

# Knowledge and practice of retail drug sellers on rational dispensing of antibiotics

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## Abstract

**Objective:** Antibiotic resistance is a rapidly evolving health issue. Two thirds of all antibiotics are sold without prescription, through unregulated private sectors around the world. In Bangladesh pharmacies are sometimes first point of contact with the patient. This study aimed at assessing knowledge and observing practice of antibiotic dispensing among retail drug sellers.

**Methods:** The study was a cross sectional study, carried out from January 2018 to December 2018. A total 294 retail drug sellers were conveniently selected as study participants. The study conducted in Fatullathana and Narayanganj sadar thana of Narayanganj District, Bangladesh.

**Results:** In this study the mean age of the respondents is  $37.41 \pm 7$  years, ranged from 20 to 60 years where most of the respondents were male, 99% (n=291) and 1% (n=3) was female. Among the respondents 40.14% (n=118) had a bachelor or above degree.. In this study 100% (n=294) of the respondents said that they knew it is mandatory to sell antibiotic with prescription. 100% (n=294) said that they know it is necessary to inform patient about dose and duration of the antibiotics as written on prescription. In practice, 94.22% (n=277) sold antibiotic without prescription, 100% (n=294) helped their consumer to understand the dose and duration of antibiotics as written on prescription and 31.97% (n=94) advised consumer to consult a doctor if any side effect occurs after taking antibiotics.

**Conclusion:** This study was conducted with a view to explore the knowledge and practice of retail drug sellers while dispensing antibiotics. Though the results yielded major discrepancies between knowledge and practice, it was not the representative image of the whole country, as it was done in small scale. It may help the policy makers to revise the existing laws and regulation of antibiotics selling.

**Keywords:** antibiotic resistance, antibiotic dispensing, drug sellers, antibiotic prescription

## Introduction

Bangladesh, the world's largest delta and a riverine country is located in the south-east Asia. The country tests its liberation on 1971 after a century long oppression by the British colonials and Pakistani military junta. Bangladesh is now considered as one of the most densely populated countries. Its population density is 1077/Sq.

kilometer (Bangladesh Economic Review, 2017). Bangladesh fulfilled eligibility criteria for the first time to be in the list of developing countries in the year 2018 (UN Economic Analysis & Policy Division, March, 2018). Before that Bangladesh has already fulfilled some of the vital Millennium Development Goals (MDG) in health sector. According to Center for Research and Information (CRI) some of the notable achievements in MDG are reducing child mortality which comprises under-five mortality rate, infant mortality rate & immunization against measles; improvement of maternal mortality rate which can be signified by declination of maternal mortality from 322 in 2001 to 194 in 2010, a 40 percent decline in nine years development and combating malaria, HIV and other diseases (CRI, 2014). Health is a prerequisite to sustain this development process. Provision of door to door health service to this massive number of population is a mammoth task. Government of Bangladesh successfully launched community clinics in the year 1998 to combat the health service scarcity and provide health service to the community level. Currently 13136 community clinics are in operation (CBHC, 2018). Despite of remarkable success in the field of primary health care Bangladesh is facing various health challenges. These are not only confined to Bangladesh or SEAR (South- East Asian Region) but also spreading throughout the world. Among these alarming global health conditions the most dangerous one is probably the “Antibiotic Resistance”. According to World Health Organization antibiotic resistance means, the ability of a microorganism (like bacteria, viruses, and some parasites) to stop an antimicrobial (such as antibiotics, antivirals and antimalarials) from working against it. As a result, standard treatments become ineffective, infections persist and may spread to others (WHO, 2017). It is the global health problem of new era. While antibiotics were synthesized to treat infection, indiscriminate use of antibiotics leads to a dire situation where organisms are no longer sensitive to this drugs. The Organisms that are spared by inadequate or inappropriate dosing of antibiotic, changes their biological structure to resist the action of that drug in future. In the west this risk has been created by using antibiotics in agriculture and livestock. In global perspective, in the year 2016, 490000 people developed multi-drug resistant TB globally, and drug resistance is starting to complicate the fight against HIV and malaria, as well. The most commonly reported resistant bacteria were *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, and *Streptococcus pneumoniae*, followed by *Salmonella* spp. The system does not include data on resistance of *Mycobacterium tuberculosis*, which causes tuberculosis (TB), as WHO has been tracking it since 1994 and providing annual updates in the Global tuberculosis report. Among patients with suspected bloodstream infection, the proportion that had bacteria resistant to at least one of the most commonly used antibiotics ranged tremendously between different countries, from zero to 82%. Resistance to penicillin, the medicine used for decades worldwide to treat pneumonia, ranged from zero to 51% among reporting countries. And between 8% to 65% of *E. coli* associated with urinary tract infections presented resistance to ciprofloxacin, an antibiotic commonly used to treat this condition (WHO, February 2018). There are many causes of antimicrobial resistance, amongst them we can broadly categorize it into two major causes, and these are microbial causes and human

causes. In human cause the single most factor that contributes to this problem is irrational use of antibiotics. Irrational use denotes self-medication, taking antibiotics in inappropriate dose and duration by patient and selling antibiotics without prescription and appropriate caution by drug sellers. Non-prescription purchase of antibiotics or self-medication is one of the major cause (Michael, et al., 2014, pp. 3,5). In Bangladesh pharmacies are sometimes first point of contact with the patient. Patients from urban and rural areas often seek medical advice from pharmacists. Sometimes patients or their relatives buy antibiotics for minor problems without a prescription. On the other hand, pharmacists sometimes advice their patient antibiotic which is an unlawful act. There are numerous challenges and barriers faced by pharmacists in developing countries to implement and maintain sustainable pharmaceutical care services. Most developing countries are struggling with a shortage of pharmacists, inadequate education and training for pharmacists, and support from other health care professionals. Moreover, numerous studies have highlighted that inappropriate medication practices are relatively common in the community and hospital settings of developing countries. For example, use of antibiotics without medical prescriptions is a well described practice, despite regulation prohibiting the supply of antibiotics in this manner. (Sakeena, et al., 2018). In another report of World Health Organization (WHO), The World Medicine Situation, 2011 they said that, dispensing process greatly influences how medicines are used. From the analysis of their database WHO show that about 80% of all prescribed medicines are dispensed often by unqualified personnel. They further shows that, on average, dispensing time is 1 minute, only half of patients are told how to take their medicines, about one third of patients do not know how to take their medicines immediately on leaving the facility (Holloway & Dijk, 2011). In such circumstances it is not surprising that patient adherence to medicines is poor. Inappropriate use of antibiotics is a key driver of antibiotic resistance development. In the light of the current situation of antibiotic dispensing, in this study rational selling of antibiotics by retail drug sellers has been given emphasized.

## **Background**

Retail drug shops are often the first and only source of health care outside home for a majority of patients in developing countries such as Bangladesh. Antibiotics are often sold without prescription. Over the counter sale of antibiotics is a global problem and it is increasingly recognized as a source of antibiotic misuse and is believed to

increase treatment costs, adverse effects of treatment and emergence of resistance. Nonprescription sale of antibiotics is one of the major reasons to increasing antibiotic consumption which facilitates emergence of drug resistance (Gebretekle & Serbessa, 2016). As self-medication is a common practice in our country, antibiotics are being dispensed without prescription in a considerable amount. In a cross sectional study conducted in Rajshahi city in 2014 they found about 26.69% of the consumers buy antibiotics without prescriptions (Biswas, et al., 14 August 2014). Most of the time consumers ask for antibiotics but it is also frequent that pharmacists sell antibiotics deliberately without prescription. In their article “Guidelines for regulatory Assessment of Medicinal Products for use in Self-Medication.” World Health Organization (WHO) says, “Pharmacist in particular can play a key role in giving advice to consumers on the proper and safe use of medicinal products intended for self-medication. It is important, therefore, to take this role account bot in their training and in practice” . The irrational overuse of antibiotics should be minimized as it drives the development of antibiotic resistance, but changing these practices is challenging. A better understanding is needed of practices and economic incentives for antibiotic dispensing in order to design effective interventions to reduce inappropriate antibiotic use (Nga, et al., 2014). An estimated two-thirds of global sales of antimicrobials occur over the counter without a prescription. Furthermore, antimicrobials are the most commonly sold medicines in developing countries. The overuse, misuse, or inappropriate use of antimicrobials are major contributing factors to the emergence of antimicrobial resistance. This does not only lead to failure of therapy, increased morbidity and mortality and rise in healthcare costs, but it puts these countries on a fast track to the pre-antibiotic era. Inadequate knowledge, incorrect attitudes and malpractices of healthcare professionals and patients regarding the use of antimicrobials and reducing the emergence of antimicrobial resistance may be fuelling this crisis. Pharmacists in particular, may have a key role in rationalizing the use of antimicrobials in community and reducing the emergence of resistance.

### **Justification of the study:**

The current study aimed at assessing the knowledge and practice of the community retail drug sellers about the rational dispensing of antibiotics. Antibiotics can be sold inappropriately without prescription, caution and proper indication. This misuse of

antibiotics can be facilitated by consumers, pharmacists and even educated health care providers. This study will be limited to only pharmacists, more precisely those who sells antibiotic in the retail drug shops or known as community pharmacists. The pharmacists included in this study are not bachelor degree holders on Pharmacy from any university, but they are mostly community people who are provided with license to sell medicine by the government of the country or regulatory authority. Although it is mandatory to run a retail drug shop only after getting license from authority, there are many drug shops that are running across cities and rural areas without drug license. A study shows currently in Bangladesh, 1,03,451 licensed retail drug shops and approximately an equal number of unlicensed retail drug shops are involved in selling drugs “over-the-counter” (Bachar, et al., 2015 ). Most of the salespeople and dispensers at those retail drug shops do not have training in dispensing drugs or in offering diagnoses and treatment, which they frequently do. Because those drug shop salespeople have no other channel of information beyond the formal sectors open to them, they fall easy prey to the aggressive marketing strategies of the pharmaceutical companies. Irrational use of drugs such as overprescribing, multidrug prescribing, using unnecessarily expensive drugs, dispensing drugs without a prescription, and overusing antibiotics and injections have been the most common problems found with those retailers for a long time. They sell drug indiscriminately for fulfilling their economic purpose. Though government has made it mandatory that to sell drug every drug seller or owner must have at least “Category-C” registration, most of the times these drug sellers have no authorized training in selling medicine. For their lack of training or lack of surveillance of regulatory authority they sell medicines over the counter that are mandatory to sell after getting prescription. This poses a greater threat to public health. It is strictly mentioned in the book “Sahaj Oshudhbiggan” published by Pharmacy Council of Bangladesh that selling antibiotics without prescription is completely prohibited (Faruque & Khan, 2017, p. 12). This research has been conducted to have an idea about the knowledge and practice of the community pharmacists while selling antibiotics. There are several studies that were conducted around the world. But the rules and regulations of drug administration vary from country to country. So according to existing regulation of Bangladesh’s Drug Administration and practical experience of the researcher, questionnaire is modified. This study will help to understand whether there is any discrepancy between their knowledge and actual practice. So, in this study it is the primary concern to assess the level of knowledge of the retail drug sellers about antibiotic dispensing and observe their practice. This study may also help the decision makers to modify their strategy while making any improvement in drug dispensing rules or regulations. This might act as a supportive study to carry out more researches to get an actual view of current antibiotics situation of the country.

### **Research question:**

What is the level of knowledge and practice of retail drug sellers about rationale dispensing of Antibiotics?

## Objectives

### General Objective:

To assess the level of knowledge and observe the practice of retail drug sellers on rational dispensing of antibiotics.

