

A research report on

**Community Pharmacy Personal's Perception, Attitude and
Dispensing Practice towards Antibiotics in Selected Districts of
Terai Region of Province-1, Eastern Nepal.**

Submitted by:

Principal Investigator:

Nikita Goswami, Post Graduate in Clinical Pharmacy

Team members:

Dr. Prasanna Dahal, associate Professor, PUCMAS

Dr. Shyam Mallik, associate professor, PUCMAS

Affiliation:

Purbanchal University College of Medical and Allied Sciences

(PUCMAS), Purbanchal University

Gothgaon, Morang

Nepal

Submitted to:

NEPAL HEALTH RESEARCH COUNCIL

Kathmandu

2020

ACKNOWLEDGEMENT

I would like to express my gratitude and thanks to all those who have generously contributed to the completion of this dissertation with their help, knowledge, expertise.

I would like to express my deep sense of gratitude to my supervisor Dr. Prasanna Dahal and Dr Shyam Mallik for their guidance, supervision and monitoring of research. I would also express my sincere gratitude to Dr. Kajiram Adhikari, Head of Program, Mrs. Kabita Adhikari, campus chief, Purbanchal University College of Medical and Allied Sciences (PUCMAS), for their support and encouragement provided to me for the completion my dissertation work.

I would deeply like to express my sincere gratitude to my guide Asst. Prof Dr.Prasanna Dahal for his excellent guidance, keen interest, inspiration and kind cooperation throughout this study. His simplicity, agility, thinking will always be an inspiration in my life.

I also acknowledge Shakti Shrestha sir and Bhuvan KC sir for their significant contribution in data analysis, reviewing and editing this work for intellectual content and supporting in preparation of the manuscript of this work.

I must express my sincere thanks to NHRC (Nepal Health Research Council) for providing support to this work, Department of Drug Administration-Biratnagar, all the drug dispensers of the study area who participated in this research work and to all my friends of Master of Pharmacy for their support and tolerance with their indulgence in this research work.

Last but not least I owe my deepest respect to my mother late. Mrs. Sita Goswami for her inspiration.

Nikita Goswami

Abstract

Background:

In the developing countries like Nepal, people depend more on community pharmacies to obtain medications due to quick access and easy availability. Many studies showed that the irrational dispensing of antibiotics by the drug dispensers adds to antimicrobial resistance.

Objective:

The aim of our study is to assess the perception, attitude and dispensing practice of retail community pharmacy drug dispensers in the three districts of Province-1, Nepal, and to identify the contribution of drug dispenser's, attitude and practice of antibiotics in irrational dispensing of antibiotics.

Method:

A descriptive, cross sectional and self-administered questionnaire based survey was conducted in 312 pharmacies of Jhapa, Morang and Sunsari districts of Eastern Nepal. The data were collected from the drug dispensers working in these retail community pharmacies. The study was conducted for six months between March to August 2019.

Result:

Out of 312 drug dispenser, Majority of the drug dispensers (39.1%) were assistant pharmacists followed by other paramedical professionals (32%), pharmacy oriented registered professional 19.6%, whereas only 4.2% were Pharmacist. 76.9% of the drug dispensers agree that there is problem in dispensing antibiotics without prescription. 86.9% of the drug dispensers are aware of this provision that dispensing antibiotics without prescription is not legal but still nearly one third (34.9%) of the drug dispensers in the study area admit that they dispense antibiotics without prescription. 32.7% of the drug dispensers were not aware that the misuse of the antibiotics leads to the loss of sensitivity of to specific pathogens and 34.3% of the drug dispensers think that antibiotics are given to reduce any kind of pain and inflammation. However, 94.5% of the dispensers at the community pharmacy suggest patients to follow drug dosage regimen adherence and course completion but only 34.6% of them take follow-up feedback after dispensing antibiotics.

Conclusion:

Antibiotics dispensing without prescriptions by non-pharmacists was seen. Perception of drug dispenser was associated with inappropriate dispensing of antibiotics. These practice and attitude may add to the existing burden of antibiotics resistance in worldwide. There is need of strict regulation and monitoring of the concerned authority for the dispensing of antibiotics. Provision of training to Upgrade Drug dispenser's knowledge should be made also the drug dispensers need to understand their role in appropriate use of antibiotics.

Keywords: Community pharmacy, Pharmacist, Drug dispensers, antibiotics resistance, irrational drug dispensing.

Table of Content	Page no
Acknowledgement	i
Abstract	ii
List of Tables	vii
List of Figures	vii
List of Abbreviations	viii
CHAPTER I	1
1. Introduction	1
1.1 Background	1
1.2 Problem Statement	1
1.3 Rationale of study	2
1.4 Objectives	3
1.4.1 General Objective	3
1.4.2 Secondary Objectives	3
CHAPTER II	4
2. Literature review	4
a. Antibiotics	4
b. Antimicrobial resistance	6
c. Community Pharmacist	6
d. Practice of antibiotic dispensing in other countries	7
e. Practice of antibiotic dispensing in Nepal	10
f. Studies on attitude of dispensing antibiotics	12
g. Similar studies	13
CHAPTER III	15
3. Research methodology	15

a.	Study design	15
b.	Study area and period	15
c.	Study population, sample size and sampling procedure	15
d.	Data collection tool and method of data collection	15
e.	Study criteria	16
i.	Inclusion criteria	16
ii.	Exclusion criteria	16
f.	Statistical analysis	17
g.	Ethical approval and consent of participants	17
CHAPTER IV		18
4.	Result and Discussion	18
a.	Result	18
i.	Socio demographic characteristics of the drug dispensers	18
ii.	Drug dispensers based on gender	19
iii.	Drug dispensers based on age group	19
iv.	Drug dispensers based on work experience	19
v.	Drug dispensers based on qualification	20
vi.	Pharmacy location and registration status	20
vii.	Sources of drug information of the drug dispensers	21
viii.	Most commonly dispensed antibiotics in the study area	22
ix.	Dispensing perception of drug dispensers	23
x.	Dispensing attitude of drug dispensers	24
xi.	Dispensing practice of drug dispensers	25
xii.	Association studies	26
b.	Discussion	28
CHAPTER V		33
5.	Conclusion and Recommendation	33
a.	Conclusion	33

b. Strength and Limitation	33
c. Recommendation	34
6. References	35
7. Appendices	
Annex 1- Data Collection Tool	38
Annex 2- Informed Consent Form	44
Annex 3- Recommendation letter from University	47
Annex 4- Ethical Approval letter from NHRC	48
Annex 5- Work plan and schedule	49

LIST OF TABLES

4.1.1	Socio-demographic details of drug dispenser	18
4.1.6	Pharmacy location and registration status	20
4.1.7	Sources of information of the drug dispensers in this study area.	21
4.1.8	Most commonly dispensed antibiotics in the study area.	22
4.1.9	Dispensing Perception of drug dispensers in community pharmacy	23
4.1.10	Dispensing attitude of drug dispenser dispensers at community pharmacy	24
4.1.11	Dispensing practice of drug dispenser dispensers at community pharmacy	25
4.1.12	Associations between the perception, attitude and practice response in terms of gender, age, work experience and qualification.	26

