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Original Article

A Cross-Sectional Study of Knowledge, Attitude, and Practice Regarding Antibiotic Use and Resistance among Patients Visiting a Secondary Care Hospital

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ABSTRACT

Background: Antibiotic misuse in the community accelerates antimicrobial resistance and reduces the clinical effectiveness of commonly used drugs. Understanding patient knowledge, attitude, and practice is essential for designing targeted educational and stewardship interventions in secondary care settings.
Objectives: To assess the knowledge, attitude, and practice regarding antibiotic use and resistance among patients visiting a secondary care hospital.
Methods: A hospital-based cross-sectional study was conducted among 100 patients attending the Department of Pharmacology, Mahabodhi Medical College, Bodhgaya, Bihar, India. Data were collected using a structured questionnaire covering sociodemographic details and items related to knowledge, attitude, and practice. Responses were summarized using frequencies and percentages, and overall domain scores were categorized into predefined levels.
Results: Most participants were aged 31–45 years, and 52% were men. Adequate knowledge was observed in 61% of respondents, while 68% showed a positive attitude. Although 76% correctly identified antibiotics as drugs for bacterial infections and 74% recognized that incomplete courses promote resistance, only 59% knew that antibiotics are not useful for viral illnesses. Appropriate practice was noted in 54%; however, self-medication, non-prescription purchase, and early discontinuation of therapy were reported by 34%, 29%, and 26% of respondents, respectively.
Conclusion: Patients demonstrated moderate to good awareness and generally favorable attitudes, but several unsafe practices remained common. Focused counseling, reinforcement of prescription-only access, and routine patient education at hospital level are required to promote rational antibiotic use and reduce the risk of resistance.

Keywords*: antibiotic resistance, antibiotic use, knowledge, attitude, practice, cross-sectional study, patients, secondary care hospital.*

INTRODUCTION

Antibiotics transformed the management of infectious diseases and remain indispensable in modern medicine[1,2]. However, inappropriate use of these agents in the community has accelerated antimicrobial resistance, which is now recognized as a major threat to effective treatment, prolonged survival, and safe routine clinical care. Public behavior plays a central role in this process because antibiotics are frequently consumed for self-limiting illnesses, obtained without proper prescription, discontinued prematurely, or shared with family members. Global evidence indicates that misconceptions about the action of antibiotics and the meaning of resistance remain common, especially in low- and middle-income settings [3,4].

Population-based surveys from the United Kingdom, Malaysia, Palestine, Pakistan, Singapore, Saudi Arabia, Jordan, Ethiopia, and Myanmar have repeatedly shown a gap between basic awareness and actual antibiotic-related behavior [5-11]. Many respondents know that antibiotics should be used cautiously, yet large proportions still believe that these medicines are useful for colds, cough, or fever of presumed viral origin. Other studies have highlighted persistent self-medication, purchase from pharmacies without prescription, storage of leftover medicines, and early discontinuation once symptoms improve [5-12]. Such practices increase selective pressure on microorganisms and contribute to the emergence and spread of resistant strains at both individual and community levels [13].

In India, irrational antibiotic consumption remains an important public health concern because of easy access to medicines, variable health literacy, and limited patient counseling during routine consultations. Secondary care hospitals represent a particularly important interface where patients from urban and rural backgrounds seek treatment, receive prescriptions, and shape long-term health behaviors. Data from community and hospital-linked settings suggest that awareness of antimicrobial resistance is improving, but understanding of appropriate indications, dosage completion, and the harms of unsupervised use is still incomplete [14]. Local evidence is therefore required to guide educational strategies, strengthen outpatient counseling, and support antimicrobial stewardship efforts that extend beyond prescribers to include patients and caregivers.

Against this background, the present study was undertaken to assess the knowledge, attitude, and practice regarding antibiotic use and resistance among patients visiting a secondary care hospital. The specific objectives were to describe the sociodemographic profile of the participants, evaluate their level of knowledge regarding antibiotic use and resistance, assess their attitudes toward rational antibiotic use, and examine their actual antibiotic-related practices.

METHODOLOGY

Study design and setting

This hospital-based cross-sectional study was carried out in the Department of Pharmacology, Mahabodhi Medical College, Bodhgaya, Bihar, India. The study focused on patients visiting a secondary care hospital attached to the institution. A cross-sectional design was considered appropriate because the objective was to measure the existing level of knowledge, attitude, and practice regarding antibiotic use and resistance at a single point in time. The hospital setting provided access to a heterogeneous patient population from both urban and rural areas, enabling assessment of community-facing patterns of antibiotic-related understanding and behavior.

