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Research Article

Self-medication Practices in Bangladesh: A Comparative Cross-Sectional Study Between Urban and Rural Communities

Abstract

Self-medication (SM) is widely practiced in Bangladesh and constitutes a growing public health concern due to inappropriate medicine use and limited regulatory enforcement. Of particular concern is the misuse of prescription only medicines, including antibiotics, driven by decisions made without consultation from qualified healthcare practitioners. Evidence comparing determinants of self-medication between urban and rural populations remains limited. This study evaluated the prevalence and determinants of self-medication practices in Bangladesh, with a specific focus on decision making influenced by unqualified pharmacy dispensers and the misuse of antibiotics without professional supervision. A community based cross-sectional survey was conducted using a structured questionnaire administered through face-to-face interviews. A total of 530 respondents from urban and rural communities were included. Data were analyzed descriptively to assess sociodemographic characteristics, frequency of self-medication, sources of treatment decisions, indications for medicine use, and categories of drugs obtained without prescription. Self-medication was frequently practiced on a regular basis, predominantly among individuals aged 15-60 years. Decision making was largely influenced by advice from retail or community pharmacy dispensers who were not licensed medical practitioners, followed by reuse of old prescriptions and personal experience with similar illnesses. Higher educational attainment did not prevent self-medication and was associated with greater confidence in self-directed treatment decisions. Pain related conditions, febrile illness, and gastrointestinal complaints were the most common indications. A substantial proportion of respondents reported using prescription only medicines, including antibiotics, without physician consultation. Antibiotic misuse was significantly higher among rural respondents (68%) compared to urban respondents (32%), reflecting limited access to qualified healthcare providers and greater reliance on nonprofessional dispensers in rural communities. Self-medication in Bangladesh is driven primarily by nonprofessional treatment advice and inappropriate access to prescription medicines, including antibiotics. These practices pose significant risks for antimicrobial resistance and unsafe drug use. Strengthening regulation of pharmacy dispensing, restricting nonprescription antibiotic sales, and implementing targeted public health education are critical to promoting rational medicine use.

Keywords: Self-medication practices; Antibiotic misuse; Prescription-only medicines; Retail pharmacy dispensing; Urban rural comparison; Rational use of medicines; Bangladesh

