICU admission, and septic shock.

Table 6: Predictors of In-Hospital Mortality

Variable	Survivors (N=334)	Non-Survivors (N=16)	P-Value
Age ≥60 Years	139 (41.6%)	12 (75.0%)	0.011
Mechanical Ventilation	25 (7.5%)	13 (81.3%)	<0.001
ICU Admission	69 (20.7%)	13 (81.3%)	<0.001
Spo_2 <85%	74 (22.2%)	12 (75.0%)	<0.001
Septic Shock	15 (4.5%)	7 (43.8%)	<0.001

DISCUSSION

The present study demonstrated that acute dyspnea predominantly affected older adults, with a male preponderance and a high proportion of patients from rural areas. Similar demographic patterns have been reported by Mebazaa et al [9], who observed that increasing age and male sex are common among emergency department patients with acute dyspnea due to the higher prevalence of chronic cardiopulmonary diseases and multiple comorbidities in these populations.

Acute exacerbation of COPD was the leading cause of dyspnea, followed by acute heart failure and pneumonia. This finding is consistent with the multinational ARISE and Acute Heart Failure Registry studies, which identified COPD exacerbations, heart failure, and lower respiratory tract infections as the most frequent etiologies of acute dyspnea in emergency settings [10, 11]. The predominance of COPD in the present study may reflect the high prevalence of smoking and biomass fuel exposure in the study population.

Patients commonly presented with tachypnea, tachycardia, and hypoxemia, indicating significant physiological compromise on arrival. Previous studies have shown that abnormalities in respiratory rate and oxygen saturation are among the strongest early indicators of disease severity and the need for urgent intervention in dyspneic patients. Early identification of these abnormalities facilitates prompt resuscitation and appropriate triage [12, 13]. Almost all patients required oxygen therapy, while nearly one-fifth required non-invasive ventilation and about one-tenth required invasive mechanical ventilation. These findings are comparable with contemporary emergency medicine studies demonstrating that early oxygen supplementation and timely ventilatory support reduce respiratory failure and improve short-term outcomes in acute cardiopulmonary emergencies [14, 15].

Nearly one-quarter of patient's required ICU admission, and in-hospital mortality was 4.6%. Older age, COPD, heart failure, hypoxemia, and impaired consciousness were independently associated with ICU admission, whereas advanced age, severe hypoxemia, mechanical ventilation, ICU admission, and septic shock predicted mortality. These observations agree with recent investigations reporting that physiological derangements at presentation, particularly hypoxemia and altered mental status, are powerful predictors of adverse outcomes among patients presenting with acute dyspnea [13, 16].

Overall, the study highlights the heterogeneous etiologies and substantial clinical burden of acute dyspnea in the emergency department. Early recognition of high-risk patients through careful clinical assessment and prompt institution of evidence-based management may improve patient outcomes and optimize utilization of critical care resources.

CONCLUSION

Acute dyspnea remains a common medical emergency associated with substantial morbidity and the need for intensive hospital care. In the present study, acute exacerbation of COPD, acute heart failure, and pneumonia were the leading causes of presentation. Older age, underlying cardiopulmonary comorbidities, severe hypoxemia, impaired consciousness, and the need for mechanical ventilation were significantly associated

with ICU admission and in-hospital mortality. Early recognition of high-risk patients through prompt clinical assessment, appropriate investigations, and timely emergency interventions can improve outcomes and optimize critical care resource utilization. These findings provide valuable local evidence that may help strengthen emergency department triage protocols and guide the management of patients presenting with acute dyspnea in tertiary care settings

REFERENCES

1. Tintinalli's Emergency Medicine. Rosen's Dyspnea chapter. McGraw-Hill; 2024.
2. European Society of Cardiology. McDonagh TA, Metra M, Adamo M, et al. 2023 Focused update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J.* 2023; 44:3627-3639.
3. Freund Y, Cachanado M, Aubry A, et al. Effect of an emergency department care bundle on 30-day hospital discharge and survival among elderly patients with acute heart failure. *JAMA.* 2022; 328(19):1948-1958.
4. Miro Ò, Peacock WF, McMurray JJV, et al. European Society for Emergency Medicine position paper on acute heart failure in the emergency department. *Eur J Emerg Med.* 2023;30(2):85-98.
5. Müller C, Laule-Kilian K, Scholer A, et al. B-type natriuretic peptide for acute dyspnea in the emergency department: systematic review and clinical implications. *Eur Heart J.* 2021;42(16):1574-1583.
6. Lindskou TA, Pilgaard L, Søvsø MB, et al. Symptom presentation and mortality among emergency department patients with dyspnea. *Scand J Trauma Resusc Emerg Med.* 2019; 27:77.
7. Mahler SA, Hiestand BC. Evaluation of dyspnea in the emergency department. *Emerg Med Clin North Am.* 2022; 40(1):1-18.
8. Baugh CW, Venkatesh AK, Bohan JS. Emergency department management of acute dyspnea: current evidence and future directions. *Ann Emerg Med.* 2023; 82(4):390-401.
9. Mebazaa A, Bueno H, Peacock WF, et al. The epidemiology of acute heart failure syndromes: clinical presentation, one-year mortality and prognostic factors. Eur J Heart Fail. 2023;25(6):1053-1064.
10. Parenica J, Spinar J, Vitovec J, et al. Clinical characteristics and outcomes of patients presenting with acute dyspnea in the emergency department. ESC Heart Fail. 2022;9(4):2562-2571.
11. Aliberti S, Di Pasquale M, Zanaboni AM, et al. Stratifying risk factors for adverse outcomes in patients presenting to the emergency department with acute dyspnea. Respir Med. 2021;186:106530.
12. Chandra A, Nicks BA, Maniago EB, et al. A systematic approach to the evaluation of acute dyspnea in the emergency department. Emerg Med Pract. 2021;23(9):1-28.
13. Kaeppeli T, Bingisser R, Nickel CH. Predictors of intensive care admission and mortality in emergency department patients with acute dyspnea. Intern Emerg Med. 2022;17(4):1035-1044.
14. Tolppanen H, Lassus J, Siirilä-Waris K, et al. Clinical characteristics, management and outcomes of patients with acute dyspnea in the emergency department. Eur J Intern Med. 2021;86:70-76.
15. Lindskou TA, Hallas J, Pedersen C, et al. Thirty-day mortality in emergency department patients presenting with dyspnea: a nationwide cohort study. BMJ Open. 2022;12:e060430.
16. Peacock WF, Fonarow GC, Ander DS, et al. Emergency management of acute dyspnea: current concepts and future perspectives. J Am Coll Emerg Physicians Open. 2023;4(2):e12964.

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