

Original Article

Knowledge and Practices of Retail Drug Sellers on the Rational Dispensing of Antibiotics

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Abstract

Background: Retail drug pharmacies are often the primary and sometimes the sole source of healthcare for many patients in developing countries. The nonprescription selling of antibiotics is a major contributor to the rise in antibiotic usage, hastening the emergence of drug resistance. Bangladesh, as a developing country with a growing economy, is currently facing the global health threat of antibiotic resistance. **Objective:** The purpose of the present study was to assess the levels of knowledge and practices of retail drug sellers regarding the rational dispensing of antibiotics. **Methodology:** This cross-sectional study was conducted from January to December 2018 to evaluate the levels of knowledge and practices among the conveniently selected 294 retail drug sellers regarding the rational dispensing of antibiotics. Pharmacies were purposively selected from the Fatulla and Narayanganj Sadar Narayanganj districts of Dhaka, Bangladesh. **Results:** Most retail drug sellers had an average level of practice (68.3%), in contrast to the majority had good knowledge level (94.5%). Compared to older dealers (aged 41-60); younger sellers (aged 21-40) were significantly more likely to prescribe antibiotics without a prescription. On the contrary, retail drug sellers with a higher daily client volume were significantly more likely to dispense antibiotics without a prescription than those with fewer clients. **Conclusion:** This study revealed that while most retail drug sellers had a good level of knowledge, the majority demonstrated only an average level of practice.

Key Words: Knowledge; practices; retail drug sellers; rational dispensing of antibiotics; Bangladesh

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Introduction:

Bangladesh satisfied the requirements to be ranked as a developing country in 2018.¹ One of the criteria for maintaining this development process is health.² Despite significant achievements in primary healthcare, Bangladesh faces several health challenges, with antibiotic resistance being perhaps the most alarming.³ The ability of microorganisms (including bacteria, viruses, and some

parasites) to withstand the effects of antimicrobial agents (such antibiotics, antivirals, and antimalarial) is known as antibiotic resistance. As a result, infections continue to exist and may even spread to other people, rendering conventional therapies useless.⁴ Antimicrobial resistance has many causes, which can be broadly categorized into two main types: microbial and human causes. The most significant

human factor is the irrational use of antibiotics, including self-medication, improper dosing and duration by patients, and the sale of antibiotics without a prescription or proper caution by drug sellers. One of the primary contributors to this problem is the non-prescription purchase of antibiotics or self-medication.⁵ Around 80% of all prescribed medications are often dispensed by unqualified personnel, with an average dispensing time of just one minute. Only half of the patients receive instructions on how to take their medicines, and nearly one-third leave the facility without knowing how to use them properly.⁶

In Bangladesh, pharmacies often serve as the first point of contact for patients. Both urban and rural populations frequently turn to pharmacists for medical advice.⁷ In developing countries, the practice of using antibiotics without medical prescriptions is well documented, despite regulations prohibiting the sale of antibiotics in this manner.⁸

The sale of antibiotics without prescriptions is a major contributor to rising antibiotic consumption, which facilitates the emergence of antimicrobial resistance.⁹ To develop successful treatments intended at limiting inappropriate antibiotic use, an expanded understanding of the procedures and monetary incentives surrounding antibiotic dispensing is required.¹⁰ Given the current state of antibiotic dispensing, this study emphasizes the need for rational selling of antibiotics by retail drug sellers. Its goal is to explore the knowledge and practices of community pharmacists when it comes to selling antibiotics.

Methodology

Study Design and Settings: This cross-sectional study was conducted in the Department of Public Health and Informatic at National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh and was directed to assess the knowledge and practices of retail drug sellers concerning the rational dispensing of antibiotics from January to December 2018. Pharmacies were purposefully selected from the areas of Siddhirganj, Bandar, Fatullah, Narayanganj Sadar sited in the Narayanganj district of Dhaka, Bangladesh.

Sample Selection Criteria: Participants in the study were conveniently selected and included 294 drug sellers. The inclusion criteria specified that participants must be at least 18 years old and have been directly involved in selling medicine for more than one year. Sellers from pharmacies located near hospitals and model pharmacies were excluded from the study.

Data Collection Procedures: Participants in the study were interviewed face-to-face using a pretested, semi-structured questionnaire. This questionnaire included socio-demographic characteristics of the sellers, as well as their knowledge and practices regarding the rational dispensing of antibiotics. The pre-testing was conducted in Pagla Thana of the Narayanganj district in Dhaka, Bangladesh.

Statistical Analysis: Data was entered, curated and analyzed using IBM SPSS Version 23 (New York, USA). Descriptive statistics were expressed as frequency (percentage) and mean ($\pm$ standard deviation, or SD) for categorical and continuous data, respectively. Chi-square test and Fisher exact test were used to assess the significance of associations between two nominal variables. A p-value of <0.05 at a 95% confidence interval (CI) was considered significant for all statistical tests.