LIST OF FIGURES

4.1.2	Drug dispenser based on gender	19
4.1.3	Drug dispenser based on age group	19
4.1.4	Drug dispenser based on years of experience	19
4.1.5	Drug dispenser based on qualifications	20

List of abbreviation

AMR- Antimicrobial Resistance

AMS- Antimicrobial Stewardship

ANM- Auxiliary Nursing Midwifery

BPH- Bachelor in Public Health

CMA- Community Medicine Auxiliaries

CMLT- Certified in Medical Laboratory Technologist

CP- Community Pharmacy

CTEVT- Council for Technical Education and Vocational Training

DDA- Department of Drug Administration

FG- Focus Group

GARP- Global Antibiotic Resistant Partnership

HA- Health Assistants

NCDA- Nepal Chemist and Druggist Association

NHRC- Nepal Health Research Council

OPP- out patient Pharmacy

SPSS- Statistical Package for Social Sciences

UTI- Urinary Tract Infection

WHO- World Health Organization

CHAPTER I

1. Introduction

1.1 Background

Community Pharmacist provides a wide range of healthcare services and has a major role in upbringing and improving the public health. They can ensure medication safety and can encourage a healthy lifestyle through their knowledge and practices [1].

Community pharmacists provides professional health care services like handling prescriptions, dispensing, providing primary support and a referral services to higher health care in Nepal. Along with other health care personnel's they are an important part of the health care service to provide patient care [2].

Due to ease of access to the community pharmacy it has been the quick hub to obtain the medications for the common people [3]. Community pharmacy is the major link to the patients before and after visiting physicians, in a way to seek advice before concerning a physician and to obtain medicaments and drug information after the health checkup [4]. In Nepal community pharmacy is referred to aushadhi pasal or a medical shop [5].

Community pharmacy represents as one of the main sources for dispensing antibiotics worldwide [6]. A recent multi country survey conducted by WHO showed that 93% of people obtained their most recently taken antibiotics from a pharmacy or a medical store [7].

1.2 Problem Statement

Use of antibiotics is increasing worldwide [8]. With the high prescribing and frequent use of antibiotics it is essential to select and dispense the antibiotics rationally [5]. There is evidence of Antibiotics dispensing without prescriptions in many countries of the world. Inappropriate use of antibiotics leads to the increase in the treatment cost, reduction in quality of drug therapy, adverse drug reactions and emergence of antibiotic resistance, treatment failure and is responsible to causes high mortality rate [9]. Reasons for irrational and self-medication practice with antibiotics are seen in different parts of the world and it is mainly due to over prescribing, irrational

prescribing, easy availability without any prescription and due to lack of public awareness [4].

Irrational use of antibiotics such as misuse, over use, use in sub therapeutic doses, use of combination product when there is no advantages over a single formulation, poor regulatory control and surveillance, self-medication adds to emergence of antimicrobial resistance worldwide [10,11]. Bacterial resistance is growing and is being the world wide problem; it has threatened the entire world [12]. According to the World Health Organization (WHO), the mortality of 25,000 people per year in European hospitals is associated with this health concern. This has increased health expenditure up to €1.5 billion [13]. In 2014, a WHO report showed high proportions of resistance to common treatments for bacteria causing infections in both healthcare and community settings in all regions of the world [14]. Global antibiotic consumption increased by 65% between 2000 and 2015 [15]. It is necessary to select and dispense antibiotics rationally [5].

1.3 Rationale of study

Antibiotic resistance is increasing worldwide and Nepal is not away from it. GARP (Global Antibiotic Resistance Partnership) Nepal is the working group on the national level on strategies related to antibiotics resistance. Strategies have been made to improve antibiotics at national level [16].

In the developing countries there is very easy access to the prescription as well as non-prescription drugs and with the poor drug therapy monitoring it is adding to the irrational use of antibiotics [17].

The Government of Nepal has formulated the National Antibiotic Treatment Guidelines 2014 [18]. The implementation of this guideline is still a challenge in the country, so there is high level of irrational drug use in Nepal [5]. In Nepal Drug Act was implemented in 1978 and has the provision for categorization of drugs into different categories and has outlined the regulation of their use, according to the act, antibiotics may be dispensed by drug sellers only upon receipt of a valid prescription [19].

An inappropriate dispensing practice of antibiotics due to unregulated practice has added to be a cause of antimicrobial resistance in the developing countries. Some

studies have emphasized on the need of study of dispensing pattern of antibiotics that could help prevent further spread of resistance of antimicrobial [8].

The aim of this study is to investigate the attitude and dispensing patterns of the antibiotics by the community pharmacies in three major district of eastern terai region of Nepal.

1.4 Objectives

1.4.1 Primary Objective:

To determine the Perception, attitude and dispensing practice towards antibiotics by retail community pharmacist.

1.4.2 Secondary Objectives:

1. To access the general demographic details and qualification of drug dispenser.
2. To determine the pharmacy registration status.
3. To determine attitude towards dispensing antibiotic without prescription.
4. To access the awareness regarding proper dispensing practice of antibiotics.
5. To identify dispenser perception regarding antibiotic use and antibiotic resistance.
6. To determine most commonly dispensed antibiotics.

CHAPTER II

2. LITERATURE REVIEW

2.1 Antibiotics

Antibiotics are the substances which are derived from one microorganism in order to kill another microorganism. Antibiotics are effective against bacterial, fungal and parasitic infections. But, antibiotics are not helpful against viral infections. In 1908, a German bacteriologist, Paul Ehrlich had developed a synthetic component from an arsenic-based structure for the treatment of syphilis, which is called as arsphenamine or salvarsan. Then, in 1929, Alexander Fleming discovered Penicillin from the fungus *Penicillium notatum*.

Antimicrobial drugs can be classified in many ways:

A. Chemical structure

1. Sulfonamides and related drugs: Sulfadiazine and others, Sulfones—Dapsone (DDS), Paraaminosalicylic acid (PAS).
2. Diaminopyrimidines: Trimethoprim, Pyrimethamine.
3. Quinolones: Nalidixic acid, Norfloxacin, Ciprofloxacin, Prulifloxacin, etc.
4. β -Lactam antibiotics: Penicillins, Cephalosporins, Monobactams, Carbapenems.
5. Tetracyclines: Oxytetracycline, Doxycycline, etc.
6. Nitrobenzene derivative: Chloramphenicol.
7. Aminoglycosides: Streptomycin, Gentamicin, Amikacin, Neomycin, etc.
8. Macrolide antibiotics: Erythromycin, Clarithromycin, Azithromycin, etc.
9. Lincosamide antibiotics: Lincomycin, Clindamycin.
10. Glycopeptide antibiotics: Vancomycin, Teicoplanin.
11. Oxazolidinone: Linezolid.
12. Polypeptide antibiotics: Polymyxin-B, Colistin, Bacitracin, Tyrothricin.