### Specific Objectives:

- . i) To assess the socio economic condition of the retail drug sellers.
- . ii) To assess professional condition of retail drug sellers.
- iii) To assess the knowledge of retail drug sellers on rational dispensing of antibiotics.
- iv) To assess the knowledge of retail drug sellers about practice of rational dispensing of antibiotic.
- v) To observe the practice of rational dispensing of antibiotic by retail drug sellers.

## List of variables:

### A. Socio-Demographic variables

- Age
- Sex
- Religion
- Marital status
- Number of family members
- Monthly income

Educational qualification [L]  
[SEP]

B. Variables related to profession [L]  
[SEP]

Duration of the respondent associated with medicine selling [L]  
[SEP]

Training on medicine selling [L]  
[SEP]

Number of customers buy medicine daily [L]  
[SEP]

Number of antibiotics sold daily [L]  
[SEP]

Number of customers buy antibiotic without prescription [L]  
[SEP]

C. Variable related to knowledge on Rational Dispensing of Antibiotics

Selling antibiotic with prescription is mandatory [L]  
[SEP]

Selling expired antibiotic is harmful [L]  
[SEP]

Selling antibiotic with old prescription is harmful [L]  
[SEP]

Patient should not buy antibiotic without prescription [L]  
[SEP]

Necessary to inform patients about dose and duration of the  
antibiotics [L] as written on prescription [L]  
[SEP]

Necessary to inform patient about adverse effect of the  
antibiotics [L]  
[SEP]

Pharmacists should stop dispensing antibiotics without  
prescription [L]  
[SEP]

Pharmacists should encourage patients to consult the  
physician and get [L] a prescription [L]  
[SEP]

Refusal of dispensing antibiotic without prescription will  
negatively [L] affect sales and profits [L]  
[SEP]

Familiar with the term “Antibiotic Resistance” [L]  
[SEP]

D. Variables related to knowledge of practice of rational dispensing of antibiotics

Dispense antibiotics after seeing the prescription [L]  
[SEP]

- Dispense antibiotics repeatedly following old prescription
- Helps patient to understand about the dose and duration of antibiotic as written on prescription
- Informs patient that they should not buy antibiotics without prescription
- Informs patient about the possible adverse effect of antibiotics

#### E. Variables related to practice of rational dispensing of antibiotics

- Wants to see prescription
- Sells antibiotic repeatedly following old prescription
- Helps consumer to understand the dose and duration of antibiotics written on prescription
- Warns consumer about not to buy antibiotics without prescription
- Warns consumer about possible adverse effect about antibiotics

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#### Operational Definition

**Rational use of medicine:** Medicine use is rational (appropriate, proper, correct) when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and the community (Holloway & Dijk, 2011).

**Knowledge of rational dispensing of antibiotic:** In this study knowledge of rational dispensing of antibiotics denoted knowledge of dispensing with prescription, helping consumer to understand dosage and duration, giving advice if any adverse effect occurs, sell antibiotic with old prescription.

**Practice of rational dispensing of antibiotic:** In this study practice of rational dispensing of antibiotics denoted act of dispensing with prescription, helping consumer to understand dosage and duration, giving advice if any adverse effect occurs, sell antibiotic with old prescription to simulated patient.

**Retail drug seller:** Those who sells any amount of drug in retail manner. Age: Age was taken as completed years. There was no definite age range. Religion: Religion



practiced by the respondents, classified as Islam, Hindu, Christian and Buddhist. **Marital status:** Current marital condition of the respondents, classified as married, unmarried, divorced and widow. **Number of family members:** Members of respondents' family who eat from same kitchen and stay together. **Monthly income:** Total monthly income earned by all earning members in the family (in taka). **Respondents' educational qualification:** This is categorized in six steps. **Primary:** Studied from class I to class V. **Secondary:** Studied from class VI to class X. **SSC:** Passed Secondary School Certificate exam. **HSC:** Passed Higher Secondary Certificate exam. **Diploma:** Having a diploma on any subject after **SSC/HSC**. **Bachelor or above:** Having a bachelor degree and above. Respondents studying for bachelor degree are not considered as bachelor degree holder. **Training on drug selling:** Having at least "Category-C" training of drug dispensing.

**Customers buy antibiotics without prescription:** Numbers of customer request or insist to sell antibiotics without prescription. **Drug/ Medicine:** "Drug" and "Medicine" are used interchangeably in this study. **Old prescription:** Prescription that are issued one month ago at the time of the study and doctor had not given advice to buy antibiotic with the same prescription.

## Limitations of the study

Although optimum efforts had been given in every steps of this study, still some limitations existed:

- .  The study was conducted in two thanas of Narayanganj district. So the study population might not represent the whole country.
- .  Response bias and Observation bias(Hawthorne effect) may be a major concern.
- .  Data could not be collected according to calculated sample size due to time constraint.

## Literature Review:

Several literatures have been reviewed throughout the study process. There are international journals and reports that are considered to be valuable resources for this study. As there were fewer studies conducted on this topic, studies that are not exactly similar but related to this topic are also reviewed. Below, the reviewed articles are discussed in short.

A qualitative study titled, **“Exploration of over the counter sales of antibiotics in community pharmacies of Addis Ababa, Ethiopia: pharmacy professionals’ perspective”** was reviewed. It was conducted in Addis Ababa by Gebretekle & Serbessa in five randomly selected community pharmacies of Addis Ababa. One pharmacy professional from each pharmacy were interviewed at the spot using semi-structured, open ended interview checklist. Besides, observation of professionals’ dispensing practice was made for at least one hour in the same community pharmacies using an observation checklist. In the study they stated that all (n = 5) study participants agreed that the dispensing practice was not up to the standards set by the regulatory authority. The participants also mentioned that majority of the pharmacy professionals didn’t comply with the country’s law, professional code of ethics and regulatory guide of good dispensing practice. Non-prescription sale of antibiotics was recognized to be a growing public health problem by all participants. Majority of them believed the trend was of nonprescription sale as increasing. From this part we can interpret that in developing country like Ethiopia non-prescription dispensing is a major public health problem and country’s law cannot put bar on this situation.

Here they also showed the reasons for over the counter sale of antibiotics that all participants argued that the situation of OTC dispensing practice of antibiotic in Addis Ababa was becoming common and different reasons were identified for such practices. Four major reasons were identified to explain OTC sale of antibiotics. These were attributed to customers, owners of pharmacies, professionals’ interest and regulatory mechanism. The causes are,

Customers’ demand:

It was found that continued customers’ demand is a major reason for maintaining OTC sale of antibiotics. The study participants reported that factors related to customers’ previous experiences, lack of awareness about risks of nonprescription use of antibiotics, prolonged waiting time at the health facilities to get prescription, unnecessary and high costs of physician visits were frequently mentioned reasons by their customers to demand antibiotics without prescription.

#### Owner's expectation:

Findings related to owners' expectation shows that majority of participants raised owners influence as one of the reasons for increasing OTC sales of antibiotics. In this regard, most of the owners expect professionals to dispense medicines without prescription.

#### Professionals' conflict of interest:

Pharmacy professionals who participated in the study were all employed by owners. All participants pointed out that making financial profit is basic expectation from owners. As such every professional intends to draw as many customers as possible to maximize profit and maintain position. Consequently, majority of respondents pointed out to ignore their professional code of ethics.

#### Weak regulatory mechanism:

Findings showed that weak regulatory mechanism to enforce implementation of policies restricting nonprescription sale of antibiotics was mentioned by all respondents as one of the major reasons for nonprescription sales of antibiotics. All respondents indicated that the unethical dispensing of antibiotics without prescription is not because of lack of knowledge or awareness about its consequences but due lack of strong regulatory enforcement mechanism. Participants agree that customer's demand for antibiotics without prescription and owner's interest to reap more profit is reinforce by lack of functioning regulatory mechanisms. The study revealed that nonprescription sale of antibiotics in Addis Ababa is getting common. The study participants have admitted that despite knowing it is against the law, selling antibiotics as OTC medicines is common. It is documented that such nonprescription dispensing practice often leads to a wrong choice and/or dispensing insufficient doses to customers with little history taking and inadequate counseling. From this study we can understand that nonprescription drugs are sold in the basis of many factors especially in a developing country. This factors are mainly customer's demand, owner's expectation, professionals' conflict of interest and weak regulatory mechanism. So, in a developing country like Bangladesh this factors may somewhat related to knowledge of community pharmacists towards antibiotics.

Another study titled "**Antibiotic sales in rural and urban pharmacies in northern Vietnam: an observational study**" by Do Thi Thuy Nga was reviewed. It was a cross sectional study was conducted in which all drug sales were observed and recorded for three consecutive days at thirty private pharmacies, 15 urban and 15 rural, in the Hanoi region in 2010. The proportion of antibiotics to total drug sales was assessed and the revenue was calculated for rural and urban settings. Pharmacists and drug sellers were interviewed by a semi-structured questionnaire and in-depth interviews to understand the incentive structure of antibiotic dispensing. In their study they showed, "The proportion of transactions that included antibiotics was high: 24%

in the urban sites and 30% in the rural sites. Most antibiotics were sold without a prescription: 88% in urban and 91% in rural area showing no significant difference between two areas).” Here from their result we can say that both rural and urban pharmacies sell antibiotics without prescription in an alarming amount. There is very little difference between rural and urban pharmacies. In their result we can also see that in term of self-medication, 50% of the urban pharmacy customers decided by themselves which antibiotics to buy, whereas the rural clients more often asked for advice from drug sellers, with only 28% self-prescribed. It was observed that antibiotics were the most common drug sold at the pharmacies in both areas (17% in urban and 18% in rural), followed by herbal medicines (15% in urban and 11% in rural). However, in term of monetary value, herbal medicines was the most important groups which mainly contributed to total sales of both urban and rural pharmacies with 24% in urban and 27% in rural, followed by antibiotics (24% in urban versus 18% in rural ), analgesics group and vitamins. Average number of customers per pharmacy per day was 46 in urban and 19 in rural area. Among them, 11 clients in urban area had transactions that included antibiotics and the corresponding figure in rural area was 6 clients. The most common reason for buying antibiotics in the urban sites was cough (32%), and in the rural sites this was fever (22%). Antibiotics were often sold in combination with other drugs: analgesics 17%, cough and cold preparations 16%, vitamins 9%, corticosteroids 9%, and herbal medicines 5%. Interpreting the results they stated that there is widespread inappropriate antibiotic dispensing at private pharmacies in the Hanoi region. With only about 10% complying with prescription regulations. Also at the time of data collection and to reduce biasness & Hawthorne Effect (the alteration of behavior by the subjects of a study due to their awareness of being observed) the sellers were unaware during the observation that the objective was to assess antibiotic sales. During the study they also observed that some respondents were both drug seller and pharmacy shop owner, which might affect the results as the owner may mostly be interested in profit and their opinion about incentives driving irrational antibiotic dispensing. They also discussed that revenues from antibiotic sales are considerable for private pharmacies in both rural and urban areas. Complying with drug regulations, to dispense antibiotics only with a prescription, would therefore lead to economic loss for pharmacies (Nga, et al., 2014).

