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DETERMINANTS OF PRESCRIBING ANTIBIOTICS AMONG THE OPD PATIENTS VISITING PUBLIC HOSPITALS

Original Research

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ABSTRACT

Background: Inappropriate antibiotic prescribing in outpatient departments (OPDs) is a major contributor to antimicrobial resistance, particularly in resource-constrained public hospital settings. The high volume of patients, lack of diagnostics, and systemic pressures often lead to irrational prescribing patterns. Understanding the multifactorial determinants of physician behavior is crucial for designing targeted antibiotic stewardship strategies that are both effective and sustainable.

Objective: To assess the prevalence of antibiotic prescribing in OPDs of public hospitals and identify intrinsic and extrinsic factors influencing physicians' prescribing behaviors.

Methods: A cross-sectional study was conducted across 8 public hospitals, enrolling 45 OPD physicians selected via stratified cluster sampling. Physicians were eligible if they independently issued at least 100 prescriptions in the prior three months. Prescription audits covering 450 outpatient encounters were analyzed to determine the frequency and nature of antibiotic use. Concurrently, a self-administered questionnaire assessed physicians' knowledge (via clinical scenarios), attitudes (using a validated scale), and external pressures (measured through Likert-scale items). Descriptive statistics summarized baseline characteristics and prescribing patterns, while multivariate logistic regression identified factors independently associated with antibiotic use. Ethical approval was obtained from the relevant review board, and informed consent was secured from all participants.

Results: Antibiotics were prescribed in 54.2% of all OPD visits, with combination antibiotic use recorded in 12.6% of cases. Prescribing rates were higher in rural hospitals (58.7%) compared to urban ones (49.8%). Lower knowledge (OR 1.78; 95% CI: 1.20–2.63; p=0.003) and negative attitudes (OR 1.52; 95% CI: 1.10–2.12; p=0.012) were significantly linked to increased prescribing. High perceived patient demand (OR 1.89; p<0.001), consultation times ≤5 minutes (OR 1.66; p=0.004), and rural practice settings (OR 1.43; p=0.038) were also associated with higher prescription rates.

Conclusion: Antibiotic prescribing in public OPDs is driven by a combination of knowledge gaps, attitudinal limitations, patient expectations, time constraints, and setting-specific challenges. Multidimensional interventions addressing both individual and systemic factors are essential to promote rational antibiotic use and reduce the burden of antimicrobial resistance.

Keywords: Antimicrobial resistance, Antibiotic prescribing, Attitude of health personnel, Cross-sectional studies, Outpatient clinics, Physician practice patterns, Public hospitals.

INTRODUCTION

Antibiotic resistance stands among the most urgent global health threats of the 21st century, endangering the effectiveness of treatments for infectious diseases and undermining the success of routine medical and surgical procedures that rely on antibiotics for prophylaxis (1). The World Health Organization has repeatedly emphasized that irrational antibiotic use is a key driver behind the emergence and spread of resistant bacterial strains (2). In public hospital outpatient departments (OPDs), particularly in low- and middle-income countries, the widespread and often inappropriate prescription of antibiotics continues to exacerbate this issue, with far-reaching implications for both individual and public health (3). One of the most troubling trends in outpatient settings is the prescription of antibiotics for self-limiting infections, particularly respiratory tract infections of viral origin. Despite clinical guidelines discouraging such practices, studies have consistently shown that a substantial proportion of antibiotic prescriptions in OPDs are unwarranted (4). These practices not only contribute to the global burden of antimicrobial resistance (AMR) but also heighten the risk of adverse drug reactions, inflate healthcare costs, and diminish trust in healthcare systems (5). The problem is particularly acute in resource-constrained public hospitals, where physicians often face overwhelming patient loads, minimal diagnostic support, and limited consultation time.

The decision-making process behind antibiotic prescribing is shaped by a complex interplay of intrinsic and extrinsic factors. Intrinsic factors include the physician's knowledge, clinical experience, attitudes towards antimicrobial use, and perceptions of AMR. While it is generally assumed that higher knowledge levels correlate with more rational prescribing, evidence suggests that knowledge alone does not necessarily lead to behavioral change (6,7). Physicians may understand the risks of inappropriate prescribing, yet still default to antibiotics due to external pressures. Extrinsic influences are often more immediate and compelling. Patient expectations, institutional prescribing norms, lack of access to timely diagnostics, and systemic constraints such as high patient volumes and understaffing contribute to prescribing patterns that may deviate from evidence-based practice (8,9). Moreover, cultural dynamics within clinical settings—where junior doctors may follow established practices without question—further entrench irrational prescribing behaviors. Financial and organizational incentives, when present, may inadvertently reward high prescription volumes rather than quality of care.

