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Original Article

Severity of Pneumonia in Adult Asthma Patients in a Tertiary Care Hospital

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ABSTRACT

Background: Pneumonia is an important cause of morbidity and mortality among patients with bronchial asthma. Early identification of severe pneumonia is essential for appropriate management and prevention of adverse outcomes. **Objective:** To assess the severity and clinical outcomes of pneumonia among adult asthma patients admitted to a tertiary care hospital. **Methods & Materials:** This observational study was conducted in the Department of Respiratory Medicine, Monno Medical College and Hospital, Bangladesh, from January 2025 to December 2025. A total of 350 consecutive patients aged ≥18 years with bronchial asthma and clinically and radiologically diagnosed pneumonia were enrolled. Demographic, asthma-related, clinical, laboratory, radiological, treatment, and outcome data were collected. Pneumonia severity was assessed using the Pneumonia Severity Index (PSI) and CURB-65. Statistical analysis was performed using SPSS version 25.0, with $p<0.05$ considered statistically significant. **Results:** Cough (92.6%), dyspnea (88.6%), fever (81.7%), and sputum production (79.4%) were the predominant presentations. Elevated CRP was present in 77.7%, while SpO_2 <90% occurred in 24.0%. According to PSI, 46.9% were classified as class IV–V, while 15.5% had CURB-65 scores of 3–5. Severe pneumonia was significantly associated with age >60 years, previous asthma exacerbation, poor asthma control, bilateral infiltrates, multilobar involvement, SpO_2 <90%, and elevated CRP (all $p<0.05$). Severe cases had longer hospital stays, more complications, greater respiratory support requirements, and higher mortality (11.0% vs. 2.2%, $p=0.001$). **Conclusion:** Severe pneumonia was common among hospitalized adult asthma patients and was associated with substantial morbidity and mortality. Early severity assessment and close monitoring may improve clinical management and outcomes.

Keywords: *Bronchial asthma; Pneumonia; Disease severity; CURB-65; Pneumonia Severity Index*

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INTRODUCTION

Pneumonia remains a major cause of morbidity, hospitalization, and mortality among adults worldwide. Community-acquired pneumonia (CAP) encompasses a wide spectrum of illness, ranging from disease that can be managed in the community to severe infection requiring hospitalization, intensive care, respiratory support, and management of systemic complications. Recent reviews continue to identify CAP as an important cause of severe illness and healthcare utilization, with clinical outcomes influenced by patient characteristics, comorbidities, causative pathogens, and the extent of pulmonary and systemic involvement.[1-3]

Asthma is a common chronic respiratory disease characterized by airway inflammation, variable respiratory symptoms, and variable expiratory airflow limitation. Respiratory infections are particularly relevant in patients with asthma because they can precipitate acute worsening of respiratory symptoms and contribute to healthcare utilization. A 2023 systematic review and meta-analysis involving 3511 adults with asthma exacerbations found evidence of acute infection in approximately 40% of exacerbation episodes, with viruses being the most frequently detected infectious agents.[4] This association indicates that infection is an important component of acute respiratory deterioration among adults with asthma.

Asthma may also be associated with an increased occurrence of pneumonia. A 2023 review examining inhaled corticosteroid therapy in asthma noted that asthma itself has been associated with pneumonia, while available evidence regarding the effect of inhaled corticosteroids on pneumonia risk remains inconsistent.[5] A nationwide Finnish observational study published in 2023 also demonstrated a substantial comorbidity burden among adults with asthma, with pneumonia occurring more frequently among patients with severe asthma than among those with nonsevere asthma.[6] These observations highlight the clinical importance of pneumonia in adults with asthma while also indicating that the relationship between asthma severity, treatment, and pneumonia is complex.

The clinical distinction between asthma exacerbation and pneumonia can be challenging because cough, dyspnea, wheezing, chest discomfort, fever, and hypoxemia may occur in either condition. Furthermore, infection-related inflammation may aggravate pre-existing airway disease. A 2024 study of hospitalized adults demonstrated that infective and inflammatory asthma exacerbation phenotypes have distinct clinical characteristics and that identifying an infective phenotype may have implications for hospital outcomes.[7] Therefore, assessment of pneumonia in adults with asthma requires attention not only to the underlying respiratory disorder but also to objective indicators of infection and disease severity.