Introduction

In recent years there has been an increasing trend in self-medication practice in both developed and developing countries (Ali et al.; 2012). Self-medication refers to the practice in which individuals select and use medicines to manage self-recognized symptoms or illnesses without consulting a qualified healthcare professional, including the intermittent or continued use of previously prescribed medicines without current medical supervision (WHO, 2000; Awad et al.; 2005; Zheng et al., 2023). Self-medication (SM) is a widespread and increasing practice worldwide and is considered a public health concern because it can lead to antibiotic resistance, harmful side effects, drug interactions, and delayed diagnosis of diseases (Baracaldo-Santamaría et al., 2022). Recent evidence from a systematic review and meta-analysis indicates that antibiotic self-medication remains highly prevalent worldwide, with an estimated pooled prevalence of approximately 43%. Marked differences across regions and considerable variability among studies further underscore the global and widespread misuse of antibiotics **(**Gashaw et al., 2025). The rational use of medicines means that patients receive medications that are appropriate for their clinical needs, in doses that meet their individual requirements, for an adequate period of time, and at the lowest possible cost to them and the community. When medicines are not used rationally, they may be prescribed, dispensed, or sold inappropriately, leading to poor treatment outcomes, adverse drug reactions, antimicrobial resistance, and unnecessary healthcare costs. The World Health Organization has highlighted that irrational medicine use remains a significant global health problem, particularly in low and middle income countries, and includes inappropriate self-medication with prescription only medicines (WHO, 2025). An emerging issue highlighted in recent literature is the increasing tendency of individuals to self-medicate for chronic health conditions, including hypertension, diabetes, and mental health disorders. Unlike the short-term management of minor symptoms, unsupervised use of medicines for long-term conditions carries a higher risk of inadequate disease control, adverse drug effects, and delayed recognition of complications. Evidence suggests that the continued reuse of previously prescribed medications for chronic illnesses is becoming more common, particularly in settings where access to regular medical follow-up is limited (Saha et al., 2023). At the global public health level, self-medication is increasingly recognized as a significant contributor to the antimicrobial resistance (AMR) problem. International health authorities and recent evidence syntheses have repeatedly highlighted the widespread use of antibiotics without prescription, particularly at the community level, as a major factor accelerating resistance. The continued prevalence of this behavior suggests that awareness-raising efforts alone are inadequate unless accompanied by stronger regulatory controls and improved access to appropriate healthcare services (WHO, 2025; Gashaw et al., 2025). Recent regional evidence indicates that differences between urban and rural settings play an important role in shaping self-medication practices. Individuals living in rural areas tend to depend more on self-medication because of constrained healthcare facilities, transportation difficulties, and the greater time and financial burden associated with seeking professional medical care. In contrast, urban residents often have easier access to a wide range of drug outlets, which may increase exposure to a greater variety of medicines and raise the risk of polypharmacy. Despite these distinct patterns, systematic investigation of urban rural differences in self-medication within Bangladesh remains limited (Osei-Tutu et al., 2024). In addition, the rapid expansion of digital health resources and loosely regulated online medicine vendors has further intensified self-medication practices by enabling direct access to drug-related information and products. Such autonomous medicine use frequently occurs without appropriate diagnostic evaluation, thereby increasing the likelihood of inadequate management of chronic health conditions. Strengthening regulatory oversight alongside targeted public education initiatives is therefore essential to promote patient safety and rational use of medicines (Mackey et al., 2016; Limbu et al., 2023). Furthermore, the role of non-professional medicine sellers and informal advisors remains underexplored in many settings, despite their significant influence on treatment decisions. Understanding these dynamics is essential for designing effective interventions aimed at promoting rational medicine use. The influence of pharmacies and easy access to medicines has been linked with higher self-medication practices in community settings (Chautrakarn et al., 2021). In Bangladesh, perceived convenience and medication knowledge have shown significant associations with self-medication behavior among university populations (Tohan et al., 2024). Table 1 summarizes commonly used prescription medicines involved in self-medication practices and highlights their intended therapeutic use along with associated safety concerns. The table illustrates that a wide range of drug classes including antibiotics, analgesics, acid-suppressing agents, and medications for chronic and acute conditions are frequently used without professional supervision, underscoring the potential public health risks associated with inappropriate self-medication.

Table 1. Common prescription medicines used for self-medication and associated safety concerns.

Self-medication Category	Common Examples	Intended Use	Potential Concern	Reference
Antibiotics	Amoxicillin, Azithromycin	Infections	Antimicrobial resistance	(Shah et al., 2014)
NSAIDs	Diclofenac, Naproxen	Inflammation, pain	GI bleeding, cardiovascular risk	(Krasniqi et al., 2024)
Cough & Common Cold Medicines	Codeine containing syrups, antihistamine & decongestant combinations	Cold, flu symptoms	Sedation, dependence	(Tian et al., 2025)
Vitamins & Minerals	Vitamin D (high dose), Iron, Zinc	Immunity, fatigue	Toxicity, organ damage	(Badr et al., 2022)
Acid-Suppressing Drugs	Pantoprazole	Acidity, GERD	Nutrient malabsorption, rebound acidity	(Häcker & Morck, 2012)
Antihistamines	Cetirizine, Loratadine	Allergy relief	Drowsiness, masking disease	(Idris et al., 2016)
Weight-Loss Drugs	Orlistat, Metformin	Weight management	GI effects, metabolic risk	(Abdalfattah et al., 2025)
Antidiarrheal / Antimicrobials	Metronidazole	Diarrhea	Masking infection, resistance	(Saha et al., 2023)
Prescription Analgesics	Tramadol	Moderate to severe pain	Dependence, organ toxicity	(Osei-Tutu et al., 2024)
Emergency Contraceptives	Ulipristal acetate	Unplanned pregnancy	Hormonal imbalance	(Barbian et al., 2021)
Ophthalmic Drops	Steroid antibiotic combinations	Eye infection	Glaucoma, resistance	(Alamer et al., 2023)

While self-medication has been widely studied globally, limited research compares self-medication practices between urban and rural populations in Bangladesh. Despite extensive research on self-medication, nationally comparative evidence examining urban rural differences in Bangladesh remains scarce. Existing studies primarily focus on specific cities or diseases, lacking a comprehensive evaluation of the socio-demographic factors and drug types involved in self-medication across different regions. The aim of this study is to compare self-medication practices between urban and rural populations in Bangladesh, focusing on prevalence, patterns, and socio-demographic influences. The objectives of this study were to assess the prevalence of self-medication among the general population in Bangladesh, to compare self-medication practices between urban and rural areas, to identify the common medicines and health conditions associated with self-medication, to examine the sources of information influencing self-medication behavior, and to evaluate the role of socio-demographic factors in shaping self-medication practices.

