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Antibiotic Use in Palliative Care Units: A Multicenter Point Prevalence Study in Türkiye

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Research Article

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Abstract

Background

Although multiple studies have demonstrated that antibiotic use does not significantly contribute to mortality in palliative care patients, the rate of antibiotic use remains high in this population.

Methods

This study was a point-prevalence survey conducted on May 28, 2024, among patients at 35 palliative care centers in Türkiye. Patients were assessed epidemiologically and demographically and grouped according to antibiotic receipt for subsequent statistical comparison.

Results

A total of 629 patients were included, with 319 (50.7%) being female. The median age was 77(Q1:67-Q3:84) years. Among these, 289 patients (45.9%) received antibiotic therapy. In the antibiotic group, the prevalence of malignancy and decubitus ulcers was significantly higher than in the non-antibiotic group ($p < 0.05$). Among the 289 patients who received antibiotics, therapy was deemed inappropriate in 57 cases (19.7%). Of these, antibiotics were prescribed by palliative care physicians without consultation with infectious disease specialists in 50 patients (87.7%). Notably, in 14 patients (24.6%), antibiotics were initiated solely based on elevated C-reactive protein (CRP) levels, despite the absence of documented infection.

Conclusion

Antibiotic use in palliative care is frequent, and a notable proportion falls outside guideline recommendations. CRP-based decision-making, when used without supporting clinical or microbiological findings, may be associated with inappropriate antibiotic use.

Background

Although antibiotics have been a major advancement for humanity, they also pose significant challenges, as antibiotic-resistant pathogens are a growing global concern [1,2]. In the United States alone, an estimated 2.8 million people are infected with antibiotic-resistant pathogens each year, resulting in approximately 35,000 deaths [3]. In hospices and palliative care settings, antibiotic use has been reported to vary widely, ranging from 4% to 84% [4].

Several studies have highlighted that antibiotics may often be prescribed unnecessarily in patients receiving palliative or hospice care. For instance, one study of patients discharged from hospitals to hospices found that 21.1% received antibiotic prescriptions, yet 28.2% of these patients had no documented infection [5]. Furthermore, only 60% of patients who were appropriately prescribed antibiotics experienced symptom relief [6].

Many experts argue that symptom relief should remain the primary goal of antibiotic therapy in hospice and palliative care settings [7]. Despite this, the frequency and determinants of antibiotic use in this population remain unclear. Developing evidence-based guidelines for antibiotic use in palliative care is essential, given the growing number of patients with complex healthcare needs. Infections are common among these patients, occurring both as the primary reason for hospitalization and as nosocomial infections during their hospital stay.

We designed our study as a point-prevalence study to examine antibiotic use rates in palliative care centers across Türkiye, and to evaluate the reasons for antibiotic initiation, potential causes of infection, the microorganisms causing the disease, the antibiotics used, and their appropriateness.

Methods

Study Design

This study was a point-prevalence survey conducted by the Rational Antibiotics Working Group of the Turkish Infectious Diseases and Clinical Microbiology Specialist Society (EKMUD). Data were collected on May 28, 2024, from palliative care patients at 35 centers across Türkiye. Centers that responded to the email invitation were included in the study. The study received ethical approval from the Ankara Etlik City Hospital Scientific Research Evaluation and Ethics Committee (Decision No: AEŞH-BADEK-2024-277).

Inclusion and Exclusion Criteria

All patients admitted to the palliative care wards of participating hospitals who had been monitored for more than 24 hours, as well as patients present in the ward at 8:00 a.m. who had not been discharged at the time of the survey, were included. Patients under 18 years of age and outpatients were excluded.

Assessment of Appropriateness:

The appropriateness of antibiotic therapy was determined by infectious diseases physicians at each participating centre, based on current guideline recommendations and available clinical, laboratory, and microbiological data. In two centres, data entry and assessment were performed by geriatric medicine specialists in collaboration with infectious diseases physicians.