Severity assessment is a central component of pneumonia management because it assists clinicians in determining the appropriate level of care and identifying patients who may require intensive monitoring or organ support. Severe CAP is associated with considerable morbidity and mortality and may progress to acute respiratory failure, sepsis, shock, and multiorgan dysfunction.[8,9] The 2023 ERS/ESICM/ESCMID/ALAT guideline specifically addressed severe CAP and provided evidence-based recommendations concerning diagnosis, antimicrobial treatment, organ support, biomarkers, and adjunctive therapy.[8] Subsequent 2024 reviews further emphasized the importance of early identification of patients at increased risk of poor outcomes.[9,10]

Several clinical prediction tools are available for assessing pneumonia severity. The Pneumonia Severity Index (PSI) and

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CURB-65 remain commonly used approaches for estimating short-term risk and assisting decisions regarding hospitalization and intensity of care. A large 2023 real-world study involving 50,984 adults with CAP compared outcomes according to the use of CURB-65 and PSI and demonstrated the continuing clinical relevance of structured severity assessment in emergency practice.[11] A 2024 review similarly identified PSI, CURB-65, SMART-COP, SCAP, and ATS/IDSA criteria among the commonly used approaches for estimating short-term mortality and intensive-care requirements.[12]

Laboratory biomarkers may provide additional information for determining pneumonia severity and prognosis. C-reactive protein and procalcitonin are among the most frequently investigated biomarkers, while other inflammatory and endothelial markers have also been evaluated.[13] A 2023 study developed a prediction model incorporating C-reactive protein, procalcitonin, and angiopoietin-like 4 to improve prediction of severe CAP, demonstrating the potential value of combining biomarkers with established clinical variables.[14] However, emerging prediction approaches require appropriate validation before they can replace established clinical assessment tools. A 2025 systematic review of machine-learning models for predicting CAP severity also found considerable variability in model performance and emphasized the need for external validation and reproducibility.[15]

Despite substantial research on asthma exacerbations and CAP separately, relatively limited literature has specifically characterized the severity of pneumonia among adult patients with asthma, particularly in tertiary-care hospital settings. Most available evidence has focused on respiratory infections as triggers of asthma exacerbations, the risk of pneumonia in asthma, or severity assessment among general CAP populations. Therefore, studying pneumonia severity specifically in adult asthma patients may provide clinically useful information for early identification of high-risk patients and appropriate allocation of hospital resources.

The present study was therefore undertaken to assess the severity of pneumonia in adult asthma patients in a tertiary care hospital, with emphasis on their clinical characteristics and relevant indicators of disease severity. Understanding the severity pattern of pneumonia in this population may support timely risk stratification, appropriate clinical management, and early identification of patients who may require intensive monitoring or advanced respiratory support.

OBJECTIVES

The main objective was to assess the severity of pneumonia among adult patients with asthma in a tertiary care hospital.

METHODS & MATERIALS

The observational study was conducted in the Department of Respiratory Medicine, Monno Medical College and Hospital, Bangladesh. The study was carried out over one year from January 2025 to December 2025. The study population consisted of adult patients with bronchial asthma who were admitted to the Department of Respiratory Medicine with clinically and radiologically diagnosed pneumonia.

Inclusion Criteria:

- Patients of either sex aged ≥18 years.
- Patients with a previous or documented diagnosis of bronchial asthma.
- Patients diagnosed with pneumonia based on compatible clinical features and new infiltrates or consolidation on chest radiography or other appropriate chest imaging.
- Patients who could be clinically evaluated and followed during their hospital stay.
- Patients or their legal guardians who provided informed written consent.

Exclusion Criteria:

- Patients aged <18 years.
- Patients without a documented diagnosis of bronchial asthma.
- Patients with chronic respiratory diseases other than asthma, particularly chronic obstructive pulmonary disease.
- Patients with active pulmonary tuberculosis or known pulmonary malignancy.
- Patients with severe immunosuppression or other major medical conditions that could independently influence pneumonia severity or outcome.
- Pregnant women.
- Patients with incomplete clinical or laboratory information required for assessment of pneumonia severity.
- Patients or legal guardians who did not provide informed consent.