Materials and Methods

3.1 Study Design, Setting, and Population

This study was designed as a survey-based cross-sectional study to evaluate self-medication practices among the general population of Bangladesh. A total of 530 respondents, including both male and female participants from various age groups, were enrolled in the study. Data collection was conducted over a one-year period from November 2014 to October 2015. Participants were recruited from community settings without restriction to occupation, education level, or socioeconomic status. Participation was entirely voluntary, and all respondents were informed about the purpose and objectives of the survey prior to inclusion. The study was carried out across 15 districts representing diverse geographic and sociodemographic backgrounds, including Dhaka, Chattogram, Madaripur, Munshiganj, Narayanganj, Faridpur, Shariatpur, Patuakhali, Comilla, Noakhali, Barisal, Khulna,

Rajshahi, Rangpur, and Sylhet. Selection of these locations considered population diversity, accessibility, and time feasibility.

3.2 Data Collection Instrument and Procedure

Data were collected using a structured questionnaire designed to obtain information on sociodemographic characteristics, patterns of self-medication, indications for self-medication, sources of information, and types of medicines used. The questionnaire was reviewed for clarity and consistency prior to data collection. Participants were approached voluntarily, and the purpose of the study was explained before administering the questionnaire. The study was conducted in accordance with ethical principles for research involving human participants. Verbal informed consent was obtained from all respondents before data collection. Participation was voluntary, and anonymity and confidentiality of participants' information were strictly maintained throughout the study.

3.3 Data Analysis

All collected data were checked for completeness and consistency before analysis. Data were entered and analyzed using Microsoft Excel (Microsoft Corp., USA). Descriptive statistics were used to summarize frequencies and percentages. Chi-square (χ^2) tests were applied to examine associations between categorical variables, including sociodemographic factors and self-medication practices. A p-value of less than 0.05 was considered statistically significant.

Results

Distribution of Sociodemographic Characteristics of the Respondents

The study population consisted of respondents of varying ages, gender, and residential backgrounds. Male participants predominated, and most respondents belonged to the economically active age group. A higher proportion of participants were married, and representation from both urban and rural areas was comparable. Overall, the sample reflected a diverse sociodemographic profile suitable for evaluating self-medication practices.

Table 2. Sociodemographic characteristics of respondents with chi-square analysis (n = 530)

Variable	Category	Frequency (n)	Percentage (%)	χ^2 value	p-value
Gender	Male	435	82.0	218.11	<0.001
	Female	95	18.0		
Place of Residence	Urban	281	53.0	1.93	0.165
	Rural	249	47.0		
Age Group (years)	15–30	276	52.0	238.75	<0.001
	31–60	244	46.0		
	>60	10	2.0		
Marital Status	Married	339	64.0	316.46	<0.001
	Unmarried	186	35.0		
	Widowed/Divorced	5	1.0		
Monthly Income (BDT)	0–5000	196	37.0	110.11	<0.001
	5001–15000	170	32.0		
	15001–30000	127	24.0		
	>30000	37	7.0		
Educational Status	Illiterate	117	22.0	128.82	<0.001
	Primary	32	6.0		
	Secondary	191	36.0		
	University	190	36.0		
Occupation	Employed	334	63.0	286.29	<0.001
	Unemployed	180	34.0		
	Retired	16	3.0		

Chi-square tests were used to examine distributional differences across categorical variables within the study population. The findings indicate that self-medication was commonly practiced, with most respondents reporting

regular use on a weekly or monthly basis. The primary motivation for self-medication was the perception of illness as minor, followed by prior experience with similar health conditions. Retail pharmacies emerged as the most influential source of information guiding self-medication practices, while previous prescriptions and advice from family or friends also played a notable role. Formal sources such as drug information leaflets and mass media contributed minimally. Overall, the results highlight the central role of retail pharmacies and personal experience in shaping self-medication behavior.

