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FROM PRESCRIPTION TO PERCEPTION: A COMPREHENSIVE SURVEY AND REVIEW ON AWARENESS OF MEDICINE, SELF -MEDICATION PRACTICES AND SIDE EFFECTS

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ABSTRACT

Background

Self-medication with non-steroidal anti-inflammatory drugs (NSAIDs), proton pump inhibitors (PPIs), and antibiotics represents a growing public health challenge in India, where over-the-counter access is widespread and pharmacological literacy remains limited. Understanding self-medication behaviour across different population groups—including trained pharmacy students, the general public, and community pharmacists—is essential for designing targeted interventions.

Objectives

This study assessed the prevalence and patterns of self-medication, pharmacological awareness regarding NSAIDs, PPIs, and antibiotics, and community pharmacy dispensing practices, with the aim of identifying knowledge-practice gaps and evaluating intergroup associations through inferential statistical analysis.

Methods

A cross-sectional survey was conducted using a structured, validated Google Form questionnaire administered to 200 respondents across three groups: pharmacy students (n=122), pharmacists/medical chemists (n=5), and the general public (n=73). Data were analysed using descriptive statistics and inferential tests including Chi-Square test, Fisher's Exact test, Mann-Whitney U test, Kruskal-Wallis test, and Spearman's rank correlation at $\alpha = 0.05$.

Results

Self-medication prevalence was 64.4% among the general public and 77.9% among pharmacy students for NSAIDs. Despite formal pharmacy enrolment, 52.5% of students had received no training in rational drug use, yet formal training showed no statistical association with NSAID self-medication behaviour ($\chi^2=0.000$, $p=1.000$). Only 37.0% of the general public correctly identified antibiotics as effective against bacterial infections, while 23.3% were aware of long-term PPI-associated risks. Significant findings included a positive correlation between counselling intent and medication safety attitude ($\rho=0.193$, $p=0.033$), and significant variation in regulatory support across antibiotic misuse groups ($H=7.020$, $p=0.030$).

Conclusion

A substantial knowledge-practice gap exists across all respondent groups. Pharmacological knowledge alone does not deter irrational self-medication behaviour. Structural interventions including stricter prescription enforcement, curriculum reform, and public medicine-literacy programmes are urgently required.

KEYWORDS: *Self-Medication, NSAIDs, Proton Pump Inhibitors, Antibiotics, Rational Drug Use, Antimicrobial Resistance.*

1. INTRODUCTION

Self-medication, defined as the use of medicines without professional consultation for self-diagnosed symptoms, has become an increasingly common healthcare behaviour worldwide. In developing countries such as India, the practice is driven by over-the-counter availability of medicines, limited healthcare accessibility, financial constraints, and widespread social acceptance of unsupervised medicine use. A recent meta-analysis estimated that nearly 64% of the Indian population engages in self-medication practices for common ailments such as fever, pain, and gastric discomfort.1

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Among the most frequently self-medicated drug categories are non-steroidal anti-inflammatory drugs (NSAIDs), proton pump inhibitors (PPIs), and antibiotics. NSAIDs such as ibuprofen, diclofenac, naproxen, and paracetamol are widely used due to their analgesic and antipyretic properties. However, inappropriate and prolonged use can lead to gastrointestinal ulceration, renal impairment, and cardiovascular complications.2,3

PPIs are commonly used acid-suppressive agents indicated for gastroesophageal reflux disease (GERD), peptic ulcer disease, and Helicobacter pylori eradication therapy. Although considered relatively safe, long-term unsupervised use has been associated with vitamin B12 deficiency, hypomagnesemia, bone fractures, renal dysfunction, and enteric infections.4,5 Reports from Indian tertiary-care hospitals indicate widespread overprescription and irrational use of PPIs, often without appropriate indications.6

The misuse of antibiotics without prescription remains one of the most serious contributors to antimicrobial resistance (AMR), which the World Health Organization recognises as a major global health threat.7 Antibiotics are frequently consumed for viral illnesses such as the common cold and influenza despite lacking therapeutic benefit in such conditions. A recent Indian systematic review reported substantial antibiotic self-medication among adolescents and young adults.8

