Knowledge, Attitudes, and Practices Regarding Antimicrobial Usage Among Patients Attending the Outpatient Clinic

Bhattacharyya Sayan*, Dan A, Bhattacharyya Sanjoy, Chakraborty R and Nayak A

UHU&TC Chetla under AIIH & PH Kolkata, India

ABSTRACT

Background: Antimicrobial resistance has emerged as a major global public health threat, largely driven by inappropriate use of antimicrobials. Patients' knowledge and understanding of antimicrobials plays a crucial role in their rational use. Assessing public awareness and practices related to antimicrobial usage is essential to design effective educational interventions. **Objective:** To assess the knowledge, attitudes, and practices regarding antimicrobial use and indications among patients attending the outpatient clinic.

Methods: A cross-sectional questionnaire-based survey was conducted among patients attending the outpatient clinic of a public health institute. A structured questionnaire consisting of socio-demographic details and questions related to knowledge, usage, and indications of antimicrobials was administered. Data were analyzed using descriptive statistics, and associations between demographic variables and knowledge scores were evaluated.

Results: A total of 200 patients participated in the study and were interviewed. While 50% of respondents had heard of antimicrobials, very few correctly identified that antimicrobials are effective against bacterial infections only. Approximately 58% believed antimicrobials could be used for viral infections like common cold. Self-medication with antimicrobials was reported by 46% of participants. Knowledge scores were significantly higher among participants with higher educational status. **Conclusion:** The study revealed considerable gaps in patients' knowledge regarding appropriate antimicrobial use and indications. Misconceptions and inappropriate practices such as self-medication were common. Targeted educational interventions in outpatient settings are urgently needed to promote rational antimicrobial use and combat antimicrobial resistance.

Keywords: Antimicrobials; Knowledge; Questionnaire; Outpatient clinic; Antimicrobial resistance; Rational drug use

***Correspondence to**: Dr. Bhattacharyya Sayan, UHU&TC Chetla under AIIH & PH Kolkata, India

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INTRODUCTION

Antimicrobials are among the most commonly prescribed medications worldwide and have revolutionized the treatment of bacterial infections [1]. Their discovery has significantly reduced morbidity and mortality which are associated with infectious diseases. However, the widespread and often irrational use of antimicrobials has culminated in the rapid emergence of antimicrobial resistance, posing a serious threat to global health [2]. Hence antimicrobials are also the most misused drugs now.

Antimicrobial resistance occurs when bacteria develop the ability to survive exposure to antimicrobials that are designed to kill them or inhibit

their growth [3]. The World Health Organization has identified antimicrobial resistance as one of the top ten global public health threats facing humanity [4]. A major contributing factor to this problem is the inappropriate use of antimicrobials, including overuse, misuse, and self-medication.

Patients' knowledge, beliefs, and practices do play a critical role in antimicrobial consumption patterns. Understanding patients' knowledge and practices concerning antimicrobials can help to mitigate antimicrobial resistance and also sustain antimicrobial effectiveness [5]. Misconceptions like using antimicrobials for viral infections like common cold, stopping treatment once symptoms improve, implying incomplete dosage, or sharing antimicrobials with others are commonly reported, particularly in developing countries [6]. In outpatient settings, where a large number of patients seek care for minor illnesses, inappropriate expectations regarding antimicrobial prescriptions are frequently encountered.

Very few new antimicrobials are there in the pipeline, and efforts need to be channelized into finding new classes of antimicrobials. AMR has reached alarming proportions, and is slated to be the next pandemic. Assessing patients' understanding of antimicrobials and their proper use is essential for designing effective educational strategies and interventions. The WHO Strategy for Containment of Antimicrobial Resistance encourages prescribers and dispensers to educate patients on proper use of antimicrobials and the importance of completing the prescribed treatment dosage and regime [7]. Questionnaire-based surveys provide a practical and efficient method for evaluating knowledge and practices among healthcare seekers. This study was conducted to assess the level of knowledge, attitudes, and practices related to antimicrobial usage and indications among patients attending an outpatient clinic.

OBJECTIVES

1. To assess the level of knowledge regarding antimicrobials among patients attending an outpatient clinic
2. To evaluate patients' practices related to antimicrobial usage
3. To identify misconceptions regarding indications of antimicrobials
4. To determine the association between socio-demographic factors and knowledge of antimicrobials

MATERIALS AND METHODS

Study Design: This was a hospital-based cross-sectional questionnaire-based survey that was conducted over a period of 9 months from May 2025 to January 2026.

