Knowledge, Attitudes, and Practices Regarding Antibiotic Usage Among the General Population of Dhaka City

Nafisa Ahmed[1], Md. Alimur Reza[2], Md Ashiqur Rahman[3], Arifa Akram[4]

[1]Assistant Professor, Department of Obstetrics & Gynaecology, Medical College for Women and Hospital, Dhaka, Bangladesh; [2]AGM, Department of Medical Affairs, Beximco Pharmaceuticals Ltd. Dhaka, Bangladesh; [3]Officer, Department of Laboratory Medicine, Novus Clinical Research Services Limited (NCRSL), Dhaka, Bangladesh; [4]Assistant Professor, Department of Virology, National Institute of Laboratory Medicine and Referral Centre, Dhaka, Bangladesh

Abstract

Background: Antibiotic resistance is a growing global health threat, causing treatment failures and increased healthcare costs. **Objective:** This study was aimed to investigate the knowledge, attitudes, and practices (KAP) surrounding antibiotic use among the general population of Dhaka city. **Methodology:** The cross-sectional descriptive study was conducted at the epidemiology department of the State University of Bangladesh, Dhaka, Bangladesh from July to December 2013 for a period of 6 months. They are above 18 years old; they are aware of the term "antibiotics". Participants were excluded if he/she refused to participate in the study and the participants who were unable to provide information due to physical or mental illness. Three selected wards in Dhaka city were included in this study, with a total sample size of 120. A self-administered pre-tested questionnaire prepared in English was used for data collection. Data were presented as mean ± SD, with prevalence rates as percentages. Tests of significance and cross-tabulation were used to determine the relation between socio-demographic characteristics and antibiotic use. **Results:** The study revealed that among the respondents, 68(56.7%) used antibiotics without a doctor's prescription (self-medication). In this study, a total of 112(93.33%) respondents used antibiotics, while only 8(6.67%) did not use antibiotics. 32(47.1%) respondents selected antibiotics from a previous doctor's prescription, and 30(44.1%) based their choice on the community pharmacist's recommendation. Among the respondents, 85(71.4%) used antibiotics due to fever, 47(39.5%) due to cough, 39(32.8%) due to diarrhea, and 37(31.1%) due to aches and pains. Out of the 120 respondents, the majority, about 72(60%), had poor knowledge, followed by 40(33.3%) who had satisfactory knowledge, and only 8(6.7%) who had good knowledge. A statistically significant association was found between self-medication and the level of knowledge (P-value <0.05), level of attitude (P<0.05), and level of education (P<0.05), underscoring the profound impact of these factors on antibiotic use. **Conclusion:** In conclusion self-medication with antibiotics is prevalent among the general public in Dhaka city. We need to implement a robust educational program to increase awareness about the negative impacts of using antibiotics without a doctor's prescription. [*Bangladesh Journal of Infectious Diseases, June 2025;12(1):69-77*]

Keywords: Antibiotic resistance; Self-medication; KAP; Bangladesh.

Correspondence: Dr Arifa Akram, Assistant Professor, National Institute of Laboratory Medicine and Referral Centre, Sher-E-Bangla Nagar, Agargaon, Dhaka-1207, Bangladesh; **Email:** drbarna43@gmail.com; **Cell No.:** +8801816296249; ORCID: https://orcid.org/0000-0001-8829-9817

Introduction

Antimicrobial resistance (AMR) is a paramount global concern for public health and development. In 2019, it was directly linked to approximately 1.27 million global fatalities and contributed to 4.95 million deaths[1]. The proliferation of drug-resistant pathogens primarily stems from the excessive and inappropriate use of antimicrobials in humans, animals, and plants. AMR impacts nations across all income levels and geographical regions, rendering infections more challenging to treat and heightening the risks associated with medical procedures such as surgery, cesarean sections, and cancer chemotherapy. The world confronts a crisis in antibiotic availability and accessibility. The mounting levels of resistance underscore an insufficient research and development pipeline, necessitating additional measures to ensure fair access to both new and existing vaccines, diagnostics, and medications. Beyond its toll on lives and well-being, AMR bears substantial economic costs. The World Bank projects that by 2050, AMR could result in an extra $1 trillion in healthcare expenses and annual gross domestic product (GDP) losses ranging from $1 trillion to US$3.4 trillion by 2030[2].

