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Original Article

Antibiotics Overuse in Wardha, India: A Cross-Sectional Survey on Knowledge, Attitudes, and Public Health Implications of Self-Medication

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ABSTRACT

Objectives: Antimicrobial Resistance (AMR) is a growing public health crisis driven by the misuse and overuse of antibiotics. India, a major consumer of antibiotics, faces greater risks due to unregulated Over-the-Counter (OTC) sales and inadequate awareness. This study aimed to identify factors contributing to antibiotic misuse among adults in Wardha to inform targeted interventions. **Materials and Methods:** A cross-sectional, questionnaire-based survey was conducted at a tertiary care hospital in Wardha from January to June 2024. Using systematic sampling, 400 adults (≥18 years) were recruited. A structured questionnaire collected information on demographics, history of antibiotic use, self-reported practices, and basic knowledge and attitudes toward antibiotics. Descriptive statistics were applied for analysis. **Results:** The findings revealed critical knowledge gaps and unsafe practices. Among respondents, 60% reported antibiotic use in the past year, of whom 30% admitted self-medication without prescription. Premature discontinuation of antibiotics was highly prevalent, reported by 60% of participants, while only 40% consistently completed treatment. Misconceptions were widespread: 70% failed to recognize that antibiotics do not treat viral infections, and half was unaware of the role of overuse in resistance. OTC access was significant, with 25% obtaining antibiotics directly from pharmacies without prescriptions. **Conclusion:** The study highlights alarmingly high rates of antibiotic misuse among the adult population in Wardha, largely due to poor awareness and easy OTC availability. Strict enforcement of prescription regulations, focused health education campaigns, and comprehensive antimicrobial stewardship programs are urgently needed to curb misuse and mitigate the threat of AMR.

Keywords: Antimicrobial Resistance (AMR), Antibiotic Misuse, Self-Medication, Knowledge-Attitudes-Practices (KAP), Wardha, Public Health.

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INTRODUCTION

Fleming's accidental discovery of penicillin ushered in a new era of medicine, revolutionizing the treatment of bacterial infections and saving many lives. However, its latter era of intensive use has been marred by the persistent emergence of Antimicrobial Resistance (AMR), a dynamic in which infections evolve to render such life-saving treatments ineffective. AMR is no longer a distant threat, but rather a real and growing worldwide catastrophe. In 2019, systematic research revealed that bacterial AMR was directly responsible for 1.27 million fatalities worldwide, making it the leading cause of death (Klein *et al.*, 2018). In its global action plan on antimicrobial resistance, the World Health Organization identifies AMR as a leading global public health problem and calls for collective worldwide action (Ventola, 2015).

With its billions of people and a heavy infectious disease burden, India represents the ground zero of this crisis. Antibiotic consumption has increased remarkably across the globe, and India has been a significant contributor to that excessive consumption (Llor & Bjerrum, 2014).This excessive consumption is the result of a net of forces working together, and includes: consumer demand, diagnostic uncertainty as a reason for empirical prescribing, and most significantly (Murray *et al.*, 2022), the over-the-counter availability of antibiotics, elongating the amount of antibiotics without a prescription. This, in turn, creates an environment that promotes self-medication, a practice commonplace in low- and middle-income countries (Andersson & Hughes, 2011). The consequences of this irrational use are dire, in terms of hastening resistance, resulting in treatment failure, and increased costs for health care (Roope *et al.*, 2019).

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While there are sound national and global trends on this, there is a clear need for local data to determine the particular KAP that is driving antibiotic misuse in heterogeneous populations. What we know about the patterns of misuse is unclear for adults in small towns, e.g., Wardha, Maharashtra, the most heterogeneous area by urban-rural demographics. This study attempts to fill that gap by providing a cross-sectional, detailed description of antibiotic misuse in Wardha. The study objectives were to ascertain the level of antibiotic knowledge; learn attitudes towards the use of antibiotics and information about the antibiotic misuse practices such as self-medication, taking regimens, and sources of antibiotics. Through an awareness of the underlying causes of misuse, this work tries to establish a requisite evidentiary foundation for the construction of effective and focused public health interventions (Mulchandani *et al*., 2025).

