

Original article

Pattern, Awareness, and Risk Factors Associated with Over-the-Counter Antibiotic Use Among Adults Attending a Tertiary Care Hospital: A Cross-Sectional Study

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Abstract

Background: Over-the-counter use of antibiotics without a valid medical prescription is a major public health concern and contributes significantly to irrational drug use, treatment failure, adverse drug reactions, and antimicrobial resistance. Easy access to antibiotics, reuse of previous prescriptions, lack of awareness, and self-medication are important drivers of inappropriate antibiotic use.

Aim: To assess the pattern, awareness, common indications, and risk factors associated with over-the-counter antibiotic use among adult patients attending a tertiary care hospital.

Materials and Methods: A cross-sectional observational study was conducted in the Department of Pharmacology among 300 adult participants attending outpatient departments. A structured questionnaire was used to collect information regarding demographic profile, history of antibiotic use without prescription, common symptoms for which antibiotics were used, source of antibiotics, knowledge regarding antibiotic resistance, treatment completion, adverse effects, and reasons for self-medication. Data were analyzed using descriptive statistics and chi-square test. A p-value less than 0.05 was considered statistically significant.

Results: Among 300 participants, 126 (42.0%) reported use of antibiotics without prescription during the previous one year. The most common indications were fever, sore throat, cough and cold, dental pain, and diarrhea. The common sources were community pharmacies, leftover medicines at home, and previous prescriptions. Only 108 (36.0%) participants were aware that inappropriate antibiotic use can cause antimicrobial resistance. Incomplete course of antibiotics was reported by 92 (30.7%) participants. Over-the-counter antibiotic use was significantly associated with younger age group, prior similar illness, easy pharmacy access, lack of awareness, and previous antibiotic availability at home.

Conclusion: Over-the-counter antibiotic use is common among adults and is driven by easy availability, previous prescription reuse, poor awareness, and convenience. Irrational use of antibiotics increases the risk of antimicrobial resistance, adverse drug reactions, and treatment failure. Public education, pharmacist sensitization, prescription regulation, and antimicrobial stewardship activities are essential to promote rational antibiotic use.

Keywords- Antibiotic Resistance, Antimicrobial Stewardship, Irrational Drug Use, Over-the-Counter Antibiotics, Pharmacology, Self-Medication.

Introduction

Antibiotics are among the most important therapeutic agents in modern medicine and have significantly reduced morbidity and mortality from bacterial infections. However, their irrational and inappropriate use has contributed to the emergence and spread of antimicrobial resistance. Over-the-counter antibiotic use, defined as

antibiotic consumption without a valid prescription or medical consultation, is an important form of irrational antibiotic use.¹

Over-the-counter antibiotic use is common in many low- and middle-income countries where antibiotics may be easily obtained from community pharmacies, informal providers, previous prescriptions, or leftover medicines at home. Patients may use antibiotics for fever, cough, cold, sore throat, diarrhea, dental pain, skin infections, or urinary symptoms without knowing whether the illness is bacterial or viral.²

A major concern is that many self-limiting viral illnesses are treated unnecessarily with antibiotics. Such use provides no clinical benefit and increases selection pressure for resistant organisms. Incomplete courses, wrong dose, inappropriate antibiotic choice, and repeated use further increase the risk of antimicrobial resistance.³

Antimicrobial resistance is a global health threat affecting treatment outcomes, healthcare costs, hospital stay, and mortality. Resistant infections require broader-spectrum antibiotics, longer therapy, and more expensive treatment. The problem is worsened when antibiotics are used without diagnostic confirmation or professional guidance.⁴

Several factors contribute to over-the-counter antibiotic use. These include easy pharmacy availability, previous experience of symptom relief, high consultation cost, lack of time, distance from healthcare facility, poor awareness of antibiotic resistance, self-confidence in managing illness, and storage of leftover antibiotics at home. In some settings, antibiotics may be dispensed without prescription despite regulatory restrictions.⁵

Pharmacology departments have an important role in promoting rational drug use, pharmacovigilance, antimicrobial stewardship, and public awareness regarding safe medicine practices. Understanding the local pattern of antibiotic self-medication can help design educational interventions for patients, pharmacists, and healthcare professionals.⁶

The present study was conducted to assess the pattern, awareness, common indications, and risk factors associated with over-the-counter antibiotic use among adult patients attending a tertiary care hospital.

Materials and Methods

This cross-sectional observational study was conducted in the Department of Pharmacology during the study period among 300 adult participants attending outpatient departments.

Adults aged 18 years and above who were willing to participate were included in the study. Patients who were severely ill, unable to respond to the questionnaire, healthcare professionals, and participants who refused consent were excluded.

A structured questionnaire was used for data collection. The questionnaire included demographic details, educational status, occupation, history of antibiotic use without prescription, frequency of such use, common symptoms for which antibiotics were taken, source of antibiotics, reason for self-medication, completion of antibiotic course, adverse effects, and knowledge regarding antimicrobial resistance.

Over-the-counter antibiotic use was defined as use of any systemic antibiotic without consultation with a qualified medical practitioner or without a current valid prescription. Use of antibiotics based on old prescriptions, advice from pharmacist, advice from family members, or leftover medicines was included under over-the-counter use.