The widespread availability and inappropriate use of antibiotics by both patients and healthcare providers are significant contributing factors to the rise of drug resistance, particularly with key antibiotics used in the treatment of prevalent diseases[3]. There is a concern that this misuse may lead to the rapid loss of effectiveness of newly discovered antibiotics. Inappropriate antibiotic use encompasses unnecessary administration for non-responsive conditions and suboptimal usage for antibiotic-responsive conditions, including overly broad agents, incorrect drug dosing or duration, and poor drug adherence. Antibiotics are accessible to the public through various sources in developing countries, including hospitals, pharmacies, licensed medicine stalls, and drug stores, often without requiring a prescription[4]. This broad availability has led to the inappropriate use of antibiotics and, subsequently, a steady increase in drug resistance. Therefore, there is currently widespread recognition of the serious health implications of inappropriate antibiotic prescribing and use in both industrialized and non-industrialized countries.

A study conducted in Bangladesh found that 63.0% of antibiotics were prescribed by unqualified healthcare providers, and 44.0% of patients obtained prescribed antibiotics without a proper diagnosis from authorized sources[5]. Furthermore, a significant proportion of physicians, totaling 31.9%, reported never receiving any feedback on the antibiotics they prescribe[6]. Physicians have attributed patient non-compliance as the primary cause of antibiotic resistance in Bangladesh, with 68.8% indicating this factor[7]. Additionally, more than 50% of patients were reported to discontinue antibiotic usage as soon as their symptoms subsided. The prevalence of self-medication with antibiotics was found to be substantial in various regions, ranging from 24% to 73.9% in Africa[8-10], 4% to 75% in Asia[11-17], 36.1% to 45.8% in the Middle East[18-22], and 29%[23-24] in South America. In developed countries, the prevalence of self-medication with antibiotics was lower, with rates reported as 3% in northern Europe[25-26], 6% in central Europe[27], and 19% in southern Europe[28-30].

The prevalence of self-medication with antibiotics is linked to several distinct risk factors, including prior knowledge of antibiotics, advanced age, and higher monthly income[31-32]. This indiscriminate use of antibiotics has been associated with various adverse outcomes, such as the emergence of antibiotic-resistant bacteria in hospitals, waterborne, and food-borne infections, as well as health issues like enteropathy (such as irritable bowel syndrome and antibiotic-associated diarrhea), drug hypersensitivity, biosphere disruption, and the promotion of human and animal growth[33]. Furthermore, the unrestricted availability of antibiotics and other medications in Bangladesh can contribute to the high and inappropriate use of antibiotics. Consequently, the public's knowledge, perception, and attitude toward antibiotic usage play a substantial role in this issue. The main objective of this study was to explore the current situation regarding the use of antibiotics by the general public in Dhaka city.

Methodology

Study Settings and Design: This cross-sectional descriptive study aimed to assess the level of awareness about antibiotics among the general public in Dhaka city. The study targeted individuals who were aware of the term "antibiotics" from three selected wards, which were chosen to represent a diverse sample in terms of demographics, socioeconomic status, and health awareness. Conducted over six months, from July to December, the study included 120 participants. The study was descriptive in nature, focusing on describing the awareness of antibiotics without attempting to influence participants' behaviors. The findings provided valuable insights into the public's understanding of antibiotics in Dhaka city.

Selection Criteria: They are above 18 years old; they are aware of the term "antibiotics". Participants were excluded if he/she refused to participate in the study and the participants who were unable to provide information due to physical or mental illness.