MATERIALS AND METHODS

Study Design and Study Population

The cross-sectional study was conducted as a questionnaire study during the period between January and June 2024. The research was performed at a tertiary care hospital within the city of Wardha, and this hospital caters to a wide range of patients, comprising both rural and urban populations. Adult patients (18 years and above) were included in the study and included those in the general medicine outpatient and inpatient settings. As this trial did not include paediatric patients (Laxminarayan *et al*., 2016).

Sampling and Sample Size

A target sample size of 400 respondents was determined to be sufficient for descriptive analysis. A systematic sampling technique was employed to minimize selection bias. Every third eligible adult patient encountered in the designated departments was approached and invited to participate in the survey until the target sample size was achieved.

Data Collection Instrument

Data were collected using a structured, pre-tested questionnaire administered face-to-face by trained interviewers in local languages (Marathi and Hindi) to ensure clarity and comprehension. The questionnaire was divided into sections covering:

Demographics: Age, gender, educational attainment, and socioeconomic status.

Antibiotic Use History and Practices: Previous year's antibiotic use, history of self-medication, sources of procurement (pharmacy, leftover), and adherence to prescribed courses.

Knowledge and Attitudes

Questions designed to assess understanding of the function of antibiotics (e.g., efficacy against bacteria vs. viruses), awareness of AMR, and beliefs regarding the necessity of antibiotics for common ailments like colds and fever. Questions utilized true/false, yes/no, and multiple-choice formats (Laxminarayan *et al*., 2013).

Ethical Considerations and Data Analysis

Participation in the study was completely voluntary and anonymous. All participants provided informed consent before the interview. The institutional ethics committee approved the study protocol. Collected data were entered into a database and analysed using descriptive statistics. Proportions and frequencies were calculated for all categorical variables to summarize the KAP findings (Rather *et al*., 2017).

RESULTS

Participant Characteristics

A total of 400 patients completed the survey. The mean age of the respondents was 40.5 years (Standard Deviation: 12.8). The sample consisted of 60% males and 40% females. Educational attainment varied: 50% had completed college or higher education, 37.5% had a high school education, and 12.5% were illiterate or had only primary schooling. The majority of respondents (55%) belonged to a middle socioeconomic status (World Health Organization, 2017).

Antibiotic Use and Practices

A significant portion of the respondents reported recent and often unregulated use of antibiotics. Key findings on practices are summarized in Table 1.

60% of participants had taken at least one course of antibiotics in the preceding 12 months. Of these users, a substantial minority engaged in high-risk behaviors. 30% admitted to using antibiotics without any medical consultation. The primary sources for this self-medication were direct purchases from pharmacies without a prescription (reported by 25% of all respondents) and the use of leftover medications (reported by 20%).

Adherence to prescribed treatment was notably poor. A majority (60%) reported that they "sometimes or often" stopped taking their antibiotics once they felt symptomatic improvement. Consequently, only 40% of antibiotic users stated that they always completed the full prescribed course (Gashaw *et al*., 2025).

The findings reflect the complex interplay between public antibiotic-use behaviors and the challenges pharmacists face in ensuring responsible dispensing. To illustrate this relationship, a conceptual model has been developed (Figure 1), highlighting the conflicting pressures influencing pharmacists' ability to promote rational antibiotic use.

Knowledge and Attitudes

The survey revealed profound deficits in public knowledge regarding antibiotics. Only 30% of respondents correctly identified that antibiotics are effective against bacteria but not viruses. This lack of understanding was reflected in the common belief that antibiotics could treat viral illnesses, with 40% believing they could cure a common cold.

There was also poor awareness of AMR. 50% of the participants (50%) were fully aware that possible resistance could be caused by the misuse or overuse of antibiotics. The attitudes towards the use of antibiotics were usually careless and ill-informed. Most of them (60%) believed that common ailments like cough and fever had to be immediately treated with antibiotics. Besides these, one-third of the respondents (35) believed that it was rational to administer their antibiotics to their relatives, and this is not a good reflection of the understanding of proper diagnoses and prescriptions.

