Section: Microbiology

Original Research Article

PATTERNS OF ANTIBIOTIC USE WITHOUT PRESCRIPTION: A SURVEY BASED STUDY

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ABSTRACT

Background: Non-prescription antibiotic use is a major contributor to antimicrobial resistance (AMR), a growing global public health threat. Community-level misuse, including self-medication and inappropriate indications, accelerates resistance development and compromises treatment outcomes. The objective is to assess patterns of antibiotic use without prescription, awareness of AMR, and attitudes toward responsible antibiotic practices among adults in the community. **Materials and Methods:** A cross-sectional, questionnaire-based survey was conducted among 100 adults. A structured tool consisting of 21 closed-ended questions assessed antibiotic use practices, healthcare-seeking behaviour, AMR awareness, and behavioural intentions. Data were analysed using descriptive statistics and expressed as percentages. **Result:** More than half of participants (55%) reported antibiotic use within the past six months. Although 59% reported always consulting a doctor before antibiotic use, 54% admitted occasional or frequent non-prescription use. Community pharmacies were the primary source of antibiotics (77%). Misconceptions persisted, with 62% believing antibiotics are always or sometimes effective for the common cold. While 57% recognized that misuse is harmful, 43% either disagreed or were uncertain. Nearly half of respondents demonstrated moderate-to-high AMR awareness. Encouragingly, 72% expressed definite or probable intention to avoid non-prescription antibiotic use in the future. **Conclusion:** Despite moderate awareness and positive behavioural intentions, significant misconceptions and self-medication practices persist. Strengthened public education, stricter regulation of antibiotic dispensing, and targeted community-level antimicrobial stewardship interventions are essential to mitigate inappropriate antibiotic use and curb AMR.

INTRODUCTION

Antibiotics represent one of the most transformative achievements in modern medicine, fundamentally reshaping the treatment of infectious diseases across the globe. Their introduction dramatically reduced deaths and complications associated with bacterial infections and made it possible for several advanced medical interventions, including organ transplantation, cancer chemotherapy, intensive care management, and major surgical procedures. Despite these achievements, the continued effectiveness of antibiotics is increasingly jeopardized by the accelerating emergence and dissemination of antimicrobial resistance (AMR). AMR develops when microorganisms such as bacteria, viruses, fungi, and parasites acquire genetic adaptations that diminish or eliminate the efficacy of antimicrobial agents. Consequently, infections become more difficult to treat, often resulting in prolonged disease, increased risk of severe complications, higher healthcare costs, and greater mortality. Recognizing its far-reaching consequences, the World Health Organization (WHO) has classified AMR as one of the top ten global public health threats, noting that resistance now undermines the treatment of common infections in every region of the world.[1]

The implications of AMR extend beyond clinical outcomes to encompass substantial economic and societal consequences. Drug-resistant infections frequently require extended hospitalization, more complex diagnostic procedures, and the use of expensive second- or third-line therapeutic agents. This places significant strain on healthcare systems,

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particularly in resource-limited settings. Although AMR arises from interconnected forces spanning human health, veterinary practice, agriculture, and environmental contamination, inappropriate antibiotic consumption in community settings has emerged as a critical contributor. Contemporary estimates suggest that a large proportion of total antibiotic use occurs outside hospital settings, often without adequate medical oversight.[2] In many regions, community-level misuse surpasses hospital-based misuse in both frequency and volume, underscoring the urgent need for population-focused interventions. Community misuse of antibiotics occurs through multiple pathways. These include self-medication without professional consultation, over-the-counter purchase of prescription-only antibiotics, consumption of leftover drugs from previous treatments, sharing medications among family members, and use of antibiotics for conditions where they are not indicated, particularly viral infections. Additional problematic behaviours include incorrect dosing and premature discontinuation of therapy once symptoms subside. Such practices exert selective pressure on microbial populations, enabling resistant organisms to survive and propagate.[3,4] Over time, these resistant strains disseminate within communities, diminishing the effectiveness of commonly used first-line antibiotics and narrowing available treatment options.