Study population and sampling

The study population comprised adult patients attending the hospital during the study period. Individuals aged 18 years and above who were willing to participate and able to provide informed consent were included. Patients who were critically ill, cognitively unable to respond, or unwilling to participate were excluded. A total sample size of 100 participants was included. Participants were recruited using a consecutive sampling approach until the required sample size was achieved. This method was feasible in the outpatient and general patient-care setting and ensured inclusion of routinely encountered hospital attendees.

Study tool and data collection

Data were collected using a structured, interviewer-administered questionnaire developed after review of previously published KAP studies on antibiotic use and antimicrobial resistance [6-10]. The tool consisted of four sections: sociodemographic characteristics, knowledge regarding antibiotic use and resistance, attitude toward rational antibiotic use, and self-reported practice. The knowledge section included items on indications for antibiotic use, viral versus bacterial infections, consequences of incomplete treatment, reuse of leftover medicines, and community impact of resistance. The attitude section explored participant perceptions regarding prescription-only use, seriousness of resistance, need to complete therapy, and importance of awareness programmes. The practice section assessed recent antibiotic use, consultation with doctors, completion of the prescribed course, self-medication, purchase without prescription, storing leftovers, sharing antibiotics, and checking expiry dates. The questionnaire was pretested on a small number of respondents outside the final sample to improve clarity and sequence.

Study variables and scoring

Responses were coded and entered into a master sheet for analysis. For knowledge items, correct responses were scored as 1 and incorrect or uncertain responses as 0. Overall knowledge was categorized as adequate, moderate, or poor based on the proportion of correct responses obtained by each participant. Attitude items were scored in a positive direction, and the overall attitude was classified as positive, neutral, or negative. Practice items were evaluated according to rational antibiotic-use principles, and overall practice was categorized as appropriate, fair, or poor. These categories were used to provide an interpretable summary of patient behavior and to identify domains requiring educational reinforcement.

Statistical analysis
The collected data were checked for completeness, coded, and entered into Microsoft Excel, and the final analysis was performed using SPSS software version 25.0. Descriptive statistics were used for data presentation. Categorical variables were summarized as frequencies and percentages, while the findings were organized under the domains of knowledge, attitude, and practice. Tables were prepared to present the sociodemographic profile and the distribution of responses across the three domains. The emphasis of the present analysis was descriptive, in line with the objective of profiling antibiotic-related awareness and behavior in the study population.

Ethical considerations
The study was conducted after obtaining approval from the Institutional Ethics Committee of Mahabodhi Medical College. Participation was voluntary, and written informed consent was obtained from each participant before enrolment. Confidentiality of individual responses was maintained throughout the study by anonymizing data during entry and analysis. Participants were informed that refusal to participate would not affect their treatment or access to hospital services.

RESULTS
A total of 100 patients visiting the secondary care hospital were included in the study. The largest proportion of participants belonged to the 31–45 years age group [36.0%], followed by 46–60 years [28.0%], 18–30 years [24.0%], and above 60 years [12.0%]. Of the study participants, 52.0% were men and 48.0% were women. Most participants were from urban areas [58.0%], while 42.0% were from rural areas. With regard to educational status, 14.0% had no formal education, 22.0% had primary education, 34.0% had secondary education, and 30.0% were graduates or above. Sociodemographic characteristics are shown in Table 1.

Table 1. Sociodemographic characteristics of the study participants [n = 100]

Variable	Category	n	%
Age group [years]	18–30	24	24.0
	31–45	36	36.0
	46–60	28	28.0
	>60	12	12.0
Sex	Male	52	52.0
	Female	48	48.0
Residence	Urban	58	58.0
	Rural	42	42.0
Education	No formal education	14	14.0
	Primary school	22	22.0
	Secondary school	34	34.0
	Graduate and above	30	30.0
Occupation	Homemaker	24	24.0
	Employed	38	38.0
	Self-employed	20	20.0
	Unemployed/retired	18	18.0

With respect to knowledge regarding antibiotic use and resistance, 72.0% of participants had heard of antibiotic resistance. A total of 76.0% correctly identified that antibiotics are used to treat bacterial infections, whereas only 59.0% knew that

antibiotics are not effective against common viral illnesses such as cold and flu. Nearly three-fourths of respondents [74.0%] were aware that stopping antibiotics early can contribute to antibiotic resistance, and 69.0% knew that unnecessary antibiotic use can make future treatment less effective. However, awareness about the inappropriate reuse of leftover antibiotics and the need to avoid antibiotics without prescription remained suboptimal. Overall, 61.0% of participants demonstrated adequate knowledge, 27.0% had moderate knowledge, and 12.0% had poor knowledge, as presented in Table 2.