13. Nitrofuran derivatives: Nitrofurantoin, Furazolidone.
14. Nitroimidazoles: Metronidazole, Tinidazole, etc.
15. Nicotinic acid derivatives: Isoniazid, Pyrazinamide, Ethionamide.
16. Polyene antibiotics: Nystatin, Amphotericin-B, Hamycin.
17. Azole derivatives: Miconazole, Clotrimazole, Ketoconazole, Fluconazole.
18. Others: Rifampin, Spectinomycin, Sod. fusidate, Cycloserine, Viomycin, Ethambutol, Thiacetazone, Clofazimine, Griseofulvin.

B. Mechanism of action

1. Inhibit cell wall synthesis: Penicillins, Cephalosporins, Cycloserine, Vancomycin, and Bacitracin. 2. Cause leakage from cell membranes: Polypeptides—Polymyxins, Colistin, Bacitracin. Polyenes—Amphotericin B, Nystatin, Hamycin.
 3. Inhibit protein synthesis: Tetracyclines, Chloramphenicol, Erythromycin, Clindamycin, Linezolid.
 4. Cause misreading of m-RNA code and affect permeability: Aminoglycosides—Streptomycin, Gentamicin, etc.
- 690 SECTION 12 ANTIMICROBIAL DRUGS
5. Inhibit DNA gyrase: Fluoroquinolones— Ciprofloxacin and others.
 6. Interfere with DNA function: Rifampin.
 7. Interfere with DNA synthesis: Acyclovir, Zidovudine.
 8. Interfere with intermediary metabolism: Sulfonamides, Sulfones, PAS, Trimethoprim, Pyrimethamine, Metronidazole.

C. Type of organisms against which primarily active

1. Antibacterial: Penicillins, Aminoglycosides, Erythromycin, Fluoroquinolones, etc.
2. Antifungal: Griseofulvin, Amphotericin B, Ketoconazole, etc.
3. Antiviral: Acyclovir, Amantadine, Zidovudine, etc.
4. Antiprotozoal: Chloroquine, Pyrimethamine, Metronidazole, Diloxanide, etc.
5. Anthelmintic: Mebendazole, Pyrantel, Niclosamide, Diethyl carbamazine, etc.

D. Spectrum of activity

1. Broad-spectrum antibiotics: These antibiotics are widely used to kill or inhibit the Gram-positive and Gram-negative bacteria. Example: Chloramphenicol
2. Narrow spectrum antibiotics: These antibiotics are widely effective against specific groups of bacteria. Example: Penicillin G
3. Limited spectrum antibiotics: These antibiotics are effective against a single organism or a single disease. Example: Dysidazirine [20].

2.2 Antimicrobial resistance

Antimicrobial resistance (AMR) is 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. The report of WHO shows “serious lack of new antibiotics under development to combat the growing threat of antimicrobial resistance. Most of the drugs currently in the clinical pipeline are modifications of existing classes of antibiotics and are only short-term solutions. The report found very few potential treatment options for those antibiotic-resistant infections identified by WHO as posing the greatest threat to health, including drug-resistant tuberculosis which kills around 250 000 people each year. In addition to multidrug-resistant tuberculosis, WHO has identified 12 classes of priority pathogens – some of them causes common infections such as pneumonia or urinary tract infections – that are increasingly resistant to existing antibiotics and urgently in need of new treatments [21].

2.3 Community Pharmacist

Community pharmacists are the health professionals most accessible to the public. They supply medicines in accordance with a prescription or, when legally permitted, sell them without a prescription. In addition to ensuring an accurate supply of appropriate products, their professional activities also cover counseling of patients at the time of dispensing of prescription and non-prescription drugs, drug information to health professionals, patients and the general public, and participation in health-

promotion programmes. They maintain links with other health professionals in primary health care [22].

Community pharmacists are seen being involved in providing the health care facilities to the public in the community. They perform a wide range of functions in the community some of them are Processing of prescriptions Care of patients or clinical pharmacy, monitoring of drug utilization, Extemporaneous preparation and small-scale manufacture of medicines, Traditional and alternative medicines, responding to symptoms of minor ailments, Informing health care professionals and the public, Health promotion, Domiciliary services, Agricultural and veterinary practice [23].

2.4 Practice of antibiotics dispensing in other countries

SahaShuvashis *et al.* has carried out the study to Evaluate of medicines dispensing pattern of private pharmacies in Rajshahi, Bangladesh, with the aim to investigate medicines dispensing patterns of the pharmacies in Rajshahi, Bangladesh and to identify and analyze contribution of drug sellers and quacks in irrational drug use. As in developing country like Bangladesh, people depend more on pharmacies due to expediency, shorter waiting time, cost reduction, availability of credit and flexible opening hours. A cross sectional study was done during January 2016 - April, 2016 in 75 randomly selected private pharmacies including both licensed and unlicensed pharmacies of covering Lakshmipur area. During the whole study process, total 7944 clients visited the pharmacies under observation and 24,717 medicines were dispensed. During the whole study process, total 7944 clients visited the pharmacies under observation and 24,717 medicines were dispensed. 22.70% of all these drugs were sold without a prescription. Out of the 5610 items dispensed without prescription, 66.2% were dispensed on the request of clients themselves and 33.8% on the recommendation of a drug seller. The study found that Majority of medicines were dispensed irrationally without any prescription and over the counter dispensing of many low safety profile drugs was common. The results and discussion presented in this paper will be helpful to provide a baseline to redirect further studies in this area [17].

Roque Fatima *et.al* have done qualitative study in Portugal on Attitudes of community pharmacists to antibiotic dispensing and microbial resistance. Qualitative research, in the form of focus groups (FGs), was designed to explore the knowledge and attitudes of pharmacists with regard to antibiotic resistance, dispensing and consumer demand. The study was conducted in a NUTS II (Nomenclatura das Unidades Territoriais para Fins Estatísticos/Nomenclature of Territorial Units for Statistics) area of Portugal defined by the Northern Regional Health Administration (Administração Regional de Saúde do Norte/ARS-N), which includes five geographical districts. To obtain information on all geographic areas, focus-group sessions were carried out in the five districts, from December 2010 to March 2011. A total of six FGs were conducted with 32 pharmacists, 28 women and 4 men, in the five districts of Portugal's Northern Health Region. In one district (with biggest geographical dispersion), two FG sessions were held, with the aim of obtaining a total sample of over 30 pharmacists, in the line to literature, and other similar studies. Some of the pharmacists interviewed were aware of their important role in fighting antibiotic resistance. This exploratory study enabled to identify pharmacists' attitudes to the problem of antibiotic resistance and dispensing practices, and led pharmacists to reflect on their behavior during the dispensing process. It was suggested that information on community-based resistance measures and enhanced interaction between physicians and pharmacists could improve antibiotic use [24].

Lenjisa Jimma Likisa *et al.* Has carried out the study to Analyse the Dispensing Practices at Community Pharmacy Settings in Ambo Town, West Shewa, and Ethiopia as irrational dispensing practice is a severe deep rooted problem in Ethiopia, a Cross sectional study was conducted in 15 community pharmacy settings including 255 clients from April to June 2014. Dispensing practices were evaluated using WHO standards. Data was analyzed using SPSS. The team concluded with the study that dispensing practices found at those pharmacy settings mostly were not standard. The issues worth considering and addressing was the involvement of non-pharmacy professionals in dispensing, very short dispensing time, poor clients' knowledge, poor labeling of medications, significant number of dispensing errors and unavailability of essential dispensing-aids. So there is a need for urgent managerial and educational

intervention to improve dispensing practices in the country and in the study area particularly [25].