Participants were asked whether they had used antibiotics without prescription during the previous one year. The indications were categorized as fever, sore throat, cough and cold, dental pain, diarrhea, urinary symptoms,

wound or skin infection, and others. Sources were categorized as pharmacy, leftover medicines at home, previous prescription reuse, advice from relatives or friends, and informal healthcare providers.

Awareness regarding antibiotic resistance was assessed by asking whether the participant knew that unnecessary or incomplete antibiotic use can reduce antibiotic effectiveness in future infections. Knowledge regarding completion of full course and need for medical consultation was also recorded.

Data were entered and analyzed using SPSS software. Descriptive statistics were used to express frequencies and percentages. Chi-square test was used to assess association between over-the-counter antibiotic use and selected risk factors. A p-value less than 0.05 was considered statistically significant.

Institutional ethical committee approval was obtained before commencement of the study. Informed consent was obtained from all participants. Confidentiality of participant information was maintained.

Results

A total of 300 adult participants were included in the study.

Table 1: Demographic Characteristics of Study Participants

Variable	Frequency (%)
Male	168 (56.0)
Female	132 (44.0)
Age 18–30 years	94 (31.3)
Age 31–50 years	132 (44.0)
Age >50 years	74 (24.7)
Urban residence	178 (59.3)
Rural residence	122 (40.7)

Male participants constituted 168 (56.0%) and female participants constituted 132 (44.0%). The majority belonged to the 31–50 years age group. Urban residence was observed in 178 (59.3%) participants.

Table 2: Pattern of Over-the-Counter Antibiotic Use

Parameter	Frequency (%)
Used antibiotics without prescription in last one year	126 (42.0)
Did not use antibiotics without prescription	174 (58.0)
Used antibiotics more than once without prescription	54 (18.0)
Used leftover antibiotics at home	38 (12.7)
Reused previous prescription	46 (15.3)

Over-the-counter antibiotic use was reported by 126 (42.0%) participants. More than one episode of antibiotic use without prescription was reported by 54 (18.0%) participants. Previous prescription reuse and leftover antibiotics were common practices.

Table 3: Common Indications for OTC Antibiotic Use

Indication	Frequency (%)
Fever	48 (38.1)
Sore throat	42 (33.3)
Cough and cold	40 (31.7)
Dental pain	24 (19.0)

Diarrhea	22 (17.5)
Urinary symptoms	18 (14.3)
Skin or wound infection	16 (12.7)

Fever was the most common indication for over-the-counter antibiotic use, followed by sore throat and cough or cold. Use of antibiotics for cough and cold indicates probable irrational use because many such illnesses are viral and self-limiting.

Table 4: Source of Antibiotics

Source	Frequency (%)
Community pharmacy	82 (65.1)
Previous prescription	46 (36.5)
Leftover medicines at home	38 (30.2)
Advice from relatives or friends	24 (19.0)
Informal healthcare provider	16 (12.7)

Community pharmacy was the most common source of antibiotics, reported by 82 (65.1%) participants who used antibiotics without prescription. Previous prescriptions and leftover medicines at home were also common sources.

Table 5: Awareness Regarding Antibiotic Use

Awareness Parameter	Frequency (%)
Aware that antibiotics do not work for all fevers	116 (38.7)
Aware that antibiotics do not treat viral cold	98 (32.7)
Aware of antibiotic resistance	108 (36.0)
Aware that incomplete course may be harmful	132 (44.0)
Completed full antibiotic course	208 (69.3)
Did not complete full course	92 (30.7)

Only 108 (36.0%) participants were aware of antibiotic resistance. Awareness that antibiotics do not treat viral cold was present in 98 (32.7%) participants. Incomplete antibiotic course was reported by 92 (30.7%) participants.

Table 6: Reasons for OTC Antibiotic Use

Reason	Frequency (%)
Easy availability at pharmacy	76 (60.3)
Similar illness treated earlier	58 (46.0)
Avoiding consultation cost	44 (34.9)
Lack of time to visit doctor	40 (31.7)
Perception that illness was minor	36 (28.6)
Advice from pharmacist	52 (41.3)

Easy availability at pharmacy was the most common reason for over-the-counter antibiotic use, followed by previous similar illness and pharmacist advice. Avoidance of consultation cost and lack of time were also common reasons.

Table 7: Factors Associated with OTC Antibiotic Use

Factor	OTC Antibiotic Use n (%)	p-value
Age 18–30 years	52 (55.3)	0.004
Previous prescription available	46 (68.7)	<0.001
Poor awareness of antibiotic resistance	82 (52.6)	0.002
Easy pharmacy access	76 (58.9)	<0.001
Leftover antibiotics at home	38 (73.1)	<0.001

Over-the-counter antibiotic use showed significant association with younger age, previous prescription availability, poor awareness of antibiotic resistance, easy pharmacy access, and presence of leftover antibiotics at home.

