

Characteristics of Antibiotic Use Among Older Adults with Respiratory Diseases at Puskesmas X in West Jakarta

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ABSTRACT

The impact of respiratory diseases on the older population worldwide had become increasingly evident as the global population aged 65 years and older continued to grow. Problems related to medication use had been associated with increased morbidity and mortality, longer hospital stays, higher treatment costs, and reduced quality of life. The various respiratory conditions and diseases that could occur in older adults did not always require antibiotic treatment. This study aimed to describe the characteristics of antibiotic use among older adults with respiratory diseases at (Primary Healthcare Centre) Puskesmas X, West Jakarta. This study used a descriptive retrospective cross-sectional design and analyzed secondary data obtained from the medical records of patients who met the study criteria at Puskesmas X, West Jakarta, in 2024 and 2025. A total of 285 medical records were analyzed, with a relatively balanced proportion of male and female patients. Six respiratory disease diagnoses were identified, with upper respiratory tract infections (acute pharyngitis, acute respiratory infection, common cold, and acute tonsillitis) accounting for the majority (85%), followed by chronic obstructive pulmonary disease (COPD) (12%), pneumonia (2%), and bronchitis (2%). Only two types of antibiotics were prescribed, namely amoxicillin and cefadroxil, with amoxicillin being predominant (92%). The most common treatment duration was 5 days (45%), followed by 3 days (11%) and 7 days (3%), while the duration was not documented in 42% of the medical records. In conclusion, antibiotic use among older adults with respiratory diseases at the Pusekesmas X was dominated by amoxicillin, particularly for upper respiratory tract infections. The high proportion of medical records without documented antibiotic treatment duration indicated a need to improve the quality of documentation of antibiotic prescribing and use.

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1. INTRODUCTION

The World Health Statistics 2024 report from the World Health Organization (WHO) identified respiratory diseases among five of the ten leading causes of death globally.[1] In Indonesia, data from the Ministry of Health in 2023 showed that four of the ten most prevalent diseases were related to respiratory conditions, including chronic obstructive pulmonary disease (COPD), lung cancer, pneumonia, and asthma.[2] The burden of pulmonary diseases among older adults has become increasingly apparent in parallel with

the growing global population aged 65 years and above. Chronic lower respiratory diseases are currently the third leading cause of death in this age group.[3]

The lungs are the largest organs in the human body and maintain a distinctive connection with the external environment. Throughout an individual's lifetime, pulmonary cells are exposed to and influenced by various types of stress, including oxidative, chemical, biological, and immunological factors. Pulmonary function progressively declines with advancing age, even in otherwise healthy individuals. This age-related decline is associated with anatomical changes that affect gas exchange and alterations in immune function, thereby increasing susceptibility to respiratory infections.[4] Pulmonary function is one of the physiological functions that commonly deteriorates with age and is influenced by aging, physical activity, and overall physical capacity. Reduced pulmonary function in older adults is associated with several chronic conditions, including chronic obstructive pulmonary disease (COPD).[4] Furthermore, age-related deterioration of immune function increases the risk of severe pneumonia in older adults, potentially leading to hospitalization and, in severe cases, death.[3]

Age-related physiological changes can alter the pharmacokinetics and pharmacodynamics of medications, making pharmacotherapy in older adults increasingly complex. Medication-related issues, such as underdosing or overdosing, polypharmacy, adverse drug reactions, and medication non-adherence, have been associated with higher morbidity and mortality, longer hospital stays, increased healthcare costs, and poorer quality of life.[5] The greater susceptibility of older adults to infections further presents challenges in clinical management. Treatment of infectious diseases in this population may be complicated by multiple comorbidities, polypharmacy, functional impairment, and disability. Inappropriate use of antibiotics among older adults may lead to significant adverse outcomes, including drug-drug interactions, adverse effects related to age- or disease-associated changes in drug metabolism, and infections involving multidrug-resistant organisms (MDROs).[6] Consequently, the growing burden of serious and difficult-to-treat infections may further contribute to increased morbidity and mortality, prolonged hospitalization, and higher healthcare expenditures.