Table 3. Framework of the self-medication Decision Process among Respondents

Step	Component	Key Contributor
Step 1	Frequency of practice	Regular use (weekly or monthly)
Step 2	Motivation for self-medication	Perceived minor or simple illness
Step 3	Information pathway	Retail pharmacy
Step 4	Reinforcing factor	Previous experience with similar conditions

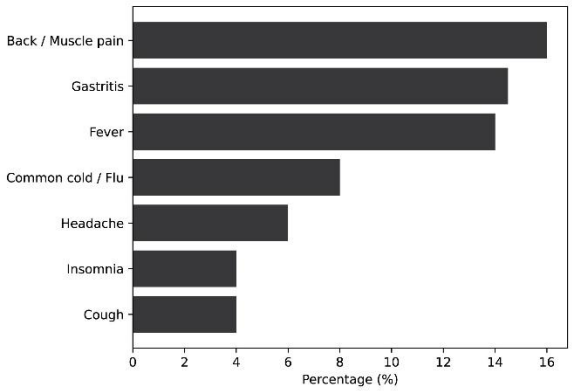

Figure 1: Major indications for self-medication among the study population. Back or muscle pain was the most frequently reported indication, followed by gastritis and fever, while conditions such as headache, insomnia, and cough were reported less frequently.

The distribution of health conditions for which self-medication was practiced differed between urban and rural populations. To better understand these variations, the most frequently reported indications were analyzed comparatively. Figure 2 presents the top indications for self-medication in urban and rural areas, highlighting differences in the pattern and prevalence of commonly reported conditions between the two settings.

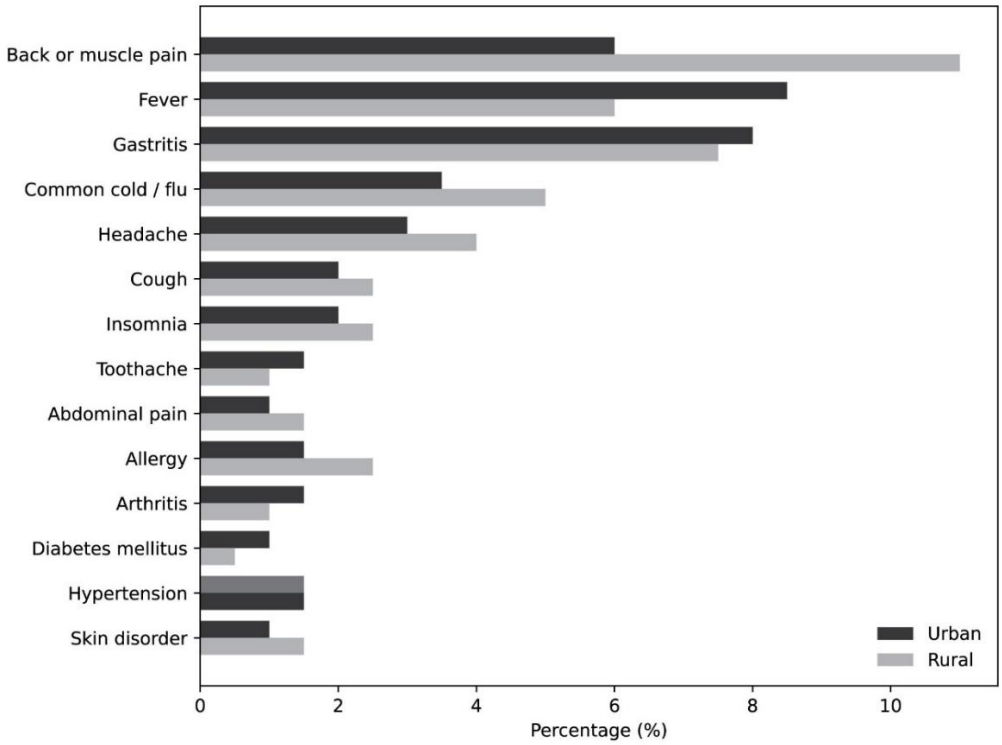

Figure 2: Comparative Indications for self-medication in Urban and Rural Areas (Top 14). The comparative analysis of indications for self-medication shows clear differences between urban and rural populations. Back or muscle pain was the most common indication in rural areas, while fever and gastritis were more frequently

reported in urban settings. Rural respondents showed higher self-medication practices for common cold, headache, insomnia, and allergy, whereas urban respondents demonstrated relatively greater use for fever, gastritis, and toothache. Overall, rural populations relied more on self-medication for pain-related and common illnesses, while urban populations showed higher use for gastrointestinal and febrile conditions.