Ethical approval: Participation was voluntary, and confidentiality was ensured, and informed written consent was obtained from all participants. Ethical approval for the study was approved by the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Dhaka 1212, Bangladesh (Reference: NIPSOM/IRB/2018/471). All procedures were conducted according to the guidelines of the Declarations of Helsinki.

Results

The table presents the socio-demographic profile of 294 retail drug sellers. The majority of respondents (70.1%) were between 21 and 40 years old, with an average age of 37.4 years and a standard deviation of 7.0 years. Nearly all respondents (99.0%) were male. A significant portion (88.8%) was married, with average marriage duration of 5.2 years and a standard deviation of 1.4 years. A large share, 40.1%, held a bachelor's degree or higher, while 37.4% had a high school education or less. Additionally, 71.1% reported a monthly income of less than 30,000 taka, with the average income being 29,539 taka and a standard deviation of 12,212 taka. Overall, the table indicates that most retail drug sellers in this study were young, male, married, relatively well-educated, but a substantial portion had a low-income level (Table 1).

The following table outlines the professional characteristics of the 294 retail medicine sellers. Nearly half (50.7%) had less than 10 years of experience

in retail drug sales, while 49.8% had been in the business for 10 years or more. The average experience was 9.9 years, with a standard deviation of 5.2 years. Almost all (99.0%) of the sellers had received some form of training in drug dispensing. On average, 53.4% of respondents dispensed to fewer than 60 clients per day, while 46.6% served more than 60 clients.

The average number of clients per day was 69.1, with a standard deviation of 31.0. Additionally, 61.2% of respondents sold fewer than 20 pieces of antibiotics per day, while 38.8% sold more than 20 pieces. The mean daily sales of antibiotics were 24.1 pieces, with a standard deviation of 13.9. A significant majority (78.6%) reported selling fewer than 10 pieces of antibiotics without a prescription each day, while only 6.8% sold over 20 pieces without a prescription. The average number of antibiotics sold without a prescription per day was 5.4, with a standard deviation of 8.8 (Table 2).

This table highlights the knowledge of retail medicine sellers regarding the rational dispensing of antibiotics. A significant majority (96.3%) of respondents acknowledged that antibiotics should only be sold with a prescription, and 94.6% understood that selling outdated or expired antibiotics is harmful to patients. Nearly all (99.0%) were aware of the risks of repeatedly selling antibiotics based on an old prescription. All respondents knew that antibiotics should not be purchased without a prescription and that physicians are responsible for informing patients about the correct dosage and duration of antibiotic use.

Table 1: Socio-demographic Characteristics (n=294)

Characteristics	Frequency	Percent
Age groups		
21 to 40 Years	206	70.1
41 to 60 Years	88	29.9
Mean±SD	37.4±7.0	
Gender		
Male	291	99.0
Female	3	1.0
Marital status		
Married	261	88.8
Unmarried	33	11.2
Mean±SD	5.2±1.4	
Education		
HSC and below	110	37.4
Diploma	66	22.5
Bachelor and above	118	40.1
Monthly incomes		
≤30,000 BDT	209	71.1
>30,000 BDT	85	28.9
Mean±SD	29539±12212	

Table 2: Information related to Professional Attributes (n=294)

Attributes	Frequency	Percent
Duration of retail drug sales		
<10 Years	149	50.7
≥10 Years	145	49.8
Mean±SD	9.9±5.2	
Had drug dispensing training		
Yes	291	99.0
No	3	1.0
Daily number of clients		
≤60	157	53.4
>60	137	46.6
Mean±SD	69.1±31.0	
Antibiotics sold per day (in pieces)		
≤20	180	61.2
>20	114	38.8
Mean±SD	24.1±13.9	
Number of antibiotics sold a day without a prescription (in pieces)		
≤10	231	78.6
11-20	43	14.6
>20	20	6.8
Mean±SD	5.4±8.8	

Additionally, 91.2% recognized the importance of informing patients about potential adverse effects of antibiotics, and all pharmacists knew that selling antibiotics without a prescription should be stopped, advising patients to consult a physician for one. However, only 78.6% were familiar with the term "Antibiotic Resistance." (Table 3)

The table outlines the practices of retail drug sellers regarding the rational dispensing of antibiotics. Only 5.8% of respondents reported consistently checking prescriptions before dispensing antibiotics, though a larger proportion (12.2%) advised consumers not to purchase antibiotics without a prescription. The majority (78.6%) helped consumers understand the correct dosage and duration as indicated on the prescription. Meanwhile, 32.0% informed consumers to consult a doctor if they experienced side effects after taking antibiotics. However, a significant 76.5% of respondents dispensed antibiotics based on old prescriptions. The table reveals that, while many retail drug sellers educate consumers on proper antibiotic use, ideal practices- such as verifying prescriptions and avoiding the sale of antibiotics based on outdated prescriptions were not widely followed. (Table 4)