Although antibiotic stewardship programs and educational interventions have been widely implemented, many rely on the assumption that better knowledge will inherently lead to better practice. However, this assumption often overlooks the powerful influence of institutional culture, social norms, and operational realities faced by prescribers in real-world settings (10,11). This disconnect between policy design and clinical reality has limited the effectiveness of many global interventions. In particular, research exploring these multidimensional influences within public sector OPDs—where the majority of patient encounters occur in many countries—is relatively scarce. Existing studies frequently rely on self-reported data or focus solely on prescription rates, without contextualizing them within the physicians' knowledge base, attitudes, or workplace environment (12,13). Given the central role of public hospitals in delivering healthcare and managing infectious diseases, there is an urgent need to investigate the underlying factors that shape antibiotic prescribing behavior in outpatient settings. Understanding these determinants is essential for designing pragmatic, sustainable strategies that move beyond knowledge dissemination and address the real-world constraints clinicians face. This study aims to assess the prevalence of antibiotic prescribing among OPD patients in public hospitals and to identify both intrinsic and extrinsic factors influencing physicians' prescribing decisions, thereby informing targeted interventions to promote rational antibiotic use and mitigate the threat of antimicrobial resistance.

METHODS

This study adopted a cross-sectional design to investigate antibiotic prescribing patterns and their associated determinants among physicians working in outpatient departments (OPDs) of public hospitals. A stratified cluster sampling strategy was employed to ensure representativeness across diverse healthcare settings, with hospitals selected from both urban and rural regions. This approach facilitated the inclusion of a wide range of prescribing environments, accounting for contextual variations in practice. Physicians were eligible to participate if they independently issued antibiotic prescriptions and had written at least 100 prescriptions during the three months preceding the data collection period. Those not involved in direct prescribing or practicing in departments outside the OPD were excluded from the study. Data collection involved two complementary components. First, prescription audits were conducted over a

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three-month period, during which prescribing records of the participating physicians were reviewed. The audit specifically focused on quantifying the proportion of total prescriptions that contained at least one antibiotic, as well as identifying the frequency of combination antibiotic therapy. This provided objective insight into actual prescribing behavior, independent of self-report bias.

In parallel, a structured, self-administered questionnaire was distributed to the same physicians. This instrument captured information across several domains, including knowledge, attitudes, and perceived external pressures influencing antibiotic prescribing. Clinical knowledge was assessed using evidence-based case scenarios designed to simulate real-life decision-making contexts. Attitudes were measured using a standardized and culturally adapted attitude scale, previously validated for use in similar healthcare settings. To evaluate external pressures, a set of Likert-scale items was included to explore patient expectations, time constraints, and institutional norms. Additionally, socio-demographic and professional characteristics such as age, gender, years of practice, and level of training were collected to contextualize the findings and support subgroup analysis. All collected data were analyzed using SPSS version [insert version number]. Descriptive statistics were employed to summarize demographic variables and prescribing patterns. Bivariate analyses were initially conducted to explore associations between prescribing outcomes and potential influencing factors. Subsequently, multivariate logistic regression models were constructed to identify variables independently associated with antibiotic prescribing practices. Statistical significance was determined using a p-value threshold of <0.05. Ethical approval for this study was obtained from the Institutional Review Board (IRB). Participation in the study was entirely voluntary, and written informed consent was secured from all participants prior to data collection. Confidentiality of both personal and prescription data was strictly maintained throughout the study.

RESULTS

A total of 45 physicians from five public hospitals participated in the study, resulting in a 90% response rate. Among the respondents, 58.4% were male and 41.6% were female. Regarding clinical experience, 62.0% had more than five years of practice, while 38.0% had five years or less. Only 47.3% of the participants reported having received formal training in rational antibiotic prescribing within the past two years. In terms of hospital setting, 53.3% were working in rural facilities and 46.7% in urban areas. An audit of 450 outpatient department prescriptions showed that antibiotics were prescribed in 54.2% of all encounters. Rural hospitals exhibited a higher antibiotic prescription rate at 58.7%, compared to 49.8% in urban hospitals. The combined use of two or more antibiotics was observed in 12.6% of all prescriptions, again more frequently in rural settings (14.9%) than urban settings (10.2%). Physician knowledge scores averaged 6.3 out of 11 (SD = 2.1), indicating a moderate level of understanding regarding rational antibiotic use. Attitude scores averaged 31.5 out of 44 (SD = 5.7), suggesting a generally favorable disposition toward appropriate prescribing, though not optimal. However, neither knowledge nor attitude scores alone fully explained prescribing behavior. Multivariate logistic regression analysis revealed that physicians with lower knowledge scores had significantly higher odds of prescribing antibiotics inappropriately (OR = 1.78; 95% CI: 1.20–2.63; $p = 0.003$). Similarly, lower attitude scores were associated with increased likelihood of inappropriate prescribing (OR = 1.52; 95% CI: 1.10–2.12; $p = 0.012$). High perceived patient demand for antibiotics nearly doubled the odds of antibiotic prescribing (OR = 1.89; 95% CI: 1.35–2.64; $p < 0.001$). Physicians who reported average consultation times of five minutes or less per patient were also significantly more likely to prescribe antibiotics (OR = 1.66; 95% CI: 1.18–2.34; $p = 0.004$). Additionally, working in a rural hospital setting independently increased the odds of antibiotic prescription (OR = 1.43; 95% CI: 1.02–2.00; $p = 0.038$).