Table 4. Medicine Groups Used for Self-medication (n = 530)

Medicine group	Number of respondents (n)	Percentage (%)
Proton pump inhibitors	121	22.8
Non-steroidal anti-inflammatory drugs (NSAIDs)	119	22.5
Antibiotics	76	14.3
Cough preparations	67	12.6
Antihistamines	65	12.3
H2 blockers	29	5.5
Antacids	14	2.6
Vitamins	14	2.6
Topical skin preparations	14	2.6
Anti-diabetic drugs	12	2.3
Antihypertensive drugs	11	2.1
Eye drops	11	2.1
Antidiarrheals / antiprotozoal agents	11	2.1
Sedatives	6	1.1
Antiemetics	6	1.1
Steroids	5	0.9
Herbal preparations	4	0.8
Bronchodilators	2	0.4
Antispasmodics	2	0.4
Antifungal drugs	1	0.2

Comparative analysis of medication use between urban and rural respondents demonstrates a consistently higher tendency toward self-medication among individuals residing in rural areas for most medicine groups. Antibiotic use was notably higher in the rural population compared to the urban population, indicating a greater reliance on antibiotics without prescription in rural settings. A similar pattern was observed for non-steroidal anti-inflammatory drugs (NSAIDs), where rural respondents showed higher usage than their urban counterparts. Proton pump inhibitors and H2 blockers were also more frequently used in rural areas, suggesting increased self-management of gastrointestinal symptoms among rural respondents. Antihistamines and cough preparations followed the same trend, with rural usage exceeding urban usage, reflecting a higher prevalence of self-treatment for allergic and respiratory conditions in rural communities.

In contrast, urban respondents showed relatively comparable or slightly higher use of certain medications such as eye drops, topical skin preparations, and vitamins; however, the overall differences remained modest. Less frequently used medication groups including antidiabetic drugs, antihypertensives, antispasmodics, bronchodilators, and antifungal agents were reported at low levels in both settings, though rural use remained marginally higher in most categories.

Overall, the findings indicate that rural populations exhibit a greater inclination toward self-medication across multiple therapeutic categories, particularly for antibiotics, NSAIDs, and acid-suppressing drugs, compared to urban populations. A higher proportion of antibiotic self-medication was observed among rural respondents than urban respondents (68% vs. 32%), with chi-square analysis indicating a significant association between place of residence and antibiotic use ($p < 0.05$).