Sampling Technique: Dhaka city, which is comprised of 92 wards, was divided into 2 City Corporations. The selection of the wards from Dhaka city was carried out through simple random sampling. Subsequently, one drugstore from each ward was purposively chosen. Finally, 40 respondents were selected from each drugstore using systemic random sampling. Every 5th individual visiting the store was chosen as a respondent after meeting the inclusion and exclusion criteria. The study involved the general public in Dhaka city who are aware of the term antibiotics and are at least 18 years old. Participants were excluded if they refused to participate in the study or were unable to provide information due to physical or mental illness.

Data Collection Method: A structured questionnaire served as the primary tool for data collection. Prior to commencing the final data collection, a preliminary questionnaire was tested outside the study areas. Face-to-face interviews were conducted with the general public to gather data, each of which was personally administered by the researcher. Prior to the interviews, study objectives were communicated to the participants, who were then solicited for verbal consent. Upon completion, the questionnaires were meticulously reviewed to ensure the accuracy and completeness of the information before being collated. Subsequently, the data underwent thorough editing before being subjected to analysis.

Data Management: The completed questionnaire was collected and checked for the completeness and clarity of the information to exclude missing or inconsistent data and then compiled together. Data were edited properly before analysis. Data analysis was done through MS excel and SPSS 17. Data were evaluated by frequency, percentage, table, figure and standard deviation.

Statistical Analysis: Analytical methods encompassed the use of frequency, percentage, tables, figures, and standard deviation to discern patterns and insights. A descriptive analysis was conducted on the study variables, and frequency tables of determinants and socio-demographic characteristics were generated. Data were presented as mean ± standard deviation, and prevalence rates were reported as percentages with 95% confidence intervals. Significance tests and cross-tabulations were utilized to investigate the relationship between socio-demographic characteristics and antibiotic use. All statistical analyses were carried out using SPSS for Windows, version 17.0 (SPSS Inc., Chicago, IL, USA).

Ethical Consideration: Ethical approval for this study was obtained from the Ethical Committee of State University of Bangladesh. Written informed consent was obtained from all participants prior to their inclusion in the study.

Results

A total of 120 respondents of three different wards in Dhaka city was included in the study. Face to face interview was conducted for data collection and 40 respondents were selected from each ward. Among the respondents 59(49.2%) were in the age group of less than 30 years, followed by 40(33.3%) were in the age group between 31 years and 45 years and 21(17.5%) were in the age group more than 46 years. The mean age of respondents was found to be 34.61±10.942 years where the value lies between minimum 18 years and maximum 67 years. About 34(28.3%) respondents were female and 86(71.7%) respondents were in males among the total respondents. Forty-Seven (39.2%) of the respondents were graduate and 26(21.7%) were passed HSC, 27(22.5%) were passed SSC and 17(14.2%) had a primary level of education. Total 3(2.5%) respondents were illiterate. Total 63(52.5%) respondents were service holder, whereas 27(22.5%) were businessman, 19(15.8%) were housewife, 6(5%) were student and 5 (4.2%) respondents were retired person. Among the respondents total 48(40.0%) respondent's income was more than 30000.00 whereas 27(22.5%) respondent's income less than 10000.00, 22(18.3%) was in between 10001.00 to 20000.00 and 23(19.2%) respondent's income were in between 20001.00 to 30000.00. Total 87(72.5%) respondents were married, whereas 30(25.0%) were unmarried and only 3(2.5%) respondents were in the other group (widow/widower) (Table 1).