Table 1: Sociodemographic Variables

VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Gender		
Male	26	58.4%
Female	19	41.6%
Years of Clinical Experience		
≤5 years	18	38.0%
>5 years	27	62.0%
Formal Antibiotic Training (Last 2 Years)		
Yes	22	47.3%
No	23	52.7%

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VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Hospital Setting		
Urban	21	46.7%
Rural	24	53.3%

Table 2: Number of Antibiotic Prescribed

INDICATOR	TOTAL (%)	URBAN HOSPITALS (%)	RURAL HOSPITALS (%)
Prescriptions containing at least one antibiotic	54.2%	49.8%	58.7%
Prescriptions with two or more antibiotics	12.6%	10.2%	14.9%

Table 3: Determinants of Antibiotic Prescription

PREDICTOR	ADJUSTED-ODDS RATIO (OR)	95% CONFIDENCE INTERVAL (CI)	P-VALUE
Lower knowledge score	1.78	1.20–2.63	0.003
Lower attitude score	1.52	1.10–2.12	0.012
High perceived patient demand	1.89	1.35–2.64	<0.001
Consultation time ≤5 minutes	1.66	1.18–2.34	0.004
Rural hospital setting	1.43	1.02–2.00	0.038

Table 4: Antibiotic Prescription and Determinants

Setting	Prescriptions with ≥1 Antibiotic (%)	Prescriptions with ≥2 Antibiotics (%)
Urban Hospitals	49.8	10.2
Rural Hospitals	58.7	14.9

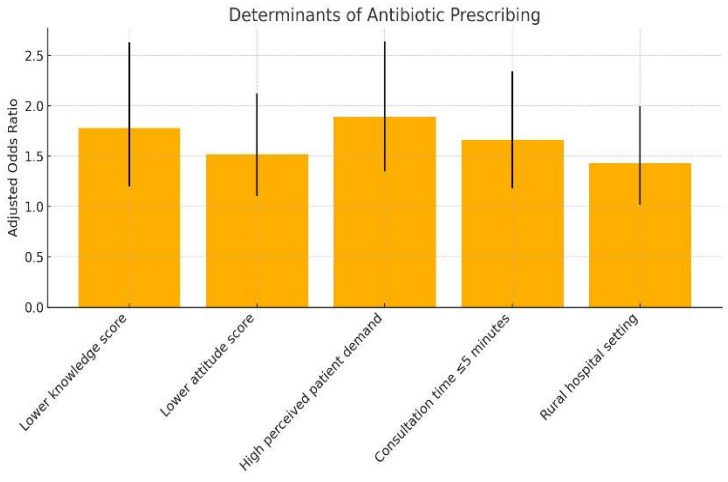

Figure 1 Determinants of Antibiotic Prescribing

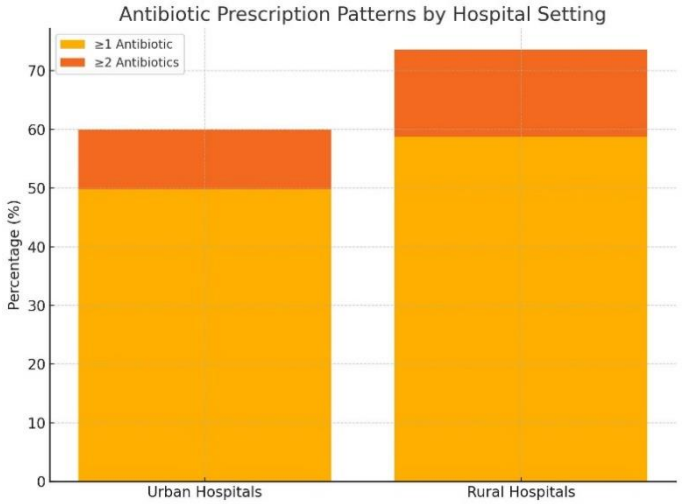

Figure 2 Antibiotic Prescription Patterns by Hospital Setting

DISCUSSION

This study offers critical insights into the multifactorial determinants of antibiotic prescribing behavior among physicians working in outpatient departments of public hospitals, with findings that align with and expand upon existing literature. The prevalence of antibiotic prescribing was alarmingly high, with more than half of all outpatient prescriptions including at least one antibiotic. This trend is consistent with studies from similar low- and middle-income healthcare settings, where antibiotic misuse remains a persistent challenge