A total of 350 adult patients with bronchial asthma and pneumonia who fulfilled the inclusion criteria were enrolled consecutively during the study period. Pneumonia was identified clinically by the presence of symptoms and signs suggestive of lower respiratory tract infection, including fever, cough, sputum production, dyspnea, pleuritic chest pain, abnormal chest auscultation, and evidence of new pulmonary infiltrates or consolidation on chest radiography. Particular attention was given to respiratory distress, tachypnea, hypoxemia, hypotension, altered mental status, and other clinical features indicating severe pneumonia.

Data were collected using a pretested structured questionnaire. Baseline demographic and clinical information, including age, sex, smoking history, duration of asthma, asthma treatment, history of previous exacerbations, and relevant comorbidities, was recorded. At admission, clinical parameters including temperature, pulse rate, respiratory rate, blood pressure, oxygen saturation, level of consciousness, and respiratory findings were documented. Laboratory investigations, including complete blood count, serum creatinine, blood urea nitrogen, blood glucose, C-reactive protein, and other relevant investigations, were recorded. Chest radiography findings and microbiological investigations, including sputum and blood cultures where clinically indicated, were also documented.

Pneumonia severity was assessed using established clinical severity assessment tools. The Pneumonia Severity Index (PSI) and CURB-65 score were calculated based on the relevant clinical and laboratory parameters. The presence of severe pneumonia was additionally assessed according to important clinical indicators, including hypoxemia, respiratory failure, hypotension, altered mental status, intensive care unit admission, and requirement for mechanical ventilation or other respiratory support. Patients were categorized according to the predefined severity criteria. During hospital admission, patients were regularly monitored for vital signs, oxygenation, respiratory status, progression of pneumonia, development of respiratory failure, and requirement for oxygen therapy or mechanical ventilation. Treatment details, including antimicrobial therapy, bronchodilator therapy, corticosteroid use, oxygen supplementation, non-invasive ventilation, invasive mechanical ventilation, and other supportive treatment, were documented. The duration of hospital stay, ICU admission, complications, clinical improvement, and final outcome were also recorded. The principal outcome measure was the severity of pneumonia among adult asthma patients. At the same time, respiratory failure, requirement for mechanical ventilation, ICU admission, duration of hospital stay, complications, and in-hospital mortality were assessed as important secondary outcomes.

Ethical principles were maintained throughout the study. Permission was obtained from the appropriate hospital authority before commencement of data collection. Written informed consent was obtained from each patient, or from a legal

guardian when the patient was seriously ill or unable to provide consent. Participation was voluntary, and participants were free to withdraw at any stage without affecting their treatment. Confidentiality and anonymity of all participants were strictly maintained, and the collected information was used solely for research purposes.

Statistical Analysis: All data were recorded systematically in a pre-formed data collection sheet and entered into Statistical Package for the Social Sciences (SPSS), Version 25.0, for analysis. Quantitative variables were expressed as mean ± standard deviation, while qualitative variables were presented as frequency and percentage. Appropriate statistical tests were applied where applicable to compare demographic, clinical, laboratory, and outcome characteristics according to pneumonia severity. The chi-square test or Fisher's exact test was used for categorical variables. In contrast, the independent-samples *t*-test or other appropriate tests were used for continuous variables according to data distribution. A *p*-value <0.05 was considered statistically significant. Confidentiality of all patient information was strictly maintained throughout the study.

RESULT

Table I presents the sociodemographic characteristics of the 350 participants. The largest age group was 41–50 years (24.6%), followed by 31–40 years (22.3%). Males comprised 53.7% and females 46.3% of the participants. Most participants were from urban areas (56.0%), while 57.1% were never smokers.

Table I
Sociodemographic characteristics of the study participants (*n*=350).