Table 3: Knowledge on rational dispensing of antibiotics (n=294)

Attributes	Positive Responses	
	Frequency	Percent
Knew that it is mandatory to sell antibiotics with prescription	283	96.3
Knew that selling outdated antibiotics is harmful to patients	278	94.6
Knew that repeatedly selling antibiotics with an old prescription poses risks to patients	291	99.0
Knew that patients should not purchase antibiotics without a prescription	294	100
Knew that patients needed to be informed about the prescribed dosage and duration of antibiotics	294	100
Knew that it's necessary to inform patients about the adverse effects of antibiotics	268	91.2
Knew that pharmacists should stop dispensing antibiotics without a prescription	294	100
Knew that pharmacists have to encourage patients to consult with physicians to get a prescription	294	100
Knew the term "Antibiotic Resistance"	231	78.6

Table 4: Practices on rational dispensing of antibiotics (n=294)

Attributes	Positive Responses	
	Frequency	Percent
Followed the practice of verifying prescriptions before dispensing antibiotics	17	5.8
Advised consumers not to purchase antibiotics without a prescription	36	12.2
Helped consumers in understanding the dosage and duration of antibiotics as indicated on the prescription	231	78.6
Advised consumers to consult a doctor if any side effects occur after taking antibiotics	94	32.0
Dispensing antibiotics based on an old prescription	225	76.5

Table 5: Association of Different Variables with Dispensing Antibiotics Without Prescription (n=294)

Variables	Dispense Antibiotics without Prescription			P-value
	Yes n(%)	No n(%)	Total n(%)	
Age Groups				
21 to 40 Years	194(66.0)	12(4.1)	206(70.1)	*0.002
41 to 60 Years	83(28.2)	5(1.7)	88(29.9)	
Education				
HSC & below	87(31.1)	13(6.3)	110(37.4)	0.079
Diploma	46(16.5)	20(6.0)	66(22.5)	
Bachelor & above	30(6.2)	88(33.9)	118(40.1)	
Monthly income				
≤30,000 BDT	198(67.3)	11(3.8)	209(71.1)	0.595
>30,000 BDT	79(26.9)	6(2.0)	85(28.9)	
Duration of retail drug sales				
<10 Years	141(48.0)	8(2.7)	149(50.7)	0.807
≥10 Years	136(46.7)	9(3.1)	145(49.8)	
Daily number of clients				
≤60	148(50.3)	9(3.1)	157(53.4)	*0.002
>60	129(43.9)	8(2.7)	137(46.6)	
Antibiotics sold per day (in pieces)				
≤20	167(56.8)	13(4.4)	180(61.2)	0.419
>20	110(37.4)	4(1.4)	114(38.8)	

†Chi-square test, *Statistically significant value

This table presents the relationship between various demographic, socioeconomic, and business-related factors and the practices of dispensing antibiotics without a prescription among retail drug sellers. The analysis revealed that younger sellers (aged 21-40) were significantly more likely to dispense antibiotics without a prescription compared to older sellers (aged 41-60). No significant associations were found between education, monthly income, years of experience in retail drug sales, or the number of antibiotics sold per day with the practices of dispensing antibiotics without a prescription. However, drug sellers who served a higher daily number of clients were significantly more likely to dispense antibiotics without a prescription than those with fewer clients. (Table 5)

The majority of participants demonstrated a good level of knowledge (94.5%), while a small portion had an average level of knowledge (5.2%). Regarding practices, most participants exhibited an average level (68.3%), with a minor group showing poor practice levels (5.2%). (Figure 1)

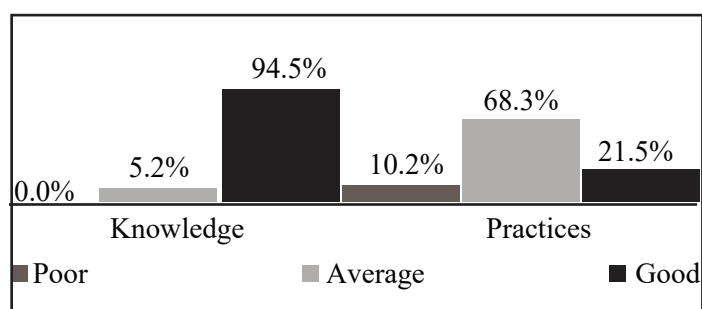


Figure I: Levels of knowledge, and practices on rational dispensing of antibiotics (n=294)