Data Collection

A standardized database containing the required variables for the study was created by the principal investigator using Microsoft Excel (Microsoft Corp., USA) and shared with researchers at participating centers via email. The database was revised in response to feedback from participating investigators. Data were collected using a structured data collection form developed by the authors for this study. The original form included additional variables; however, only variables relevant to the study objectives and statistical analyses are presented in this manuscript. The full version of the data collection form is provided as Supplementary File 1.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) for Mac OS X 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean ± standard deviation and median (interquartile range), as appropriate. Patients who received antibiotics were compared with patients who did not (Table 1). Normal distribution of data was determined using the Shapiro-Wilk test, histograms, and QQ plots. Categorical variables were analyzed using the Chi-square test and presented as frequencies and percentages. Nonparametric values were analyzed using the Mann-Whitney U test. P values less than 0.05 were considered statistically significant**.**

Results

Of the 629 patients included in our study, 319 were female (50.7%), and 310 were male (49.3%), with the median age of 77.0 (Q1:67.0-Q3:84.0) years. The median hospital stay was 37.0(Q1:17-Q3:81) days. The median duration of palliative care was 21.0 (8.0-63.0)days. The most common reasons for palliative care were the need for end-stage support (56.6%), impaired oral intake (28.7%), and transfer from another clinic for continued infection treatment (21.9%).

Among the 629 patients, 289 (45.9%) received antibiotic treatment. Of these, 244 (71.8%) had clinically and laboratory-confirmed infections. Antibiotic therapy was initiated based on culture results in only 36.7% of patients. Respiratory tract infections were the most common (34.1%), followed by urinary tract infections (29.4%), skin and soft tissue infections (19.6%), bloodstream infections (12.3%), and other infections (4.4%). Community-acquired infections were detected in 27.1%, whereas healthcare-associated infections were observed in 72.8%. Among cultured microorganisms, the most frequent were *Klebsiella* species (23.7%) and *Pseudomonas* species (19.5%), with ESBL (extended-spectrum β-lactamase) -producing organisms detected in 14% and CRE (carbapenem-resistant *Enterobacterales)* in 5.1%. Evaluation of the antibiotics used revealed that Meropenem was the most frequently administered (27.3%), followed by Piperacillin-tazobactam (23.9%) and Ceftriaxone (15.9%) (Table 1).

Patients who received antibiotics were compared with those who did not. Demographic and clinical characteristics were assessed according to underlying diseases, invasive procedures, nutritional support, and the presence of pressure ulcers. The presence of malignancy and pressure ulcers was significantly higher among patients who received antibiotics (Table 2).

Among the 289 patients who received antibiotics, therapy was deemed inappropriate in 57 cases (19.7%). Of these, antibiotics were started empirically in 54 patients (94.7%) and prescribed by palliative care physicians without consultation with infectious disease specialists in 50 patients (87.7%). In 33 patients (57.9%), antibiotics were initiated despite the absence of fever or positive culture results, based solely on elevated CRP levels and nonspecific symptoms such as deterioration in general condition, which did not clearly indicate an underlying infection. Notably, in 14 patients (24.6%), antibiotics were initiated solely because of elevated CRP levels, despite the absence of documented infection.

DISCUSSION

Antibiotic stewardship is an approach focused on optimizing antibiotic use in a specific clinical setting (8). The fundamental principles of antibiotic stewardship include: measuring antibiotic prescribing, minimizing

inappropriate prescribing, improving clinician antibiotic prescribing and use, minimizing misdiagnosis or delayed diagnoses, ensuring appropriate antibiotic and dose selection (9).

Traditional antibiotic stewardship can be challenging in hospice and palliative care settings because the goals of care differ from those in other settings. There is conflicting evidence on whether antibiotic use directly reduces mortality in patients in these settings (10). The issue of antibiotic discontinuation in end-of-life care is also worthy of discussion. Because frequent assessment of symptom relief is crucial for determining optimal antibiotic use, antibiotic treatment may need to be discontinued in patients who do not achieve adequate symptom relief or experience side effects (11).

A systematic review by Rosenberg and colleagues demonstrated that 92% of patients with urinary tract infections treated with antibiotics experienced symptomatic relief (4). In patients receiving palliative care, the most notable potential benefit of antibiotic therapy is the management of symptoms such as pain and dysuria associated with urinary tract infections. However, although antibiotic treatment for urinary tract infections in hospice patients may provide symptomatic relief, it generally has no significant impact on survival (7). In a Swedish study, the overall rate of symptom improvement among patients who received end-of-life antibiotic prescriptions was approximately 37%. However, when antibiotics were used to prevent or treat sepsis in these patients, the rate of symptom improvement increased to 50% (12). In our study, we found that urinary tract infection was the second most common indication for initiating antibiotic therapy. Nevertheless, the high prevalence of urinary catheters in this patient population makes it challenging to initiate treatment based on accurate clinical indications.

