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Original Article

Pattern and Outcomes of Respiratory Diseases in Geriatric Patients at a Tertiary Care Hospital in Bangladesh

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Abstract

Respiratory diseases are a major cause of morbidity and mortality among geriatric populations, particularly in developing countries like Bangladesh. Age-related physiological decline, cumulative environmental exposures, and coexisting comorbidities increase susceptibility to respiratory illnesses in the elderly. However, hospital-based data describing the patterns and outcomes of these conditions remain limited. This study aimed to assess the pattern of respiratory problems, clinical presentation, and outcomes among geriatric patients admitted to Dhaka Medical College Hospital (DMCH), and to evaluate disease severity using the Medical Research Council (MRC) breathlessness scale. This cross-sectional observational study was conducted in the indoor medicine wards of DMCH from January 2016 to July 2016. A total of 100 geriatric patients (aged ≥60 years) with respiratory complaints were selected purposively. Data were collected using a structured questionnaire, clinical examination, and relevant investigations. Variables included age distribution, presenting symptoms, diagnoses, and outcomes. Dyspnea severity was assessed among 72 patients using the MRC scale. Data were analyzed using descriptive statistics and presented as frequencies and percentages. The mean (±SD) age of the study population was 72.87 ± 6.69 years, with the majority belonging to the 66–70 years age group (47%). The most common presenting symptom was cough (100%), followed by fever (82%), breathlessness (72%), chest pain (46%), weight loss (44%), and haemoptysis (36%), while voice change (4%) was the least common. Regarding disease pattern, pneumonia (35%) was the most frequent diagnosis, followed by chronic obstructive pulmonary disease (COPD) (25%), pulmonary tuberculosis (14%), bronchial asthma (8%), and bronchial carcinoma (7%). Less common conditions included bronchiectasis (4%), lung abscess (4%), aspiration pneumonia (2%), and diffuse parenchymal lung disease (1%). Outcome analysis revealed varying fatality rates across conditions. The highest mortality was observed in aspiration pneumonia (100%), followed by acute severe bronchial asthma (50%), bronchial carcinoma (42.86%), pneumonia (28.57%), acute exacerbation of COPD (20%), and pulmonary tuberculosis (14.28%). These findings indicate significant disease burden and variable prognosis among different respiratory conditions. Respiratory diseases, particularly pneumonia and COPD, are highly prevalent among geriatric patients admitted to tertiary care hospitals. The high frequency of severe presentations and notable mortality rates underscores the need for early diagnosis, prompt management, and preventive strategies. Strengthening geriatric-focused respiratory care services is essential to reduce morbidity and mortality in this vulnerable population.

Keywords: *Respiratory problems, geriatric patients, pneumonia, COPD, MRC scale.*

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INTRODUCTION

Ageing is a universal biological process characterized by a progressive decline in physiological functions, often resulting in reduced functional capacity and increased

vulnerability to disease.[1] In many developing countries, including Bangladesh, old age is not merely defined chronologically but is often associated with diminished productivity and social dependency.[2] Historically, even early physicians such as Hippocrates recognized that certain diseases and health conditions are more prevalent in older individuals, reflecting the intrinsic biological changes associated with ageing.

With advancing age, multiple organ systems undergo structural and functional alterations, predisposing elderly individuals to a wide range of chronic and degenerative diseases. Respiratory disorders, in particular, are highly prevalent in this population due to age-related changes in lung mechanics, decreased immune function, and increased exposure to environmental and lifestyle-related risk factors.[3] These conditions often coexist with other comorbidities such as hypertension, diabetes mellitus, and cardiovascular diseases, thereby complicating clinical presentation and management.[4]

Population ageing has emerged as a major global health concern, with a rapid increase in the proportion of elderly individuals worldwide.[3] This demographic transition is particularly significant in low- and middle-income countries, where healthcare systems are often inadequately prepared to address the complex health needs of older populations. In Bangladesh, the elderly population has increased substantially over recent decades and is projected to rise dramatically in the coming years, posing significant challenges to the healthcare infrastructure.[14] Despite this trend, there remains a paucity of comprehensive data on the health problems of the elderly, especially regarding respiratory diseases.