Discussion

In this study, the mean age of the respondents was 37.4 ± 7 years. The largest portion of participants (49.7%) fell within the 31-40 age groups. A study in Ethiopia reported that respondents' ages ranged from 27 to 37 years.¹⁰ In Syria, the average age of retail drug sellers was 39.8 ± 10 years,¹¹ while in Pakistan 55.2% of respondents were aged 20 to 29.¹² Similarly, a study in Saudi Arabia found that 83% of respondents were between 19 and 30 years old.¹³ In Myanmar, the majority of medicine sellers were found to be in the 36-45 age group.¹⁴ In this study, 99% of the respondents were male, and 1% was female. A study in Turkey, however, found that 55% of retail drug sellers were female.¹⁵ In contrast; similar to our findings, a study in

Saudi Arabia reported that 100% of the respondents were male.¹⁶ Among the respondents, 40.1% had a bachelor's degree or higher, and 22.5% held a diploma. In comparison, a study in Pakistan showed that 83.5% had a bachelor's degree,¹² while in Saudi Arabia, 85.0% of pharmacy sellers held a bachelor's degree.¹³ This highlights a discrepancy in educational qualifications between the respondents in this study and those in Pakistan and Saudi Arabia. Regarding professional experience, the average duration of respondents' involvement in retail drug selling was 9.9 ± 5.2 years. Of the respondents, 40.1% had been in the profession for 6-10 years, while 25.2% had 11-15 years of experience. In contrast, a study in Ethiopia reported respondents' experience ranging from 2 to 8 years¹⁰, while in Egypt, the average was 5.3 years.¹⁷ In this study, the average number of customers per day was 69.1 ± 31.0 , with a mean sale of antibiotics at 24.1 ± 13.9 pieces per day. A study in Saudi Arabia found that more than a quarter (27.9%) of respondents reported dispensing over 300 medications daily, while nearly 90% dispensed fewer than 50 antibiotics each day.¹⁶ The average number of customers purchasing antibiotics without a prescription was 5.4 ± 8.8 per day. Among the respondents, 78.6% reported buying antibiotics without a prescription daily, while 14.6% reported purchasing them occasionally. A study in Vietnam indicated that 50% of urban patients bought antibiotics without a prescription,¹⁸ compared to 77.6% in Saudi Arabia¹⁹ and 64.6% in northern Spain.²⁰

In observing practices among the respondents, only 5.8% required a prescription before dispensing antibiotics, while 94.2% did not. In Greece, 85% of retail drug seller's dispensed antibiotics without a prescription,²¹ followed by 80% in Albania²², 97.9% in Saudi Arabia,¹³ and 89% in Syria.²³ Additionally, 12.2% of respondents advised consumers against purchasing antibiotics without a prescription, while 87.8% did not provide such warnings. Furthermore, 78.6% of the respondents assisted their customers in understanding the dosage and duration of antibiotics as indicated on the prescription. In comparison, 31.4% of drug sellers in Turkey,¹⁵ 94.5% in Spain,²⁴ and 77.5% in Egypt offered guidance on the dosage and duration of antibiotics.¹⁷ Among the respondents, 32.0% advised consumers to see a doctor if any side effects occurred after taking antibiotics. In comparison, a study in Turkey reported that 67.1% of retail drug sellers recommended consulting a physician for side effects, while 47.4% in Syria issued warnings about potential side effects.¹¹

In Saudi Arabia, however, none informed patients about possible side effects after taking antibiotics.¹⁹

The majority of participants exhibited a high level of knowledge (94.5%), while a small percentage had a moderate level of knowledge (5.2%). Regarding practices, most participants demonstrated an average level (68.3%), with a minor group showing poor practices (5.2%). A significant statistical association ($p < 0.05$) was identified between the age of the medicine sellers and the dispensing of antibiotics without a prescription, with younger sellers being more likely to sell antibiotics without prescriptions. A similar significant association was reported in a study conducted in Pakistan.²⁵ Additionally, researchers in Eritrea also found a significant correlation between the ages of medication dealers and the sale of antibiotics without prescriptions.²⁶ Another notable statistical association in this study was between the daily number of clients and the sale of antibiotics without prescriptions; drug sellers with a higher number of daily clients were more likely to dispense antibiotics without a prescription.

Conclusion

According to the study, the majority of retail drug sellers showed average practices, although having good knowledge. If the irrational dispensing of antibiotics is not controlled, it could lead to a public health disaster. Practical, hands-on training programs, including behavior change interventions, should be introduced to educate retail drug sellers about the severity of this issue. A robust referral system should be implemented promptly to provide optimal healthcare, helping to reduce self-medication. Existing laws and regulations on antibiotic use need to be updated, and new strategies should be adopted to curb the indiscriminate sale of antibiotics.

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