Another literature was reviewed titled, **“Community Pharmacists' Role in Controlling Bacterial Antibiotic Resistance in Aleppo, Syria”** by Ossama Mansoura and Rawaa Al-Kayali which was conducted to evaluate the knowledge, attitudes of community pharmacists regarding antibiotic use and potential drug resistance besides assessing their behaviors about dispensing antibiotic without prescription and correlation of the outcomes with demographic variables. They stated in the introduction that the major cause of antimicrobial resistance is the inappropriate use of antibiotics, which was found to be directly related to the tendency towards self-medication and the unnecessary use of antibiotics for viral disease. They also emphasize the improvement of the role of the pharmacist as the main supplier and

regulator of antibiotics. Most initiatives regarding antibiotic misuse are directed toward optimizing physicians' prescriptions, while other potential sources of antibiotic misuse are neglected. However, the effectiveness of antibiotics in the community and the risk of resistance may also be influenced by how antibiotics are used by the patient. Antibiotics, while often classified as prescription-only medicines, can be purchased without prescription from various drug outlets and community pharmacies in a range of countries around the world. Despite being illegal, over-the-counter sales of antibiotics occur frequently in Syria. The supply of an antibiotic from a pharmacy without a prescription usually involves a consultation with a pharmacist. Therefore, modifying public attitudes and improving the knowledge of the people regarding antibiotic use will be a responsibility of community pharmacist, the source of these drugs. Pharmacies in low- and middle- income countries are often the first point of contact for patients seeking health care as they are usually more accessible and less socially distant than other providers, including medical doctors. In the analysis they the knowledge scores were computed by scoring 1 for each correct answer and 0 for an incorrect answer with 'unsure' added into incorrect. The attitude scores were computed by scoring 1 for each good behavior and 0 for poor behavior with 'sometimes' added into poor behavior. These scores were then summed up and divided by the total number of test items. A score greater than 70% of the possible maximum score was considered as adequate and good and less than 50% as inadequate or poor for knowledge and behavior respectively, whereas a score between 50 and 70% was considered as moderate. In the result they showed that Participants were asked to answer the questions about speculating case of tonsillitis to determine the percentage of pharmacists who sell antibiotics without a medical prescription. The majority of pharmacists admitted that they dispense antibiotics for tonsillitis treatment without physician prescription. The comparison of dispensing behavior among participants showed no association between any demographic characters and their behavior. In the discussion they say that irrational use of antibiotics and weak regulatory enforcement of drug sales are serious issues in developing countries that contribute significantly to bacterial resistance. Knowledge and attitude on antibiotics related issues can greatly influence the way this drug is used. Therefore, evaluation of pharmacists dispensing behavior of such drug may provide valuable information which could help towards developing interventions targeting to improve the use of antibiotics. The surprising finding of this study was that the majority of participating pharmacists declared disagreement about activation of law that restricts sales of antibiotics without prescription. This might be explained by the fact that activation the law would negatively affect the sales quantities at their pharmacies and reflects pharmacists' commerce orientation even with the evidence of harm based practice. No association was found between sale of antibiotics without prescription conducted by participated pharmacists and their demographic characters, which reflect general behavior due to lack of strict control by the authorities. Their study reveals high rate prevalence of antibiotics dispensing without prescription which calls for imposing strict measures leading to restriction of antibiotic sales. The knowledge and attitudes of the pharmacists participate in this study indicate the urgent need for continuous

awareness campaigns directed to pharmacists and public. Educating the pharmacy staff on the risks of antibiotic resistant and emphasis on their role in helping to reduce the prevalence of resistance is an essential issue. Pharmacists have to accept these challenges to ensure that antibiotics are used appropriately even during the self-medication. So from this study we can say that despite knowing about one of the causes of antibiotic resistance is selling antibiotics without prescription most of the community pharmacists from Aleppo, Syria sells antibiotics without prescription. They also mentioned that following regulation if they only sell antibiotics with prescription it will adversely affect their sells and profit (Mansoura & Al-Kayali, 2017).

A literature has been reviewed titled, **“Non-prescribed sale of antibiotics in Riyadh, Saudi Arabia: A Cross Sectional Study”** by Aref A Bin Abdulhak and his team in Riyadh, Saudi Arabia is a cross sectional study of a quasi-random sample of pharmacies stratified by the five regions of Riyadh. Each pharmacy was visited once by two investigators who simulated having a relative with a specific clinical illness. In their study they said that antibiotic sales without medical prescriptions have been observed in many countries. This exacerbates the existing problem of inappropriate use of antibiotics that leads to an increase in treatment cost, drug adverse effects, and antibiotic resistance among bacteria. Antibiotic resistance is a global health problem, closely related to volume of antibiotic consumption; therefore, restricting antibiotic use and marketing regulations are among many important strategies to control this problem. However, most initiatives regarding antibiotic misuse are directed toward optimizing physicians’ prescriptions, while other potential sources of antibiotic misuse are neglected. Discussing about their methodology it was a cross sectional study of a quasi- random sample of 327 pharmacies was conducted in Riyadh, the capital of Saudi Arabia with about 5 million habitants, in November 2010. The sample was intended to be representative of all Riyadh pharmacies. The sample was stratified by the five regions of Riyadh (Eastern, Western, Northern, Southern, Central) regardless of the pharmacy’s size, deprivation level of the area. A convenience sample of streets was chosen from each region and a complete enumeration of all pharmacies in each street was considered. Each pharmacy was visited once by two investigators (total of 6 male physicians and 2 male medical students participated) who simulated having a brother/sister with a predetermined clinical scenario according to simulated client method pharmacy surveys. The scenarios included sore throat, acute bronchitis, otitis media, acute sinusitis, diarrhea, and urinary tract infection in a pregnant (childbearing age) women. The investigators concealed their identity and the study objective of their visits from the approached pharmacists who were identified by their licenses and pictures on the front wall of the pharmacy. The clinical scenarios were presented as follow; one investigator talked to the pharmacist while the other observed the discussion and memorized the responses. Immediately after leaving the pharmacy, both investigators completed a standardized data form that included information about the location of the pharmacy, antibiotics dispensing practice, pharmacists’ inquiries about associated symptoms (e.g.

fever/shortness of breath/abdominal pain/loin pain), allergy history, pregnancy status in case of UTI; type of antibiotic, if dispensed; and information about drug interactions if this was provided by the pharmacist. In the result they showed antibiotics were dispensed without medical prescription 77.6% with different levels of demand. Simulated cases of sore throat and diarrhea accounted for the highest percentage of antibiotic sales without medical prescription (90%) with level one of demand. None of the visited pharmacists asked about history of drug allergy or provided information regarding potential drug interactions when dispensing any antibiotics for any of the simulated clinical scenarios. The majority of pharmacists did not inquire about associated symptoms, and only few recommended a medical evaluation. In this representative sample of community pharmacies in Riyadh, we observed that antibiotic could be easily obtained without a medical prescription or an evidence-based indication. Moreover, pharmacists dispensed broad spectrum antibiotics without even being requested by the simulated participants. None of the interviewed pharmacists asked about allergy history or provided information about potential drug interactions which may lead to a greater risk. The causes behind high observed rate of antibiotic sales without a prescription in Riyadh could be explained by several factors: lack of enforcement of the national regulations, suboptimal compliance to the code of ethics and professionalism among community pharmacists, and financial interests of community pharmacists. Obtaining antibiotics without prescription will not only promote antimicrobials resistance but can also be associated with significant adverse events including drug adverse effects, high cost and complications. Antimicrobial resistance is a major concern associated with this practice. So at the conclusion of the study they describe their observation as they observed that antibiotics could be easily obtained without a medical prescription or an evidence based indication. There are major potentials equally associated with this practice. There is a need for strict enforcement and adherence to existing regulations regarding antibiotics sale. Educating the public about the world wide existing problems of antibiotic resistance, drug adverse effects and unnecessary cost associated with antibiotic sales without medical prescription is urgently needed (Abdulhak, et al., 2011).

A scientific literature was reviewed titled **“Evaluation of Rational Antibiotic Dispensing in the Community Pharmacy Setting: A Simulated Patient Study”** by Betül Okuyan. This study was conducted to evaluate rational antibiotic dispensing with- out prescription in the community pharmacy setting by using a simulated patient method in the city of Malatya, Turkey. In Turkey, the high rate of irrational antibiotic dispensing is a well-recognized fact that has existed for many years in the community pharmacy setting. In Turkey it is illegal to dispense antibiotics without prescription. It is more common to use simulated patient techniques to control antibiotic dispensing in countries in which the rate of antibiotics being dispensed without prescription is high. The reason behind using simulated patient method is that, this method is not to audit or supervise the pharmacist. It has been well documented that the most efficient and reliable feedback which can contribute to the development of professional skills can be obtained by using the simulated patient method.1 It is easier to observe when

pharmacists inappropriately dispense antibiotics without prescription by using the simulated patient method. It has been well documented that in cases where there is no great risk of bacterial infection, treatments with antibiotics do not provide additional benefits. Treatment with antibiotics is not recommended in cases where the duration of symptoms is less than two days and where there is no high fever. The second aim of their study is to assess the practices of community pharmacists during the recording of patient histories and patient education. While discussing result they stated that, during medication information that was provided by pharmacists is evaluated, 75.7% of them provided information regarding the reason for using the medication, while 60.0% of them explained how to use the medication. However, only 31.4% clarified when the medication was to be used and only 8.6% of them provided information about how long the medication should be used. Only eleven pharmacists did not suggest any medication to the simulated patient. However, thirty-two (45.7%) pharmacists recommended various medication regimens, including antibiotics. The common usage of antibiotics in the population cannot only be attributed to the prescription rate of physicians. It is well known that despite legal restrictions in many countries, dispensing antibiotics without prescription at community pharmacies and the attitude of the patient have also contributed to an increase in usage of antibiotics. In the present study, 45.7% of pharmacists recommended various medication regimens, including antibiotics, to simulated patient with symptoms of non-bacterial rhinosinusitis. Of these 67.1% referred the simulated patient to a physician (Okuyan, et al., 2017).

An article titled **“Dispensing of antibiotics without prescription in Greece, 2008: another link in the antibiotic resistance chain”** by D Plachouras was conducted in Athens, Greece. In this article the researcher says that, antibiotic resistance has been associated with the use of antibiotics. The dispensing of antimicrobials without prescription is a potential source of inappropriate antibiotic use. Antibiotic resistance is a major public health threat worldwide. There is plenty of evidence that the use of antibiotics is associated with the emergence of resistance. Rates of antibiotic consumption correlate closely with rates of antimicrobial resistance at national level, including both the hospital environment and outpatient settings. Variation in resistance correlates with variability in antibiotic use across Europe. This difference reflects socio- economic, healthcare system, legislative and cultural differences among European countries. To a large extent, this variation is a result of the over and misuse of antibiotics, especially for upper respiratory tract infections, many of which are of viral cause. Excessive use is partly attributed to inappropriate prescriptions by physicians. Self-medication with antibiotics is also a known practice in various European countries, especially in the southern and eastern parts, and this may exacerbate the problem. The two main sources of self-medication include the use of left-over antibiotics from previous courses of treatment and the acquisition from pharmacies without prescription. In the methodology they stated that their study was conducted throughout pharmacies in the greater Athens metropolitan area, were visited from April to May 2008 by 21 voluntary collaborators, who asked for either



ciprofloxacin or amoxicillin/clavulonic acid without providing a prescription or any other relevant justification. Amoxicillin/clavulonic acid was chosen for our study because it is one of the most frequently used antibiotics and ciprofloxacin because of the additional restrictions in dispensing for fluoroquinolones in Greece. The collaborators were advised to neither insist in case the antibiotic was refused, nor to simulate any specific disease or symptom, in order not to influence the pharmacist in the decision. Collaborators included physicians, nurses and laboratory technicians, but the identity or occupation was not revealed during the visit. The number of pharmacies visited in each area was chosen to roughly reflect the population. Each collaborator was assigned a specific area and the pharmacies visited were chosen randomly by the collaborator. All pharmacies visited were privately owned small enterprises. During the visit there was no way of differentiating between pharmacy employees and pharmacist, and the voluntary collaborators did not attempt to do this as it might have compromised the aim of the study (Plachouras, et al., 2010).