Respiratory illnesses such as chronic obstructive pulmonary disease (COPD), pneumonia, bronchial asthma, and pulmonary tuberculosis are commonly encountered among geriatric patients.[7] Several studies conducted in Bangladesh have highlighted the burden of respiratory conditions among older adults, with a notable proportion suffering from chronic respiratory symptoms and diseases.[5,8] Additionally, healthcare-seeking behaviour among elderly individuals is influenced by socioeconomic and cultural factors, which may delay diagnosis and treatment.[4]

Globally, COPD is a leading cause of morbidity and mortality and is projected to become one of the top causes of death worldwide.[9] Respiratory tract infections also contribute significantly to hospital admissions among the elderly population.[8] Tuberculosis, although traditionally considered a disease of younger individuals in high-prevalence countries, has increasingly been recognized as a significant health issue among older adults, particularly in developed settings.[10] Furthermore, ageing is a well-established risk factor for malignancies, including lung cancer, which contributes substantially to morbidity and mortality in the elderly population.[11,12]

Previous studies have demonstrated that respiratory diseases are among the leading causes of hospitalization and death in elderly patients.[16,17] The clinical presentation in this age group is often atypical, and outcomes are influenced by factors such as age, comorbid conditions, and severity of disease at presentation.[13] Therefore, a clear understanding of the pattern of respiratory diseases in geriatric patients is essential for improving diagnostic accuracy, optimizing management strategies, and reducing mortality.

MATERIALS AND METHODS

Study design and setting: This was a hospital-based cross-sectional observational study conducted in the Department of Medicine, Dhaka Medical College Hospital, Bangladesh. The study was carried out over six months from January to June 2016. The study population comprised geriatric patients aged ≥65 years who were admitted to the Medicine wards of Dhaka Medical College Hospital with respiratory problems during the study period. A total of 100 patients fulfilling the inclusion and exclusion criteria were enrolled in the study. A purposive (non-probability) sampling technique was applied to recruit eligible participants consecutively during the study period. Patients admitted with clinical features suggestive of respiratory diseases (e.g., cough, breathlessness, fever, chest pain, haemoptysis) were included in this study, and patients aged <65 years, without respiratory complaints or diagnoses and unwilling to provide informed consent were excluded from the study. Ethical clearance was obtained from the Institutional Review Board (IRB), Dhaka Medical College. Ethical standards were maintained throughout the study. Informed written consent was obtained from all participants or their attendants before enrolment. Confidentiality and privacy of patient information were strictly preserved. The study was conducted in accordance with institutional ethical guidelines.

Data collection procedure: Data were collected using a predesigned and pretested structured case record form.

Detailed clinical history was obtained from each patient, including demographic characteristics, presenting symptoms, and a thorough physical examination.

Clinical assessment and operational definitions: Respiratory diseases were diagnosed based on clinical evaluation supported by relevant laboratory and radiological investigations. Breathlessness severity was assessed using the Medical Research Council (MRC) dyspnoea scale, and only patients reporting breathlessness were graded accordingly (n = 72). Final diagnoses (e.g., pneumonia, chronic obstructive pulmonary disease, pulmonary tuberculosis, bronchial asthma, bronchial carcinoma, bronchiectasis, lung abscess, aspiration pneumonia, and diffuse parenchymal lung disease) were established based on a combination of clinical findings, imaging, and laboratory results.

Laboratory and radiological investigations (available at the hospital)**:**

- Complete blood count and erythrocyte sedimentation rate (ESR)
- Sputum examination for acid-fast bacilli (AFB)
- Gene Xpert testing for tuberculosis
- Sputum cytology for malignant cells (when indicated)
- Chest X-ray (posteroanterior view)
- Pleural fluid analysis, including adenosine deaminase (ADA), in cases of pleural effusion
- Lymph node biopsy and histopathological examination in selected cases

*These investigations were used to confirm diagnoses and to determine the aetiology of conditions such as pleural effusion.

Outcome measures: The primary outcome was the pattern of respiratory diseases among geriatric patients. Secondary outcomes included- distribution of presenting symptoms and clinical signs, laboratory and radiological profiles, aetiology of pleural effusion, and disease-specific fatality rates. Mortality during hospital stay was recorded, and its association with age and initial MRC breathlessness score was assessed.

