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Self-Medication and Its Contribution to Antibiotic Resistance: Insights from a Cross-Sectional Study Among Urban Households

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ABSTRACT

Background: Self-medication with antibiotics is an escalating public health concern, particularly in developing countries, contributing significantly to the global threat of antimicrobial resistance. ***Objective:*** This cross-sectional study aimed to assess the prevalence of antibiotic self-medication, identify commonly used antibiotics, and evaluate public awareness of antibiotic resistance among urban households in Khulna, Bangladesh. ***Methodology:*** A total of 300 adult participants were recruited from three major medical institutions in Khulna city between June 2023 to June 2024. Data was collected using a structured questionnaire, and analysis was performed with SPSS. Descriptive statistics and chi-square tests were used to identify associations, with p-values <0.05 considered statistically significant. ***Result:*** The study revealed a high prevalence of self-medication, with 72.0% of participants reporting antibiotic use without a prescription. The most common reason for not completing the full course was early symptom relief (57.9%). Metronidazole (38.0%) and Ciprofloxacin (26.9%) were the most frequently used antibiotics, primarily obtained from pharmacies without a prescription (58.3%). Awareness of antibiotic resistance was low; only 47.3% had heard of the term, and 37.3% believed that misuse contributes to resistance. A statistically significant association was observed between education level and self-medication practices (p = 0.032), with the highest prevalence among those with no formal education (85.7%) and the lowest among graduates or higher (76.9%). ***Conclusion:*** These findings highlight a high rate of unprescribed antibiotic use and a substantial lack of awareness regarding antibiotic resistance in urban Khulna. They underscore the urgent need for targeted public health interventions and stricter regulation of antibiotic sales to combat antimicrobial resistance effectively.

Keywords: Self-Medication, Antibiotic Resistance, Urban Households.

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INTRODUCTION

Antibiotics have fundamentally transformed modern medicine, drastically reducing mortality and morbidity from infectious diseases. However, the benefits of these life-saving drugs are being eroded by their inappropriate use, which remains a growing global problem despite increased awareness among health professionals and the public.[1,2] Misuse accelerates the emergence of antibiotic-resistant microorganisms, a major public health crisis.[3, 4] It is estimated that 700,000 lives are lost annually due to antibiotic resistance, and this number could exceed 10 million by 2050 if current trends continue.[5] The economic burden is equally severe, with nations facing rising healthcare expenditures and productivity losses.[6-8] Without urgent collective action, the world risks entering a "post-antibiotic era," where common infections could once again become fatal.[9] While developed countries often face antibiotic resistance due to hospital overuse, in low- and middle-income countries (LMICs) the problem is largely driven by weak regulations, substandard drug quality, and unregulated access to antibiotics.[10] This easy access promotes self-medication, a major driver of antibiotic misuse worldwide.[4,11,12]

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The World Health Organization (WHO) defines self-medication as the use of drugs to treat self-diagnosed conditions or the inappropriate use of prescribed medicines.[13] Such practices may involve incorrect drug selection, improper dosage, or incomplete treatment courses.[14] Antibiotics for self-medication are commonly obtained through over-the-counter sales, leftover supplies, or sharing among family and friends.[15,16] Globally, more than 50% of antibiotics are purchased without a prescription.[17] The problem is particularly critical in LMICs, where self-medication often substitutes for formal healthcare due to financial constraints and limited-service availability.[4,15,18,19] As a result, these regions report disproportionately higher rates of antimicrobial resistance compared to high-income countries.[20,21] Contributing factors include cost barriers, time limitations, social influence, and aggressive pharmaceutical advertising.[14,19] While self-medication may provide short-term benefits such as convenience and reduced expenses, its long-term consequences—especially the acceleration of antibiotic resistance—pose serious global health risks.[22] Against this backdrop, the present study was conducted in Khulna, Bangladesh, to assess the prevalence of antibiotic self-medication, identify commonly used antibiotics, explore sources of procurement, and evaluate awareness regarding antibiotic resistance among urban households.

METHODOLOGY

A cross-sectional study was conducted in Khulna city from June 2023 to June 2024 to explore self-medication practices and their role in antibiotic resistance. Data was collected from three medical institutions: Khulna City Medical College Hospital, Gazi Medical College and Hospital, and Khulna Specialized Hospital. A total of 300 adult participants were recruited from both indoor and outdoor departments of these hospitals, presenting them with different types of infections. Participants were selected purposively, ensuring they were permanent residents of urban Khulna for at least one year and aged 18 years or older. Healthcare professionals and critically ill patients unable to respond were excluded.