Considering the diverse respiratory conditions and diseases that can affect the older adults, many of which do not necessarily require antibiotic therapy, this study aimed to characterize antibiotic use among older adults patients with respiratory diseases. The study was conducted at a primary healthcare center (puskesmas) in West Jakarta. The study site was selected considering that, as a primary healthcare facility, the puskesmas is expected to provide adequate initial management to achieve favorable patient outcomes and, when necessary, facilitate appropriate referral to a higher level of care without resulting in unintended consequences. These consequences may include adverse drug reactions, whether occurring as individual effects or arising from unnecessary drug interactions, as well as the potential development of multidrug-resistant organisms (MDROs).

This study is intended to provide insight into the patterns and characteristics of antibiotic use among older adults patients with respiratory diseases, an area that remains relatively underexplored. The findings may provide scientific evidence to support the development and evaluation of local policies at the puskesmas and, where appropriate, contribute to broader healthcare policy considerations. Furthermore, the data obtained from this study may be useful for supporting education and awareness among healthcare professionals in clinical practice, serving as a reference for future research, and facilitating health education for the general public.

2. RESEARCH METHODS

This study employed a retrospective descriptive cross-sectional design using medical record data from patients diagnosed with respiratory tract diseases at a Puskesmas, West Jakarta, during 2024–2025 who met the predefined inclusion criteria. The study was conducted from April to June 2026 following approval from the relevant Ethics Committee and obtaining research permission from the appropriate authorities.

The study was conducted at a Puskesmas in West Jakarta, which was selected based on the relatively high number of respiratory tract disease cases and the availability of medical records relevant to the objectives of the study. The study population comprised all patients who sought medical care at the health center and were diagnosed with respiratory tract diseases during the 2024–2025 period. The study sample consisted of all medical records that met the inclusion criteria, namely records of patients aged ≥ 60 years who had been diagnosed with a respiratory tract disease, as documented in the medical records during the study period.

A total sampling technique was employed, whereby all medical records meeting the inclusion criteria were included in the study without applying a formal sample size calculation. This approach was considered appropriate because the study population was relatively limited, the relevant medical records were comprehensively available, and the inclusion of all eligible records was expected to provide a comprehensive description of antibiotic use among older adults with respiratory tract diseases.

The collected data were analyzed quantitatively using statistical software, with SPSS as the primary analytical tool. Univariate analysis was conducted to describe the characteristics of the study population and the distribution of each study variable. The findings were subsequently presented as frequency and percentage distributions in tables.

3. RESEARCH RESULTS AND DISCUSSION

A total of 285 medical records were analyzed, with a relatively balanced distribution between male and female patients. The largest proportion of older adults was in the 60–79-year age group (92%), followed by those aged <60 years (6%) and 80–85 years (2%). (Tabel 1.) The prevalence observed in this study is consistent with the increasing burden of respiratory diseases among older adults, as reflected by the rise in the prevalence of respiratory diseases among individuals aged >65 years, from 5.87% in 1985 to 8.28% in 2015.[7]

A study examining the prevalence of respiratory tract diseases at a primary healthcare center reported that the highest proportion of cases occurred among adults aged 19–59 years (42.9%), followed by individuals aged over 60 years (23.6%). In comparison, patients younger than 19 years accounted for 33.4% of the total cases.[8] According to the United Nations World Population Prospects, the global population aged 65 years and older was estimated at 71 million in 2022, representing nearly 10% of the total world population. The number of older adults is expected to continue increasing over the coming decades. By 2050, individuals aged 65 years and older are projected to account for approximately 16% of the global population, with this proportion expected to rise further to around 24% by 2100.[3]

Table 1. Demographic Characteristics and Clinical Manifestations
Among Older adults (N = 285)