Data processing and statistical analysis

Collected data were checked for completeness, consistency, and accuracy before analysis. Data were coded and entered into Statistical Package for Social Sciences (SPSS) version 21 and Microsoft Excel 2010. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequency and percentage. Associations between variables, including correlation between mortality and age, as well as the MRC breathlessness score, were evaluated. A p-value of <0.05 was considered statistically significant.

OPERATIONAL DEFINITIONS

- **Geriatric patient:** Any individual aged 65 years or above.
- **Respiratory problem:** Any clinical condition affecting the respiratory system presenting with symptoms such as cough, breathlessness, fever, chest pain, or haemoptysis, and confirmed by clinical evaluation and/or investigations.
- **Breathlessness severity (MRC scale):** Graded according to the Medical Research Council dyspnoea scale (Grades 1–5), where higher grades indicate greater functional limitation.
- **High ESR:** Erythrocyte sedimentation rate >100 mm in the first hour.
- **Pleural effusion:** Accumulation of fluid in the pleural space, confirmed by chest X-ray and/or clinical examination.
- **Aetiology of pleural effusion:** Determined based on clinical, radiological, and laboratory findings (including pleural fluid analysis and ADA levels).
- **Confirmed tuberculosis:** Diagnosis established by positive sputum for acid-fast bacilli (AFB) and/or Gene Xpert test.
- **Fatality rate:** Proportion of deaths among patients diagnosed with a specific respiratory disease during hospital admission, expressed as a percentage.
- **Comorbidity:** Presence of one or more additional diseases or conditions (e.g., hypertension, diabetes mellitus, heart disease, chronic kidney disease) coexisting with the primary respiratory illness.

RESULTS

A total of 100 patients were selected purposively from the study population who were admitted in the indoor medicine ward of DMCH during January 2016 to July 2016.

Table I presents the age distribution of the study population. The majority of patients were within the 66 - 70 years age group (47%), followed by 71 - 75 years (23%). The mean (±SD) age was 72.87 (±6.69) years, with an overall age range of 66–95 years.

Table I: Distribution of the study population according to age group (n = 100)

Age group (In years)	Frequency	Mean (±SD)	Age Range
66-70	47	72.87 (±6.69)	66 - 95
71-75	23		
76-80	12		
81-85	14		
86-90	3		
>90	1		

Figure 1, the pie chart illustrates the sex distribution of the study population, showing a male predominance (56%) compared to females (44%).

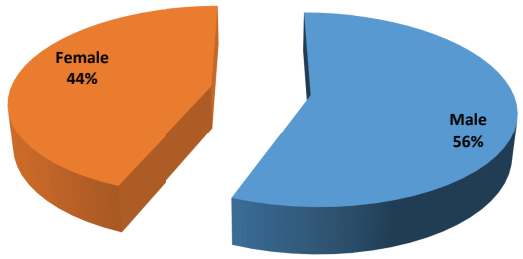

Figure 1: Distribution of the study population according to sex (n = 100)

Table II summarizes the frequency and percentage of presenting symptoms. Cough was the most common symptom (100%), followed by fever (82%) and breathlessness (72%). Other notable symptoms included chest pain (46%), weight loss (44%), haemoptysis (36%), altered consciousness (15%), and voice change (4%).

Table II: Presenting symptoms among the study population (n=100)

Symptoms	Frequency	Percentage
Fever	82	82
Cough	100	100
Chest pain	46	46
Breathlessness	72	72
Weight loss	44	44
Haemoptysis	36	36
Voice change	4	4
Altered consciousness	15	15

Figure 2, the line diagram demonstrates the severity of breathlessness among patients based on the Medical Research Council (MRC) scale. Among the 72 patients with breathlessness, the majority were in grades 2 and 3, while fewer patients presented with severe grades (4 and 5).

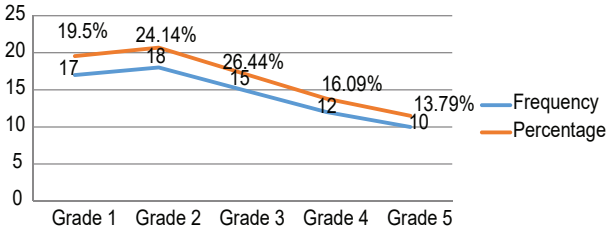

Figure 2: Distribution of the study population according to the MRC breathlessness scale (n = 72)

Table III shows the distribution of key clinical signs observed during physical examination. Anaemia was the most frequent finding (30%), followed by cyanosis (19%), oedema (17%), clubbing (16%), and enlarged lymph nodes (10%), reflecting both chronic disease burden and possible hypoxic states.