A structured questionnaire was used to collect data through face-to-face interviews, covering socio-demographic characteristics, self-medication behavior, types and sources of antibiotics used without prescription, and awareness regarding antibiotic resistance. Data was analyzed using SPSS software. Descriptive statistics and chi-square tests were applied to determine associations between self-medication and socio-demographic factors, with a p-value <0.05 considered significant. Ethical approval was obtained from the Institutional Review Board of Khulna City Medical College. Written informed consent was taken from all participants, ensuring confidentiality and anonymity.

RESULTS

Table 1: Socio-Demographic Characteristics of Participants (N = 300)

Characteristic	Category	n	%
Age Group	18–30 years	92	30.7
	31–43 years	84	28.0
	44–56 years	62	20.7
	57–69 years	42	14.0
	≥70 years	20	6.6
Gender	Male	172	57.3
	Female	128	42.7
Education Level	No formal	42	14.0
	Primary	78	26.0
	Secondary	118	39.3
	Tertiary+	62	20.7
Monthly Income (BDT)	<10,000	85	28.3
	10,000–20,000	138	46.0
	>20,000	77	25.7
Occupation	Formal employed	106	35.3
	Self-employed	87	29.0
	Homemaker	62	20.7

	Student	45	15.0

Table 1 shows that most participants belonged to the age group 18–30 years (30.7%), followed by 31–43 years (28.0%). Males (57.3%) outnumbered females (42.7%). Nearly 40% of participants had completed secondary education, while 20.7% had tertiary-level education. The majority (46%) reported monthly income between 10,000–20,000 BDT.

Table 2: Self-Medication Practices Among Participants (N = 300)

Variable	Category	n	%
Practiced self-medication with antibiotics	Yes	216	72.0
	No	84	28.0
Frequency of use (past 12 months)*	Once	70	32.4
	2–3 times	108	50.0
	>3 times	38	17.6
Common infections self-treated*	Respiratory	118	54.6
	Gastrointestinal	62	28.7
	Skin/urinary	36	16.7
Completion of full antibiotic course*	Yes	95	44.0
	No	121	56.0
Reason for not completing course*	Symptom relief	70	57.9
	Side effects	26	21.5
	Cost	25	20.6

*Calculated among those who practiced self-medication (n = 216).

Table 2 illustrates that 72% of participants practiced self-medication with antibiotics, most frequently 2–3 times in the past year (50%). Respiratory infections (54.6%) were the most common condition for which self-medication was practiced. More than half (56%) did not complete the full antibiotic course, with the main reason being early symptom relief (57.9%).

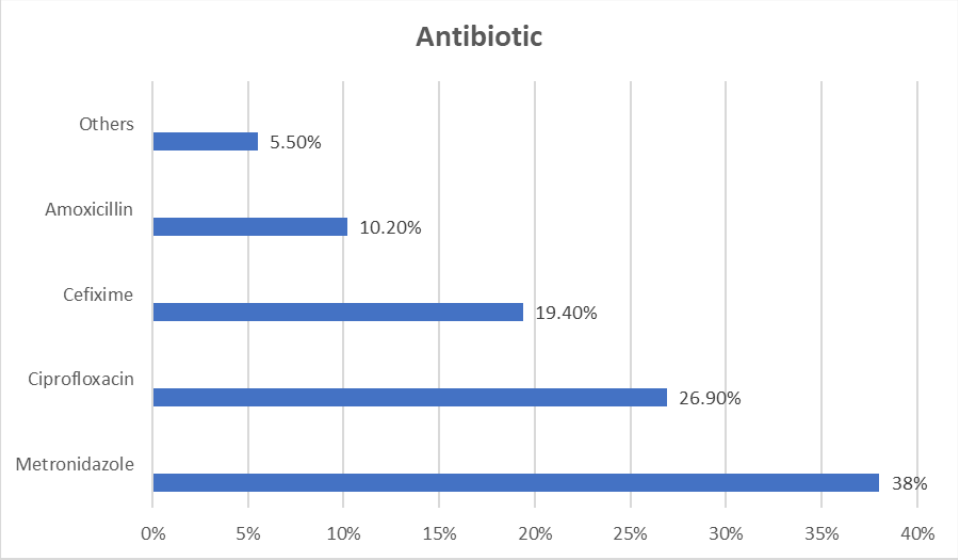

Figure 1: Antibiotics Commonly Used Without Prescription (n = 216)

Figure 1 presents that Metronidazole 82 (38.0%) was the most frequently used antibiotic without prescription, followed by Ciprofloxacin 58 (26.9%) and Cefixime 42 (19.4%).