Although many countries have implemented policies restricting antibiotic sales to prescription-only status, non-prescription access remains prevalent. Evidence from both low- and middle-income countries (LMICs) and high-income settings demonstrates that antibiotics are frequently obtained without medical consultation, often through community pharmacies, informal drug vendors, or previously stored medications at home.[5,6] In certain contexts, inadequate enforcement of pharmaceutical regulations and commercial incentives within private pharmacy sectors facilitate continued over-the-counter availability. Even in more regulated systems, patients may pressure healthcare providers to prescribe antibiotics or seek alternative, unregulated sources when prescriptions are denied. The drivers of non-prescription antibiotic use are multifaceted and involve behavioural, economic, and structural determinants. Individuals may perceive certain illnesses as minor and manageable without professional care, particularly when symptoms resemble prior episodes. Practical barriers such as long waiting times, high consultation fees, transportation challenges, and limited access to qualified practitioners further encourage self-medication.[7,8] Cultural norms and misconceptions also significantly shape antibiotic use behaviours. Antibiotics are frequently viewed as powerful, broad-spectrum remedies capable of rapidly resolving a wide range of symptoms, regardless of whether the underlying cause is bacterial or viral. Public awareness and understanding of AMR play an important role in influencing antibiotic-related behaviours. While global awareness campaigns have improved general recognition of AMR as a health concern, detailed comprehension of how resistance develops and spreads remains insufficient. Survey findings indicate that although many individuals are familiar with the term “antimicrobial resistance,” fewer appreciate the direct link between inappropriate antibiotic consumption and the acceleration of resistance.[9] Persistent misconceptions regarding the role of antibiotics in treating viral infections, including the common cold, influenza, and sore throat, continue to contribute to inappropriate demand and self-medication.[10] Notably, increased awareness does not automatically translate into appropriate behavior. Community-based investigations across diverse geographical settings consistently reveal a disconnect between knowledge and practice.

Perceptions regarding antibiotic safety and risk further influence decision-making. Individuals who consider antibiotics to be inherently safe are more inclined to self-medicate. In contrast, those who recognize potential adverse effects, treatment failure, and the broader societal impact of resistance are more likely to support prudent use and antimicrobial stewardship initiatives.[11] Nevertheless, favourable attitudes may not translate into responsible practice when structural challenges such as easy pharmacy access, inconsistent patient counselling, absence of standardized dispensing protocols, and weak regulatory enforcement persist.[12] Behavioural science approaches have increasingly informed AMR research, highlighting the importance of behavioural intention as a determinant of action. Expressed intention to avoid non-prescription antibiotic use has been identified as a strong predictor of subsequent behaviour, particularly when reinforced through educational programs and supportive policy measures.[13,14] The COVID-19 pandemic heightened public attention to infectious diseases and preventive health practices, potentially enhancing receptivity to messages promoting rational antibiotic use. However, whether this heightened awareness will produce sustained improvements in antibiotic practices remains uncertain.[15] International and national frameworks consistently emphasize community engagement as a cornerstone of AMR containment. The WHO Global Action Plan on AMR prioritizes public education, effective communication strategies, strengthened regulatory systems, and monitoring of antibiotic consumption as essential components of comprehensive response efforts.[16] In settings where electronic prescription surveillance systems are limited, survey-based research provides valuable insights into patterns of antibiotic consumption, prevailing misconceptions, and community attitudes. Given the ongoing escalation of AMR and the continued prevalence of non-prescription antibiotic use, there is a pressing need for updated, context-specific evidence on community practices. Comprehensive understanding of antibiotic use behaviours, determinants of self-

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medication, levels of AMR awareness, and attitudes toward responsible use can inform targeted public health interventions and stewardship programs. Structured survey methodologies offer a practical and cost-efficient means of capturing these critical dimensions at the population level. Accordingly, the present study aims to assess patterns of antibiotic use without prescription, evaluate awareness of antimicrobial resistance, and examine attitudes toward responsible antibiotic practices among adults in the community using a structured questionnaire. By identifying prevailing behaviours and associated determinants, this study seeks to generate evidence to guide community-level antimicrobial stewardship strategies and support policy initiatives aimed at reducing inappropriate antibiotic consumption and mitigating the growing threat of antimicrobial resistance.

MATERIALS AND METHODS

Study design and setting: A cross-sectional, questionnaire-based study was conducted to assess patterns of antibiotic use, knowledge, and attitudes toward antimicrobial resistance (AMR). The study employed a structured survey questionnaire administered to adult participants from the general population. The study was non-interventional and anonymous in nature.

Ethics Statement: Ethical approval was not sought for this study as it involved an anonymous, questionnaire-based survey with no intervention and no collection of personal identifiers or sensitive information. Participation was voluntary, and completion of the questionnaire was considered to imply informed consent. The study posed minimal risk to participants and was conducted in accordance with standard ethical principles for observational public health research.

Study population and sample size: A total of 100 participants were included in the study. Individuals aged 18 years and above were eligible to participate. No personal identifiers were collected. Participation was voluntary.

Data collection tool: Data were collected using a pre-structured questionnaire consisting of 21 closed-ended questions. Each question had four predefined response options, designed to capture demographic characteristics, antibiotic use practices, prescription behaviour, access and compliance, and knowledge and attitudes related to antibiotics and AMR.

The questionnaire was developed based on previously published surveys on antibiotic use and antimicrobial resistance, with modifications to suit the local context. The sequence and wording of the questions were standardized for all participants.