An article titled **“The Sale of Antibiotics without Prescription in Pharmacies in Catalonia, Spain”** by Carl Llor and Josep Maria Cots was conducted to quantify the percentage of pharmacies selling antibiotics without an official medical prescription in Catalonia, Spain, by the simulation of 3 different clinical cases presented by actors. It was a prospective study carried out from January through May 2008 throughout Catalonia. In this study sampling was done through randomization from 197 pharmacies from 4 provinces was stratified from different aspects like, by urban and rural areas and by richer or poorer socioeconomic zones. Three different clinical cases were presented; each case type was always presented by the same actor. There were two actors who visited a sample of pharmacies among the 2959 community pharmacies existing in Catalonia in 2007. The actors rehearsed with the aid of physicians to obtain standardization of the simulation of the diseases. In all cases, the actors who were simulating patients were very polite and entered the pharmacies stating that they were not from the neighborhood or city, they also stated that they were commercial representatives, and that were passing through. Three cases were presented: a. sore throat, simulated by an actor during the first months of the study; b. acute bronchitis, simulated by the same actor who presented with the sore throat, after the previous case was finalized to avoid overlap and c. an uncomplicated urinary tract infection, simulated by an actress. In their study a total of 197 pharmacies were visited. Antibiotics were obtained from 55 (79.7%) of 69 pharmacies when a urinary tract infection was simulated, 24 (34.8%) of 69 pharmacies when a sore throat was simulated, and 10 (16.9%) of 59 pharmacies when acute bronchitis was simulated (Llor & Cots, 2009).

A literature was reviewed titled, **“Community Pharmacists' Knowledge, Attitude and Practices towards Dispensing Antibiotics without Prescription”** by Fakhir Thamir Alotaibi and his colleagues conducted in Makkah, Saudi Arabia. In this study they used the KAP study method (Alotaibi, et al., 2018). That method depends on identifying the knowledge, measuring the attitude, and the practice of the sample

being tested. Researchers were concerned with both the patients and pharmacists on equal terms. In their consideration, it is not only up to the pharmacists to recommend antibiotics, but it also refers back to the patients to follow proper rules and course of treatment without self-stopping it nor starting discontinuous dosage of the drugs. They collected data by mail questionnaire. To identify the knowledge of the pharmacists and patients, we had taken a sample of a variety of ages, genders, nationality, and years of experience –in the case of pharmacists- and medical background in the case of patients- to specify that matter with the most data out possible. While analyzing the result they found that more than seventy five percent of the pharmacists were unknowledgeable about the fact that such treatment with dispensing antibiotics without prescription is certainly illegal and could lead to hazardous outcomes. That majority scored 50%-75%, and thus they were labelled as Poor. About the practice of pharmacists it was found that most of them were open to guide the patients through consulting their doctors first before ordering the antibiotics. Also, it was noticed from the answers that most of the pharmacists, if not all, tried in a way or another to warn the patients about allergies against the common antibiotics before dispensing them. They, in most cases, advise the patients to follow the course of treatment with antibiotics upon taken completely without any discontinuity in the middle, and they make it clear that it is an important step in the process of healing (Alotaibi, et al., 2018).

Another literature titled, “**Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain**” was reviewed. It was conducted by Maruxa Zapata-Cachafeiro and his colleagues in the north of Spain. In their study they said that Antibiotic resistance is a major public health concern and is greatly exacerbated by inappropriate antibiotic use at a community level. The aim of their study was to ascertain which attitudes of community pharmacists were related to inappropriate antibiotic dispensing. They conducted a cross-sectional study of community pharmacists in a region situated in northern Spain. Their interviews were conducted using a self-administered questionnaire. The degree of agreement with each item of knowledge and attitude was measured using an unnumbered, horizontal visual analogue scale, with replies being scored from 0 (total disagreement) to 10 (total agreement). The data were analyzed using logistic regression. Of the total of 286 pharmacists (72.8%) who completed the questionnaire, 185 (64.7%) acknowledged having undertaken dispensing of antibiotics without a medical prescription. Attitudes such as patient complacency, external responsibility, indifference and insufficient knowledge were shown to be related to dispensing of antibiotics without a medical prescription. In contrast, no association was found with any of the pharmacists’ personal or professional traits. They found that dispensing of antibiotics without a medical prescription continues to be a common practice in Spain. Several attitudes strongly associated with the dispensing of antibiotics without a medical prescription were identified. They suggested that results of their study could be used to design interventions to improve antibiotic dispensing (Zapata-Cachafeiro, et al., 2014).

A study titled, **“Non-prescription antimicrobial use worldwide: a systematic review”** by Daniel J Morgan and co researchers shows that much of the world antimicrobial drugs are sold without prescription or oversight by health-care professionals. They systematically reviewed published works about non-prescription antimicrobials from 1970–2009, identifying 117 relevant articles. There were nine surveys from Asia where they showed antimicrobials used, weighted non-prescription use was 58%. In the safety section they found that potential adverse events were common. Pharmacists dispensing non-prescription antimicrobials had no knowledge of patients’ allergies 83–100% of the time. Potential side-effects were discussed in about 50% of non-prescription antimicrobial purchases. In discussion section they mentioned that the causes and consequences of non-prescription antimicrobial use are varied. Poor regulation of antimicrobials results from absent policies or, more commonly, from absent enforcement of policies (Morgan, et al., 2011).

A study titled, **“A qualitative analysis of pharmacists' attitudes and practices regarding the sale of antibiotics without prescription in Syria”** conducted by Anas Bahnassi at Syria was reviewed. The objective of this study was investigate the Syrian pharmacists’ attitudes and practices in regard to antibiotic dispensing without prescription. The study was conducted by direct interview questions and five hypothetical scenarios were presented to 350 pharmacists in 3 major Syrian cities. Interview transcripts were prepared, coded and categorized under 5 major themes. During the study all pharmacists admit to dispense antibiotics without a prescription. Pharmacists were more likely to dispense antibiotics to their relatives, usual customers, and to patients who were prescribed the same antibiotic before. Most pharmacists did not agree that this practice posed a problem to patients’ welfare. The ones who agreed felt that more laws were needed and that the existing laws lacked enforcement. The results that are found to be alarming as the study shows that this practice will most probably continue to exist. Stricter laws and more law enforcement in addition to pharmacists and public education may constitute the most important elements to limit the spread of antibiotic dispensing without prescription in Syria (Bahnassi, 2015).

Another study conducted by A. Al-Mohamadi and colleagues at Jeddah, Saudi Arabia titled, **“Dispensing medications without prescription at Saudi community pharmacy: Extent and perception”** was reviewed. In this study their objective was to investigate the dispensing behavior of pharmacist s in retail pharmacy practice and to assess their attitude toward dispensing non-OTC drugs and scrutinize the causes of their malpractice. The study was conducted between December 2010 and January 2011 retail pharmacies in Jeddah-KSA. The pharmacies were visited randomly by a number of voluntary collaborators who played the role of asking for one or more of the following medications without providing a prescription: Co-amoxiclav or Cefaclor, Captopril and Fluoxetine. After completion of their study they discussed that total of 60 pharmacies were randomly included in this study where 100% of the pharmacists working were male, 96.7% of them were non-Saudis and only 2 (3.3%)

were Saudis. In a total 119 drug requests, almost all pharmacists (97.9%) handed out the antibiotic immediately, 100% dispensed captopril and 89.5% gave the antipsychotic simply by following the collaborator's request without even asking for a doctor's prescription. In the second part of the study (where a mini-questionnaire is administered). The highest reason given for their wrongdoing, was for that if the pharmacist did not, others, of neighboring pharmacies, would do the same, followed by that there is no available OTC list. So from their study they come to a conclusion that pharmacists are violating the law to some extent, which is leading to a profound malpractice in retail pharmacies around the country. Consequently, regulations should be reviewed and structured educational campaigns are a must to both pharmacists and public. The over the counter list should be generated, implemented and monitored by appropriate regulators and penalize the violators (Al-Mohamadi, et al., 2013).

Another literature titled, **“Antibiotic dispensing by drug retailers in Kathmandu, Nepal”** by David A.Wachter was reviewed. The study was conducted in Kathmandu, Nepal. The objective of the study was to assess over-the-counter antimicrobial dispensing by drug retailers in Kathmandu, Nepal, for rationality, safety, and compliance with existing government regulations of their country. During study standardized cases of dysuria in a young adult male and acute watery diarrhea in a child were presented by a mock patient to retailers at 100 randomly selected pharmacies. Questions asked by retailers and advice and medications given at their initiative were recorded. At the end of the study it was found that all retailers engaged in diagnostic and therapeutic behavior beyond their scope of training or legal mandate. Patients' history of illness obtained by retailers was inadequate to determine the nature or severity of disease or appropriateness of antimicrobial therapy. 97% of retailer dispensed unnecessary antimicrobials in diarrhea, while only 44% recommended oral rehydration therapy and only 3% suggested evaluation by a physician. 38% gave antimicrobials in dysuria, yet only 4% adequately covered cystitis. None covered upper urinary tract or sexually transmitted infections, conditions which could not be ruled out based on the interviews, and only 7% referred for a medical history and physical examination necessary to guide therapy. After analyzing the result the researcher come to a conclusion that despite of legislation in Nepal mandates a medical prescription for purchase of antibiotics, unauthorized dispensing is clearly problematic. Drug retailers in the study did not demonstrate adequate understanding of the disease processes in question to justify their use of these drugs. Risks of such indiscretion include harm to individual patients as well as spread of antimicrobial resistance. At last the researcher recommended that more intensive efforts to educate drug retailers on their role in dispensing, along with increased enforcement of existing regulations, must be pursued (A.Wachter, et al., 1999).

Another study titled, **“Survey on How Antibiotics are Dispensed in Community Pharmacies in Albania”** was reviewed. This study was conducted by Iris Hoxha and her colleagues. The main objective of the study was to evaluate pharmacists' tendency

to dispense antibiotics without prescription. The aim of our study was to make a survey focused on the dispensing of antibiotics without prescription in the community pharmacies in the country. The pharmacies were tested for their tendency to dispense antibiotic without prescription. A random survey was conducted for this study. Out of 450 pharmacies visited in this survey, in 259 pharmacies tested the request for dispensing antibiotic without production was approved (80% of tested pharmacies). Generally some questions (like age or possible allergies) were asked from pharmacists before approving the request of dispensing the antibiotic without prescription. The results of the survey suggest that dispensing of antibiotics without prescription is very common in Albania. The research group personnel were generally asked for further information before approving the request. They suggested that different actions should be taken in the country to enhance compliance with regulation and protocols regarding dispensing antibiotics. These actions can be focused on regulatory enforcement and also in enhancement of awareness on antibiotic misuse and microbial resistance through public campaigns or targeted messages to professionals (Hoxha, et al., 2015)

A literature titled, “**Antibiotic dispensing in Egyptian community pharmacies: An observational study**” conducted by Nirmeen A. Sabry, Samar F. Farid and Dalia M. Dawoud in Egypt was reviewed. In the background of the study they stated that antibiotics are commonly dispensed medications from community pharmacies, and they are frequently prescribed for inappropriate indications. In many countries, they are easily accessible without prescriptions. The inappropriate use of antibiotics results in the emergence of resistant bacterial strains, which represents a considerable public health problem, particularly in developing countries. So, their study aimed to describe the pattern of antibiotics dispensing from Egyptian community pharmacies and to collect baseline descriptive data on the antibiotics dispensed and their appropriateness. This study was cross-sectional, observational study of antibiotic dispensing encounters was conducted at 36 randomly selected pharmacies in Greater Cairo, Egypt. Data were collected during one shift at each pharmacy. Structured questionnaires recording patient demographics, antibiotics dispensed and reasons for dispensing were completed for each antibiotic dispensing encounter. In this study the data were descriptively analyzed. In the result of the study they show that self-medication and purchasing without medical prescriptions were common, representing around 23.3% of the antibiotics, most antibiotics were prescribed by a doctor or dentist which contributed 63.6%. The results of this study showed that antibiotics are frequently dispensed from community pharmacies in Egypt without appropriate prescriptions. These findings support the need for strict enforcement of pharmacy laws through improved inspection processes. They highlight the need for evidence-based guidelines and educational interventions to improve antibiotic prescribing and dispensing practices (Sabry, et al., 2014).