Furthermore, when symptoms are clearly caused by an infection such as shingles, Clostridioides difficile infections, or mucocutaneous candidiasis, it is reasonable to believe that antimicrobial therapy may improve quality of life. However, in other settings, there is no clear evidence of benefit from symptom-relieving antimicrobials. These data suggest that, even in elderly patients whose primary medical goal is to improve survival, it is possible to avoid hospitalization and aggressive parenteral antibiotic therapy and maintain oral treatment (13).

There is ample evidence suggesting that antibiotics are currently overused in hospice and palliative care settings. A 2013 study examined 3,884 patients from the 2007 National Home and Hospice Care Survey and found that approximately 27% received antibiotics, with most having no documented infection (14). A similar study examined patients discharged from inpatient hospitalization to hospice care and reported that 21.1% were prescribed antibiotics, and 28.2% of those prescribed antibiotics had no documented infection (5). In our study, we observed that antibiotic use was widespread in this population and was not limited to patients with documented infections. Even without clear evidence of infection, most patients received two or more broad-spectrum antibiotics during their hospitalization. Despite the absence of symptoms or culture evidence of infection in these patients, the finding of elevated CRP as the most common reason for antibiotic initiation suggests that antibiotics were initiated without considering the possibility that comorbidities or malignancy could contribute to elevated CRP.

The use of broad-spectrum antibiotics is more common in palliative care units, and resistance rates are increasing. A study of this group of patients found that most antibiotic use during hospitalization was empirical rather than culture-guided. Even in patients admitted with an infectious diagnosis, most respiratory

tract infections were treated empirically. The same study also found that third-generation cephalosporins, piperacillin/tazobactam, carbapenems, and glycopeptides were the most commonly used antibiotics in this patient group. Broad-spectrum antibiotics were used equally throughout the hospital stay in patients without an infection diagnosis, but first- and second-generation cephalosporins were more common than third-generation cephalosporins in this group (15). In our study, we found that the most commonly used antibiotics were carbapenems, piperacillin/tazobactam, and third-generation cephalosporins. We observed that cephalosporins were also preferred by physicians attending palliative services, without seeking an infectious disease consultation. This suggests that this may be due to a lack of knowledge about antibiotic resistance among patients and their families, as well as some clinicians, or concerns about infection.

In addition, these patients often reside in hospice care or other healthcare facilities and experience repeated hospitalizations within a short period. This may result in the recurrent use of broad-spectrum antibiotics, as many of these infections are classified as healthcare-associated from the outset (15). Although antibiotic administration is less invasive than other interventions, it is not without harm. Antibiotic exposure is associated with drug interactions, Clostridioides difficile infection, and colonization and/or infection with multidrug-resistant organisms (MDROs) (16). In this patient population, one study reported an approximately 20% prevalence of MDROs during hospitalization (17). In our study, we identified ESBL-producing organisms in 14.0% and CRE in 5.1% of isolates. In a previous survey of palliative care patients, *Klebsiella spp*. (27.4%) and *Escherichia coli* (27.4%) were the most common causative agents of urinary tract infections, *Acinetobacter baumannii* (36.7%) was the most frequently isolated pathogen in respiratory tract infections, and *Pseudomonas aeruginosa* (30%) was the most common agent in wound infections (18). Consistent with this, we found *Klebsiella spp*. and *Pseudomonas aeruginosa* to be the most frequently identified pathogens in our cohort.

To our knowledge, this is the first multicentre point-prevalence study evaluating the appropriateness of antibiotic use in palliative care centres across Türkiye. A major strength of this study is that antibiotic appropriateness was assessed mainly by infectious diseases physicians, with only two geriatricians contributing to the evaluation, reflecting the specialist composition of the study team. Conducted across palliative care centres from different regions of the country, this study provides valuable insight into current antibiotic prescribing practices in palliative care settings. Nevertheless, the single-day study design represents an important limitation, and future studies with longitudinal follow-up are warranted. Overall, our findings indicate that antibiotics are frequently prescribed to palliative care patients in the absence of documented infection, underscoring the need for more judicious and individualised antibiotic decision-making. In light of the well-recognised harms of antibiotic overuse, further research is needed to define better the balance between potential benefits and burdens of antibiotic therapy in end-of-life care. Incorporating infectious diseases consultation and prioritising symptom-oriented rather than biomarker-driven decision-making may help reduce inappropriate antibiotic use in this vulnerable population.