Table 2. Knowledge regarding antibiotic use and resistance among study participants [n = 100]

Knowledge item	n	%
Had heard of antibiotic resistance	72	72.0
Knew antibiotics are used for bacterial infections	76	76.0
Knew antibiotics are not useful for viral infections such as cold/flu	59	59.0
Knew incomplete antibiotic course can lead to resistance	74	74.0
Knew unnecessary antibiotic use reduces future effectiveness	69	69.0
Knew antibiotics should not be taken without a doctor's prescription	48	48.0
Knew leftover antibiotics should not be reused without medical advice	57	57.0
Knew antibiotic resistance can affect the community, not just the individual	63	63.0
Overall knowledge score: Adequate knowledge	61	61.0
Overall knowledge score: Moderate knowledge	27	27.0
Overall knowledge score: Poor knowledge	12	12.0

Participants generally showed a favorable attitude toward rational antibiotic use. Most respondents agreed that antibiotics should only be taken when prescribed by a registered medical practitioner [81.0%] and that antibiotic resistance is a serious public health problem [78.0%]. A substantial proportion [73.0%] believed that patients should strictly complete the full prescribed course, and 70.0% supported the need for public education programmes on antibiotic use. Nevertheless, 29.0% still believed that antibiotics help in faster recovery from any episode of fever, cough, or sore throat, reflecting persistence of misconceptions. Overall, 68.0% of participants had a positive attitude, 22.0% had a neutral attitude, and 10.0% had a negative attitude, as shown in Table 3.

Table 3. Attitude regarding antibiotic use and resistance among study participants [n = 100]

Attitude item	n	%
Agreed that antibiotics should be used only when prescribed by a doctor	81	81.0
Agreed that antibiotic resistance is a serious public health problem	78	78.0
Agreed that the full antibiotic course should be completed even if symptoms improve	73	73.0
Agreed that self-medication with antibiotics is unsafe	67	67.0
Agreed that awareness programmes on antibiotic resistance are necessary	70	70.0
Disagreed with demanding antibiotics from the doctor when not prescribed	65	65.0

Attitude item	n	%
Disagreed that antibiotics are needed for all fever/cough/sore throat illnesses	71	71.0
Overall attitude score: Positive attitude	68	68.0
Overall attitude score: Neutral attitude	22	22.0
Overall attitude score: Negative attitude	10	10.0

Practice-related findings revealed several inappropriate behaviors despite reasonably good knowledge and attitude. In the preceding six months, 38.0% of participants reported using antibiotics. Only 54.0% stated that they always completed the full prescribed antibiotic course, whereas 26.0% admitted discontinuing antibiotics once symptoms improved. Self-medication was reported by 34.0% of respondents, and 29.0% had purchased antibiotics without prescription. Furthermore, 22.0% reported storing leftover antibiotics for future use and 17.0% had shared antibiotics with family members or acquaintances. At the same time, 71.0% reported seeking medical advice before starting antibiotics, and 63.0% checked the expiry date before use. Based on the overall practice score, 54.0% had appropriate practice, 28.0% had fair practice, and 18.0% had poor practice, as summarized in Table 4.

Table 4. Practice regarding antibiotic use among study participants [n = 100]

Practice item	n	%
Used antibiotics in the past 6 months	38	38.0
Always consulted a doctor before starting antibiotics	71	71.0
Always completed the full prescribed course	54	54.0
Stopped antibiotics once symptoms improved	26	26.0
Practiced self-medication with antibiotics	34	34.0
Purchased antibiotics without prescription	29	29.0
Kept leftover antibiotics for future use	22	22.0
Shared antibiotics with family/friends	17	17.0
Checked expiry date before antibiotic use	63	63.0
Overall practice score: Appropriate practice	54	54.0
Overall practice score: Fair practice	28	28.0
Overall practice score: Poor practice	18	18.0

Overall, the findings indicate that although awareness and attitude regarding antibiotic use and resistance were satisfactory in a majority of participants, actual practice remained suboptimal. Misconceptions regarding antibiotic use for viral illnesses, self-medication, and incomplete treatment courses were still common, highlighting the need for targeted patient education and stricter regulation of non-prescription antibiotic access.