Another literature was reviewed titled, “**Knowledge of community pharmacists about antibiotics, and their perceptions and practices regarding antimicrobial**

**stewardship: a cross-sectional study in Punjab, Pakistan”**. The study was carried out by Muhammad Rehan Sarwar and his colleagues in Punjab province of Pakistan. The objective of the study was to evaluate the knowledge of community pharmacists about antibiotics, and their perceptions and practices toward antimicrobial stewardship (AMS). A descriptive cross-sectional study was conducted among community pharmacists in Punjab, Pakistan from April to May, 2017. A self-administered and pretested questionnaire was used for data collection. A simple random-sampling method was used to select community pharmacies. During the study, of the 414 pharmacists, 400 responded to the survey (response rate 96.6%). According to study participants had good knowledge about antibiotics. They showed positive perceptions, but poor practices regarding AMS. All of the participants were of the view that AMS program could be beneficial for health care professionals for improvement of patient care, and 78% of participants gave their opinion about incorporation of AMS programs in community pharmacies. Collaboration was never/rarely undertaken by pharmacists with other health care professionals over the use of antibiotics (n= 311, 77.8%), and a significant proportion of participants (n=351, 87.8%) never/rarely participated in AMS- awareness campaigns. In the conclusion they stated that pharmacists had good knowledge about antibiotics. There were some gaps in perceptions and practices of community pharmacists regarding AMS. In the current scenario, it will be critical to fill these gaps and improve perceptions and practices of community pharmacists regarding AMS by developing customized interventions (Sarwar, et al., 2018).

## Materials and Methods

The present study has been undertaken with the objective to assess the knowledge and practice of rational dispensing of antibiotics. For achieving the above mentioned objective, the study has been carried out systematically and followed the methodology mentioned below:

**Study Design:**

The study was a cross sectional study.

**Study Period:**

The study was conducted for one year, during the period of January 01 to December 31, 2018. A work schedule was prepared including the entire task in a sequence. The first four months were allocated for literature review and the strategy finalization. The subsequent months were spent for questionnaire development, pretesting, data collection, data compilation, data analysis, report writing, printing and submission of the thesis. The detailed work schedule was shown in annexure.

**Study Place:**

The study was conducted in Fatulla and Narayanganj sadar thana of Narayanganj district.

**Study Population:**

All retail medicine sellers.

**Sampling Method:**

The samples were selected by convenient sampling method.

**Selection Criteria:**

**Inclusion Criteria**

- a. All the retail medicine sellers of Fatulla and Narayanganj sadar thana of Narayanganj district.
- b. Gave consent to participate in this study.

### Exclusion Criteria

- . Pharmacies that are nearer to hospitals.
- . Model pharmacies.

### Sample Size:

To determine the sample size of cross sectional study, statistically the following formula was used to calculate the sample size:

$n = Z^2 pq/d$  Where,  $n$  = desired sample size

$Z$  = level of significance (1.96 at 95% confidence level)

$p$  = prevalence of delayed diagnosis of breast cancer

$q = 1 - p$

$d$  = allowable error, degree of accuracy required, usually set as 5%

So, the sample size was

$$n = (1.96) \times 0.5 \times (1-0.5) / (0.05) = 384$$

Due to time limitation sample size in this study was determined as 294

### Research Instrument:

A semi structured questionnaire was developed to collect data. The questionnaire was prepared by using the selected variables according to the objectives. A checklist was prepared to observe the practice. The questionnaire was pretested in the Pagla thana of Narayanganj district. Necessary modification were done and finalized before collection of data.

### Data Collection Technique:



The purpose of the study was explained in details to the respondents. After taking informed written consent data was collected through face to face interview. Practice was observed with checklist by two trained simulated patient with chief complaints of fever for two days and runny nose.

### **Data Analysis:**

The data was analyzed after collection of data from the respondents. After completion of data collection, to maintain consistency, the data were checked and edited manually and verified before tabulation. Data were coded, entered and analyzed in a computer. The statistical analysis was conducted by using SPSS (Statistical Package for Social Science) version 25 statistical software. The findings of the study were presented by frequency, percentage in tables and graphs. Means and standard deviations for continuous variables and frequency distributions for categorical variables were used to describe the characteristics of the total sample.

### **Data Quality Management**

The objectives, variables and questionnaire were formed after extensive literature review. Consistency and competency of the collected data was checked regularly during the data collection period by the researcher. Moreover, data entry and cleaning procedures were started alongside data collection. Chances of missing data or irrelevant data were much less. Thus the quality of the data was managed.

### **Ethical Implication**

The study was conducted with the intension of protecting the human rights of all subjects. All the information collected for the study was utilized only for the purpose of thesis and was not disclosed to anyone outside the research team. At the beginning, approval was obtained from the ethical committee of NIPSOM, under Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Informed written consent was obtained from the participants after informing the purpose of the study. A complete assurance was given that all the information keeps confidentially. Their participation and contribution was acknowledged with due respects. The right was being given to the participants not to participate and to discontinue participation at any time from the study without any penalty. Informed consent was documented properly. Each respondent was interviewed separately and their privacy and confidentiality was maintained strictly.

## Results

Table 1: Distribution of respondents by age (n=294)

Age	Frequency (f)	Percentage (%)	Mean±SD
21-30 Years	60	20.4	37.41±6.96
31-40 Years	146	49.7	
41-50 Years	81	27.6	
51-60 Years	7	2.4	
Total	294	100.0	

Table 1 shows the distribution of the age of the respondents. The mean age of the respondents is 37.41±6.96 years, ranged from 20 to 60 years. Among the respondents 20.4% (n=60) are in the 21-30 years age group, 49.7% (n=146) are in the 31-40 years age group, 27.6% (n=81) are in the 41-50 years age group and 2.4% (n=7) are in the 51-60 years age group.

Table 2: Distribution of respondents by marital status (n=294)

Sex of the respondents	Frequency (f)	Percentage (%)
Married	261	88.8
Unmarried	33	11.2
Total	294	100.0

Table 2 shows the distribution of the marital status of the respondents. Among the respondents 88.8% (n=261) are married and 11.2% (n=33) are unmarried.

**Table 3: Distribution of respondents by number of family member (n=294)**

Number of family member	Frequency (f)	Percentage (%)	Mean±SD
2	4	1.4	5.18±1.38
3	17	5.8	
4	72	24.5	
5	100	34.0	
6	61	20.7	
7	20	6.8	
8	12	4.1	
9	6	2.0	
10	2	0.7	
Total	294	100.0	

Table 3 shows the distribution of the family members of the respondents. The mean number of the family members of the respondents is 5.18±1.38, ranged from minimum 2 to maximum 10 members per family. Among the respondents 34% (n=100) has 5 members, 24.5% (n=72) has 4 members, 20.7% (n=61) has 6 members in their families. Only 0.7% (n=2) has 10 members in their family which is the highest and 1.4% (n=4) has 2 members in their family which is the lowest in this study.

**Table 4: Distribution of respondents by monthly income (n=294)**

Monthly income group <sup>[1]</sup> <sub>SEPI</sub> (In taka)	Frequency (f)	Percentage (%)	Mean±SD
11000-20000	89	30.3	29539±12212
21000-40000	183	62.2	
41000-60000	16	5.4	
61000-80000	4	1.4	
81000-100000	2	0.7	
Total	294	100.0	

Table 4 shows distribution of respondents in percentage among different income groups. The mean income of the respondents is 29539±12212 taka per month, ranged from 12000 to 100000 taka per month. Among the respondents 62.24% (n=183) earns 21000-40000 taka per month, 30.3% (n=89) earns 11000-20000 taka per month, 5.44% (n=16) earns 41000-60000 taka per month. Among all 0.68% (n=2) earns 81000- 100000 taka per month which is the highest in this study.

**Table 5: Distribution of respondents by their educational qualification (n=294)**

<b>Educational qualification</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Bachelor degree or above	118	40.14
HSC pass	110	37.41
Diploma	66	22.45
Total	294	100.0

Table 5 shows distribution of respondents in percentage among different income groups. Among the respondents 40.14% (n=118) has a bachelor or above degree, 37.41% (n=110) passed HSC and 22.45% (n=66) has a diploma.

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### **Information related to profession**

**Table 6: Distribution respondents by duration of their involvement in retail drug**

**selling (n=294)**

<b>Involvement in retail drug selling (In years)</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
1-5	65	22.1
6-10	118	40.1
11-15	74	25.2
16-20	31	10.5
21-25	5	1.7
26-30	1	.3
Total	294	100.0

Table 6 shows the distribution respondents by duration of their involvement in retail drug selling. The mean duration of the respondents associated with retail drug selling is  $9.87 \pm 5.158$  years, ranged from 1 year to 26 years. Among the respondents 40.1% (n=118) is associated with retail drug selling for 6-10 years, 25.2% (n=74) is associated with retail drug selling for 11-15 years. 22.1% (n=65) is associated with retail drug selling for 1-5 years.

**Table 7: Distribution of respondents on drug dispensing training (n=294)**

Have training in drug dispensing	Frequency (f)	Percentage (%)
Yes	291	99.0
No	3	1.0
Total	294	100.0

Table 7 shows the distribution of the respondents by their drug dispensing training. Among the respondents 99% (n=291) has claimed that they has training on drug dispensing and 1% (n=3) have said that they have no training on drug dispensing.

**Table 8: Distribution respondents by number of customer daily come on average (n=294)**

Number of customer daily	Frequency (f)	Percentage (%)	Mean±SD
1-40	56	19.0	69.05±31.03
41-80	178	60.5	
81-120	40	13.6	
121-160	18	6.1	
161-200	2	0.7	
Total	294	100.0	

Table 8 shows distribution of respondents by number of customer daily come. The mean number of customer comes per day is 69.05±31.03 ranging from 10 to 200 customers per day. 60.54% (n=178) said 48-80 customers come daily, 19.05% (n=56) said 1-40 customers come daily and 13.61% (n=56) said 81-120 customers come daily.

**Table 9: Distribution respondents by number of selling antibiotics per day in pieces (n=294)**

Number of antibiotic sold daily (In pieces)	Frequency	Percent	Mean±SD
0-20	180	61.2	24.07±13.936
21-40	93	31.6	
41-60	17	5.8	
61-80	2	0.7	
81-100	2	0.7	
Total	294	100.0	

Table 9 shows the distribution respondents by number of selling antibiotics per day (in pieces). The mean sale of antibiotic is 24.07±13.936 pieces per day, ranged from lowest 0 piece to 100 pieces per day. Among them 61.2% (n=180) sells 0-20 pieces of antibiotics per day, 31.6% (n=93) sells 21-40 pieces of antibiotics per day, 5.8 % (n=17) sells 41-60 pieces of antibiotics per day, 0.7 % (n=2) sells 61-80 pieces of antibiotic per day and 0.7 % (n=2) sells 81-100 pieces of antibiotics per day.