Declarations

Human Ethics and Consent to Participate: The study received ethical approval from the Ankara Etlik City Hospital Scientific Research Evaluation and Ethics Committee (Decision No: AEŞH-BADEK-2024-277) and was conducted in accordance with the Declaration of Helsinki**.**

Conflicts of interest/Competing interests: The authors declare that they have no competing interests.

Availability of data and material: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Consent for publication: Not applicable.

Authors' contributions: Dilek Karamanlıoğlu (corresponding author) designed the study and drafted the manuscript. All authors contributed to data collection from their respective centers and critically reviewed the manuscript. All authors read and approved the final version.

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Tables

Table 1. Infection sources, microbiological findings, and antibiotics used in palliative care units

Sources of Infection

Infection Source	Number	Percentage (%)
Pneumonia	108	34.1
Urinary Tract Infection	93	29.4
Decubitus Ulcer	62	19.6
Bloodstream Infection	39	12.3
Other Infections	14	4.4

Isolated Microorganisms

Microorganism	Number	Percentage (%)
Klebsiella spp.	56	23.7
Pseudomonas spp.	46	19.5
Candida spp.	34	14.4
E. coli	29	12.3
Staphylococcus spp.	22	9.3
Acinetobacter spp.	21	8.9
MRSA	5	2.1
ESBL	33	14.0
CRE	12	5.1
Others	8	3.4

Antibiotics Used

Antibiotic	Number	Percentage (%)
Meropenem	79	27.3
Piperacillin-Tazobactam	69	23.9
Ceftriaxone	46	15.9
Colistin-Polymyxin	28	9.6
Vancomycin-Teicoplanin	25	8.7
Linezolid	12	4.2
Tigecycline	18	6.2
Ceftazidime-Avibactam	2	0.7
Fluconazole	17	5.9
Others	64	21.7

Note: Since some patients had more than one indication, the total percentage exceeds 100%.

Table 2: Demographic and clinical characteristics of patients according to antibiotic use

Patient Characteristics	Patient's Antibiotic Status				Total		P value
	Not Receiving (n:340)		Receiving (n:289)				
Sex	**count**	**% percent**	**count**	**% percent**	**count**	**%**	
Male	157	46,2	153	52,9	310	49,3	0,09
Female	183	53,8	136	47,1	319	50,7	
Presence of underlying disease	334	98,2	286	99,0	620	98,6	0,52
Alzheimer	78	22,9	68	23,5	146	23,2	0,86
Stroke	97	28,5	71	24,6	168	26,7	0,26
Parkinson	20	5,9	25	8,7	45	7,2	0,24**
Dementia	58	17,1	51	17,6	109	17,3	0,85
Neurological disability	89	26,2	75	26,0	164	26,1	0,95
Malignancy	75	22,1	86	29,8	161	25,6	**0,03**
Coronary artery disease	64	18,8	67	23,2	131	20,8	0,18
COPD	37	10,9	26	9,0	63	10,0	0,43
Chronic liver disease	4	1,2	4	1,4	8	1,3	1,00*
Heart failure	45	13,2	30	10,4	75	11,9	0,27
Chronic kidney disease	28	8,2	29	10,0	57	9,1	0,43
Diabetes Mellitus	86	25,3	89	30,8	175	27,8	0,13
Hypertension	161	47,4	116	40,1	277	44,0	0,07
Obesity	30	8,8	23	8,0	53	8,4	0,81**
Other	82	24,1	52	18,0	134	21,3	
Presence of invasive procedure	322	94,7	272	94,1	594	94,4	0,88**
Nutritional support status	275	80,9	235	81,3	510	81,1	0,97**
Presence of pressure ulcer	145	42,6	159	55,0	304	48,3	**0,002**

%: Column percentage. Pearson chi-square test. *: Fisher's exact test. **: Yates-corrected chi-square test

Supplementary Files

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