Hoxha Iris *et.al* has surveyed on how antibiotics are dispensed in community pharmacies in Albania, as misuse of antibiotics is perceived as a real problem in Albania. A random survey was conducted for this study. Statistical analyses were made with OpenEpi®. Research group personnel were instructed to ask the question "I need to get a package of amoxicillin", when posing as simulated patients in pharmacies. The main outcome of the study was considered percentages of approval of this request. 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, Confidence Levels 75.57% - 84.26%). 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. This study concluded 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 [26].

Abdulhak. Aref A Bin *et al* aimed to determine the percentage of pharmacies who sell antibiotics without medical prescriptions, examining the potential associated risks of such practice in Riyadh, Saudi Arabia; Antibiotics sales without medical prescriptions are increasingly recognized as sources of antimicrobial misuse that can exacerbate the global burden of antibiotic resistance. The team studied has done a cross sectional study on the Non prescribed sale of antibiotics in Riyadh, Saudi Arabia, of a quasi-random sample of pharmacies stratified by the five regions of Riyadh. The study was done by simulation of different clinical scenarios. A total of 327 pharmacies were visited. Each pharmacy was visited once by two investigators who simulated having a relative with a specific clinical illness (sore throat, acute bronchitis, otitis media, acute sinusitis, diarrhea, and urinary tract infection (UTI) in childbearing aged women).

They observed that an antibiotic could be obtained in Riyadh without a medical prescription or an evidence-based indication with associated potential clinical risks. Strict enforcement and adherence to existing regulations are warranted [9].

2.5 Practice of antibiotics dispensing in Nepal

Ansari Mukhtar has evaluated the status of community pharmacies, their staffs and practices towards dispensing antibiotics. Cross sectional prospective study was done in community pharmacies in two districts of central Nepal, from March 2016 to May 2016. A systematic random sampling approach was adopted to sample 161 community pharmacies. Data on the registration status of pharmacies, qualification or training of drug dispensers, and the practice of dispensing antibiotics were collected using a pre-tested questionnaire. Face to face interviews were carried out by a previously trained interviewer. Data were analyzed for descriptive and inferential statistics using IBM SPSS Statistics 21. Among 161 community pharmacies, 25% were not registered and most of them were located in rural areas. It was typical (66.5%) to dispense antibiotics without prescription and most (91.4%) of the staffs involved in dispensing were non-pharmacists. Furthermore, the study revealed common practices of replacing one brand of antibiotic with other brands (66%), dispensing incomplete courses of antibiotics (73%), and not giving any advice regarding antibiotic use (39%) or completion of a full course of therapy (80%). Dispensing antibiotics without prescription and by non-pharmacists are common in this region. The study also found several issues regarding the irrational use of antibiotics. Thus, the study concluded that there is an urgent need to address these issues and promote the informed use of antibiotics [5].

Wachter David A. *et al.* has studied about the antibiotic dispensing by drug retailers in Kathmandu, Nepal, with the aim to assess over-the-counter antimicrobial dispensing by drug retailers in Kathmandu, Nepal, for rationality, safety, and compliance with existing government regulations. Standardized cases of dysuria in young adult male and acute watery diarrhoea in a child were presented in the methodology 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. In their study they

found that all retailers engaged in diagnostic and therapeutic behavior beyond their scope of training or legal mandate. Historical information obtained by retailers was inadequate to determine the nature or severity of disease or appropriateness of antimicrobial therapy. They concluded that although legislation in Nepal mandates a medical prescription for purchase of antibiotics, unauthorized dispensing is clearly problematic. Drug retailers in their 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. More intensive efforts is required to educate drug retailers on their role in dispensing, along with increased enforcement of existing regulations, must be pursued [8].

Ghimire Saurav *et.al* has evaluated the drug dispensing practices and patients' knowledge on drug use among the outpatients and to identify and analyze the problems in drug prescribing and dispensing. A prospective cross-sectional descriptive study was conducted using World Health Organization (WHO) core drug use indicators from July 13, 2008 to August 15, 2008 in Manipal Teaching Hospital, Pokhara, Nepal. A total of 4231 prescriptions were encountered with 10591 drugs were prescribed. Out of them 9763 (92.2%) were dispensed from the OPP. The remaining drugs were either not available in the pharmacy or the patient did not have adequate money. Their finding from study showed a trend towards irrational prescribing and dispensing. Hence, concluded that there is a need for effective intervention programme to encourage the physicians and dispensing pharmacists in promoting more rational drug use [10].

KC Bhuvan *et.al* has showed in their study entitled “Do community pharmacists in Nepal have role in adverse drug reaction reporting systems” that the fully qualified pharmacists should be encouraged to join the community pharmacy to change the outlook of the profession and to promote safer medication use in the community. Management of community pharmacies by fully qualified pharmacists will promote safer medicine use, rational drug use and help in preventing drug-related problems. If all professional staff in community pharmacies reported, monitored and were aware of

possible adverse drug reactions, they could help in the reduction of potential drug-related problems in the Nepalese community [2].

2.6 Studies on attitude of dispensing antibiotics

El-din Mohamed Zaka *et al.* has studied to find out the Egyptian community pharmacists' attitudes and practices towards antibiotic dispensing and antibiotic resistance; a cross-sectional survey was carried out in Greater Cairo. In Egypt, it is prohibited by law to dispense antibiotics with no prescription; however, there are no active and enforced governmental policies and laws to regulate such process. An observational cross-sectional self-administered survey targeting licensed community pharmacists in Greater Cairo, Egypt. The survey was validated by both face and content validation. 531 pharmacists were invited to join the survey, where only 461 pharmacists agreed to participate. The study concluded that The Egyptian Ministry of Health should regulate and monitor the process of dispensing antibiotics without prescription with law enforcements. Moreover, community pharmacists should have more awareness on the consequences of such urging problem of antibiotic dispensing without a prescription regardless the business profit behind it [4].

Awad Abdelmoneim Ismail *et al.* has done study to assess the Knowledge, Attitude and Practice towards Antibiotic Use among the Public in Kuwait, as the emergence and spread of bacterial resistance to antibiotics is a growing problem worldwide, which presents a significant threat to public health globally in the 21st century. A cross-sectional survey was performed using a pretested self-administered questionnaire on a sample of 770 randomly selected Kuwaiti individuals. A cross-sectional survey was performed using a pretested self-administered questionnaire on a sample of 770 randomly selected Kuwaiti individuals. Descriptive and multivariate logistic regression analysis was used in data analysis. These findings aided in the assessment of the adequacy of present public educational campaigns. Also, it will provide further insight in designing future multifaceted interventions. to promote specific messages to rationalize antibiotic use, and compensate for knowledge and attitude gaps as an effort towards preventing development of antibiotic resistance [12].