Table III: Relevant examination findings among the study population (n=100)

Findings	Frequency	Percentage
Anaemia	30	30
Clubbing	16	16
Cyanosis	19	19
Oedema	17	17
Enlarged lymph node	10	10

Table IV outlines important laboratory and radiological findings. Elevated ESR (>100 mm in 1st hour) was observed in 52% of patients. Microbiological tests revealed AFB positivity in 5% and Gene Xpert positivity in 8% of cases. Chest X-ray findings included pleural effusion (39%), consolidation (37%), patchy opacity (8%), and cavitary lesions (6%). Pleural fluid ADA positivity was found in 8 cases. Lymph node biopsy results indicated malignancy (5 cases), tuberculosis (3 cases), and reactive changes (2 cases).

Table IV: Laboratory findings among the study population (n = 100)

Investigation	Findings	Frequency
ESR	High (>100 mm in 1st hour)	52
MT	Positive (>10 mm within 72 hours)	12
Sputum for AFB	Positive	5
Gene Xpert for TB	Positive	8
Sputum for malignant cell	Positive	2
X-ray chest P/A view	Consolidation	37
	Pleural effusion	39
	Cavitary lesion	6
	Patchy opacity	8
Pleural fluid for ADA	Positive	8
Lymph node Biopsy	TB	3
	Malignancy	5
	Reactive	2

Table V describes the underlying causes of pleural effusion. Pneumonia was the leading cause (51.28%), followed by pulmonary tuberculosis (30.77%) and bronchial carcinoma (17.95%), indicating that both infectious and malignant conditions contribute significantly.

Table V: Aetiology of pleural effusion among the study population (n=39)

Aetiology	Frequency	Percentage
Pneumonia	20	51.28
PTB	12	30.77
Bronchial Carcinoma	7	17.95

Table VI presents the distribution of final diagnoses. Pneumonia was the most common diagnosis (35%), followed by COPD (25%) and pulmonary tuberculosis (14%). Other conditions included bronchial asthma (8%), bronchial carcinoma (7%), bronchiectasis (4%), lung abscess (4%), aspiration pneumonia (2%), and diffuse parenchymal lung disease (1%).

Table VI: Respiratory diseases diagnosed among the study population (n=100)

Respiratory disease	Frequency	Percentage
Pneumonia	35	35
COPD	25	25
Pulmonary Tuberculosis	14	14
Bronchial Asthma	8	8
Bronchial Carcinoma	7	7
Brochiectasis	4	4
Lung Abscess	4	4
Aspiration pneumonia	2	2
Diffuse Parenchymal Lung Disease	1	1

Table VII shows disease-specific mortality and fatality rates. The highest fatality was observed in aspiration pneumonia (100%), followed by acute severe bronchial asthma (50%) and bronchial carcinoma (42.86%). Pneumonia (28.57%), acute exacerbation of COPD (20%), and pulmonary tuberculosis (14.28%) also contributed to mortality, highlighting the severity of these conditions in geriatric patients.

Table VII: Fatality rate of the respiratory diseases among study populations (n=26)

Respiratory disease	Frequency of death	Fatality rate
Aspiration pneumonia (n=2)	2	100
Acute severe bronchial asthma (n=8)	4	50
Bronchial Carcinoma (n=7)	3	42.86
Pneumonia (n=35)	10	28.57
Acute exacerbation of COPD (n=25)	5	20
Pulmonary Tuberculosis (n=14)	2	14.28

Figure 3 shows the relationship between age and mortality. A positive correlation is observed, indicating that mortality increases with advancing age among geriatric patients with respiratory diseases.