DISCUSSION

The present study assessed the knowledge, attitude, and practice regarding antibiotic use and resistance among 100 patients visiting a secondary care hospital. The findings show that awareness was moderate, attitude was generally favorable, and practice remained the weakest domain. While a majority of participants knew that antibiotics are used for bacterial infections and recognized the role of incomplete courses in driving resistance, important misconceptions persisted

regarding viral illnesses, non-prescription access, reuse of leftover medicines, and self-medication. This pattern suggests that basic awareness has reached many patients, but translation of that awareness into consistent behavior is still incomplete. The overall knowledge profile in the present study is broadly consistent with the international literature. The systematic review by Gualano et al. demonstrated that many members of the general population still do not clearly distinguish between bacterial and viral infections and that awareness of antibiotic resistance is often incomplete. Similar deficits have been reported in surveys from the United Kingdom and Malaysia, where misunderstanding regarding the role of antibiotics in coughs, colds, and influenza remained common [3,4]. Findings from Palestine, Pakistan, and Singapore also indicate that knowledge improves with education but does not uniformly prevent inappropriate demand or unsupervised use [5-7]. In the present study, only 59% correctly recognized that antibiotics are not useful for common viral illnesses, which remains a critical gap for hospital-based counseling.

Attitude scores were relatively better than knowledge and practice, with 68% of respondents showing a positive attitude. Most participants agreed that antibiotics should be prescribed by doctors and that resistance is a serious public health issue. Comparable observations have been documented in Saudi Arabia and Jordan, where respondents often expressed appropriate concern about resistance even when their practical behavior remained inconsistent [8,9]. This divergence between what patients believe and what they eventually do is an important finding, because attitude alone does not guarantee rational use. The persistence of the belief that antibiotics hasten recovery from fever, cough, or sore throat in nearly one-third of participants further indicates that favorable attitudes coexist with symptom-based expectations for antibiotics.

The practice findings in the present study deserve special attention. Self-medication was reported by 34%, purchase without prescription by 29%, incomplete course completion by 26%, and storage of leftover antibiotics by 22% of respondents. These findings parallel reports from Ethiopia and Yemen, where inappropriate community use remained common despite growing awareness of antimicrobial resistance [10-12]. They also align with the recent systematic review by Wang et al., which identified storage of antibiotics at home and purchase without prescription as consistent drivers of self-medication worldwide [13]. Indian evidence from low-income urban Delhi has similarly shown that community-level awareness does not fully prevent irrational consumption practices [14]. Together, these comparisons suggest that unsafe antibiotic behavior is influenced by convenience, prior experience, and access pathways as much as by knowledge deficits.

From a public health perspective, the study highlights the need for patient-centered antimicrobial stewardship in secondary care hospitals. Counseling at the point of prescription, reinforcement by pharmacists, waiting-area educational materials, and strong messaging against antibiotic use for viral illnesses are likely to improve patient behavior. Hospital-based KAP assessment can also serve as a baseline for future interventions and repeated audits. Because outpatient encounters are frequent and brief, even simple standardized messages on dosage adherence, avoidance of leftover reuse, and prescription-only access can have meaningful impact on community antibiotic use [13,14].

Limitations

This study was conducted in a single secondary care hospital with a sample of 100 participants, which restricts generalizability beyond comparable institutional settings. Information on antibiotic use was self-reported and therefore subject to recall error and social desirability bias. The cross-sectional design captured responses at one point in time and did not establish temporal relationships between knowledge, attitude, and practice. The study also relied on descriptive analysis and did not explore predictors of inappropriate antibiotic behavior.

CONCLUSION

This study shows that patients visiting a secondary care hospital had moderate knowledge and generally favorable attitudes regarding antibiotic use and resistance, but important unsafe practices remained common. Knowledge gaps were especially evident in relation to viral illnesses, prescription-free access, and reuse of leftover antibiotics. Self-medication, early discontinuation of therapy, and non-prescription purchase continue to threaten rational antibiotic use at community level. These findings support the need for sustained patient education, stronger counseling during clinical encounters, pharmacist engagement, and enforcement of prescription-only antibiotic dispensing. Hospital-based stewardship initiatives should include patients as active participants in preventing antimicrobial resistance and promoting responsible medicine use.

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