Pharmacy students and community pharmacists represent important stakeholders in promoting rational drug use. Pharmacy students possess theoretical pharmacological knowledge and are expected to demonstrate safer medicine-use behaviour; however, studies from South Asia suggest that healthcare students frequently engage in self-medication at rates equal to or higher than the general population.9 Community pharmacists, meanwhile, often encounter barriers such as patient pressure, commercial competition, and lack of counselling infrastructure that may compromise appropriate dispensing practices.10

The present study was therefore undertaken to assess self-medication practices, pharmacological awareness, and dispensing behaviours related to NSAIDs, PPIs, and antibiotics among pharmacy students, pharmacists, and the general public in urban Rajasthan, India. In addition, inferential statistical analyses were performed to identify significant associations that may guide educational and regulatory interventions.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

A cross-sectional, questionnaire-based observational study was conducted between January and April 2025 in Udaipur, Rajasthan, India.

2.2 Study Population and Sampling

A total of 200 respondents participated in the study through purposive and convenience sampling. Participants were divided into three groups:

- Pharmacy students (n=122)
- Pharmacists/medical chemists (n=5)
- General public respondents (n=73)

Participants below 16 years of age and individuals unwilling to provide informed consent were excluded.

2.3 Data Collection Tool

Data were collected using a structured and pilot-tested questionnaire prepared using Google Forms. The questionnaire consisted of separate sections for pharmacy students, pharmacists, and the general public.

The questionnaire assessed:

- Self-medication practices
- Awareness regarding NSAIDs, PPIs, and antibiotics
- Antibiotic misuse behaviour
- Counselling attitudes
- Regulatory perceptions
- Community pharmacy dispensing practices

The questionnaire underwent face and content validation by two faculty pharmacologists and was pilot-tested among 20 participants before final implementation.

2.4 Ethical Considerations

Institutional approval was obtained prior to data collection. Participation was voluntary and informed consent was obtained from all respondents.

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2.5 Statistical Analysis

Data were analysed using Python 3 (SciPy version 1.11.0). Descriptive statistics included frequencies and percentages. Inferential statistical tests included:

- Chi-Square test of independence
- Fisher's Exact test
- Mann-Whitney U test
- Kruskal-Wallis test
- Spearman's rank correlation

Statistical significance was considered at $p < 0.05$.

3. RESULTS

3.1 Demographic Characteristics

Among the 200 respondents, pharmacy students constituted 61.0% (n=122), the general public 36.5% (n=73), and pharmacists/medical chemists 2.5% (n=5). Males accounted for 77.5% of respondents and females for 22.5%.

Table 1. Demographic profile of respondents (N = 200)

Category	Subgroup	n	%
Profession	Pharmacy Students	122	61.0
	General Public	73	36.5
	Pharmacists/Medical Chemists	5	2.5
Gender	Male	155	77.5
	Female	45	22.5
Age Group	≤18 years	23	11.5
	19–21 years	80	40.0
	22–25 years	58	29.0
	26–30 years	18	9.0
	>30 years	21	10.5

3.2 Findings Among Pharmacy Students (n = 122)

More than half of pharmacy students (52.5%) reported having no formal training in rational drug use despite active enrolment in pharmacy education.

Self-medication prevalence among students was notably high:

- 77.9% used NSAIDs without medical consultation
- 61.5% used PPIs without prescription
- 39.3% admitted using leftover antibiotics

Most students recognised the importance of pharmacist counselling, with 72.1% rating counselling as "Very Important."

Table 2. Key responses from pharmacy students

Parameter	Response	n	%
Formal RDU training received	Yes	58	47.5
	No	64	52.5
Correct identification of non-NSAID	Amoxicillin	80	65.6
Self-medicated with NSAIDs	Yes	95	77.9
	No	27	22.1
Used PPIs without prescription	Yes	75	61.5
	No	47	38.5
Used leftover antibiotics	Yes	48	39.3
	Maybe	29	23.8
	No	45	36.9
Counselling rated important	Yes	88	72.1
Likely to counsel patients in future	Likely	84	68.9

3.3 Findings Among General Public Respondents (n = 73)

Among the general public, 64.4% reported self-medication during the previous three months.

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Knowledge regarding NSAIDs, PPIs, and antibiotics was generally poor. Only 37.0% correctly identified antibiotics as medicines effective against bacterial infections.