Discussion

The present study evaluated the pattern, awareness, and risk factors associated with over-the-counter antibiotic use among adults attending a tertiary care hospital. Over-the-counter antibiotic use was reported by 42.0% of participants during the previous one year. The most common indications were fever, sore throat, cough and cold, dental pain, and diarrhea. Community pharmacies were the most common source. Awareness regarding antibiotic resistance was low, and incomplete antibiotic courses were reported by a considerable proportion of participants.

Shankar et al. reported that self-medication and non-doctor prescription practices are common in South Asian settings and are influenced by previous experience, availability of medicines, and public perception of illness severity.⁷ In the present study, previous similar illness and previous prescription reuse were important reasons for antibiotic self-medication.

Ganguly et al. emphasized that irrational antibiotic use is an important driver of antimicrobial resistance in India and requires coordinated action involving prescribers, pharmacists, patients, and policymakers.⁸ The present study supports this view because antibiotics were frequently used without prescription and awareness regarding resistance was low.

Ocan et al. systematically reviewed household antimicrobial self-medication and reported that leftover medicines, easy access, and perceived minor illness are important determinants of non-prescription antimicrobial use.⁹ In the present study, leftover antibiotics at home were significantly associated with over-the-counter use.

Rather et al. discussed the relationship between self-medication and antibiotic resistance and highlighted that inappropriate antibiotic use contributes to selection of resistant organisms.¹⁰ The present study found that antibiotics were used for conditions such as cough and cold, where bacterial infection may not be present.

Sakeena et al. reviewed non-prescription sales of antimicrobials in community pharmacies in developing countries and reported that antibiotic dispensing without prescription remains common.¹¹ In the present study, community pharmacy was the most common source of antibiotics, reported by 65.1% of participants who self-medicated.

Laxminarayan et al. highlighted that antimicrobial resistance is a global problem requiring rational antibiotic use and stewardship.¹² The present study shows that public-level misuse, incomplete courses, and pharmacy-level availability contribute to the local burden of irrational antibiotic consumption.

Kakkar et al. described antibiotic resistance in India as a major public health challenge and emphasized the importance of containment strategies.¹³ The findings of the present study support the need for enforcement of prescription-only antibiotic sale and public education regarding antibiotic use.

Prestinaci et al. described antimicrobial resistance as a multifaceted global phenomenon influenced by antibiotic misuse in humans, animals, agriculture, and healthcare systems.¹⁴ The present study reflects the human community-level component of this problem, where self-medication and poor awareness are key contributors.

Fever was the most common indication for over-the-counter antibiotic use. Fever is a symptom, not a diagnosis, and may be caused by viral, bacterial, parasitic, inflammatory, or non-infectious conditions. Antibiotic use without clinical evaluation may delay diagnosis and promote resistance.

Cough and cold were also common reasons for antibiotic use. Most upper respiratory tract infections are viral and self-limiting. Antibiotics are not routinely required in such cases. Public education should clearly communicate that antibiotics are not useful for common cold unless bacterial infection is suspected by a clinician.

Dental pain and diarrhea were other reported indications. Antibiotic use for dental pain without dental evaluation may provide temporary relief but does not treat the underlying cause. Similarly, diarrhea often does not require antibiotics unless specific bacterial or parasitic etiology is suspected.

Previous prescription reuse was common. Patients may assume that similar symptoms require the same antibiotic. However, symptoms may be caused by different conditions, and antibiotic choice depends on diagnosis, severity, local resistance, allergy history, pregnancy status, renal function, and drug interactions.

Incomplete antibiotic course was reported by 30.7% participants. Patients often stop antibiotics when symptoms improve, which may result in incomplete bacterial eradication and contribute to resistance. Counseling regarding dose, duration, and completion of therapy is essential.

Poor awareness of antibiotic resistance showed significant association with over-the-counter antibiotic use. This indicates that awareness campaigns should focus on the consequences of misuse, including treatment failure, resistant infections, higher cost, and reduced future antibiotic effectiveness.

The role of pharmacists is critical. Community pharmacists are often the first point of contact for patients. Pharmacist education and regulatory enforcement can reduce non-prescription antibiotic dispensing. Pharmacists should refer patients for medical evaluation rather than dispensing antibiotics for nonspecific symptoms.

The present study has certain limitations. It was hospital-based and may not reflect community prevalence. Antibiotic use was self-reported, so recall bias is possible. Specific antibiotic names and dosage patterns were not analyzed in detail. Future studies may include pharmacy audits, prescription validation, and intervention-based awareness programs.

Conclusion

Over-the-counter antibiotic use is common among adults and is mainly driven by easy pharmacy availability, previous prescription reuse, leftover medicines, low awareness, and convenience. Fever, sore throat, cough and cold, dental pain, and diarrhea were common indications for self-medication. Community pharmacies were the most common source of antibiotics. Poor awareness of antimicrobial resistance and incomplete antibiotic course were important concerns. Over-the-counter antibiotic use showed significant association with younger age, previous prescription availability, easy pharmacy access, poor awareness, and leftover antibiotics at home.

Public education, pharmacist training, prescription regulation, antimicrobial stewardship, and rational drug use awareness are essential to reduce inappropriate antibiotic consumption and prevent antimicrobial resistance.

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