Table 1. General characteristics of the participants (N = 120)

Variables	Frequency	Percent
Age Group		
• ≤ 30 Years	59	49.2
• 31 to 45 Years	40	33.3
• ≥ 46 Years	21	17.5

Variables	Frequency	Percent
Gender		
• Male	86	71.7
• Female	34	28.3
Educational status		
• Illiterate	3	2.5
• Primary or lower	17	14.2
• SSC	27	22.5
• HSC	26	21.7
• Graduate	47	39.2
Occupation		
• Service Holder	63	52.5
• Business	27	22.5
• Housewife	19	15.8
• Student	6	5
• Retired	5	4.2
Income level		
• ≤ 10000.00	27	22.5
• 10001.00 - 20000.00	22	18.3
• 20001.00 – 30000.00	23	19.2
• ≥ 30001.00	48	40

Among the total 68 respondents (56.7%) respondents used antibiotics without a doctor's prescription (self-medication). On the other hand, 52 (43.3%) respondents used it with a doctor's prescription (Figure 1).

Among the respondents total 112 (93.33%) respondents used antibiotics in last 1 year & only 8 (6.67%) didn't use antibiotics. Among user 20(16.7%) respondents used more than two times, 40(33.3%) respondents used 2 times and 52(43.3%) respondents used antibiotics once last year. Total 42(61.8%) respondents used antibiotics without doctor's prescription due to time constraints, whereas 38(55.9%) used due to cost saving and 8(11.8%) respondents due to lack of trust to the doctor and 5(7.4%) for other various reasons. Total 32(47.1%) respondents were select antibiotics from previous doctor's prescription, 30(44.1%) from the
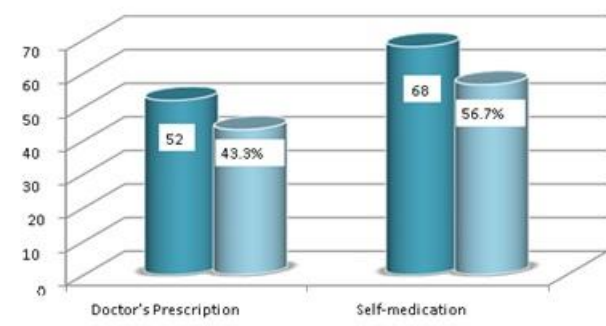

Figure I: Frequency & Rate of Self-Medication (n=120)

community pharmacist's recommendation, 19(27.9%) from own experience and 11(16.2%) from family member's opinion and 5(7.4%) of friends' opinion. Among the respondents 85 (71.4%) respondents used antibiotics due to fever. Whereas 47(39.5%) due to cough, 39(32.8%) due to diarrhea, 37(31.1%) due to aches and pains, 25(21.0%) due to running nose, 17 (14.3%) due to skin wounds and 7(5.9%) respondents due to vomiting. Eleven (9.2%) respondents used antibiotics due to some other complaints e.g. UTI etc. Among the respondents 57(47.5%) respondents stopped taking antibiotics at the completion of the course and 34(28.3%) stopped after consulting a doctor. However, 27(22.5%) respondents stopped taking antibiotics after the symptoms disappeared, 22(18.3%) after antibiotics ran out, 15(12.5%) after a few days after the recovery and only 5(4.2%) respondents after a few days regardless of the outcome. Among the respondents total 88(73.7%) respondents didn't change the dose deliberately where 32(26.7%) changes the dosage during antibiotic treatment. Regarding the idea of self-medication 98(81.7%) respondents mentioned it as not acceptable practice. But 17 (14.2%) respondents marked it as an acceptable practice and the remaining 5 (4.2%) responses mentioned it as well. Total 12 questions were prepared to assess the knowledge of respondents regarding use of antibiotics. Each question with a correct response was carried one mark. According to the scores, respondents were divided into poor, satisfactory and good knowledge. Out of the 120 respondent's majority about 72(60.0%) had poor knowledge, followed by 40(33.3%) had satisfactory and only 8(6.7%) had good knowledge. Total 6 items were constructed to assess the attitude level of the respondents. The respondents were categorized based on the scores as negative, positive and neutral attitude. Out of the 120 respondents about 48(40.0%) had negative attitude, followed by 52(43.3%) had a positive attitude and 20(16.7%) had a neutral attitude (Table 2).