Variables assessed:

The questionnaire captured the following domains:

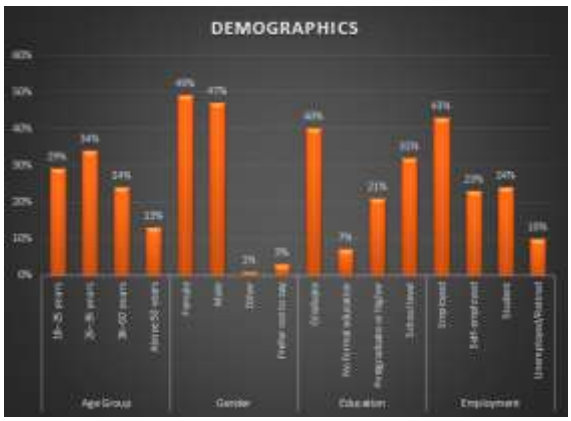
- Sociodemographic variables: age group, gender, educational status, and employment status
- Antibiotic use practices: recent antibiotic use, use without prescription, reasons for use, source of antibiotics, and course completion
- Prescription-related behavior: frequency of consulting a doctor before antibiotic use
- Knowledge and attitudes: awareness of AMR, beliefs regarding antibiotic effectiveness for common cold, perceived harm of misuse, and intention to avoid non-prescription antibiotic use in the future

Data coding and management: Responses were coded numerically for data entry and analysis. A separate coding framework was maintained to ensure consistency and reproducibility. Data were entered into Microsoft Excel and cross-checked for completeness and accuracy.

Statistical analysis: Data were analysed using descriptive statistics. Categorical variables were summarized as percentages, as the sample size was fixed at 100. Results are presented in tabular form to illustrate the distribution of responses across key variables related to antibiotic use and antimicrobial resistance awareness.

RESULTS

Participant characteristics: All 100 participants completed the questionnaire. The study population included individuals from diverse age groups, educational backgrounds, and employment categories, providing a broad representation of the general population. The demographic details have been represented in [Figure 1].



Knowledge of antimicrobial resistance: Awareness of antimicrobial resistance varied among participants. As shown in table 1, 29% of participants reported no awareness of AMR, while 28% had minimal awareness, having only heard the term. Moderate awareness was reported by 21%, and high awareness by 22% of participants. Overall, nearly half of the participants demonstrated at least moderate awareness of AMR.

Regarding the perceived effectiveness of antibiotics for the common cold as shown in [Table 1], 32% of participants believed antibiotics to be always effective, while 30% felt they were sometimes

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effective. In contrast, 25% correctly perceived antibiotics as not effective for common cold, and 13% expressed uncertainty. These findings indicate persistent misconceptions about antibiotic use for viral infections.

Most participants recognized the potential harm associated with inappropriate antibiotic use as shown in [Table 1]. Strong agreement with the statement that antibiotic misuse is harmful was reported by 32%, and 25% expressed agreement as shown in [Table 1]. However, 27% disagreed with this notion, and 16% remained uncertain, highlighting gaps in understanding of the long-term consequences of antibiotic misuse.

Participants were also asked about their intention to avoid non-prescription antibiotic use in the future as shown in [Table 1]. A definite intention to avoid such practices was reported by 41%, while 31% expressed a probable intention. Uncertainty was reported by 21%, and 7% indicated no intention to change their behavior. Overall, more than two-thirds of participants expressed a positive inclination toward responsible antibiotic use.

Table 1: Distribution of Respondents by AMR Awareness, Perceptions of Antibiotic Use, and Intention to Avoid Non-Prescription Antibiotic Use

Variable	Response category 1	Response category 2	Response category 3	Response category 4
AMR awareness	No awareness (29)	Minimal awareness (28)	Moderate awareness (21)	High awareness (22)
Perceived effectiveness of antibiotics for common cold	Always effective (32)	Sometimes effective (30)	Not effective (25)	Uncertain (13)
Perceived harm of antibiotic misuse	Strong agreement (32)	Agreement (25)	Disagreement (27)	Uncertain (16)
Intention to avoid non-prescription antibiotic use in future	Definite intention (41)	Probable intention (31)	Uncertain (21)	No intention (7)

Patterns of Antibiotic Use and Healthcare-Seeking Behavior: As illustrated in Figure 2, antibiotic use practices among respondents demonstrated considerable variability in frequency, source of procurement, and consultation behaviour. Regarding antibiotic use within the past six months, more than half of the participants (55%) reported having used antibiotics, while 32% indicated no use during this period. A small proportion of respondents were either unsure (9%) or preferred not to disclose (4%). These findings indicate that recent antibiotic exposure was common within the study population.