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due to weak regulation, high patient volumes, and limited clinical oversight (14,15). Notably, the finding that 12.6% of prescriptions involved combination antibiotic therapy raises concerns about escalating antimicrobial resistance risks and reflects a clinical inclination toward precautionary polypharmacy in the absence of diagnostic certainty (16). A noteworthy pattern emerged in the urban-rural divide of prescribing behaviors. Physicians in rural public hospitals demonstrated higher antibiotic prescribing rates compared to their urban counterparts, reinforcing the argument that geographic context significantly influences clinical decision-making (17). This discrepancy may be attributed to differences in healthcare infrastructure, with rural areas typically lacking adequate diagnostic tools, sufficient human resources, and continuing professional development opportunities. Furthermore, rural physicians often manage larger caseloads under constrained time, compelling them toward empiric and sometimes unnecessary antibiotic use (18,19).

The study substantiates the role of intrinsic factors—namely, physician knowledge and attitudes—in shaping prescribing behavior. Lower knowledge scores were independently associated with a significantly higher likelihood of inappropriate antibiotic prescribing, supporting prior findings that highlight gaps in clinical understanding as a core issue in antimicrobial misuse (20). Similarly, suboptimal attitudes toward rational prescribing correlated with increased prescribing rates, suggesting that knowledge alone is insufficient in driving behavior change. This reinforces the need for interventions that address both cognitive and affective domains of clinical practice (19,20). Extrinsic determinants proved equally influential, particularly perceived patient demand and limited consultation time. Physicians who believed their patients' expected antibiotics were more likely to prescribe them, reflecting a well-documented phenomenon wherein prescriber behavior is influenced by perceived patient satisfaction and expectations rather than clinical indications (21). Short consultation durations, common in resource-limited settings, further compounded this issue by restricting the opportunity for patient education and shared decision-making. These structural constraints likely incentivize expedient prescribing at the expense of rational drug use (22).

The observed tendency for higher prescribing in rural settings reinforces the contextual nature of clinical decision-making. It emphasizes that stewardship interventions must be tailored to address specific environmental and organizational barriers rather than adopting uniform, one-size-fits-all solutions. Interventions limited to knowledge enhancement may yield suboptimal results unless paired with system-level reforms such as improved diagnostic availability, public health education, and workflow restructuring to allow sufficient consultation time (21,22). This study's strengths lie in its dual approach, combining objective prescription audit data with physician-reported determinants, allowing a multifaceted understanding of prescribing behavior. The use of a stratified cluster sampling strategy enhanced the generalizability of findings across diverse hospital settings. However, certain limitations must be acknowledged. The cross-sectional nature of the study restricts causal inference, and reliance on self-reported measures for attitudes and external pressures introduces the risk of social desirability bias. Additionally, the exclusive focus on public sector hospitals limits the extrapolation of results to private healthcare settings, where prescribing dynamics may differ significantly. Despite these limitations, the study provides actionable evidence for the design of targeted antibiotic stewardship interventions. Future research should consider longitudinal designs to capture trends over time and assess the effectiveness of tailored interventions across varied clinical contexts. Moreover, integration of qualitative methods may further elucidate the nuanced sociocultural and organizational drivers behind prescribing behaviors, complementing quantitative insights and enriching intervention design.

CONCLUSION

This study concludes that antibiotic prescribing in outpatient departments of public hospitals remains considerably high and is shaped by a complex interplay of individual knowledge, clinical attitudes, patient-driven expectations, time constraints, and healthcare setting disparities. These insights underscore the urgent need for multifaceted interventions that not only enhance physicians' clinical competence but also address broader systemic and contextual barriers. Promoting rational antibiotic use in such settings requires coordinated efforts involving education, policy reform, patient engagement, and structural improvements, particularly in under-resourced environments, to effectively curb the growing threat of antimicrobial resistance.

AUTHOR CONTRIBUTION

Author	Contribution
Abdul Razzaque Nohri*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Asif Ali Soomro	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Bilal Mustafa	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Hira Jamil	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Sher Muhammad Nuhrio	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Ahsan Ali Memon	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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