Table 2: Distribution of Respondents' Antibiotic Use, Self-Medication Practices, Knowledge, and Attitudes

Variables	Frequency	Percent
Recent (1 year) use of antibiotics	**112**	**93.3**
• One antibiotic in last year	52	43.3
• Two antibiotics in last year	40	33.3
• More than 2	20	16.7

Variables	Frequency	Percent
antibiotics in last year		
Reason for Self-medication	**68**	**56.7**
• Time saving	42	61.8
• Cost saving	38	55.9
• Lack of trust in prescribing doctor	08	11.8
• Others	5	7.4
Criteria for selection of antibiotics among self-medication group	**68**	**56.7**
• Previous doctor's prescription	32	47.1
• Recommended by community pharmacists	30	44.1
• My own experience	19	27.9
• Opinion of family members	11	16.2
• Opinion of friends	05	7.4
Complaints for use of antibiotics among respondents	120	100
• Fever	85	71.4
• Cough	47	39.5
• Diarrhea	39	32.8
• Aches and pains	37	31.1
• Running nose	25	21.0
• Skin wounds	17	14.3
• Vomiting	07	5.9
• Others	11	9.2
Reason for the decision to stop taking antibiotics	**120**	**100**
• At the completion of the course	57	47.5
• After consulting a doctor	34	28.3
• After symptoms disappeared	27	22.5
• After antibiotics ran out	22	18.3
• A few days after the recovery	15	12.5
• After a few days, regardless of the outcome	05	4.2
The rate of antibiotic dosage changes deliberately during	**120**	**100**

| Variables	Frequency	Percent
treatment		
• No	88	73.3
• Yes	32	26.7
Acceptance of self-medication	**120**	**120**
• Not acceptable Practice	98	81.7
• Acceptable Practice	17	14.2
• Well Practice	05	4.2
Level of knowledge about antibiotic usage	**120**	**100**
• Poor Knowledge	72	60
• Satisfactory Knowledge	40	33.3
• Good Knowledge	08	6.7
Level of attitude about antibiotic usage	**120**	**100**
• Negative Attitude	48	40
• Neutral	20	20
• Positive Attitude	52	52
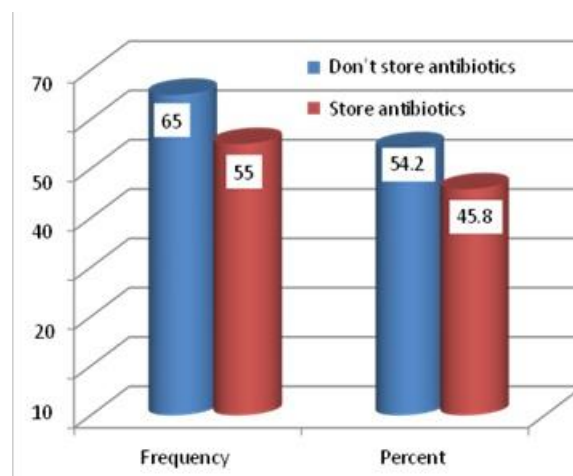
Figure II: Storage of antibiotics for using later during an emergency among respondents (n=120)

Among the respondents 65 (54.2%) did not store antibiotics for using later during an emergency and 55 (45.8%) store any antibiotics in emergency use (Figure II).