Characteristic	Frequency (n)	Percentage (%)
Age group (years)		
18–30	62	17.7
31–40	78	22.3
41–50	86	24.6
51–60	72	20.6
>60	52	14.9
Sex		
Male	188	53.7
Female	162	46.3
Residence		
Urban	196	56
Rural	154	44
Smoking history		
Current smoker	96	27.4
Former smoker	54	15.4
Never smoker	200	57.1

Table II shows the asthma-related characteristics. Asthma duration of 5–10 years was most common (36.0%). Previous asthma exacerbation was reported in 52.6%, while 28.0% had previous hospitalization. Regular inhaled corticosteroid use was reported in 68.0%, and 40.6% had poor asthma control at presentation.

Table II
Asthma-related characteristics of the study participants (*n*=350).

Asthma-related characteristic		Frequency (n)	Percentage (%)
Duration of asthma	<5 years	108	30.9
	5–10 years	126	36
	>10 years	116	33.1
Previous asthma exacerbation		184	52.6
Previous hospitalization for asthma		98	28
Regular inhaled corticosteroid use		238	68
Bronchodilator use		294	84
Previous systemic corticosteroid use		126	36
Poor asthma control at presentation		142	40.6

Figure 1 demonstrates the clinical presentation. Cough (92.6%), dyspnea (88.6%), and fever (81.7%) were the most frequent symptoms. Wheezing was present in 72.0%, while 24.0% had oxygen saturation below 90%.

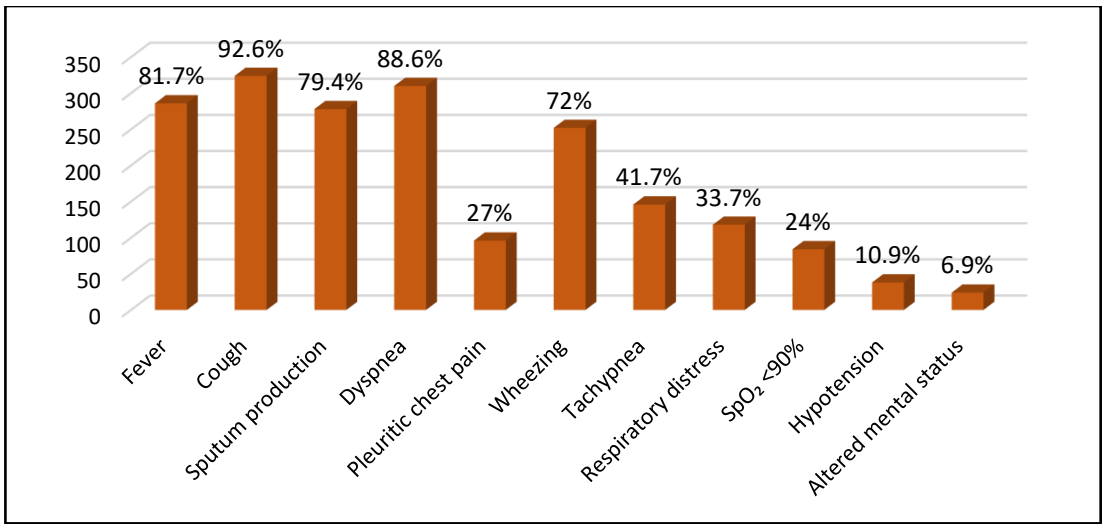


Figure 1 Clinical presentation of pneumonia among the study participants (*n*=350).

Table III summarizes the laboratory and radiological findings. Elevated CRP was observed in 77.7% and leukocytosis in 61.1%. Bilateral infiltrates were present in 35.4%, while multilobar involvement and lobar consolidation were found in 32.0% and 39.4%, respectively.

Table III
Laboratory and radiological findings among the study participants (*n*=350).

Finding	Frequency (n)	Percentage (%)
Leukocytosis	214	61.1
Elevated CRP	272	77.7
Elevated serum creatinine	42	12
Elevated blood urea nitrogen	58	16.6
Hypoxemia on ABG	82	23.4
Chest X-ray findings		
Unilateral infiltrate	226	64.6
Bilateral infiltrates	124	35.4
Lobar consolidation	138	39.4
Multilobar involvement	112	32
Pleural effusion	54	15.4

Figure 2 shows the CURB-65 distribution. Most patients were classified as low risk (62.9%), while 21.7% had moderate risk and 15.5% had high or very high risk.