When assessing consultation practices prior to antibiotic use, 59% of respondents reported that they always consult a doctor before taking antibiotics, and 29% stated that they mostly consult a doctor. However, 8% rarely consult a doctor, and 4% never seek medical advice before antibiotic use. Although the majority reported appropriate healthcare-seeking behavior, a notable minority demonstrated limited medical consultation.

With respect to non-prescription antibiotic use, 37% of participants reported never using antibiotics without prescription. Nevertheless, 27% indicated occasional non-prescription use and another 27% reported frequent non-prescription use, while 9% were unsure. These findings suggest that nearly half of the respondents engaged in some degree of self-medication with antibiotics.

Community pharmacies emerged as the primary source of antibiotics, reported by 77% of participants. Other sources included leftover medicines from previous treatments (12%), friends or family members (9%), and online purchases (2%). The predominance of community pharmacies highlights their central role in antibiotic accessibility at the community level.

In terms of treatment adherence, 35% of respondents reported always completing the prescribed antibiotic course, while 26% completed it sometimes and another 26% rarely completed the full course. Additionally, 13% reported never completing the course. These findings indicate substantial gaps in adherence, with a majority not consistently completing antibiotic therapy.

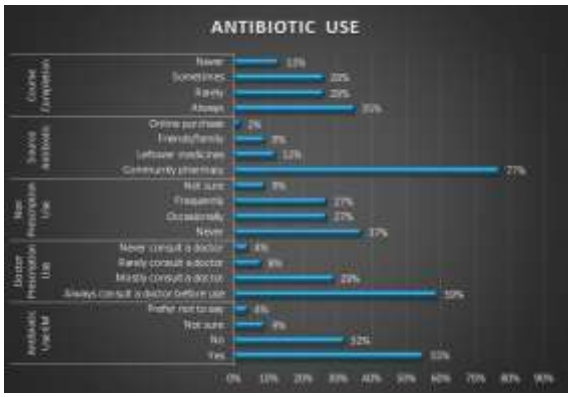

Figure 2: Patterns of Antibiotic Use, Source of Procurement, Consultation Behavior, and Course Completion Among Study Participants

DISCUSSION

This study examined community-level patterns of antibiotic use, awareness of antimicrobial resistance (AMR), and attitudes toward responsible antibiotic practices. Overall, the findings indicate a cautiously optimistic trend: while misconceptions regarding antibiotic use persist, particularly for self-limiting illnesses, a substantial proportion of participants demonstrated awareness of AMR and expressed positive intentions toward appropriate antibiotic use in the future.

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In the present study, approximately half of the participants reported moderate to high awareness of AMR, while the remainder demonstrated minimal or no awareness. This finding is consistent with recent population-based surveys conducted in multiple regions, which report uneven public understanding of AMR despite increasing global advocacy efforts.[16] Similarly, a large cross-sectional survey across 14 European countries found that although most respondents had heard of AMR, fewer than half could accurately describe its causes or consequences.[17] These findings suggest that awareness campaigns may increase recognition of the term "AMR" without necessarily translating into deeper understanding.

A key concern highlighted by this study is the continued belief that antibiotics may be effective for common colds and other viral illnesses. Over 60% of respondents indicated that antibiotics were always or sometimes effective for such conditions. This misconception has been repeatedly documented in recent literature and remains a major driver of inappropriate antibiotic demand.[18] A community-based study from India reported comparable findings, where more than half of respondents believed antibiotics could hasten recovery from viral respiratory infections.[19] These persistent misunderstandings underscore the need for targeted educational interventions focusing on the distinction between bacterial and viral infections.

Encouragingly, the majority of participants in this study acknowledged that misuse of antibiotics can be harmful, with over half expressing agreement or strong agreement. This aligns with recent evidence suggesting that public recognition of AMR as a serious health threat is increasing globally.[1]

One of the most positive findings of this study is the strong intention among participants to avoid non-prescription antibiotic use in the future. More than two-thirds of respondents reported definite or probable intention to adhere to appropriate practices. Similar trends have been reported in recent post-COVID-19 surveys, where heightened attention to infectious diseases may have improved receptivity to rational antibiotic use.[20] Nevertheless, intention alone may not be sufficient to ensure behavioural change, particularly in contexts where antibiotics remain easily accessible without prescriptions.

CONCLUSION

This study highlights the continued prevalence of non-prescription antibiotic use within the community despite moderate awareness of antimicrobial resistance. Although a majority of participants acknowledged the harmful consequences of antibiotic misuse and expressed willingness to avoid inappropriate practices, misconceptions regarding antibiotic effectiveness for viral illnesses remain common. Community pharmacies emerged as the principal source of antibiotics, underscoring the need for strengthened regulatory enforcement and pharmacist-led stewardship initiatives. Targeted community-based interventions and ongoing surveillance of antibiotic consumption patterns are critical to reducing inappropriate use and mitigating the growing threat of antimicrobial resistance.

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