Study Setting: The study was carried out in the outpatient clinic (OPD) of Urban Health Unit of a Public Health Institute catering to a diverse population from urban and semi-urban areas.

Study Population: Patients attending the outpatient clinic during the study period were considered eligible for participation, and 200 patients were surveyed.

Inclusion Criteria

- Patients aged >18 years
- Patients willing to participate and who provided informed consent

Exclusion Criteria

- Healthcare professionals
- Patients who were critically ill or unable to respond to the questionnaire

Sample Size: A total of 200 patients were included in the study using convenience sampling.

Study Tool: Data were collected using a structured, pre-validated questionnaire. The questionnaire consisted of four sections:

1. **Socio-demographic details:** age, gender, education level, occupation
2. **Knowledge about antimicrobials:** definition, types of infections treated, antimicrobial resistance
3. **Usage practices:** adherence, self-medication, source of antimicrobials
4. **Indications and attitudes:** expectations from physicians, stopping antimicrobials, sharing medicines

The questionnaire was administered in the local language, and assistance was provided when necessary. Informed written voluntary consent was obtained from the participants.

Questionnaire was as follows:

1. What are antimicrobials? (any idea)
2. Are antimicrobials able to treat common cold?
3. Name some antimicrobials.
4. What do you do for a living?
5. Do antimicrobials lead to any adverse effects?
6. If you need antimicrobials and go to the store or pharmacy, will you buy it with proper prescription or just tell the shop-owner to provide?

Scoring System: Each correct knowledge response was awarded one point. The total knowledge score ranged from 0 to 10 and was categorized as:

- Poor knowledge: 0-3
- Moderate knowledge: 4-6
- Good knowledge: 7-10

Data Analysis: Data was entered into Microsoft Excel and analyzed using statistical software. Descriptive statistics such as frequencies and percentages were used. Associations between demographic variables and knowledge scores were analyzed using chi-square test, with a p-value <0.05 considered statistically significant.

Ethical Considerations: Written bilingual informed consent document was obtained from all participants, and confidentiality was professionally maintained throughout the study.

Ethical principles satisfied:

a) Principle of Autonomy: Subjects were told and explained that they were free to withdraw from the study whenever they felt like.

b) Principle of anonymity: The name and other demographic details of the subjects will not be divulged and will be kept confidential.

c) Principle of beneficence: Subjects and the society at large will be benefited from the outcome of the study.

d) Principle of non-maleficence: Nobody will be harmed from the study.

e) Principle of essentiality: This study is essential from the point of view of antimicrobial resistance as an upcoming menace.

RESULTS

Socio-Demographic Characteristics: Out of the 200 participants, 78 (54%) were males and 122 (46%) were females. So, the male: female ratio was 1:1.5. The majority of participants (38%) belonged to the age group of 31-45 years. Occupation-wise, 3 were sweet shop owners (male subjects), 1 was teacher, 1 was professional worker or freelancer, 1 was a fee collector in parking lot, 1 served as a security guard, 1 was cloth presser or ironer, 1 was driver, 1 was security guard, 1 was boutique worker, 1 was student while 60 of the females remaining were housewives. Among males, 40% were school dropouts. The profession of others was not asked.

Age of the subjects ranged from 19 years to 75 years. Hence the mean age was 47 years.

The socio-demographic details are also shown in the table below.

Number of Participants	Males	Females	Statistically significant difference
200	78	122	p value 0.134835, difference not significant (Z test)

Table 1: Socio-demographic details.

Knowledge About Antimicrobials

- Out of all subjects, 50 % of participants had heard the term “antimicrobials”
- Only 21% correctly identified antimicrobials as drugs effective against bacterial infections
- Out of those who knew the name of antimicrobials, majority of respondents mentioned Azithromycin.
- About 58% believed that antimicrobials may be used for viral infections such as the common cold or flu
- Of all subjects, 35% were aware of the concept of antimicrobial resistance (this question was not in questionnaire)
- Out of all, 29% knew that incomplete antimicrobial courses could contribute to resistance

- Out of all, 80 respondents said that antimicrobials consumed in higher dose or without any indication could lead to adverse effects. The rest of the respondents had no knowledge of adverse effects of antimicrobials.
- A total of 180 respondents said that they will only take antimicrobials by showing a valid prescription from a registered medical practitioner. This was a good sign since respondents at least knew that over-the counter buying of antimicrobials are harmful for them as well as for the sake of impending burden of antimicrobial resistance.