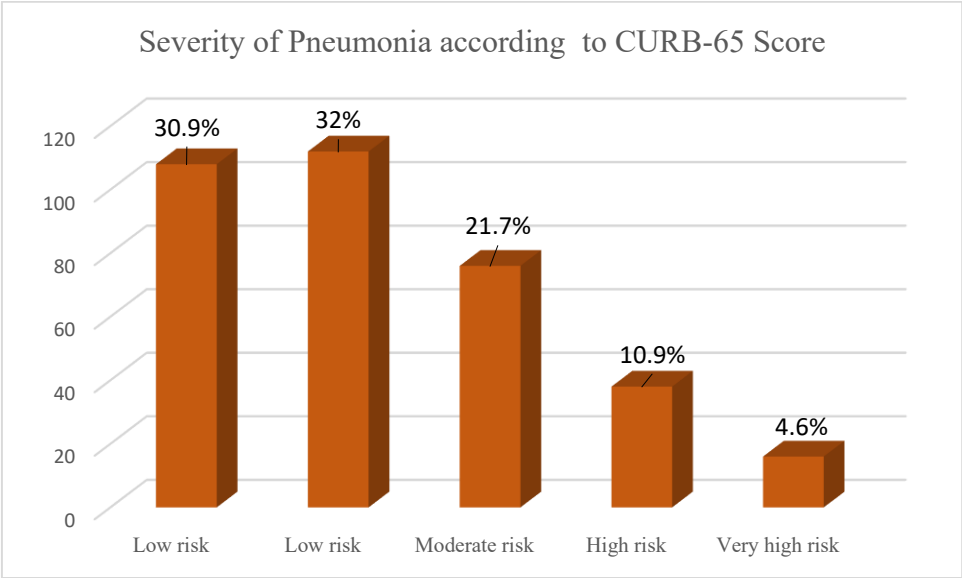


Figure 2 Distribution of patients according to pneumonia severity based on CURB-65 score (*n*=350).

Table IV presents the PSI classification. PSI class IV was most frequent (33.7%), followed by class III (27.4%). Overall, 46.9% of patients were in PSI classes IV–V.

Table IV
Distribution of patients according to Pneumonia Severity Index (PSI) class (*n*=350).

PSI class	Risk category	Frequency (n)	Percentage (%)
I	Very low risk	18	5.1
II	Low risk	72	20.6
III	Moderate risk	96	27.4
IV	High risk	118	33.7
V	Very high risk	46	13.1
Total		350	100

Figure 3 shows the major indicators of severe disease and respiratory support. Severe hypoxemia occurred in 23.4%, respiratory failure in 18.3%, and ICU admission in 14.9%. Non-invasive and invasive mechanical ventilation were required in 13.1% and 8.0%, respectively.