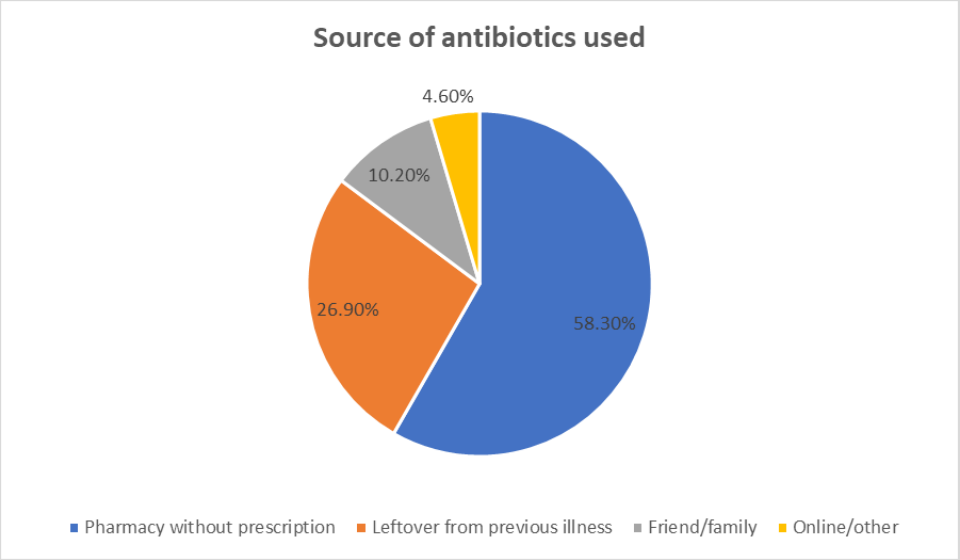

Figure 2: Source of Antibiotics Used for Self-Medication (n = 216)

Figure 2 illustrates that, among the 216 individuals who practiced self-medication with antibiotics, the majority obtained them from pharmacies without prescription 126 (58.3%), followed by leftover medicines from previous illnesses 58 (26.9%).

Table 3: Awareness Regarding Antibiotic Resistance (N = 300)

Awareness aspect	n	%
Heard about antibiotic resistance	142	47.3
Believe misuse contributes to resistance	112	37.3

Table 4: Association between Education Level and Self-Medication (N = 300)

Education Level	Practiced self-medication (n, %)	Did not practice (n, %)	Total	p-value
No formal education	36 (85.7%)	6 (14.3%)	42	
Primary (Class 1–5)	56 (71.8%)	22 (28.2%)	78	
Secondary (Class 6–10 / SSC)	80 (67.8%)	38 (32.2%)	118	
Higher secondary (Class 11–12 / HSC)	24 (66.7%)	12 (33.3%)	36	
Graduate & above (University level)	20 (76.9%)	6 (23.1%)	26	
Total	216 (72.0%)	84 (28.0%)	300	**0.018**

Table 4 indicates the relationship between education level and the practice of self-medication among the participants. The prevalence of self-medication was highest among individuals with no formal education (85.7%). In contrast, the lowest prevalence was observed in the group with a graduate degree or higher (76.9%). This association between education and self-medication was found to be statistically significant (χ^2 test, $p = 0.018$), suggesting that as the level of education increases, the likelihood of practicing self-medication tends to decrease.

DISCUSSION

This study highlights a high prevalence of antibiotic self-medication among urban residents of Khulna, consistent with findings from other studies in Bangladesh and low- and middle-income countries. Easy access to antibiotics, lack of awareness regarding their proper use, and financial constraints appear to drive this behavior.[7, 8] The finding that 72.0% of participants self-medicated with antibiotics is a major public health concern, reflecting gaps in healthcare access, public knowledge, and regulatory enforcement. Respiratory infections were the most

common self-treated condition, likely due to their frequent occurrence and the public's familiarity with antibiotic use for coughs and colds.[10,14] However, many respiratory infections are viral, and the unnecessary use of antibiotics contributes directly to antimicrobial resistance. Over half of the participants (56.0%) did not complete their full antibiotic course, primarily because of early symptom relief. This behavior facilitates the survival of resistant bacterial strains, underscoring the need for improved public education on the proper use of antibiotics.[18,19] Pharmacies were the main source of unprescribed antibiotics (58.3%), followed by leftover medication (26.9%), indicating that enforcement of prescription regulations and patient counseling remain inadequate. Awareness of antibiotic resistance was low; only 47.3% had heard of the term, and 37.3% understood the link between misuse and resistance. Education level was significantly associated with self-medication practices (χ^2, $p \approx 0.032$), with higher education linked to lower likelihood of self-medication. This suggests that improving health literacy through public campaigns could effectively reduce the inappropriate use of antibiotics.