Association between socio-demographic factors and knowledge of antimicrobials

Females in general had a poorer mean score than male respondents. While 40 out of 78 males interviewed (51.28%) had a bad score (<3), 90 out of 122 female respondents (73.77%) had a bad score of <3. This has been shown in table 2.

Also, educated subjects also had better knowledge of antimicrobials (4 graduates had mean score of 7) when compared to uneducated subjects or school drop outs (194 such respondents having mean score of 4). Two were students. Statistically significant difference was present in percentages observed. The p-value was near zero by online Z-test calculator.

Practices Related to Antimicrobial Usage

- It was found that 46% of respondents reported using antimicrobials without a prescription, 39% stopped taking antimicrobials once symptoms improved, 34% admitted to saving leftover antimicrobials for future use, and 22% reported sharing antimicrobials with family members.

Education: Only 4 respondents were graduates; 2 were students. The rest were either uneducated or school dropouts. Among school drop-outs, most studied up to 8th standard.

Attitudes and Expectations

- Of all respondents, 58% expected antimicrobials to be prescribed for common cold or fever or viral infections
- Of all respondents 48% believed antimicrobials speed up recovery from any illness
- Of all respondents 31% trusted pharmacists as a source of antimicrobial advice without consulting a doctor

Knowledge Score Distribution

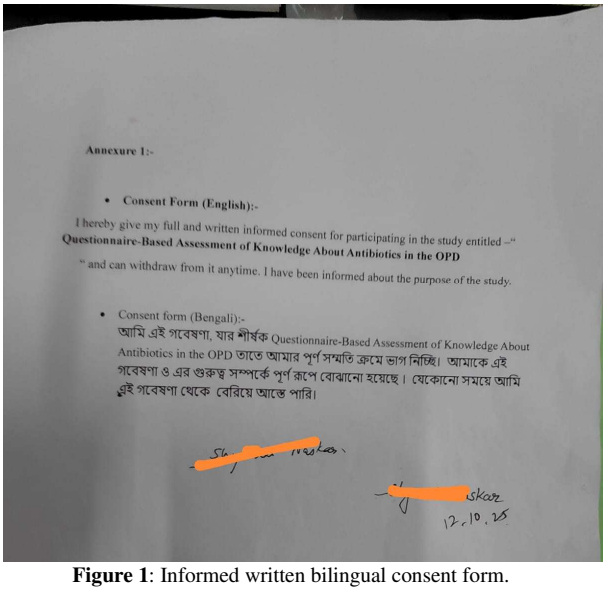
- Poor knowledge: 44%
- Moderate knowledge: 37%
- Good knowledge: 19%

Hence most of the respondents did not know properly about antimicrobials. Some of them told that Paracetamol and Cetirizine were antimicrobials. Very few of the respondents actually knew what antimicrobials were.

The table 3 shows significance of difference of knowledge among people having good or poor knowledge

A statistically significant association was also found between higher educational level and better knowledge scores ($p < 0.05$).

The image below highlights image of the written informed consent form that the respondents filled.


Annexure 1:-

- Consent Form (English):-

I hereby give my full and written informed consent for participating in the study entitled –" **Questionnaire-Based Assessment of Knowledge About Antibiotics in the OPD** " and can withdraw from it anytime. I have been informed about the purpose of the study.

- Consent form (Bengali):-

আমি এই গবেষণা, যার শীর্ষক Questionnaire-Based Assessment of Knowledge About Antibiotics in the OPD তাতে আমার পূর্ণ সম্মতি ক্রমে ভাগ নিচ্ছি। আমাকে এই গবেষণা ও এর গুরুত্ব সম্পর্কে পূর্ণ রূপে বোঝানো হয়েছে। যেকোনো সময়ে আমি এই গবেষণা থেকে বেরিয়ে আসতে পারি।

12.10.25

Figure 1: Informed written bilingual consent form.

Males having poor score with percentage	Females having poor score with percentage	Statistically significant difference if present in percentages observed	Remarks
40 (51.28%)	90 (73.77%)	Yes, p value 0.005967 by online Z-test calculator	Females had significantly poorer knowledge about antimicrobials when compared to males

Table 2: Association between socio-demographic factors and knowledge of antimicrobials.

Percentage of respondents of both genders having good knowledge	Percentage of respondents of both genders having poor knowledge	Statistical significance of difference	Remarks
19% (n = 38)	44% (n = 88)	p value: - 0.003728 by online Z test calculator	Significantly more respondents had poor knowledge of antimicrobials when compared to respondents having good knowledge

Table 3: Significance of difference of knowledge among people having good and poor knowledge.