**Table 10: Number of customer buy antibiotic without prescription daily (n=294)**

<b>Number of customer buy antibiotic without prescription daily</b>	<b>Frequency</b>	<b>Percent</b>	<b>Mean±SD</b>
0-10	231	78.6	5.35±8.826
11-20	43	14.6	
31-40	3	1	
<b>Total</b>	<b>294</b>	<b>100.0</b>	

Table 10 shows the distribution respondents by number of customer buy antibiotic without prescription daily. The mean number of customer bought antibiotic without prescription was 5.35±8.826 per day, ranged from lowest 0 to 40 customers per day. Among the respondents 78.6% (n=231) said 0-10 customers buy antibiotic without prescription per day, 14.6% (n=43) said 11-20 customers buy antibiotic without prescription per day, 5.8 % (n=17) said 21-30 customers buy antibiotic without prescription per day and 1% (n=3) said 31-40 customers buy antibiotic without prescription per day.

### **Information related to knowledge on Rational Dispensing of Antibiotics**

**Table 11: Distribution of respondents by knowledge that it is mandatory to sell antibiotic with prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 11 shows the distribution of the respondents knowledge that it is mandatory to sell antibiotic with prescription. Among the respondents 100% (n=294) has said that they know that it is mandatory to sell antibiotic with prescription

**Table 12: Distribution of respondents by knowledge that selling expired dated antibiotics is harmful for patient (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 12 shows the distribution of the respondents by knowledge that selling expired dated antibiotics is harmful for patient. Among the respondents 100% (n=294) has said that they know that it is harmful for patient to sell expired dated antibiotics.

**Table 13: Distribution of respondents by knowledge that repeated selling of antibiotics with old prescription is dangerous for patient (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 13 shows the distribution of the respondents by that repeated selling of antibiotics with old prescription is dangerous for patient. Among the respondents 100% (n=294) has said that they know it is dangerous for patient to sell antibiotics repeatedly by old prescription.

**Table 14: Distribution of respondents by knowledge that patient should not buy antibiotics without prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 14 shows the distribution of the respondents by that knowledge that patient should not buy antibiotics without prescription. Among the respondents 100% (n=294) has said that they know patient should not buy antibiotics without prescription.

**Table 15: Distribution of respondents by knowledge that it is necessary to inform patient about dose and duration of the antibiotics as written on prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 15 shows the distribution of the respondents by the knowledge that it is necessary to inform patient about dose and duration of the antibiotics as written on prescription. Among the respondents 100% (n=294) has said that they know it is necessary to inform patient about dose and duration of the antibiotics as written on prescription.

**Table 16: Distribution of respondents by knowledge that it is necessary to inform patient about adverse effect of the antibiotics (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 16 shows the distribution of the respondents by the knowledge that it is necessary to inform patient about adverse effect of the antibiotics. Among the respondents 100% (n=294) has said that they know it is necessary to inform patient about adverse effect of the antibiotics.

**Table 17: Distribution of respondents by knowledge that pharmacists should stop dispensing antibiotics without prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 17 shows the distribution of the respondents by the knowledge that pharmacists should stop dispensing antibiotics without prescription. Among the respondents 100% (n=294) has said that they know pharmacists should stop dispensing antibiotics without prescription.

**Table 18: Distribution of respondents by knowledge that pharmacists should encourage patients to consult the physician and get a prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	294	100%
No	0	0%
Total	294	100.0

Table 18 shows the distribution of the respondents by the knowledge that pharmacists should encourage patients to consult the physician and get a prescription. Among the respondents 100% (n=294) has said that they know pharmacists should encourage patients to consult the physician and get a prescription.

**Table 19: Distribution of respondents by knowledge that refusing to dispense antibiotic without prescription will negatively affect sales and profits (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	2	0.68%
No	292	99.32%
Total	294	100.0

Table 19 shows the distribution of the respondents by the knowledge that refusing to dispense antibiotic without prescription will negatively affect sales and profits. Among the respondents 99.32% (n=292) said that refusing to dispense antibiotic without prescription did not negatively affect sales and profits and 0.68% (n=2) said that refusing to dispense antibiotic without prescription negatively affected sales and profits.

**Table 20: Distribution of respondents by having knowledge of the term “Antibiotic Resistance” (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	288	97.96%
No	6	2.04%
Total	294	100.0

Chart 20 shows the distribution of the respondents by having knowledge of the term “Antibiotic Resistance”. Among the respondents 97.96% (n=288) said that they are familiar with the term “Antibiotic Resistance” and 2.04% (n=6) said that they have no knowledge about the term “Antibiotic Resistance”.

### **Information related to practice of rational dispensing of antibiotics**

**Table 21: Distribution of respondents by statement regarding practice of dispensing antibiotics after seeing the prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	200	68.03%
No	94	31.97%
Total	294	100.0

Table 21 shows the distribution of respondents by information regarding practice of dispensing antibiotics after seeing the prescription. Among the respondents 68.03% (n=200) said that they practice dispensing of antibiotics after seeing the prescription and 31.97% (n=94) said that they do not practice dispensing of antibiotics after seeing the prescription.

**Table 22: Distribution of respondents by statement regarding practice of informing patient that they should not buy antibiotics without prescription**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	215	73.13%
No	79	26.87%
Total	294	100.0

Table 22 shows the distribution of respondents by practice of informing patient that they should not buy antibiotics without prescription. Among the respondents 73.13% (n=215) said that inform patient that they should not buy antibiotics without prescription and 26.87% (n=79) said that they do not inform patient that they should not buy antibiotics without prescription.

**Table 23: Distribution of respondents by statement regarding practice of helping patient to understand about the dose and duration of antibiotic as written on prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	293	99.66
No	1	0.3
Total	294	100.0

Table 23 shows the distribution of respondents by practice of helping patient to understand about the dose and duration of antibiotic as written on prescription. Among the respondents 99.66% (n=293) said that they help patient to understand about the dose and duration of antibiotic as written on prescription and 0.68% (n=2) said that they do not help patient to understand about the dose and duration of antibiotic as written on prescription.

**Chart 24: Distribution of respondents by statement regarding practice of informing patient to see a doctor if any side effect occurs after taking antibiotics**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	292	99.3
No	2	0.7
Total	294	100

Table 24 shows the distribution of respondents by practice of informing patient to see a doctor if any side effect occurs after taking antibiotics. Among the respondents 99.32% (n=292) said that they inform patient to see a doctor if any side effect occurs after taking antibiotics and 0.68% (n=2) said that they do not inform patient to see a doctor if any side effect occurs after taking antibiotics.

**Table 25: Distribution of respondents by statement regarding practice of selling antibiotic repeatedly following old prescription (n=294)**

<b>Response</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
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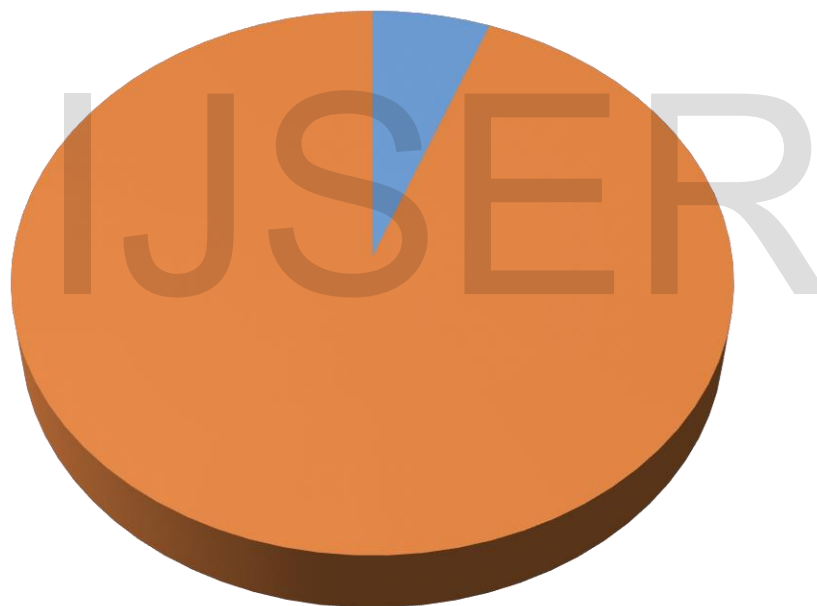


Yes	0	0%
No	294	100%
Total	294	100.0

Table 25 shows the distribution of the respondents by practice of selling antibiotic repeatedly following old prescription. Among the respondents 100% (n=294) has said that they do not sell antibiotic repeatedly following old prescription.

**Checklist related to practice of rational dispensing of antibiotics**

**Distribution of respondents by their practice of seeing prescription before dispensing of antibiotics**



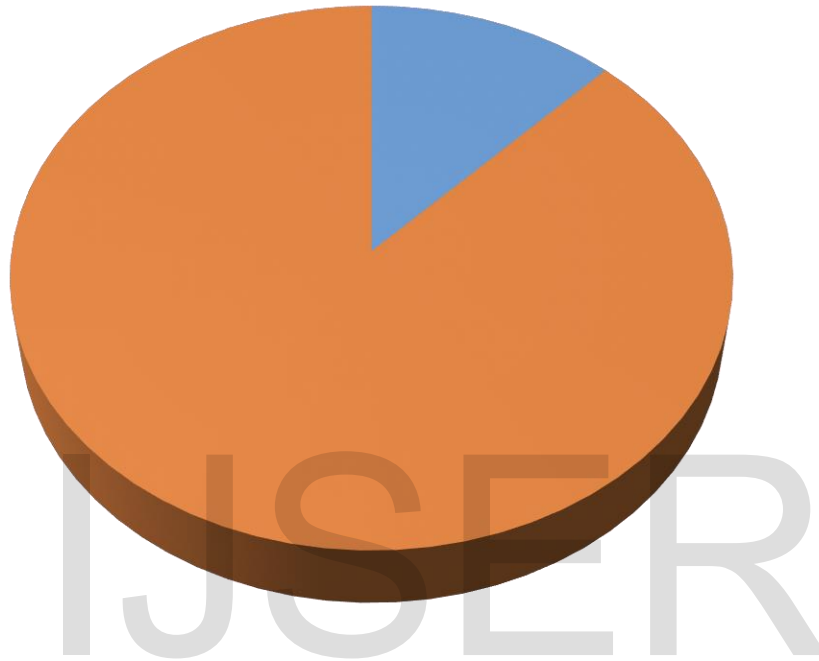
Yes No

6% 94%

**Figure 3:** Pie-chart showing the distribution of respondents by their practice of seeing prescription before dispensing

Figure 3 shows the distribution of respondents by their practice of seeing prescription before dispensing. Among the respondents 5.78% (n=17) wanted to see prescription before dispensing antibiotics and 94.22% (n=277) did not want to see prescription before dispensing antibiotics.