Self-medication was highly prevalent about 52(73.0%) in respondents with poor knowledge, 113(32.5%) in the satisfactory knowledge group and 5(37.5%) in good knowledge group. We found a statistically significant association between self-

medication and level of Knowledge (P-value - <0.05). Self-medication was highly prevalent about 35(73.0%) in respondents with negative attitudes, 60% (12) in the neutral attitude group and 21(40.4%) in a positive attitude group. We found a statistically significant association between self-medication and level of attitude (P<0.05). Self-medication was found more about 61% (36) in respondents who were less than 30 years' age. On the other hand, self-medication found 52.5% (21) in 31-45 years' group and 11(52.4%) in more than 46 years of respondents. So, it was found not statistically significant association between self-medication and age (P>0.05). Self-medication was highly prevalent about 19(70.4%) among the respondent whose income less than 10000.00. Followed by 13(59.1%) among the respondent whose income was in between 10001.00 to 20000.00, 13(56.5%) among the respondent whose income was in between 20001.00 to 30000.00 and 23(47.9%) among the respondent whose income was more than 30000.00. We found not a statistically significant association between self-medication and income level (P>0.05). All 3(100%) respondents were taken antibiotics without prescription in illiterate group. Followed by 14(82.4%) in the primary level educated group, 16(59.3%) in SSC passed respondents, 15(57.7%) in HSC passed group and 20(42.6%) among graduation completed respondents. We found a statistically significant association between self-medication and level of education (P<0.05). Self-medication was highly prevalent among female respondents which were about 21(62%) and 47(54.7%) among male respondents. So, it was found not statistically significant association between self-medication and Sex (P>0.05).

Table 3: Association between Self-Medication and Other Variables (N = 120)

Parameters	Self-Medication		P value
	Yes	No	
Level of Knowledge			
• Poor Knowledge	52(72.2%)	20(27.8%)	0.000
• Satisfactory Knowledge	13(32.5%)	27(67.5%)	
• Good Knowledge	3(37.5%)	5(62.5%)	
Level of Attitude			
• Wrong Attitude	35(72.9%)	13(27.1%)	0.004
• Neutral	12(60.0%)	8(40.0%)	
• Favourable Attitude	21(40.4%)	31(59.6%)	

Parameters	Self-Medication		P value
	Yes	No	
Age Group			
• ≤ 30 years	36(61.0%)	23(39.0%)	0.639
• 31–45 years	21(52.5%)	19(47.5%)	
• ≥ 46 years	11(52.4%)	10(47.6%)	
Income Level			
• ≤ 10,000	19(70.4%)	8(29.6%)	0.306
• 10,001–20,000	13(59.1%)	9(40.9%)	
• 20,001–30,000	13(56.5%)	10(43.5%)	
• ≥ 30,001	23(47.9%)	25(52.1%)	
Education			
• Illiterate	3(100.0%)	0(0.0%)	0.029
• Primary	14(82.4%)	3(17.6%)	
• SSC	6(59.3%)	11(40.7%)	
• HSC	15(57.7%)	11(42.3%)	
• Graduate & above	20(42.6%)	27(57.4%)	
Gender			
• Female	21(61.8%)	13(38.2%)	0.479
• Male	47(54.7%)	39(45.3%)	
Occupation			
• Retired	4(80.0%)	1(20.0%)	0.705
• Student	4(66.7%)	2(33.3%)	
• Housewife	11(57.9%)	8(42.1%)	
• Service	36(57.1%)	27(42.9%)	
• Business	13(48.1%)	14(51.9%)	

Data was analyzed using pearson χ^2 Test; ($\chi^2 - 2.168$).

About 46(67%) respondents who were unmarried were taken antibiotics without prescription followed by about 53% (46) in married group and 67% (2) in another group. It was found not statistically significant association between self-medication and marital status (P>0.05). Among all retired respondents, 80% (4) were taken antibiotics without prescription followed by 4(67.0%) among students, 57.9% (11) among housewife, 36(57.1%) among service holder and 13(48.1%) among businessman. It was found not statistically significant association between self-medication and different occupation (P>0.05).