Characteristic	Frequency	Percentage
Gender		
Men	139	49%
Women	146	51%

Age groups		
59	18	6%
60-79	261	92%
80-85	6	2%
Clinical manifestations		
Productive cough	266	93%
Runny nose	191	67%
Fever	91	32%
Shortness of breath (dyspnea)	46	16%
Diagnosis		
Acute pharyngitis	81	28%
Acute respiratory infection (ARI)	80	28%
Common cold	67	24%
Chronic obstructive pulmonary disease (COPD)	33	12%
Acute tonsillitis	13	5%
Bronchitis	5	2%
Pneumonia	6	2%
Laboratory examination		
Performed (Leukocytosis)	61	21%
Not performed	224	79%

Six respiratory tract disease diagnoses were recorded in the study population. Upper respiratory tract infections accounted for the majority of cases (85%), comprising acute pharyngitis, acute respiratory tract infection, common cold, and acute tonsillitis. These were followed by chronic obstructive pulmonary disease (COPD), pneumonia, and bronchitis. Productive cough was the most commonly reported symptom (93%), followed by rhinorrhea (67%), fever (32%), and dyspnea (16%). Laboratory investigations were not performed in the majority of cases (79%). Among the 21% of patients who underwent laboratory evaluation, the available findings were limited to leukocytosis. (Tabel.1).

Respiratory tract infections (RTIs) are among the most common infectious diseases across all age groups, with older adults being particularly vulnerable due to age-related declines in immune function and the frequent presence of comorbid conditions.[9] Upper respiratory tract infections (URTIs) are also frequently encountered among older adults in primary care settings. Although often considered self-limiting, URTIs in this population may have a greater impact on daily functioning, contribute to delayed recovery, and lead to more frequent healthcare utilization. Furthermore, older adults may be at increased risk of developing more severe complications following an URTI.[10]

COPD represents a substantial health burden among older adults worldwide. Its prevalence is estimated at approximately 10% among individuals aged 40 years and older, with a marked increase observed with advancing age. Among those aged over 70 years, COPD is estimated to affect approximately 20–25% of the population, highlighting the greater burden of the disease in older age groups.[3] The proportion of pneumonia cases identified in the present study was lower than the prevalence reported at the national level. According to the 2018 Riset Kesehatan Dasar Riskesdas), pneumonia accounted for 16.8% of cases among individuals aged over 54 years when assessed across the overall population, including children under five years of age.[11] However, findings from the 2023 Survei Kesehatan Indonesia (SKI) suggest a considerable rise in pneumonia prevalence among individuals in the same age group, reaching 36%.[12] This increase may reflect the growing burden of pneumonia among older adults and highlights the importance

of continued surveillance and appropriate management of respiratory infections in this population.

The respiratory symptoms observed in the present study were broadly in line with those reported in previous studies. Common manifestations of respiratory tract disease include coryza, cough, sore throat, hoarseness, and nasal stuffiness.[13] In older adults, respiratory complaints may also present as dyspnea, chronic bronchitis, and wheezing, which have been reported relatively frequently in this population. In a nationally representative sample of older Americans, dyspnea was reported in 34.2% of participants, while chronic bronchitis and wheezing were observed in 15.1% and 12.4%, respectively.[14] These findings highlight the relatively high burden of respiratory symptoms among older adults and are consistent with the clinical manifestations identified in the present study. In addition, cough and fever associated with respiratory tract infections are among the common reasons for seeking care in primary healthcare settings. Studies from Western countries have reported that respiratory tract infections account for approximately 5–25% of all visits to primary healthcare facilities.[15]

Table 2. Distribution of Antibiotics Administered to Patients with Respiratory Tract Diseases (N = 285)

Characteristic	Frequency	Percentage
Amoxycillin	262	92%
Cefadroxil	23	8%

Only two antibiotics were prescribed for respiratory tract disease cases in the present study: amoxicillin and cefadroxil. Amoxicillin accounted for the majority of prescriptions (92%), while cefadroxil represented the remaining 8% (Table 2). Regarding treatment duration, a five-day course was most frequently prescribed, representing 45% of cases, followed by three-day courses in 11% and seven-day courses in 3%. In the remaining 42% of cases, the duration of antibiotic therapy was not documented in the medical records (Table 3).