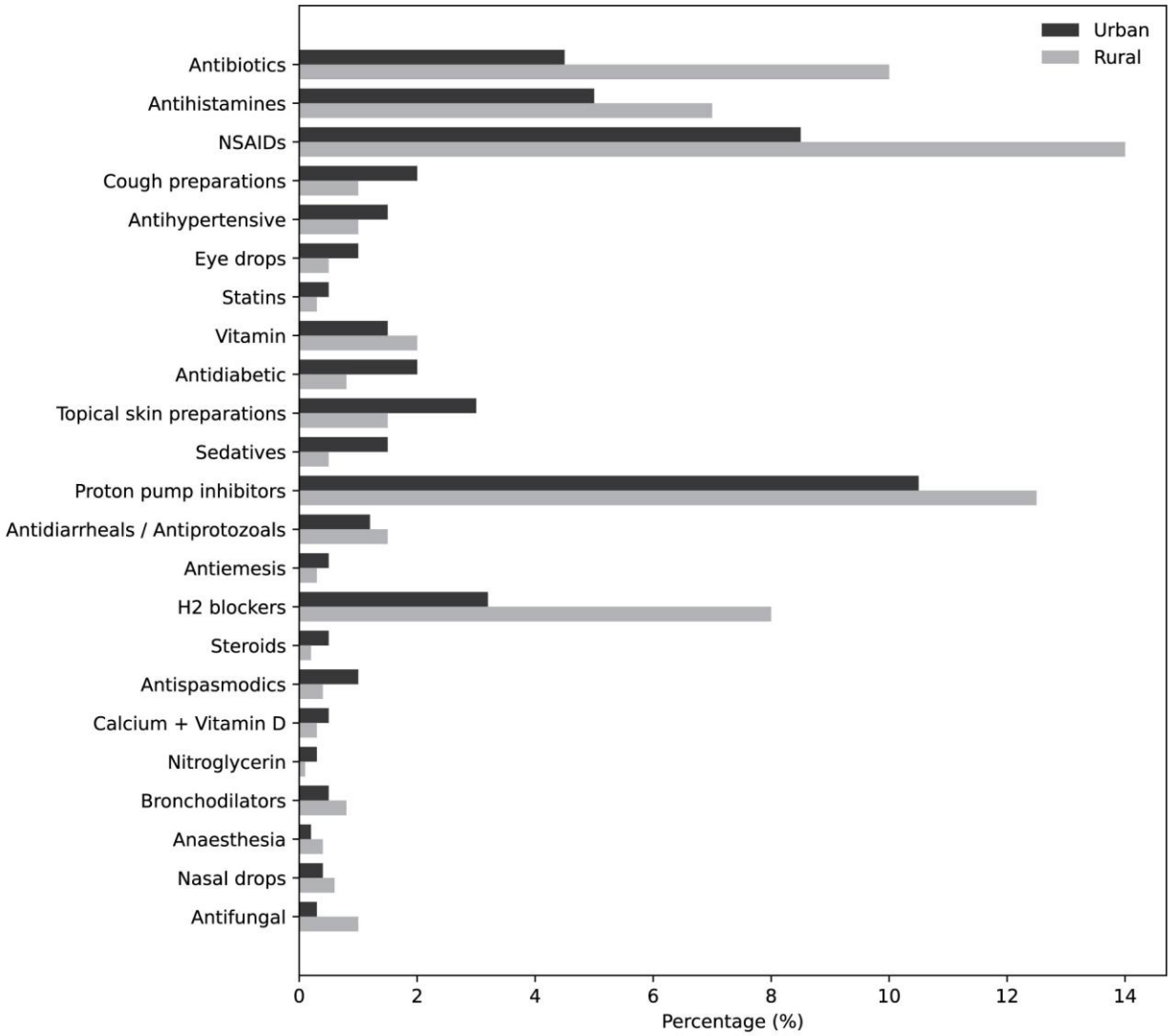

Figure 3: Comparative distribution of self-medicated drug categories in urban and rural populations. The percentage distribution of commonly self-medicated drug categories among urban and rural respondents. Higher use of antibiotics, NSAIDs, and proton pump inhibitors was observed in rural areas compared to urban areas. Urban respondents showed relatively lower but comparable use across most medication groups. The findings highlight notable rural and urban differences in self-medication practices, particularly for analgesics and gastrointestinal medications.

Discussion

Comparing results of this study with those of other studies conducted in other countries seems somewhat difficult due to differences in cultures, health care systems, and the roles of community pharmacies. This study found that male respondents practiced self-medication to a larger extent than females. This result is consistent with the findings of another study (Jasim et al., 2014) and contradicts other studies (Carrasco et al., 2009; Chua et al., 2011).

This study indicated that about 98% of the study population were 15–60 years old, which seems logical since individuals in this age group have a greater ability than older individuals to move and seek medications, due to fewer incidences of joint or cardiovascular diseases compared to older people (Kaye et al., 2010; Lakatta, 2002; North et al., 2012).

In this study, most respondents were married, which may be attributed to religious and traditional considerations that encourage marriage at younger ages.

About two-thirds of the study population ranked their monthly income as less than good. This result is consistent with other studies conducted in developing countries, which found that the majority of the population practicing self-medication belonged to a low economic status group (Worku et al., 2003).

This study demonstrated that about 71% of respondents were literate. This could be explained by the increasing percentage of educated individuals in the general population.

The primary reason mentioned by 41% of respondents for practicing self-medication was the perception of having a simple ailment that did not require physician consultation. This finding is consistent with another study, which showed that patients' perception of their current conditions as simple illnesses was the dominant factor behind self-medication practices (James et al., 2008).

The second most common reason for practicing self-medication among nearly two-thirds of the study population was prior experience and knowledge of treatment from similar previous ailments. This may be explained by individuals' ability to remember medications, whether prescribed or over-the-counter (OTC), used for similar previous conditions, especially when such medications were effective in improving symptoms (Widayati et al., 2011).

The most important source of information for self-medication reported in this study was retail dispensers, who are licensed to sell medicines but not to prescribe them.