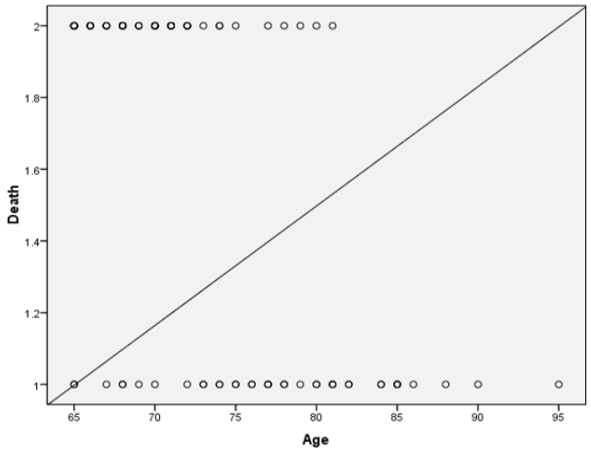

Figure 3: Correlation between death and age of the study population (n=100)

Figure 4, the scatter diagram illustrates the association between initial breathlessness severity and mortality. A higher MRC breathlessness score at presentation is associated with increased mortality, suggesting its prognostic significance.

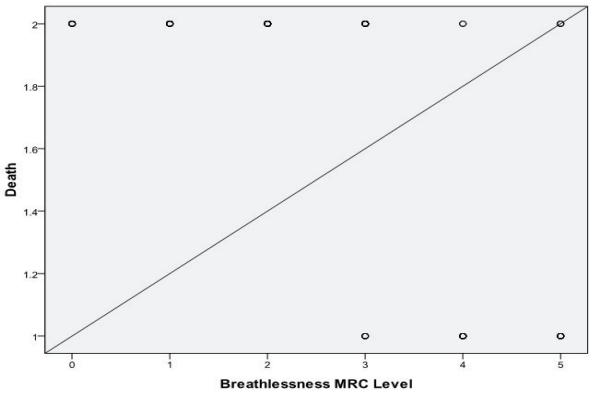

Figure 4: Correlation between death and initial MRC breathlessness scale of the study population (n = 100)

DISCUSSION

This hospital-based cross-sectional observational study was conducted to explore the pattern, clinical characteristics, and outcomes of respiratory diseases among geriatric patients admitted to Dhaka Medical College Hospital. A total of 100 patients aged ≥65 years were included, providing an overview of the burden and spectrum of respiratory illnesses in a tertiary care setting in Bangladesh.

The mean (±SD) age of the study population was 72.87 (±6.69) years, with the majority of patients belonging to the 66 - 70 years age group (47%), followed by 71–75 years (23%). This indicates that most hospitalized geriatric patients were in the early elderly age group. In contrast, Viegi et al.[13] reported a higher mean age (82.74 ± 10.7 years), likely reflecting differences in life expectancy and healthcare access between developed and developing countries.[14] The relatively younger geriatric profile in this study highlights the earlier onset of morbidity and hospital admission among elderly individuals in Bangladesh. Male predominance was observed (56% vs. 44% female), which is consistent with national demographic trends reported by the Bangladesh Bureau of Statistics.[14] This may also reflect gender differences in healthcare-seeking behaviour and exposure to risk factors such as smoking and occupational hazards.

Cough (100%), fever (82%), and breathlessness (72%) were the most common presenting complaints. These findings are consistent with previous studies in Bangladesh, which have reported a high prevalence of respiratory symptoms among elderly individuals.[5,8] The high frequency of breathlessness further emphasizes the burden of chronic and acute respiratory conditions, particularly obstructive and infective pathologies. The distribution of breathlessness severity showed that most patients fell within moderate grades (MRC grades 2–3), suggesting significant functional limitation at presentation.

On clinical examination, anaemia was the most frequent sign (30%), followed by cyanosis (19%), oedema (17%), clubbing (16%), and enlarged lymph node (10%). These findings reflect the combined effects of chronic disease, nutritional deficiencies, and hypoxia in elderly patients. Similar patterns of multimorbidity and systemic involvement have been described in earlier studies on geriatric populations in Bangladesh.[4]

Laboratory and radiological investigations revealed important diagnostic patterns. Elevated ESR (>100 mm in the 1st hour) was present in 52% of patients, indicating a high burden of inflammatory or infectious conditions. Sputum analysis showed AFB positivity in 5% and Gene Xpert positivity in 8%, confirming the continued relevance of pulmonary tuberculosis in this population[9, 10], and sputum for malignant cells detected 2% positive cases. Chest X-ray findings demonstrated pleural effusion in 39%, consolidation in 37% of cases, 8 patchy opacity, and 6 cavitary lesions supporting the predominance of infective respiratory diseases.