Among patients who received antibiotics, 13% were clinically diagnosed with non-infectious respiratory conditions, specifically chronic obstructive pulmonary disease (COPD) and bronchitis. Although most patients were diagnosed with respiratory tract infections (RTIs), supporting diagnostic investigations were not performed in all cases. The 2019 National Clinical Practice Guidelines (PNPK) for COPD recommend antibiotic therapy for exacerbations accompanied by at least two of three cardinal symptoms: worsening dyspnea, increased sputum production, and increased sputum purulence.[16] In the present study, however, these clinical features were not consistently recorded in the medical records, limiting the assessment of whether antibiotic prescribing in patients with COPD was in accordance with the guideline recommendations.

Among the 87% of patients diagnosed with respiratory tract infections (RTIs), upper respiratory tract infections (URTIs) were the most common. The causative pathogens of RTIs differ according to the anatomical site affected. URTIs are predominantly viral in origin, while lower respiratory tract infections (LRTIs) can result from either viral or bacterial pathogens. Viral pathogens are also responsible for most cases of bronchitis and bronchiolitis.[17] Therefore, antibiotics are generally not recommended for most acute respiratory infections because they are predominantly viral and provide limited benefit even in bacterial cases, while posing a risk of adverse effects.[18]

The two antibiotics documented in this study are commonly prescribed at Puskesmas. A literature review encompassing ten studies by Nurohmah et al. found that amoxicillin

was the antibiotic most consistently prescribed for respiratory tract infections in Puskesmas, being reported across all ten studies. In comparison, cefadroxil was reported in four studies. Other antibiotics documented in the review were cotrimoxazole, azithromycin, and ciprofloxacin.[19] This pattern is in line with the findings of a systematic review, which reported amoxicillin and cefadroxil as the most commonly prescribed antibiotics belonging to the Access group in Puskesmas.[20] The frequent use of amoxicillin and cefadroxil in the present study may partly reflect their availability within Puskesmas, making them readily accessible for routine treatment of respiratory tract infections.

Table 3. Distribution of Patients According to Duration of Antibiotic Treatment (N=285)

Duration of Treatment (days)	n	Percentage (%)
3	30	11
5	128	45
7	8	3
Not recorded	119	42

Of the 166 cases (69%) with a documented treatment duration, antibiotic therapy was most frequently prescribed for 5–7 days. This duration is in line with the usual recommendation for oral antibiotic treatment, which is generally administered for 5–7 days.[18], [21] This finding is further supported by a systematic review founding no significant difference in clinical outcomes between antibiotic regimens lasting 3–7 days and those extending beyond 7 days.[18]

4. CONCLUSION

Antibiotic use among older adults with respiratory diseases at Puskesmas X was predominantly amoxicillin, mainly for upper respiratory tract infections. At the same time, antibiotic prescribing was not always accompanied by adequate documentation of its indication and treatment duration. Improving the appropriateness of antibiotic use and the completeness of medical records is therefore needed in Puskesmas X.

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6. BIBLIOGRAPHY

- Kementerian Kesehatan, Polusi udara sebabkan angka penyakit respirasi tinggi. Accessed: Nov. 09, 2025. [Online]. Available: <https://kemkes.go.id/id/polusi-udara-sebabkan-angka-penyakit-respirasi-tinggi>
- Joshi, P.R.(2024). Pulmonary Diseases in Older Patients: Understanding and Addressing the Challenges, *Geriatr.*, vol. 9, no. 2. doi: 10.3390/geriatrics9020034.
- Wesnawa, M.A.D.P., Subagiarta, I.M., and Nathania, E. (2025). Lung Aging and Lung Function Assessment in Elderly. *J. Respi.* Vol. 11 (01); 93-100, doi: 10.20473/jr.v11-I.1.2025.93-100
- Beckett, C.L., Harbarth, S., and Huttner S. (2015). Special considerations of antibiotic prescription in the geriatric population. *Clin. Microbiol. Infect.*, vol. 21, no. 1, p. 3.