The second most important source was previous prescriptions, which were reused without re-consultation. Friends and family members who had suffered from similar conditions were also identified as important sources of information. The study showed that some conditions treated through self-medication were minor and did not require physician consultation; however, other conditions required medical supervision for appropriate evaluation and treatment.

Pain (17%), fever (15%), and gastritis (15%) were the main indications for self-medication. However, some critical conditions, such as diabetes mellitus and hypertension, were also treated through self-medication, which require proper medical consultation and supervision.

Respondents used a wide range of drug classes for self-medication. Some of these drugs were available over the counter and could be dispensed based on patient requests, while others were prescription only medications that should be used under physician supervision. Approximately 14% of the study population reported using antibiotics without prescription. Among antibiotic users, 32% were from urban areas, whereas 68% were from rural areas. This higher use in rural areas may reflect limited access to healthcare facilities and delayed physician consultation. Additionally, the use of sedatives (5%) and cough preparations (2%) raises concerns regarding potential misuse. The self-medication use of antidiabetic (2%) and antihypertensive drugs (3%), often sourced from retail dispensers or previous prescriptions, also poses significant health risks.

Study Limitations

This study has certain limitations. The data were self-reported and therefore subject to recall bias. Cross-sectional design limits causal interpretation. Additionally, the study was conducted in selected districts, which may limit the generalizability of the findings to the entire population of Bangladesh. Although data were collected earlier, the findings remain relevant due to persistent self-medication practices and ongoing regulatory challenges in Bangladesh.

Conclusion and Future Direction

This study demonstrates that self-medication is a widespread practice among the general population of Bangladesh, occurring in both urban and rural communities. The findings indicate that self-medication is most prevalent among individuals aged 15–60 years and is strongly influenced by perceptions of illness as minor, previous treatment experience, and advice obtained from retail pharmacy dispensers. Despite relatively high literacy levels among respondents, inappropriate self-medication practices persisted, including the use of prescription only medicines such as antibiotics, sedatives, antihypertensive, and antidiabetic drugs without professional consultation. A notable rural urban disparity was observed, with rural populations exhibiting higher reliance on antibiotics and other

prescription medicines, likely reflecting limited access to qualified healthcare services and greater dependence on nonprofessional dispensers. The predominant use of analgesics, acid-suppressing drugs, and antibiotics raises significant public health concerns, particularly regarding antimicrobial resistance, drug misuse, and delayed diagnosis of chronic diseases. Overall, the findings highlight gaps in regulatory enforcement, public awareness, and pharmacy practice that contribute to unsafe medication behaviors.

Future efforts should focus on strengthening regulatory control over the dispensing of prescription-only medicines, particularly antibiotics, through stricter enforcement of existing drug laws and enhanced monitoring of retail pharmacy practices. Capacity building and formal training for retail pharmacy dispensers are essential to promote rational medicine use and appropriate referral to qualified healthcare professionals.

Public health education campaigns targeting both urban and rural populations should be implemented to improve awareness of the risks associated with inappropriate self-medication, especially for chronic and infectious diseases. Further research using longitudinal and intervention-based study designs is recommended to assess causal factors and evaluate the effectiveness of policy and educational interventions. Integrating pharmacists more effectively into primary healthcare services and expanding access to affordable medical consultation, particularly in rural areas, may play a critical role in reducing unsafe self-medication practices in Bangladesh.

List of Abbreviations

(List all the abbreviations appeared in your manuscript as given below)

SM: Self-medication, OTC: Over the Counter, NSAIDs: Non-Steroidal Anti-Inflammatory Drugs, PPI: Proton Pump Inhibitor, H2 blocker: Histamine 2 Receptor Antagonist, GERD: Gastroesophageal Reflux Disease, WHO: World Health Organization, BDT: Bangladeshi Taka, GI: Gastrointestinal

Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions Statement **(State the contributions of each author as given below)**

Conceptualization: BMS conceptualized and designed the study. BMS, ZI, MNR, and FA were responsible for data collection, including prescription review and participant interviews. MKM, MR, and UA contributed to data organization and initial manuscript drafting. BMS conducted critical review, editing, and overall supervision of the manuscript. Final manuscript preparation and approval were carried out by BMS, ZI, MNR, and FA. NN provided project supervision and methodological guidance. All authors read and approved the final version of the manuscript.

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Data Availability Statement

Data relevant to the study is already included in the article or attached in the supplements. Raw data will be provided upon reasonable request by contacting the corresponding author.

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