2.7 Similar studies

Belkina Tatyana *et al.* has done study on Antibiotic use and knowledge in the community of Yemen, Saudi Arabia, and Uzbekistan, in which a nationwide cross-sectional study of teachers in large cities of Yemen, Saudi Arabia, and Uzbekistan was conducted. A random sample of 1,200 teachers was selected in each country. Data were collected through a questionnaire-based survey and then analyzed using descriptive and multivariate statistical methods. The prevalence of antibiotic self-medication in the educated adult population in the studied countries was found to be alarmingly high. Effective strategies involving regulatory enforcement prohibiting sales of antibiotics without prescription should be implemented along with educational interventions for health professionals and the public [11].

Sarwar Muhammad Rehan *et.al.* has evaluated the knowledge of community pharmacists about antibiotics, and their perceptions and practices toward antimicrobial stewardship (AMS) in Punjab, Pakistan. A descriptive cross-sectional study was conducted among community pharmacists in Punjab, Pakistan from April 1, 2017 to May 31, 2017. A self-administered and pretested questionnaire was used for data collection. A simple random-sampling method was used to select community pharmacies. Independent-sample Mann–Whitney U tests, independent sample Kruskal–Wallis tests, and logistic regression analysis were performed with SPSS version 21.0. Out Of the 414 pharmacists, 400 responded to the survey (response rate 96.6%). The 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% (n=312) of participants gave their opinion about incorporation of AMS programs in community pharmacies. 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 [27].

Chang Jie *et al.* had carried out a multicentered cross sectional study, using a simulated client method, in which two clinical case scenarios (pediatric diarrhoea and adult acute upper respiratory infection) were presented at systematically sampled community pharmacies to find about the sales of antibiotics without a medical prescription and to assess the quality of pharmacy services in relation to the antibiotics sold in community pharmacies in urban China. They found that the Antibiotics were easily obtained without a prescription in community pharmacies in urban China. Measures to enhance the enforcement of prescription-only regulations and training programmes for pharmacy staff to promote the appropriate use of antibiotics are warranted [28].

CHAPTER III

3. RESEARCH METHODOLOGY

3.1 Study design

A descriptive, cross sectional and questionnaire based survey was conducted in drug dispensers working in retail community pharmacy of selected district.

3.2 Study Area and Period

The study was conducted in the retail community pharmacies of Jhapa, Morang and Sunsari districts of Eastern Nepal. These are the three major, densely populated terai districts of Province 1, Nepal. The study was conducted for six months between March to august 2019.

3.3 Study population, sample size and sampling procedure

In this study, Community pharmacist represents community pharmacy personnels involved in dispensing medicines and practicing as drug dispensers at community pharmacies. As per the data provided by Department of Drug Administration, Purbanchal regional office ,Biratnagar , dated 2076-1-29 the total number of registered pharmacies in study district were 1638, (Jhapa-461. Morang-682 and Sunsari-495). As of Raosoft sample –size calculation taking 95 % Confidence Interval and 5% margin of error with 50% response rate. The estimated sample size for this study was 312 pharmacies.

The total of 312 pharmacies was divided into equal cluster/ strata and the sample was taken on the basis of proportion from each strata using cluster random sampling procedure. In this way, 130 pharmacies were surveyed from Morang district whereas 94 pharmacies were selected from Sunsari and 88 pharmacies were selected from Jhapa resulting in total of 312 Pharmacies for survey.

3.4 Data Collection Tool and Method of data collection:

A self-designed questionnaire was prepared based on literature review that meet the need of study objectives [5, 11, 27].

The initial version of the questionnaire was subjected to content and face validation. The content was validated on the basis of the opinions of experts. The questionnaire was translated into local language (Nepali) in consultation with language expert. Pivotal study was carried out in 10 pharmacies to assure its reliability and clarity of content before conducting the survey. The questionnaire had a total of 25 questions that was divided into two categories; category included general information like the age, sex, work experience, qualification, and registration status of the pharmacy and location of pharmacy. Category B included question that assessed the perception, attitude and dispensing practice of the antibiotics. The questions were on some basic perception, dispensing attitudes and practice towards antibiotics. (ANNEXURE-1)

Data was collected from pharmacy dispenser working at community pharmacies and those pharmacies which were open during the study visit. In situation where more than one dispenser is working in selected pharmacies one pharmacist dispensers among them who agree to participate in study was taken under consideration. Pharmacy in which no dispensers were willing to participate in the survey or those were no dispensers were reluctant to give the consent freely was exempted from study and another pharmacy was selected in substitute for the survey. The dispenser was asked to fill and signed the questionnaire after completing the entire questionnaire under study. No external assistance was given to answer the questions.

3.5 Study Criteria

3.5.1 Inclusion criteria:

Drug dispensers from community pharmacy of Jhapa, Morang and Sunsari district and those which were open during the study visit were included in the study.

3.5.2 Exclusion criteria:

Drug retailers or dispenser who did not give their consent freely or those not willing to participate were exempted from the study. Pharmacy located other than specified district under study were excluded.

3.6 Statistical analysis

The data were entered into MS EXCEL and then transferred into the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive analysis was conducted. The results are expressed as counts and percentages. Associations were tested using the Chi-square test and $p < 0.05$ was considered as statistically significant.

3.7 Ethics approval and consent to participate:

The ethical approval was obtained from Nepal Health Research Council (Ref no. 2500/ 2019). Written consent was taken from the participants of the study. The participant's confidentiality of the information and rights to autonomy was assured in the course of the study.

CHAPTER IV

4. RESULT AND DISCUSSION

4.1 RESULT

A total of 312 community pharmacists were participated from the selected pharmacies under study which included 130 from Morang, 94 from Sunsari and 88 from Jhapa district.

4.1.1 Socio Demographic characteristics of the drug dispensers in the study area.

Out of 312 drug dispenser 79.5 % were male followed by 20.5% of females. More than one third of the drug dispenser 37.2% were from the age group between 26-35 years followed by the age group 15-25 i.e. 26%, 35.5% of community pharmacists had working experience of more than 10 years whereas 32.7% of them had experience of working for 1-5 years. Majority of the drug dispensers (39.1%) were assistant pharmacists with the qualification of diploma in pharmacy, whereas only 4.2% of Pharmacist had bachelor in pharmacy, however individuals with professional training –orientation were 19.6%, Surprisingly 32% dispensers were other paramedical but non pharmacy professional and 5.1 % were non paramedical -non pharmacy professionals. As shown in table.