doi: 10.1016/j.cmi.2014.08.018

- Theodorakis N *et al.*(2024). Antibiotic Resistance in the Elderly: Mechanisms, Risk Factors, and Solutions. *Microorganisms*, vol. 12, no. 10. doi: 10.3390/microorganisms12101978.
- Ascher,K, Elliot, S.J., Rubio, G.A., Glassberg, M.K. (2017). Lung Diseases of the Elderly: Cellular Mechanisms. *Clin. Geriatr. Med.*, vol. 33, no. 4, pp. 473–490. doi: 10.1016/j.cger.2017.07.001.
- Mertosono, L, Ottay, R., and I. Siagian. (2024). Gambaran penyakit saluran pernapasandi Puskesmas Wenang Kecamatan Wenang Kota Manadoperiode Juli 2023 – Juni 2024. *J. Keperawatan*, vol. 8, no. 1, p. 75.
- Akhtar, A., Hassali, M.A.A., Zainal, A., Ali, I., Iqbal, M.I., Khan, A.H. (2021). Respiratory-tract infections among geriatrics: prevalence and factors associated with the treatment outcomes. *Ther. Adv. Respir. Dis.*, vol. 15, pp. 1–9. doi: 10.1177/1753466620971141.
- Geffen, L.(2006). Common upper respiratory tract problems in the elderly - A guide to clinical diagnosis and prudent prescription. *South African Fam. Pract.*, vol. 48, no. 5, pp. 20–23. doi: 10.1080/20786204.2006.10873390.
- BPPK.(2019). Laporan Nasional RISKESDAS 2018. *Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan*.
- BKPK.(2023). Survei Kesehatan Indonesia (SKI) 2023 Dalam Angka. BKPK
- Vaz Fragoso, V.A.(2017). Epidemiology of Lung Disease in Older Persons. *Clin. Geriatr. Med.*, vol. 33, no. 4, pp. 491–501. doi: 10.1016/j.cger.2017.06.003.
- Nairz, M., Weiss, G.(2025). How to identify respiratory pathogens in primary health care - a review on the benefits, prospects and pitfalls in using point of care tests. *Infection*, vol. 53, no. 6, pp. 2321–2340. doi: 10.1007/s15010-025-02600-1.
- Aronen, M. *et al.* (2019). Respiratory tract virus infections in the elderly with pneumonia. *BMC Geriatr.*, vol. 19, no. 1, pp. 1–11. doi: 10.1186/s12877-019-1125-z.
- Kementerian Kesehatan RI. (2019). Pedoman Nasional Pelayanan Kedokteran Tata Laksana Penyakit Paru Obstruktif Kronik.
- Häder, A. *et al.*(2024). Respiratory Infections in the Aging Lung: Implications for Diagnosis, Therapy, and Prevention. *Aging Dis.*, vol. 14, no. 4, pp. 1091–1104. doi: 10.14336/ad.2023.0329.
- Wilson, H.L., Daveson, K., Del Mar, C.B. (2019). Optimal antimicrobial duration for common bacterial infections. *Aust. Prescr.*, vol. 42, no. 1, pp. 5–9. doi: 10.18773/austprescr.2019.001.
- Nurrohmah, A., Suri, N., Damayamti, E.(2025). Rasionalitas Penggunaan Antibiotik Pada Pasien Infeksi Saluran Pernapasan Akut (Ispra) Di Puskesmas. *Sains Med.*, vol. 3, no. 5. [Online]. Available: homepage: <https://wpcpublisher.com/jurnal/index.php/sainsmedisina>
- Limato,R. *et al.*(2022). Optimizing antibiotic use in Indonesia: A systematic review and evidence synthesis to inform opportunities for intervention. *Lancet Reg. Heal. - Southeast Asia*, vol. 2, no. 6. doi: 10.1016/j.lansea.2022.05.002.
- Grant, J., Le Saux, N.(2021). Duration of antibiotic therapy for common infections. *J. Assoc. Med. Microbiol. Infect. Dis. Canada*, vol. 6, no. 3, pp. 181–197. doi: 10.3138/JAMMI-2021-04-29.