Table 3. Pharmacological knowledge assessment among general public

Knowledge Domain	Correct/Aware (%)	Wrong/Don't Know (%)
Purpose of NSAIDs	50.7	49.3
Purpose of PPIs	42.5	57.5
Antibiotics treat bacterial infections	37.0	63.0
Antibiotic misuse causes resistance	41.1	58.9
NSAIDs may cause ulcers/stomach problems	28.8	71.2
Long-term PPI use may cause Vitamin B12 deficiency	23.3	76.7

3.4 Findings Among Pharmacists/Medical Chemists (n = 5)

Although all pharmacists reported rarely dispensing antibiotics without prescription, one pharmacist admitted dispensing antibiotics for cold or flu symptoms, suggesting inconsistency between reported practice and actual dispensing behaviour.
Commonly reported counselling barriers included:

- Time constraints
- Patient unwillingness
- Lack of counselling space

All pharmacists supported pharmacist-led public awareness initiatives.

3.5 Inferential Statistical Analysis

Table 4. Summary of inferential statistical findings

Test ID	Variables Compared	Test Used	Statistic	p-value	Significance
A5	RDU Training × NSAID Self-Medication	Chi-Square	χ^2=0.000	1.000	NS
A8	Counselling Intent × Safety Attitude	Spearman's Correlation	ρ=0.193	0.033	Significant
A10	Leftover Antibiotic Use × Regulatory Support	Kruskal-Wallis	H=7.020	0.030	Significant
C2	NSAID Knowledge × Self-Medication	Chi-Square	χ^2=3.233	0.072	Near Significant
C3	Antibiotic Knowledge × Self-Medication	Chi-Square	χ^2=0.000	1.000	NS

Significant Findings

A statistically significant positive correlation was identified between counselling intent and medication safety attitude among pharmacy students (ρ=0.193, p=0.033).
A significant difference in regulatory support scores was also observed across groups based on leftover antibiotic use history (H=7.020, p=0.030).

Critical Null Findings

Formal rational drug use (RDU) training showed no association with NSAID self-medication behaviour (χ^2=0.000, p=1.000).
Similarly, awareness regarding antibiotic resistance did not significantly influence self-medication practices among the general public.

4. DISCUSSION

The present study demonstrates a high prevalence of self-medication among both the general public and pharmacy students in urban Rajasthan. The general public self-medication prevalence of 64.4% closely parallels national estimates reported in previous Indian studies.1

The finding that 77.9% of pharmacy students self-medicated with NSAIDs despite formal pharmacological education highlights a major knowledge-practice gap. Importantly, formal rational drug use training showed no measurable association with safer medication behaviour, indicating that current educational approaches may improve theoretical knowledge without influencing real-life decision-making.

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Low public awareness regarding antibiotic use, antimicrobial resistance, and long-term PPI complications reflects inadequate community-level pharmacological literacy. The lack of behavioural change despite awareness among some respondents suggests that knowledge alone is insufficient to reduce irrational medicine use.

The positive association between counselling intent and medication safety attitudes suggests that professional identity and patient-centred orientation may influence medicine-use behaviour more effectively than traditional didactic teaching.

The pharmacist subgroup findings further highlight the role of structural barriers such as commercial pressure, patient demand, and inadequate counselling infrastructure in irrational dispensing practices.

Strengths and Limitations

A major strength of the study is the use of multiple inferential statistical methods selected according to variable type and distribution. However, the study has limitations including:

- Small pharmacist sample size
- Self-report bias
- Predominantly urban and student-based sample
- Limited generalisability to rural populations

CONCLUSION

This study demonstrates widespread self-medication practices involving NSAIDs, PPIs, and antibiotics among pharmacy students and the general public in Rajasthan.

The findings indicate that pharmacological knowledge and formal training alone are insufficient to prevent irrational medicine use. Educational reforms incorporating reflective and experiential learning, stricter prescription regulation, and public medicine-awareness programmes are urgently required.

The significant associations identified in this study suggest that behavioural and professional identity-based approaches may offer greater potential for improving rational drug use practices than knowledge-based instruction alone.

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Conflict of Interest

The author declares no conflict of interest.

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