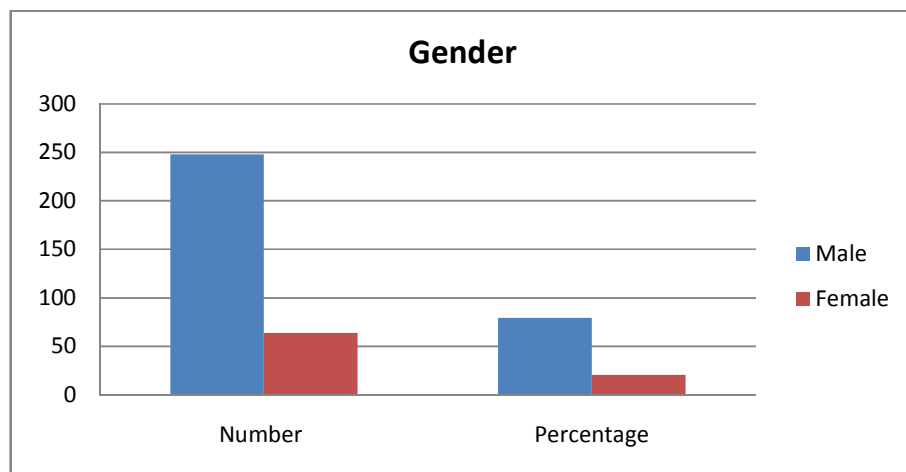
4.1.1 Demographic details and qualification of the drug dispensers are as shown in Tables below.

4.1.1 Demographic details of drug dispensers

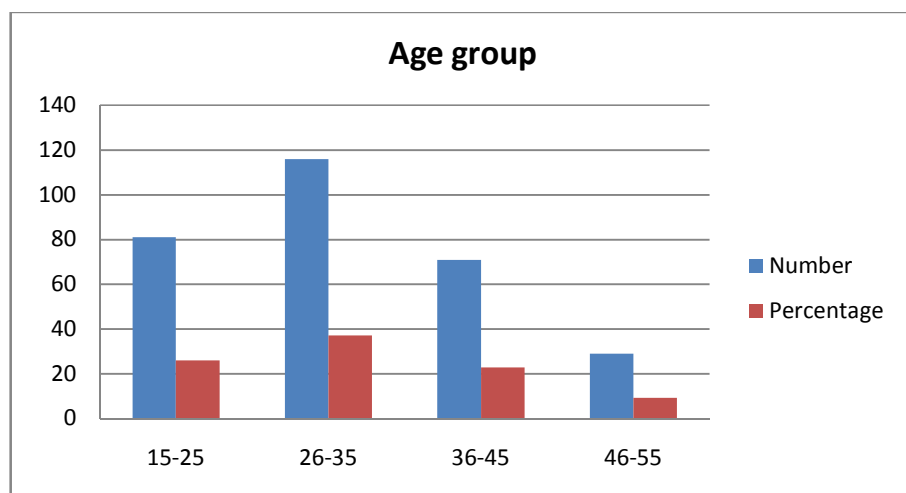
Characteristics		N=312	%
Age (years)	19-25	81	26
	26-35	116	37.2
	36-45	71	22.8
	46-55	29	9.3
	> 55	15	4.8
Gender	Male	248	79.5
	Female	64	20.5
Work experience (years)	<1	51	16.3

	1-5	102	32.7
	5-10	48	15.4
	> 10 years	111	35.6
Qualification of dispenser	Orientation	61	19.6
	Diploma in pharmacy	122	39.1
	Bachelor in pharmacy	13	4.2
	Other paramedical courses (CMA,HA, ANM, other allied health specialty)	100	32
	Non paramedical and non-pharmacy course (secondary schooling, BBS,BBA, Bsc)	16	5.1

4.1.2 Graphical representation of drug dispensers based on gender



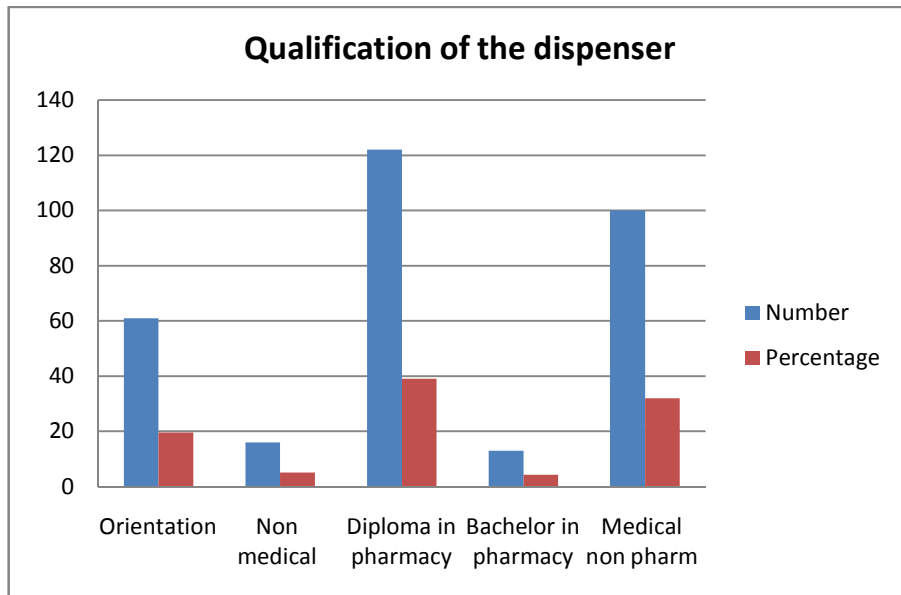
4.1.3 Graphical representation of drug dispensers based on age group



4.1.4 Drug dispensers based on years of experience



4.1.5 Drug dispensers based on qualifications



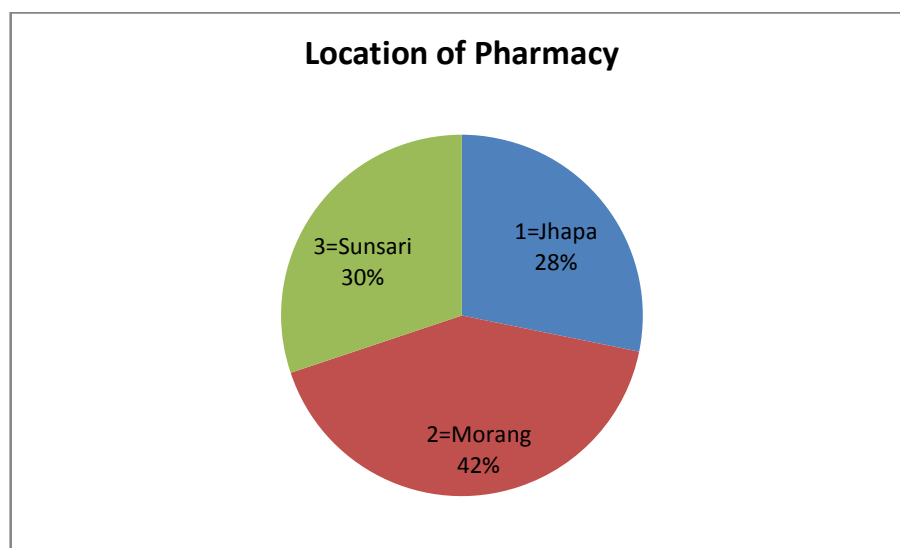
4.1.6 Pharmacy Location and Registration status

All the pharmacies surveyed were registered at Department of Drug Administration (DDA) and their distribution was as shown in the tables.