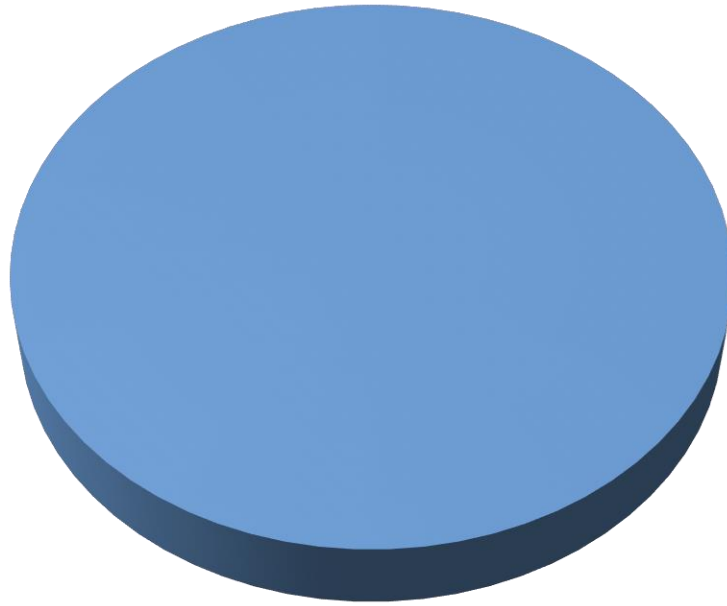
**Distribution of respondents by their warning to consumer about not to buy antibiotics without prescription**



**Figure 4:** Pie-chart showing the distribution of respondents by their warning to consumer about not to buy antibiotics without prescription

Figure 4 shows the distribution of respondents by their warning to consumer about not to buy antibiotics without prescription. Among the respondents 12.24% (n=36) warned consumer about not to buy antibiotics without prescription and 87.76% (n=258) did not warned.

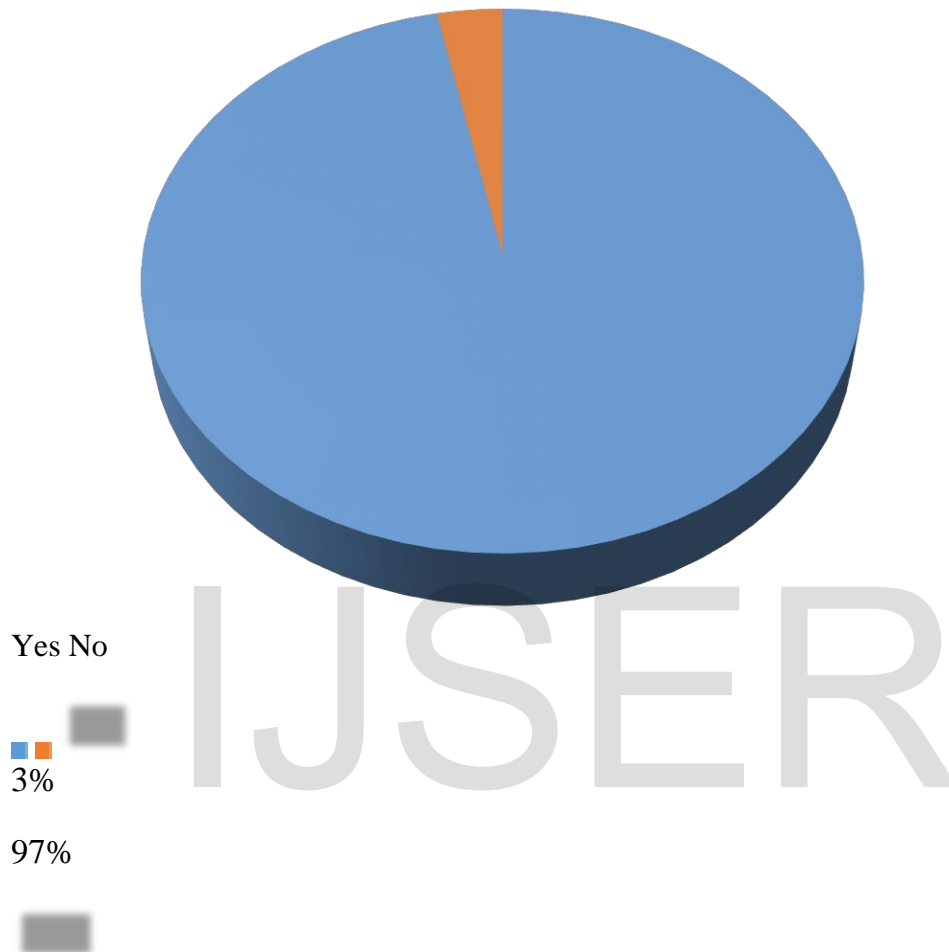
**Distribution of respondents by helping consumer to understand the dose and duration of antibiotics as written on prescription (n=294)**



**Figure 5:** Distribution of respondents by helping consumer to understand the dose and duration of antibiotics as written on prescription

Figure 5 shows the distribution of the respondents by helping consumer to understand the dose and duration of antibiotics written on prescription. Among the respondents 100% (n=294) helps their consumer to understand the dose and duration of antibiotics as written on prescription.

### Distribution of respondents by their selling of antibiotic with old prescription



**Figure 7:** Pie-chart showing the distribution of respondents by their repeated selling of antibiotic following old prescription

Above Pie-chart shows the distribution of respondents by their repeated selling of antibiotic following old prescription. Among the respondents 3.74% (n=11) did not sell antibiotic following old prescription and 96.26% (n=283) sold antibiotic following old prescription.

## Analysis<sup>[1]</sup><sub>[SEP]</sub>

**Table 26:** Difference between statement of retail drug sellers and observation on practice of rational dispensing of antibiotics (n=294)

<b>Attribute</b>	<b>Statement</b>	<b>Practice</b>
Wants to see prescription before dispensing antibiotics	68% (n=200)	6% (n=17)
Warns consumer about not to buy antibiotics without prescription	73% (n=215)	12% (n=36)
Helps consumer to understand the dose and duration of antibiotics as written on prescription	99.7% (n=293)	100% (n=294)
Advises consumer to see a doctor if any side effect occurs after taking antibiotics	99.3% (n=292)	32% (n=94)
Sells antibiotics with old prescription	0% (n=0)	97% (n=283)

Table 26 shows difference between statement of retail drug sellers and observation of practice on rational dispensing of antibiotics.

**Table 27: Association of the respondents by educational qualification and**

**dispensing antibiotics without Prescription (n=151)**

Dispensing antibiotics without Prescription	Educational qualification of the respondents		
	Diploma f (%)	HSC f (%)	Bachelor or above <sup>[1]</sup> f (%)
No	63(21.4)	101(34.4)	113(38.4)
Yes	3(1)	9(3.1)	5(1.7)

Table 27 shows the association of the respondents by educational qualification and dispensing antibiotics without prescription. No significant statistical difference was found between educational qualification and dispensing antibiotics without prescription (p=0.394).

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**Discussion**

In this part results of the study have been thoroughly discussed. Results have been

discussed in several segments. In this study the mean age of the respondents is  $37.41 \pm 7$  years, ranged from 20 to 60 years. Among the respondents 20.4% (n=60) are in the 21-30 years age group, 49.7% (n=146) are in the 31-40 years age group, 27.6% (n=81) are in the 41-50 years age group and 2.4% (n=7) are in the 51-60 years age group. Study conducted in Ethiopia (Gebretekle & Serbessa, 2016) shows age of respondents ranges from 27 to 37 years. Study conducted in Aleppo, Syria shows mean age of retail drug sellers is  $39.8 \pm 10$  years (Mansoura & Al-Kayali, 2017) and in Pakistan 55.2% respondents falls in the age range of 20 to 29 years (Sarwar, et al., 2018). In a study of Saudi Arabia 83% of the respondents fall under the age group of 19 to 30 years (Al-Mohamadi, et al., 2013). There is similarity of age group between this study and the studies conducted in Ethiopia, Syria, Pakistan and Saudi Arabia.

In this study among the respondents 99% (n=291) is male and 1% (n=3) is female. In a study conducted in Turkey (Okuyan, et al., 2017), 55% of the retail drug sellers are female which showed a major difference between Europe and Asia. But similarity found with a study of Saudi Arabia (Hadi, et al., 2016) where 100% of the respondents were male and with a study in Pakistan (Sarwar, et al., 2018) where 82% of the respondents were male.

Among the respondents 94.6% (n=278) are Muslim and 5.4% (n=16) are Hindu. Follower of other religions are not found. Among the respondents 88.8% (n=261) are married and 11.2% (n=33) are unmarried. The mean number of the family members of the respondents was  $5.18 \pm 1.38$  per family, ranged from minimum 2 to maximum 10 members per family. The mean income of the respondents was  $29539 \pm 12212$  taka per month, ranged from 12000 to 100000 taka per month.

Among the respondents 40.14% (n=118) has a bachelor or above degree, 37.41% (n=110) passed HSC and 22.45% (n=66) has a diploma. No respondent was found to have qualification of below Diploma. The study conducted in Pakistan shows 83.5% held a bachelor degree (Sarwar, et al., 2018). Also in Jeddah, Saudi Arabia, 85% of the pharmacy sellers held a bachelor degree (Al-Mohamadi, et al., 2013). Here the discrepancy can be seen in educational qualification with Pakistan and Saudi Arabia. In discussing information related to profession it was found that mean duration of the respondents associated with retail drug selling was  $9.87 \pm 5.158$  years, ranged from 1 year to 26 years. Among the respondents 40.1% (n=118) was associated with retail drug selling for 6-10 years, 25.2% (n=74) is associated with retail drug selling for 11-15 years. 22.1% (n=65) is associated with retail drug selling for 1-5 years. Study conducted in Ethiopia showed experience of respondents' ranges from 2 to 8 years (Gebretekle & Serbessa, 2016) and in the study conducted in Egypt it is 5.3 years on

average (Sabry, et al., 2014). But study in Syria shows pharmacy working experience a little higher mean experience of  $14 \pm 7.6$  years (Mansoura & Al-Kayali, 2017).

In this study 99% (n=291) has claimed that they has training on drug dispensing. The mean number of customer comes per day is  $69.05 \pm 31.03$  ranging from 10 to 200 customers per day. The mean sale of antibiotic is  $24.07 \pm 13.936$  pieces per day, ranged from lowest 0 piece to 100 pieces per day. Study conducted in Makkah, Saudi showed More than a quarter (27.9%) reported dispensing more than 300 medications per day and almost 90% reported dispensing less than 50 antibiotics per day (Hadi, et al., 2016).

The mean number of customer bought antibiotic without prescription was  $5.35 \pm 8.826$  per day, ranged from lowest 0 to 40 customers per day. Among the respondents 78.6% (n=231) said 0-10 customers buy antibiotic without prescription per day, 14.6% (n=43) said 11-20 customers buy antibiotic without prescription per day, 5.8 % (n=17) said 21- 30 customers buy antibiotic without prescription per day and 1% (n=3) said 31-40 customers buy antibiotic without prescription per day. Study conducted in Vietnam showed 50% of the urban patients buy antibiotic without prescription (Nga, et al., 2014). Where in Riyadh, Saudi Arabia 77.6% (Abdulhak, et al., 2011) and in North Spain 64.6% (Zapata-Cachafeiro, et al., 2014) patients buy antibiotic without prescription.