Among patients with pleural effusion (n=39), pneumonia was identified as the leading cause (51.28%), followed by

pulmonary tuberculosis (30.77%) and bronchial carcinoma (17.95%). This differs from findings by Bhoumik et al.[15], where tubercular effusion was more predominant, suggesting a possible shift in disease pattern or differences in study settings. The significant contribution of malignancy (17.95%) also highlights the importance of considering neoplastic causes in elderly patients presenting with pleural effusion. The presence of adenosine deaminase (ADA) in the pleural fluid was positive in 8% of the patients. Additionally, 10% of the patients had cervical lymphadenopathy, and histopathological evaluation revealed that 5% were malignant, 3% were TB, and 2% exhibited reactive hyperplasia.

In terms of final diagnoses, pneumonia was the most common condition (35%), followed by chronic obstructive pulmonary disease (COPD) (25%) and pulmonary tuberculosis (14%). Other conditions included bronchial asthma (8%), bronchial carcinoma (7%), bronchiectasis (4%), and lung abscess (4%). These findings are comparable to those reported by Oruç et al.[16], who also identified pneumonia and COPD as leading respiratory diseases among the elderly. The predominance of infective conditions aligns with the broader epidemiological transition observed in low- and middle-income countries, where communicable and non-communicable diseases coexist. A few patients were detected as aspiration pneumonia (2%) and DPLD (1%).

The overall in-hospital mortality rate was 26%, indicating a substantial disease burden. The highest fatality rate was observed in aspiration pneumonia (100%), followed by acute severe bronchial asthma (50%) and bronchial carcinoma (42.86%). Pneumonia (28.57%), acute exacerbation of COPD (20%), and pulmonary tuberculosis (14.28%) also contributed significantly to mortality. These findings underscore the severity of respiratory illnesses in the geriatric population and are consistent with reports from the Centers for Disease Control and Prevention, which identify lower respiratory tract infections as a leading cause of death among the elderly.[17] According to the report, about 17% elderly patients died from respiratory disease.

Importantly, this study demonstrated a positive correlation between mortality and increasing age, as well as between mortality and higher initial MRC breathlessness scores. These findings suggest that advanced age and severity of dyspnoea at presentation are significant prognostic indicators. Similar associations between functional status and clinical outcomes have been reported in studies of elderly patients with respiratory diseases.[13]

The findings of this study highlight the dual burden of infectious and chronic respiratory diseases among geriatric patients in Bangladesh. The high prevalence of pneumonia and COPD, along with significant mortality rates, indicates the need for early diagnosis, prompt management, and targeted preventive strategies.

LIMITATIONS

The study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to the broader population. The sample size of 100 patients may merely represent the diverse spectrum of respiratory diseases among the geriatric population. Purposive sampling may introduce selection bias, potentially affecting the representativeness of the study population. Hospital-based populations may overestimate the severity and mortality of respiratory diseases compared to community settings. Outcomes were assessed only during hospital stay; long-term prognosis and post-discharge outcomes were not evaluated. Detailed evaluation of certain risk factors (e.g., smoking history, environmental exposure, nutritional status) was limited, which may influence disease patterns and outcomes.

CONCLUSION

This study demonstrates that respiratory diseases constitute a major cause of morbidity and mortality among geriatric patients admitted to tertiary care hospitals in Bangladesh. Infective conditions, particularly pneumonia (35%), followed by chronic obstructive pulmonary disease (25%) and pulmonary tuberculosis (14%), were the most commonly encountered diagnoses. A substantial proportion of patients present with advanced disease, as evidenced by high frequencies of breathlessness (72%) and significant mortality (26%). The highest fatality rates were observed in aspiration pneumonia (100%), acute severe bronchial asthma (50%), and bronchial carcinoma (42.86%). Increasing age and higher initial Medical Research Council (MRC) breathlessness scores were found to be important prognostic indicators of mortality, underscoring the need for early risk stratification. Strengthening geriatric healthcare services and improving preventive strategies may significantly reduce the burden and adverse outcomes of respiratory illnesses in this vulnerable group.

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