DISCUSSION

The findings of this research provide an in-depth look at the entrenched issues regarding the abuse of antibiotics in Wardha, which is a reflection of the bigger problems that are present across the whole of India and other lower- to middle-income countries. The combination of low public awareness, common self-medication, and common availability of OTC is a synergistic system resulting in a building crisis in AMR.

The Pervasive Knowledge Deficit as a Primary Driver

The simplest discovery made is that there is an extreme lack of awareness of the general population about the meaning of antibiotics and the mechanism by which antibiotics act. The basis of misuse is that 70% of the interviewed persons have never heard that antibiotics do not help against viruses. This is consistent with the worldwide survey of general thought, which has consistently shown that human beings over-rate the efficacy of antibiotics, namely, in the prevalent respiratory diseases. This shortage directly drives inappropriate patient demand, which is one of the primary causes that pushes physicians to empirical prescribing in situations when a bacterial infection is unlikely.

Systemic Drivers: The Critical Role of Unregulated Access

This study confirms that weak enforcement of regulations is a key enabler of antibiotic misuse in Wardha. The 25% of respondents who purchased antibiotics directly from a pharmacy are participating in a practice that should be prohibited under the guidelines set by the Pharmacy Council of India (PCI). This finding is consistent with other studies from India, which have highlighted that a majority of retail pharmacies dispense antibiotics without a prescription, thereby acting as primary drivers of self-medication (Khelgi *et al*., 2022).

The role of the pharmacist is therefore complex and challenging. They are often caught between professional responsibility and consumer pressure. The diagram below conceptualizes the challenges they face.

As the model suggests, while verbal counseling is highly effective, its impact is often diluted by patient skepticism (rooted in the knowledge gaps identified in our study) and severe time constraints in busy pharmacies. This underscores that interventions cannot solely target pharmacists; they must be supported by broader public education campaigns to manage patient expectations and systemic support to allow for meaningful patient engagement. This aligns with the WHO's call for comprehensive antimicrobial stewardship programs that engage all stakeholders, including community pharmacists (Iwu & Patrick, 2021).

The Dangerous Practice of Incomplete Courses

The finding that 60% of users stop their antibiotic course prematurely is one of the most clinically significant results of this survey. This practice is a well-established mechanism for promoting the selection and proliferation of drug-resistant pathogens. By eliminating the most susceptible bacteria while allowing more tolerant strains to survive and multiply, patients are inadvertently breeding resistance within their own bodies. This highlights a critical failure in patient education at both the point of prescribing and dispensing.

Table 1: Key Findings on Antibiotic Use Practices and Knowledge Gaps (*n*=400).

Question/Statement	% Yes/ Correct
Practices	
Used antibiotics in the past 12 months	60%
Admitted to self-medication (without a doctor)	30%
Obtained antibiotics from a pharmacy without prescription	25%
Used leftover antibiotics from a previous illness	20%
Stopped antibiotic course when feeling better	60%
Always completed the full prescribed course	40%
Knowledge & Attitudes	
Correctly knew antibiotics work only on bacteria	30%
Aware that antibiotic misuse causes resistance	50%
Believed antibiotics can cure the common cold	40%
Believed fever/cough requires immediate antibiotic use	60%
Felt it was acceptable to share antibiotics with relatives	35%