4.1.6 Pharmacy location and Registration status.

Characteristics		N	%
Location of Pharmacy	1=Jhapa	88	28.2
	2=Morang	130	41.7
	3=Sunsari	94	30.1
Pharmacy registration status		312	100

4.1.6 - Pharmacy location



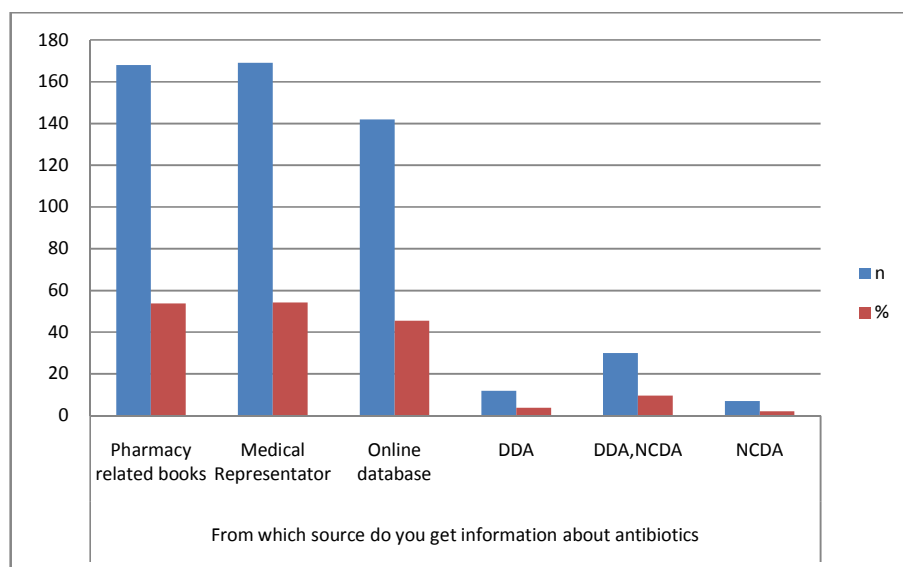
4.1.7 Sources of drug information of the drug dispensers in the study area

Pharmacy related books and Medical representatives are the major source of drug information of the drug dispensers. The drug dispenser's frequencies for the different sources of information are as given below.

4.1.7 - Sources of drug information

Question	Response	N=312	%
From which source do you get information about antibiotics	Pharmacy related books	168	53.8
	Medical Representatives	169	54.2
	Online database	142	45.5
	DDA	12	3.8
	DDA,NCDA	30	9.6
	NCDA	7	2.2

4.1.7 -Sources of information of the Community pharmacy personnels in this study area.



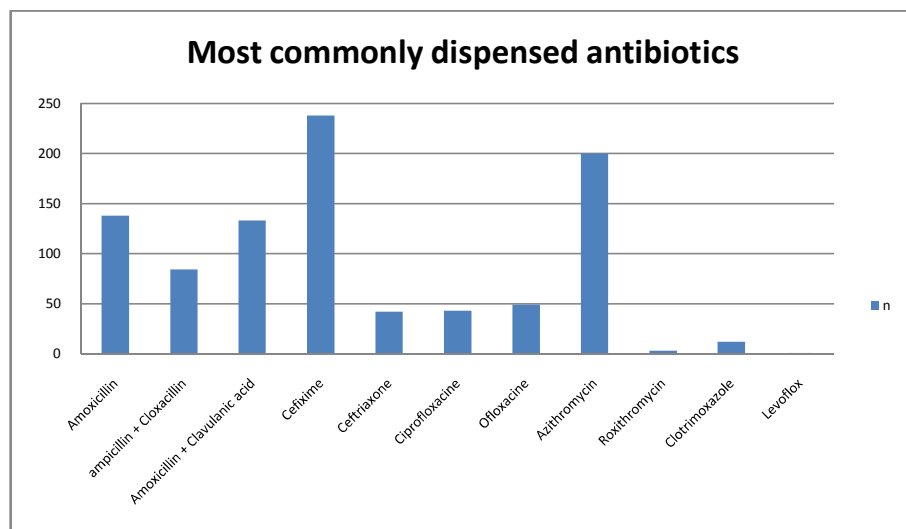
4.1.8 Most commonly dispensed antibiotics in the study area.

Cefixime and Azithromycin were found to be the most commonly dispensed antibiotics in the study followed by amoxicillin, amoxicillin and clavulanic acid and others as shown in tables below

4.1.8 Most commonly dispensed antibiotics

Name of antibiotics	n=312
Amoxicillin	138
ampicillin + Cloxacillin	84
Amoxicillin + Clavulanic acid	133
Cefixime	238
Ceftriaxone	42
Ciprofloxacin	43
Ofloxacin	49
Azithromycin	200
Roxithromycin	3
Clotrimazole	12
Levoflox	1

4.1.8 - Most commonly dispensed antibiotics



4.1.9 Dispensing Perception of drug dispenser in community pharmacy

76.9% of the drug dispensers agree that there is problem in dispensing antibiotics without prescription. Nearly one third of the drug dispensers were not aware that the misuse of the antibiotics leads to the loss of sensitivity of to specific pathogens. 34.3% of the drug dispensers think that antibiotics are given to reduce any kind of pain and inflammation. However, in the study 86.9% of the drug dispensers are aware of this provision that dispensing antibiotics without prescription is not legal.

Questions	Response	N	%
Do you think dispensing of antibiotics without a valid prescription is a problem?	No	72	23.1
	Yes	240	76.9
Do you think that inappropriate dispensing of antibiotics promote towards antimicrobial resistance?	No	84	26.9
	Yes	228	73.1
Do you think that misuse of antibiotics may lead to loss of sensitivity of antibiotics to specific pathogens?	Don't agree	102	32.7
	Agree	210	67.3
Do you think that antibiotics are indicated to reduce pain and inflammation?	No	205	65.7
	Yes	107	34.3
Do you think that it is legal to dispense antibiotics without a valid prescription in Nepal?	No	271	86.9
	Yes	41	13.1

4.1.10 Dispensing attitude of the dispensers at community pharmacy

73.1 % of the drug dispensers ask the patients if they have any drug allergies before dispensing antibiotics. 86.5% of the drug dispensers agreed that pharmacist should stop dispensing antibiotics without prescription. 89.7% of the dispensers asked the patients if they are taking any other medication before dispensing antibiotics. 87.5 % of them will ask for prescription when the patients ask for antibiotics without prescription. 46.8% of drug dispensers prefer brand substitution when the prescribed brand of antibiotics is not available in their pharmacy. 86.5% of the drug dispensers agreed that pharmacist should stop dispensing without prescription. Nearly two third (62.8%) of the drug dispensers said that refusing dispensing without prescription will negatively affect sales and profits, this may add to the reason that 34.9 % drug dispensers in the study are dispensing antibiotics without prescription. 88.1% (n =275) of drug dispensers said that patients try to obtain antibiotics from another pharmacy when they refused to dispense antibiotics without prescription. Most (85.3%) of drug dispensers gives partial medicines to the patients if they have insufficient money.14.7% of the drug dispensers suggest the patients to stop taking antibiotics if the symptoms subsides.