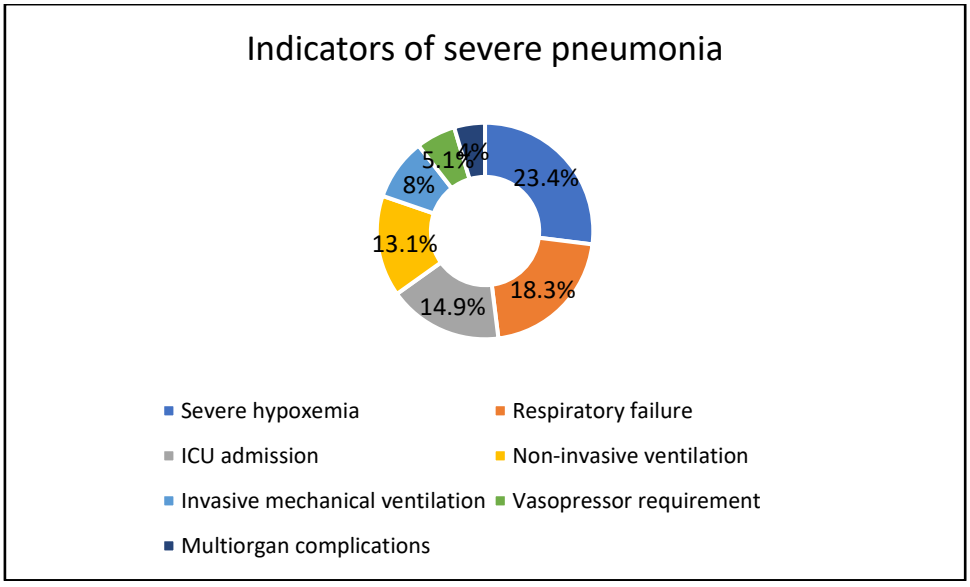


Figure 3 Clinical indicators of severe pneumonia and respiratory support (*n*=350).

Table V demonstrates factors associated with severe pneumonia. Severe pneumonia was significantly associated with age >60 years, previous asthma exacerbation, poor asthma control, bilateral infiltrates, multilobar involvement, SpO_2 <90%, and elevated CRP (all $p<0.05$). Current smoking was less frequent among patients with severe pneumonia than among non-severe cases (18.3% vs. 35.5%, $p<0.001$).

Table V
Association between selected factors and severe pneumonia (*n*=350).

Factor	Severe pneumonia n (%)	Non-severe pneumonia n (%)	p-value
Age >60 years	32 (19.5)	20 (10.8)	0.024
Current smoking	30 (18.3)	66 (35.5)	<0.001
Previous asthma exacerbation	108 (65.9)	76 (40.9)	<0.001
Poor asthma control	94 (57.3)	48 (25.8)	<0.001
Bilateral infiltrates	82 (50.0)	42 (22.6)	<0.001
Multilobar involvement	76 (46.3)	36 (19.4)	<0.001
SpO_2 <90%	70 (42.7)	14 (7.5)	<0.001
Elevated CRP	148 (90.2)	124 (66.7)	<0.001

Table VI compares treatment and outcomes according to severity. Oxygen therapy, ICU admission, mechanical ventilation, longer hospital stays, complications, and mortality were significantly more frequent among severe cases (all $p<0.001$ except mortality, $p=0.001$).

Table VI
Hospital treatment and outcomes according to pneumonia severity (*n*=350).

Outcome	Severe pneumonia (n=164)	Non-severe pneumonia (n=186)	p-value
Oxygen therapy	154 (93.9%)	82 (44.1%)	<0.001
ICU admission	52 (31.7%)	0 (0.0%)	<0.001
Mechanical ventilation	28 (17.1%)	0 (0.0%)	<0.001
Mean hospital stay (days)	9.2 ± 4.1	5.6 ± 2.3	<0.001
Complications	48 (29.3%)	18 (9.7%)	<0.001
In-hospital mortality	18 (11.0%)	4 (2.2%)	0.001

Table VII shows the final hospital outcomes. Overall, 92.6% of patients recovered and were discharged, 1.1% were referred or transferred, and 6.3% died during hospitalization.

Table VII
Final hospital outcome of the study participants (*n*=350).

Final outcome	Frequency (n)	Percentage (%)
Recovered/discharged	324	92.6
Referred/transferred	4	1.1
In-hospital mortality	22	6.3
Total	350	100

DISCUSSION

The present study evaluated the severity and hospital outcomes of pneumonia among 350 adult patients with bronchial asthma. A substantial proportion of patients had clinically important disease, with 46.9% classified as PSI class IV–V and 15.5% having high or very high CURB-65 scores. Severe community-acquired pneumonia is associated with substantial morbidity, respiratory deterioration, intensive care requirements, and mortality, making early recognition and severity assessment particularly important.[8,16]

Older age was significantly associated with severe pneumonia in the present study. Patients aged >60 years accounted for 19.5% of severe cases compared with 10.8% of non-severe cases (p=0.024). This finding is consistent with recent evidence identifying older age as an important factor associated with increased risk of complications and adverse outcomes in CAP.[16,17] In a large 2025 cohort of adults with bacterial CAP, comorbidity burden was also independently associated with in-hospital mortality, emphasizing the importance of underlying disease in determining pneumonia outcomes.[17]

