

Chest Infections

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PREDICTORS OF ACUTE RESPIRATORY FAILURE AND MECHANICAL VENTILATION AMONG ADULTS HOSPITALIZED WITH INFLUENZA IN THE UNITED STATES

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PURPOSE: Influenza is a leading cause of hospitalization and can be complicated by acute respiratory failure (ARF), a major driver of morbidity and mortality. However, data identifying predictors of ARF in hospitalized adults with influenza remain limited. Identifying factors associated with ARF may improve early risk stratification and guide management strategies in high-risk populations.

METHODS: We conducted a cross-sectional analysis of the National Inpatient Sample (NIS) from 2018 to 2021. Adult hospitalizations (≥ 18 years) with primary diagnosis of influenza (ICD-10 J09-J11) were included. The primary outcome was acute respiratory failure (ICD-10 J96). A secondary outcome was the need for mechanical ventilation during hospitalization, identified using ICD-10 PCS procedure codes. Multivariable logistic regression was performed to identify independent predictors of ARF, adjusting for demographics (age, sex, race) and cardiopulmonary and systemic comorbidities. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. Statistical significance was set at $p < 0.05$.

RESULTS: A total of 78,704 hospital admissions with primary diagnosis of influenza were identified, of which 31.2% developed acute respiratory failure. In multivariable analysis, older age was associated with higher odds of ARF (OR 1.006 per year; 95% CI 1.005-1.007). Chronic pulmonary comorbidities were independently associated with higher odds of ARF: chronic obstructive pulmonary disease (OR 3.47; 95% CI 3.35-3.60), bronchiectasis (OR 2.36; 95% CI 2.01-2.78), and interstitial lung disease (OR 2.36; 95% CI 2.11 - 2.65). Additional factors independently associated with ARF included congestive heart failure (OR 1.68, 95% CI 1.60-1.76), obesity (OR 1.79, 95% CI 1.72-1.88), and iron-deficiency anemia (OR 1.14, 95% CI 1.05-1.25). Asthma and diabetes were not independently associated with ARF after adjustment. Mechanical ventilation was required in 2.3% of hospitalizations and was independently associated with congestive heart failure, interstitial lung disease, chronic obstructive pulmonary disease, obesity, and iron-deficiency anemia.

CONCLUSIONS: In adults hospitalized with influenza in the United States, acute respiratory failure was independently associated with chronic pulmonary and cardiovascular conditions. Advanced age and obesity were also associated with a higher risk. Similar comorbidities were associated with the need for mechanical ventilation, indicating a consistent pattern of risk across escalating levels of respiratory severity.

CLINICAL IMPLICATIONS: Adults hospitalized with influenza who have underlying chronic pulmonary and cardiovascular conditions represent a high-risk population for acute respiratory failure. Early identification of these patients may support closer monitoring, proper escalation of respiratory support, and optimized management to reduce complications and improve outcomes during influenza-related hospitalizations. Recognition of this high-risk subgroup may also help anticipate the need for mechanical ventilation and guide a proper distribution of critical care resources.

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