The graph below shows the knowledge of antimicrobials among the respondents.

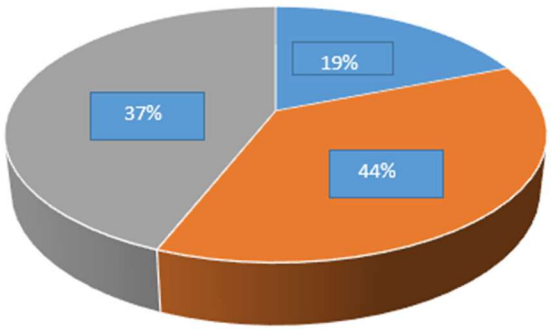


Figure. 2: Pie-chart showing knowledge of antimicrobials among the respondents.

DISCUSSION

AMR is really a menace and may well be the reason behind the next pandemic. The present study tried to assess the knowledge, attitudes, and practices regarding antimicrobial use among patients attending an outpatient clinic. The findings reveal substantial gaps or lacunae in patients' understanding of appropriate antimicrobial use and indications.

Although the majority of participants in our study had heard of antimicrobials, less than half correctly identified their role in treating bacterial infections. Similar findings have been reported in studies conducted in other developing countries, highlighting widespread misconceptions about antimicrobial effectiveness against viral infections.

The low prevalence of self-medication observed in this study is assuring. Easy availability of antimicrobials without prescription and lack of awareness contribute significantly to this practice. Self-medication not only increases the risk of inappropriate drug selection and dosing but also accelerates the development of antimicrobial resistance [8].

Another alarming finding was the tendency to discontinue antimicrobials once symptoms improved. This practice or tendency to discontinue antimicrobials once the symptoms have improved is a well-recognized contributor to antimicrobial resistance, since it allows partially resistant bacteria to survive and multiply[9].

The association between education level and knowledge scores emphasizes the role of education in

promoting rational drug use, especially antimicrobials [10,11]. Patients with higher education demonstrated better understanding of antimicrobials and were less likely to engage in inappropriate practices, which is the expected norm[10].
Outpatient clinics provide a valuable opportunity for patient education and to assess their existing knowledge of antimicrobials. Patients are often eager to understand and know more about their existing medical conditions, and educating them with the most relevant, current, consistent, and up-to-date information helps patients and their families significantly in medical care and also decision-making process [12]. Physicians, pharmacists, and other healthcare providers should collaborate and actively counsel patients on the correct use of antimicrobials, importance of completing prescribed courses, and dangers of misuse [13]. Knowledge about antimicrobial consumption and resistance, as well as values like altruism and trust in the health care system, has got significant influence on both perceptions of individual responsibility and also on behavior [14]. As a responsible society we should fulfill our responsibility towards the masses in building a society that knows about antimicrobials, keeping in mind the menace of AMR. The spread of AMR is considered a One-Health problem, given the close relationship of human and veterinary practices with environmental factors [14].

Another interesting but worrisome finding in our study is that females had significantly poorer knowledge about antimicrobials when compared to their male counterparts. This is in concordance with some other studies where significantly lesser females had heard of the term “antimicrobials: when compared to males [14]. Importantly, our findings and also other studies indicate that education plays a very important role in peoples’ understanding of antimicrobials. Also, the fact that AMR is touted to be the next pandemic cannot be ruled out, and our role assumes more importance there. All efforts now should be channelized to find such innovative solutions to address the problem of AMR.

Limitations

- Convenience sampling hampers generalizability of findings
- Self-reported data may be subject to recall and response bias
- The study was conducted at a single center

Despite these limitations, the study provides valuable insights into patient knowledge and practices regarding antimicrobial use.

CONCLUSION

The study demonstrates inadequate knowledge and inappropriate practices related to antimicrobial use among patients attending an outpatient clinic. Misconceptions regarding indications, high rates of self-medication, and poor adherence to prescribed regimens were commonly observed. This is definitely very very concerning. Educational interventions targeting patients in outpatient settings are therefore urgently needed to promote rational antimicrobial use and curb the growing threat of antimicrobial resistance.

RECOMMENDATIONS

- We should implement regular patient education programs in outpatient clinics
- We should look to strengthen regulations on over-the-counter sale of antimicrobials
- We can encourage healthcare providers to spend time counseling patients
- We can conduct larger multi-center studies to assess public awareness

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