The commonest presenting symptoms in our study were cough (92.6%), dyspnea (88.6%), fever (81.7%), and sputum production (79.4%). These findings are compatible with the established clinical presentation of CAP, in which respiratory symptoms, systemic manifestations, and compatible radiological findings are central to diagnosis.[16] In patients with asthma, however, infection-related symptoms may overlap with manifestations of asthma exacerbation. Ghanizada et al. reported that infective phenotypes represented an important proportion of hospitalized asthma exacerbations and were associated with longer hospital stay, supporting the clinical relevance of infection in patients with asthma.[7]

Hypoxemia was an important marker of disease severity in our cohort. SpO_2 <90% was present in 24.0% of patients and was significantly more common among severe cases than non-severe cases (42.7% vs. 7.5%, p<0.001). Respiratory failure occurred in 18.3%, while ICU admission and invasive mechanical ventilation were required in 14.9% and 8.0%, respectively. These findings are clinically consistent with contemporary severe-CAP guidance, which emphasizes respiratory failure and the requirement for organ support as important features of severe disease.[8] In a large tertiary-care ICU cohort, most patients with severe CAP had extensive pulmonary involvement and 85% required ventilatory support, further demonstrating the close relationship between severe pneumonia and respiratory support requirements.[18]

Inflammatory abnormalities were also common in our study. Leukocytosis was present in 61.1% of patients and elevated CRP in 77.7%. Importantly, elevated CRP was significantly more frequent among severe cases than non-severe cases (90.2% vs. 66.7%, p<0.001). Recent literature supports CRP as a useful adjunctive biomarker in CAP, although it should not be interpreted independently of clinical and radiological findings.[13,19] A 2022 study of hospitalized CAP patients also demonstrated associations between CRP levels, survival, and duration of hospital stay, supporting the clinical relevance of inflammatory markers in outcome assessment.[20]

Radiological disease extent was strongly associated with severity. Bilateral infiltrates were present in 50.0% of severe cases compared with 22.6% of non-severe cases, while multilobar involvement occurred in 46.3% and 19.4%, respectively (both p<0.001). Extensive pulmonary involvement is clinically relevant because severe CAP is frequently accompanied by impaired oxygenation and progressive respiratory dysfunction.[8,18] These findings also indicate that radiological assessment provides useful complementary information when evaluating pneumonia severity in patients with asthma.

The CURB-65 and PSI scores demonstrated a considerable burden of moderate- and high-risk disease in our cohort. According to CURB-65, 62.9% of patients were classified as low risk, 21.7% as moderate risk, and 15.5% as high or very high risk. According to PSI, 25.7% were in classes I–II, 27.4% in class III, and 46.9% in classes IV–V. Recent large-scale evidence has demonstrated the clinical utility of both PSI and CURB-65 for risk stratification in CAP.[11,21] A 2023 meta-analysis likewise found that both scores provide substantial prognostic information for mortality and intensive-care requirements.[22] Thus, the distribution observed in the present study supports the usefulness of structured severity scoring in adult asthma patients presenting with pneumonia.

Previous asthma exacerbation and poor asthma control were significantly more common among severe cases. Previous exacerbation was present in 65.9% of severe cases compared with 40.9% of non-severe cases, whereas poor asthma control was present in 57.3% and 25.8%, respectively (both p<0.001). These findings suggest that greater underlying asthma disease burden was associated with more severe pneumonia in this cohort. The association should, however, be interpreted as observational rather than causal. The recent study by Ghanizada et al. showing clinically distinct infective phenotypes among hospitalized adults with asthma further highlights the

interaction between infection and asthma disease activity.[7]

Regular inhaled corticosteroid use was reported in 68.0% of participants. The relationship between ICS treatment and pneumonia in asthma remains clinically relevant. Lee and Park reviewed the available evidence and concluded that ICS use was not associated with an increased risk of pneumonia in asthma, while also emphasizing that the evidence differs from that observed in COPD.[5] Therefore, the present study does not support drawing a causal conclusion regarding ICS therapy and pneumonia severity because treatment exposure was observational and the study was not designed to evaluate treatment effects.