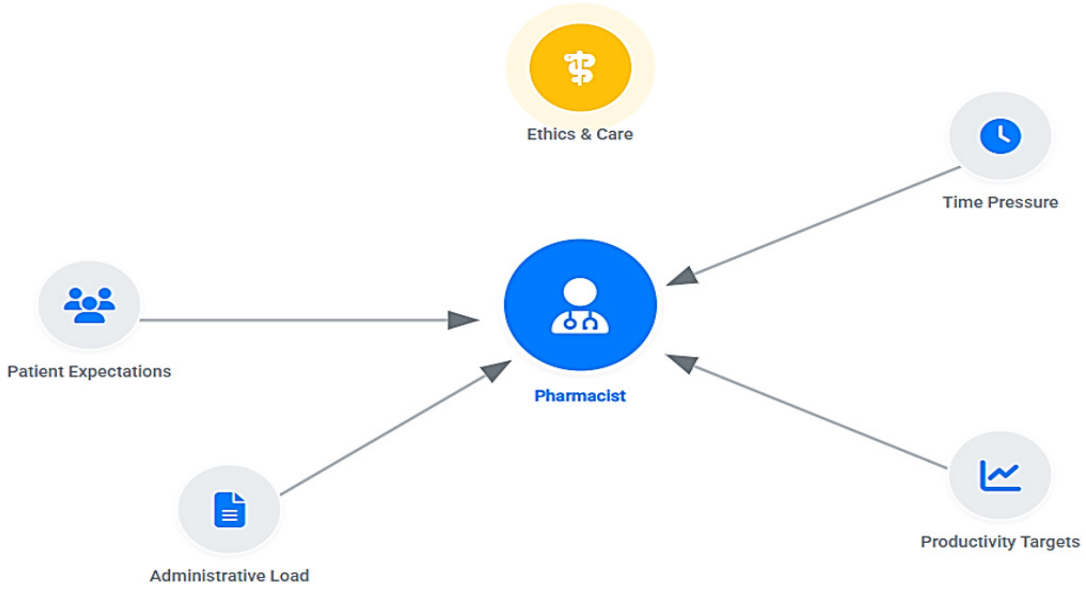

Figure 1: A conceptual model illustrating the conflicting pressures and challenges faced by pharmacists in promoting responsible antibiotic use.

Wardha's Trends in a Global Context

The behaviours observed in Wardha are a local manifestation of a global problem. The high rates of consumption and self-medication mirror trends across many low- and middle-income countries (Rajendran *et al.*, 2019). The need for global solutions to antibiotic resistance, as argued by Laxminarayan, is underscored by the fact that local resistance patterns can quickly spread internationally. The challenges in Wardha are therefore not isolated; they are part of a worldwide public health battle that requires both local action and global coordination (Biswas *et al.*, 2014).

CONCLUSION AND SUGGESTED INTERVENTIONS

This analysis demonstrates a relevant and pressing population health issue in Wardha, Maharashtra, with a decent rate of antibiotic misuse through deep knowledge deficits and facilitated by the laxity of the law, although this issue was infrequent. Self-medication, prescription-less procurement, and an absence of treatment course completion are widespread practices that are currently leading to the increasing menace of AMR and Superbugs (Nathwani *et al.*, 2014).

The results that have been found in this study are a resounding call to action. This complex issue needs a multi-faceted approach that takes place on a multi-level approach that transcends awareness and proceeds to behavioural change. In accordance with these findings and in accordance with the national and international recommendations, the following interventions were suggested:

Enhancing Regulatory Enforcement

There should be a stringent depression of zero tolerance for the OTC sale of antibiotics. That demands the active supervision of the pharmacies and the application of substantial fines to those who do not comply with it as the Pharmacy Council of India (PCI, 2016) envisions (Raghunath, 2008).

Specific Public Education Campaigns

A mass awareness campaign should also be initiated in the community in response to the identified misconceptions of this study. The messages to be used in these campaigns should be simple and clear, and in the local languages to highlight the fact that antibiotics are ineffective against cold and flu, and elaborate on the importance of taking a complete course of medication (Kotwani *et al.*, 2021).

Empowering Healthcare Providers

Physicians as well as pharmacists must be regularly trained and assisted in antibiotic stewardship. This involves the teaching of communication skills so that they can produce effective education to patients and withstand pressure to prescribe unnecessary drugs as a way of propagating the values of the Global Action Plan of the WHO (WHO, 2015; Sulis *et al.*, 2021).

Introducing Antimicrobial Stewardship Programs

Wardha and the community health system should introduce Antibiotic stewardship programs to observe the antibiotic prescribing trends in the area, to encourage the use of diagnostics, and to track the local resistance data to inform clinical practice.

The fight against antimicrobial resistance and avoiding Superbugs will be conducted or lost at the community level. The information at Wardha presents an excellent road map of the starting point. Devoid of these emergency measures, we are going to enter a post-antibiotic society where seemingly ordinary diseases will once again turn lethal and may even cause death (Umayorubhagom *et al*., 2024).

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ABBREVIATIONS

AMR: Antimicrobial Resistance; **KAP:** Knowledge-attitudes-practices.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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