In this study 100% (n=294) of the respondents said that they knew it is mandatory to sell antibiotic with prescription. A study in Makkah, Saudi Arabia 77.2% perceived it is a problem if they sold antibiotic without prescription (Hadi, et al., 2016). 100% (n=294) has said that they know that it is harmful for patient to sell expired dated antibiotics. Among the respondents 100% (n=294) has said that they know it is dangerous for patient to sell antibiotics repeatedly by old prescription. 100% (n=294) has said that they know patient should not buy antibiotics without prescription. Among the respondents 100% (n=294) has said that they know it is necessary to inform patient about dose and duration of the antibiotics as written on prescription. Among the respondents 100% (n=294) has said that they know it is necessary to inform patient about adverse effect of the antibiotics. Among the respondents 100% (n=294) has said that they know pharmacists should stop dispensing antibiotics without prescription. Among the respondents 100% (n=294) has said that they know pharmacists should encourage patients to consult the physician and get a prescription. Among the respondents 99.32% (n=292) said that refusing to dispense antibiotic without prescription did not negatively affect sales and profits and 0.68% (n=2) said that refusing to dispense antibiotic without prescription negatively affected sales and



profits. Study conducted in Saudi showed 52.9% of the respondents thought refusing to dispense antibiotic without prescription would negatively affect their sales and profit (Hadi, et al., 2016). It shows a huge difference between the perception of Saudi retail drug sellers and Bangladeshi retail drug sellers on the ground of sales and profit.

Among the respondents 97.96% (n=288) said that they are familiar with the term “Antibiotic Resistance” and 2.04% (n=6) said that they have no knowledge about the term “Antibiotic Resistance”.

While observing practice among the respondents 5.78% (n=17) wanted to see prescription before dispensing antibiotics and 94.22% (n=277) did not want to see prescription before dispensing antibiotics. In Greece 85% (Plachouras, et al., 2010; Plachouras, et al., 2010), in Albania 80% (Hoxha, et al., 2015), in Jeddah, Saudi Arabia 97.9% (Al-Mohamadi, et al., 2013) and in Syria 89% (Bahnassi, 2015) retail drug sellers dispensed antibiotic without prescription.

Among the respondents 12.24% (n=36) warned consumer about not to buy antibiotics without prescription and 87.76% (n=258) did not warn.

Among the respondents 100% (n=294) helped their consumer to understand the dose and duration of antibiotics as written on prescription. In Turkey 31.4% (Okuyan, et al., 2017), in Spain 94.5% (Llor & Cots, 2009) and in Egypt 77.5% (Sabry, et al., 2014) drug sellers helped people to understand or instructed about dosage and duration of antibiotic.

Among the respondents 31.97% (n=94) advised consumer to see a doctor if any side effect occurs after taking antibiotics. Comparing to other studies, in Turkey 67.1% (Okuyan, et al., 2017) retail drug sellers gave advice to consult a physician if any side effect occurs, in Syria 47.4 % warned about possible side effect (Mansoura & Al-Kayali, 2017), where in Riyadh, Saudi Arabia, none warned or informed patients about any possible side effect after taking antibiotic (Abdulhak, et al., 2011). This study showed a little lower rate of referring patient to a physician if any side effect occurs after taking antibiotic than other countries of Asia and Europe.

Among the respondents 3.74% (n=11) did not sell antibiotic following old prescription and 96.26% (n=283) sold antibiotic following old prescription.

This study revealed respondents had adequate knowledge on rational dispensing of antibiotics. But in practice it was found major dissimilarities with knowledge. When 68% (n=200) stated that they wanted to see prescription before dispensing antibiotics, in practice 6% (n=17) wanted to see prescription. 73% (n=215) stated that they

warned consumer not to buy antibiotics without prescription, in practice 12% (n=36) warned customers. 99.3% (n=292) of the respondents stated that they gave advice to customers to consult a doctor if any side effect occurs after taking antibiotics, in practice 32% (n=94) gave advice. While none of the respondent, 0% (n=0) stated that they sell antibiotic with old prescription, in practice 97% (n=283) sold antibiotic with old prescription. The only similarity found between statement and practice that 99.7% (n=293) of them helped consumer to understand the dose and duration of antibiotics as written on prescription, in practice 100% of them helped to understand dose and duration.

## **Conclusion**

This study was aimed at exploring the knowledge and practice of retail drug sellers while dispensing antibiotics. Though the results yielded major discrepancies between knowledge and practice, it was not the representative image of the whole country, as it was done in small scale. There are numerous scopes to conduct research and studies should be carried out in larger scale to perceive an accurate picture of the knowledge and practice of retail drug sellers considering rational dispensing of antibiotics. It may help the policy makers to revise the existing laws and regulation of antibiotics selling. Bangladesh as a developing country and booming economy is under grip of worldwide health threat of antibiotic resistance. Although in Bangladesh antibiotics are not used in farms and vegetables, her massive population and lack of strict regulation on using antibiotic use may put the mass health in danger of microbial resistance. It's high time to reevaluate the drug and health policy that will ensure a healthy and prosperous future for the country.

## **Recommendations**

- . • □Policy makers may think revise existing law and regulations on antibiotic use [L][SEP]
- . • □If needed new law can be passed to curb indiscriminate selling on antibiotics [L][SEP]
- . • □Government may patronize universities and researchers to conduct more [L][SEP]research to understand current antimicrobial situation [L][SEP]
- . • □More practical oriented training courses including behavior change intervention [L][SEP]should be launched to train retail drug sellers and help them to understand the [L][SEP]grave situation if misuse or inappropriate use of antibiotics goes unchecked [L][SEP]
- . • □Strong referral system should be implemented as early as possible to provide optimum health care to the people so that they can restrain themselves from self- [L][SEP]medication [L][SEP]

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## References

A.Wachter, D., Joshi, M. P. & Rimal, B., 1999. Antibiotic dispensing by drug retailers

in Kathmandu, Nepal. *Tropical Medicine and International Health*, 4(11), p. 782–788.

Abdulhak, A. A. B. et al., 2011. Non-prescribed sale of antibiotics in Riyadh, Saudi Arabia: A Cross Sectional Study. *BMC Public Health*, 11(538).

Al-Mohamadi, A. et al., 2013. Dispensing medications without prescription at Saudi community pharmacy: Extent and perception. *Saudi Pharmaceutical Journal*, 21(1), pp. 13-18.

Alotaibi, F. T., Khoibrani, A. A., Almalki, M. S. & Aljabri, H. A., 2018. Community Pharmacists' Knowledge, Attitude and Practices towards Dispensing Antibiotics without Prescription (DAWP). *The Egyptian Journal of Hospital Medicine*, 70(7), pp. 1234- 1237.

Bachar, S. C. et al., 2015 . Baseline Study of Private Drug Shops in Bangladesh: Findings and Recommendations, Arlington, Virginia: Systems for Improved Access to Pharmaceuticals and Services (SIAPS).

Bahnassi, A., 2015. A qualitative analysis of pharmacists' attitudes and practices regarding the sale of antibiotics without prescription in Syria. *Journal of Taibah University Medical Sciences*, 10(2), pp. 227-233.

Bangladesh Economic Review, 2017. Bangladesh Economic Review 2017, Dhaka: Government of the People's Republic of Bangladesh.

Biswas, M. et al., 14 August 2014. Self medicated antibiotics in Bangladesh : a cross-sectional health survey conducted in the Rajshahi City. *BMC Public Health*.

CBHC, G. O. B., 2018. Community Based Healthcare (CBHC), DGHS. [Online] Available at: <http://www.communityclinic.gov.bd/> [Accessed 18 October 2018].

CRI, 2014. Centre for Research and Information. [Online] Available at: <http://cri.org.bd/2014/09/17/bangladesh-continues-to-be-a-role-model-in-mdg-achievement/> [Accessed 31 October 2018].

Faruque, A. & Khan, I., 2017. *Sahaj Oshudhbiggan*. 3 ed. Dhaka: Pharmacy Council of Bangladesh.

Gebretekla, G. B. & Serbessa, M. K., 2016. Exploration of over the counter sales of antibiotics in community pharmacies of Addis Ababa, Ethiopia: pharmacy

professionals' perspective. *Antimicrobial Resistance and Infection Control*, Volume 5, p. 1.

Hadi, M. A. et al., 2016. Community pharmacists' knowledge, attitude, and practices towards dispensing antibiotics without prescription (DAwP): a cross sectional survey in Makkah Province, Saudi Arabia. *International Journal of Infectious Diseases*, 47(6), pp. 95-100.

Holloway, K. & Dijk, L. v., 2011. *THE WORLD MEDICINE SITUATION*, Geneva: World Health Organization (WHO).

Hoxha, I., Malaj, A., Tako, R. & Malaj, L., 2015. SURVEY ON HOW ANTIBIOTICS ARE DISPENSED IN COMMUNITY PHARMACIES IN ALBANIA. *International Journal of Pharmacy and Pharmaceutical Sciences*, VII(7), pp. 449-450.

Llor, C. & Cots, J. M., 2009. The Sale of Antibiotics without Prescription in Pharmacies in Catalonia, Spain. *Clinical Infectious Diseases*, 48(10), p. 1345–1349.

Mansoura, O. & Al-Kayali, R., 2017. Community Pharmacists' Role in Controlling Bacterial Antibiotic Resistance in Aleppo, Syria. *Iranian Journal of Pharmaceutical Research*, 16(4), pp. 1612-1620.

Michael, C. A., Dominey-Howes, D. & Labbate, M., 2014. The antimicrobial resistance crisis: causes, consequences and management. *Frontiers in Public Health*, 2(September 2014), pp. 3,5.

Morgan, D. J. et al., 2011. Non-prescription antimicrobial use worldwide: a systematic review. *lancet infectious disease*, 11(9), p. 692–701.

Nga, D. T. T. et al., 2014. Antibiotic sales in rural and urban pharmacies in northern Vietnam: an observational study. *BMC Pharmacology & Toxicology*, p. 1.

Okuyan, B., Savan, M. A., Izzettin, F. V. & Sancar, M., 2017. Evaluation of Rational Antibiotic Dispensing in the Community Pharmacy Setting: A Simulated Patient Study. *Acta Pharmaceutica Scientia*, 55(2), pp. 7-15.

Plachouras D, K. D. A. A. G. E. P. G. K. K. G. H., 2010. Dispensing of antibiotics without prescription in Greece. [Online]

Available at: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19488>  
[Accessed 25 October 2018].

Sabry, N. A., Farid, S. F. & Dawoud, D. M., 2014. Antibiotic dispensing in Egyptian community pharmacies: An observational study. *Research in Social and Administrative Pharmacy*, X(1), pp. 168-184.

Sakeena, M. H. F., Bennett, A. A. & McLachlan, A. J., 2018. BMC. [Online] Available at: <https://aricjournal.biomedcentral.com/articles/10.1186/s13756-018-0351-z#Sec2> [Accessed 22 October 2018].

Sarwar, M. R., Saqib, A., Iftikhar, S. & Sadiq, T., 2018. Knowledge of community pharmacists about antibiotics, and their perceptions and practices regarding antimicrobial stewardship: a cross-sectional study in Punjab, Pakistan. *Infection and Drug Resistance*, Dovepress, XI(1), p. 133–145.

UN Economic Analysis & Policy Division, March, 2018. LEAST DEVELOPED COUNTRY CATEGORY: BANGLADESH PROFILE. [Online] Available at: <https://www.un.org/development/desa/dpad/least-developed-country-category-bangladesh.html>

United Nations, 2018. *World Economic Situation and Prospectus*, New York: United Nations.

WHO, 2000. *Guidelines for regulatory Assessment of Medicinal Products for use in Self-Medication.*, Geneva: World Health Organization.

WHO, 2017. World Health Organization. [Online] Available at: <https://www.who.int/antimicrobial-resistance/en/>

[Accessed 18 October 2018].

WHO, February 2018. WHO Antimicrobial resistance fact sheet. [Online] Available at: <http://www.who.int/en/news-room/fact-sheets/detail/antimicrobial-resistance> [Accessed 19 October 2018].

Zapata-Cachafeiro, M. et al., 2014. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. *Journal of Antimicrobial Chemotherapy*, 69(11), p. 3156 – 3160.

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