Current smoking showed an inverse distribution in our study, being less frequent among severe cases than non-severe cases (18.3% vs. 35.5%, $p<0.001$). This finding should be interpreted cautiously and should not be considered evidence of a protective effect of smoking. In contrast, a 2022 systematic review and meta-analysis of Indian CAP studies identified smoking history and older age as common risk factors for CAP.[23] The difference between that broader evidence and the present severity distribution may reflect differences in study population, smoking patterns, underlying asthma characteristics, or other unmeasured factors.

The clinical consequences of severe pneumonia were substantial. Oxygen therapy was required in 93.9% of severe cases compared with 44.1% of non-severe cases. ICU admission occurred in 31.7% of severe cases, and mechanical ventilation in 17.1%, while neither occurred in the non-severe group. Severe cases also had a longer mean hospital stay (9.2±4.1 vs. 5.6±2.3 days) and a higher frequency of complications (29.3% vs. 9.7%), with all differences being statistically significant. These findings are consistent with contemporary evidence showing that severe CAP is characterized by increased respiratory support requirements and adverse hospital outcomes.[8,18]

In-hospital mortality was 6.3% overall and was significantly higher among severe than non-severe cases (11.0% vs. 2.2%, $p=0.001$). This difference is consistent with the established relationship between pneumonia severity and mortality.[8,16] The large 2025 cohort by Cheng et al. also demonstrated that underlying comorbidity burden contributes significantly to in-hospital mortality among adults with bacterial CAP.[17] In addition, recent research has demonstrated that emerging inflammatory biomarkers may correlate with pneumonia severity and mortality; for example, Wang et al. found that serum LRG1 levels increased progressively with CAP severity and were associated with mortality.[24] Such biomarkers may have future value as adjuncts to established clinical severity tools, although they are not part of routine assessment in the present study.

An important implication of the present findings is the need for continued reassessment during hospitalization rather than relying solely on the initial severity classification. Liu et al. demonstrated that changes in PSI and CURB-65 over the first 72 hours can provide additional prognostic information beyond the admission score alone.[25] In patients with asthma and pneumonia, repeated assessment of oxygen saturation, respiratory rate, respiratory effort, hemodynamic status, and other clinical indicators may therefore be particularly useful for identifying deterioration.

Overall, the present study demonstrates a substantial burden of severe pneumonia among adult asthma patients admitted to a tertiary-care hospital. Poor asthma control, previous asthma exacerbation, hypoxemia, bilateral or multilobar radiological involvement, and elevated CRP were significantly associated with severe pneumonia. Severe disease was also associated with greater oxygen and ventilatory support requirements, ICU admission, longer hospitalization, more complications, and higher in-hospital mortality. These findings support the use of structured severity assessment together with repeated clinical evaluation when managing adult patients with asthma who present with pneumonia.

LIMITATIONS

This study has several limitations. First, its observational, single-center design limits the generalizability of the findings to other healthcare settings and populations. Second, the study was conducted over a one-year period with a relatively specific hospital-based population, which may have introduced selection bias. Third, microbiological investigations were performed where clinically indicated; therefore, pathogen-specific analysis was not available for all participants. Fourth, the study assessed associations between clinical characteristics and pneumonia severity and therefore cannot establish causal relationships. Finally, potential residual confounding from unmeasured factors may have influenced the observed associations.

CONCLUSION

Pneumonia among hospitalized adults with bronchial asthma was associated with a substantial burden of severe disease. Poor asthma control, previous asthma exacerbation, hypoxemia, bilateral or multilobar pulmonary involvement, and elevated CRP were significantly associated with severe pneumonia. Severe cases required substantially greater respiratory support and were associated with longer hospitalization, more complications, ICU admission, mechanical ventilation, and higher in-hospital mortality. These findings highlight the importance of early identification of high-risk patients using structured pneumonia severity assessment together with careful clinical and radiological evaluation. Further multicenter prospective studies are warranted to validate these associations and identify strategies for improving outcomes in asthma patients with pneumonia.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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