Limitations

The study's cross-sectional design limits causal inference, and purposive sampling may introduce selection bias, restricting generalizability. Future research should use larger, representative samples and longitudinal designs to understand trends and determinants of self-medication better.

Conclusion and Recommendations

High rates of antibiotic self-medication in Khulna, coupled with low awareness and poor adherence, pose a substantial risk for antimicrobial resistance.
We recommend:
Stricter regulatory enforcement to prevent the sale of antibiotics without a prescription.
Public awareness campaigns to educate on proper antibiotic use and the dangers of resistance.
Improved healthcare access to reduce reliance on self-medication.

REFERENCES

1. Aslam B, Wang W, Arshad MI, Khurshid M, Muzammil S, Rasool MH, et al. Antibiotic resistance: a rundown of a global crisis. Infect Drug Resist. 2018;11:1645–58.
2. Ayukekbong JA, Ntemgwa M, Atabe AN. The threat of antimicrobial resistance in developing countries: causes and control strategies. Antimicrob Resist Infect Control. 2017;6(1):47.
3. Roberts SC, Zembower TR. Global increases in antibiotic consumption: a concerning trend for WHO targets. Lancet Infect Dis. 2021;21(1):10–1.
4. Bennadi D. Self-medication: a current challenge. J Basic Clin Pharm. 2013;5(1):19–23.
5. Government of the United Kingdom. Tackling drug-resistant infections globally: final report and recommendations. 2016.
6. McGowan JE. Economic impact of antimicrobial resistance. Emerg Infect Dis. 2001;7(2):286–92.
7. Ahmad M, Khan AU. The global economic impact of antibiotic resistance: a review. J Glob Antimicrob Resist. 2019;19:313–6.
8. Founou RC, Founou LL, Essack SY. Clinical and economic impact of antibiotic resistance in developing countries: a systematic review and meta-analysis. PLoS ONE. 2017;12(12):e0189621.
9. Global action plan on antimicrobial resistance. Geneva: World Health Organization; 2015.
10. Chokshi A, Sifri Z, Cennimo D, Horng H. Global contributors to Antibiotic Resistance. J Glob Infect Dis. 2019;11(1):36–42.
11. Malik B, Bhattacharyya S. Antibiotic drug-resistance as a complex system driven by socio-economic growth and antibiotic misuse. Sci Rep. 2019;9(1):9788.
12. Prestinaci F, Pezzotti P, Pantosti A. Antimicrobial resistance: a global, multifaceted phenomenon. Pathog Glob Health. 2015;109(7):309–18.
13. World Health Organization. The role of pharmacists in self-medication: an overview. Geneva: World Health Organization; 1998.
14. Atif M, Asghar S, Mushtaq I, Saleem A, Ahmad N, Butt N, et al. What drives inappropriate use of antibiotics? A mixed methods study from Bahawalpur, Pakistan. Infect Drug Resist. 2019;12:687–99.
15. Ocan M, Obuku EA, Bwanga F, Akena D, Richard S, Ogwal-Okeng J, et al. Household antimicrobial self-medication: a systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. BMC Public Health. 2015;15(1):742.
16. Aslam A, Gajdács M, Zin CS, Rahman NSA, Ahmed SI, Zafar MZ et al. Evidence of the Practice of Self-Medication with Antibiotics among the Lay Public in Low- and Middle-Income

Countries: A Scoping Review. Antibiotics. 2020;9(9):571.
17. Cars O, Nordberg P. Antibiotic resistance – the faceless threat. Int J Risk Saf Med. 2005;17(3):103–10.
18. Otaigbe II, Elikwu CJ. Drivers of inappropriate antibiotic use in low- and middle-income countries. JAC-Antimicrob Resist. 2023;5(3):dlad062.
19. Sunny TP, Jacob R, Varghese KK. Self-medication: is a serious challenge to control antibiotic resistance? Natl J Physiol Pharm Pharmacol. 2019;9(9):821.
20. Belachew SA, Hall L, Selvey LA. Non-prescription dispensing of antibiotic agents among community drug retail outlets in Sub-Saharan African countries: a systematic review and meta-analysis. Antimicrob Resist Infect Control. 2021;10:11.
21. Chalker J. Improving antibiotic prescribing in Hai Phong Province, Viet Nam: the "antibiotic-dose" indicator. Bull World Health Organ. 2001;79(4):313–20.
22. World Health Organization. Antimicrobial resistance. 2024.