Discussion

This study aimed to investigate the pattern of antibiotic use without prescription among the general public in Dhaka city. The findings indicated that 56.7% of respondents in Dhaka city reported using antibiotics without a prescription. This rate aligns with previous surveys in Asia, where non-

prescription use ranged from 4% to 75%, with a weighted average of 58.7%[8]. In contrast, developed countries such as northern Europe reported a 3.0% non-prescription use, while central Europe reported 6%, and southern Europe reported 19%[34]. The primary reasons for self-medication included the desire to save time, cited by 67% of respondents[35,36], as well as the significant cost associated with doctor consultations, mentioned by more than half of the respondents. Additionally, a lack of trust in doctors was noted by a small percentage of respondents as a contributing factor. When engaging in self-medication, respondents relied on previous doctor's prescriptions, recommendations from community pharmacists, personal experiences, and advice from family and friends to select antibiotics. The criteria and reasons for using non-prescribed antibiotics in this study correspond to those found in other less-developed countries[9,37,38] and certain European nations[11].

The primary complaints leading to the use of antibiotics were fever and cough among the respondents. Additionally, diarrhea, pain, aches, vomiting, runny nose, skin wounds, UTI, and various other issues were mentioned as reasons for antibiotic usage[39]. The study results revealed that 75% of respondents had inadequate knowledge about antibiotic use. While many were familiar with the risks, course of treatment, and effectiveness of antibiotics for bacterial infections, there was a lack of appropriate knowledge regarding their effectiveness for viral and other types of infections. Furthermore, there was a prevalent misconception that antibiotics play a significant role in reducing fever and pain/aches. Interestingly, most respondents held an unfavorable attitude toward antibiotic usage, which corresponded with a high prevalence of self-medication among those with poor knowledge and unfavorable attitudes[40]. Enhancing public knowledge and attitude about antibiotic usage is crucial to reducing self-medication rates and controlling irrational antibiotic use.

In our study, the role of education in reducing rates of self-medication across various socio-demographic groups became evident. It was observed that among graduates, only 40% of the respondents engaged in the practice of taking antibiotics without prescriptions. Notably, all illiterate respondents and over 80% of those who had only completed primary education reported taking antibiotics without prescriptions. Our findings also indicated a decrease in the rate of self-medication with increasing age, potentially attributed to the accumulation of knowledge

regarding antibiotic usage in daily life. Furthermore, the family income of the respondents emerged as a significant factor. Economic considerations were found to be important determinants of antibiotic use, as supported by another study revealing that the decision to purchase medications is often influenced by factors such as drug pricing and the general population's financial capability. However, no discernible differences were found in the use of antibiotics based on other socio-demographic characteristics such as gender and occupation.

Conclusion

Self-medication with antibiotics is prevalent among the general public in Dhaka city. The respondents cited various reasons for self-medication, including the desire to save time, the high cost of medical care, and the lack of trust in healthcare providers. Prior prescriptions from doctors and recommendations from community pharmacists were the primary sources of antibiotic selection. The study found significant associations between self-medication and education, knowledge level, and attitudes. Overall, the public involved in this study displayed deficiencies in important aspects of antibiotic use and held unfavorable attitudes toward the rational use of antibiotics. It is imperative to implement a well-organized, structured, and sustained awareness program to enhance understanding of the adverse consequences of antibiotic use without a physician's prescription.

Authors' contributions
Nafisa Ahmed: Conceptualization, Supervision, Investigation, Data curation, Resources; Md. Alimur Reza: Writing - original draft, Formal analysis, Validation, Methodology, Funding acquisition, Visualization, Project administration; Arifa Akram: Writing - review & editing, Validation; Md. Ashiqur Rahman: Investigation, Data curation, Software. All authors read and approved the final manuscript.

Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for this study was obtained from the Ethical Committee of State University of Bangladesh. Written informed consent was obtained from all participants prior to their inclusion in the study.

ORCID
Nafisa Ahmed: https://orcid.org/0009-0004-4175-0243
Md. Alimur Reza: https://orcid.org/0000-0002-5139-5319
Md Ashiqur Rahman: https://orcid.org/0000-0002-9430-5547
Arifa Akram: https://orcid.org/0000-0001-8829-9817

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