Questions	Response	N	%
Do you ask patients if they have any drug allergies before dispensing antibiotics?	No	84	26.9
	Yes	228	73.1
Do you ask patients if they are taking any other medicines before dispensing antibiotics?	No	32	10.3
	Yes	280	89.7
What would you do if the patient asks for antibiotics without prescription?	Ask for prescription	273	87.5
	Give them as they ask	20	6.4
	Others	19	6.1
What would you do when prescribed brand of antibiotics is not available in your pharmacy?	Brand substitution	146	46.8
	Refer to other pharmacy	93	29.8
	Take suggestion with doctor	73	23.4
Do you agree that Pharmacist should stop dispensing antibiotics without prescription?	No	42	13.5
	Yes	270	86.5
Do you think that refusing to dispense antibiotics without prescriptions negatively affect sales and profits of the pharmacy?	No	116	37.2
	Yes	196	62.8
Do you think that patients would try to obtain	No	37	11.9

antibiotics from another pharmacy if you refuse to dispense them without a valid prescription?	Yes	275	88.1
What would you do if the patient has insufficient money?	Replace with cheaper brands	46	14.7
	Give partial medicines	266	85.3
Do you suggest patients to stop taking antibiotics if a symptom subsides?	No	266	85.3
	Yes	46	14.7

4.1.11 Dispensing practice of the dispensers at community pharmacy

According to the drug legislation of Nepal, antibiotics can be dispensed only upon the receipt of valid prescription, however nearly one third of the drug dispensers in the study area dispense antibiotics without prescription. 94.5% of the dispensers at the community pharmacy suggest patients to follow drug dosage regimen adherence and course completion. Only 34.6% of them take feedback after dispensing antibiotics whereas 65.4% of does not take feedback.

Questions	Response	N	%
Do you dispense antibiotics without prescription?	No	203	65.1
	Yes	109	34.9
Do you suggest patient to follow drug dosage regimen adherence and course completion? (n=312)	No	16	5.1
	Yes	296	94.5
Do you take follow-up feedback after dispensing antibiotics?	No	108	34.6
	Yes	204	65.4
Which advice do you usually give to patients when dispensing antibiotics?	Complete dosage regimen	154	49.4
	Take as prescribed	158	50.6

4.1.12 Associations between the perception, attitude and practice response in terms of gender, age, work experience and qualification.

Table 5 shows that age, work experience and qualification had a significant but independent influence on positive response to understanding that antibiotics reduce pain and inflammation ($p < 0.001$, $P < 0.001$ and $p = 0.017$ respectively). Work experience and qualification both was found associated in taking follow-up feedback after dispensing antibiotics ($p < 0.001$ and $p = 0.042$ respectively), and understanding that inappropriate dispensing of antibiotics could promote antimicrobial resistance

($p=0.018$ and $p=0.004$ respectively), However, age group was independently associated with dispensing antibiotics of cheaper brands in case of where patients had insufficient money to purchase full course of antibiotics ($p=0.041$); Qualification had independent influence on response related to not dispensing antibiotic with prescription($p=0.025$) and work experience had additional influence in response to legality of dispensing antibiotics without a valid prescription ($p=0.016$) and on suggesting patients to stop taking antibiotics if symptoms subside ($p=0.003$).

4.1.12 Associations between the dispenser's response in terms of gender, age, work experience and qualification.

Questions	Positive response	n (%)	P-value			
			Gender	Age	Work	Qualification
Do you think dispensing of antibiotics without a valid prescription is a problem?	Yes	240(76.9)	0.556	0.125	0.181	0.229
Do you think that it is legal to dispense antibiotics without a valid prescription in Nepal?	No	271(86.9)	0.865	0.699	0.016*	0.49
Do you agree that pharmacy personnel should not be dispensing antibiotics without a valid prescription?	Agree	270(86.5)	0.283	0.909	0.737	0.917
Do you ask patients if they have any drug allergies before dispensing antibiotics?	Yes	228(73.1)	0.803	0.721	0.173	0.215
Do you ask patients if they are on any other medicines before dispensing antibiotics?	Yes	280(89.7)	0.470	0.618	0.807	0.191
What would you do if a patient asks for antibiotics without prescription?	Ask for a valid prescription	273(87.5)	0.054	0.347	0.085	0.283
What would you do when prescribed brand of antibiotics is not available in your pharmacy?	Take suggestion with doctor	73(23.4)	0.140	0.099	0.006*	0.899
Do you think that refusing to dispense antibiotics without prescriptions	No	116(37.2)	0.352	0.756	0.405	0.684

negatively affect sales and profits of the pharmacy?						
Do you think that patients would try to obtain antibiotics from another pharmacy if you refuse to dispense them without a valid prescription?	Yes	275(88.1)	0.798	0.790	0.129	0.520
What would you do if a patient with a valid prescription for antibiotics does not have sufficient money for its full course?	Replace with cheaper brands	46(14.7)	0.174	0.041	0.244	0.084
Do you dispense antibiotics without a prescription?	No	203(65.1)	0.115	0.731	0.522	0.025*
Do you advise patients to adhere to their antibiotic dosage regimen and its course completion?	Yes	296(94.5)	0.648	0.990	0.544	0.448
Do you take follow-up feedback after dispensing antibiotics?	Yes	204(65.4)	0.586	0.078	<0.001**	0.042*
Do you think that an inappropriate dispensing of antibiotics could promote antimicrobial resistance?	Yes	228(73.1)	0.307	0.116	0.018*	0.004*
Do you think that antibiotics are indicated to reduce pain and inflammation?	No	205(65.7)	0.988	<0.001**	<0.001**	0.017*
Do you suggest patients to stop taking antibiotics if their symptoms would subside?	No	266(85.3)	0.823	0.104	0.003*	0.354

Test analysis is done through Chi square test.

P<0.05 shows statistically significant*

P<0.001 shows highly significant **

4.2 Discussion

This study focused on drug dispenser's perception, attitude and dispensing practice of antibiotics, in the retail drug outlets of selected districts of Province-1, Nepal.

In this study only 43.3 % of the dispensers were qualified assistant and graduate pharmacists. While the Majority of drug dispenser were individuals with professional training –orientation and other paramedical profession such as ANM, BPH,CMA, CMLT, HA and few were neither pharmacy nor medical personnel working as drug dispensers. Paramedics such as Community Medicine auxiliaries (CMA) and health assistants (HA) undergoes 18-36 months of medical training and have authority to treat common illnesses and to prescribe selected group of medicines but do not have a legal authority to dispense medicines independently. This shows that there is poor regulation and monitoring of retail community pharmacy of this selected district by the regulatory authority. However, this finding coincides with finding with other study where other health and non-health professional has also been seen in two districts of central Nepal. [5]. Dispensing by other non-qualified personnel has also been seen in community pharmacies of other developing countries such as Vietnam, China, and Ethiopia [25, 28].

In Nepal, Drug act 2035, the sale and distribution of drug is authorized to only legally qualified and registered pharmacy professional [19]. Nepal pharmacy council is the legal body to registered qualified pharmacist. Till date there are 6326 assistant pharmacist and 3123 graduated pharmacist registered in Nepal [37]. However poor participation of graduate pharmacist in our study suggests that the graduate pharmacist is primarily working in other sector like academia, industry and higher educational learning and they least prefer working in Community level. Other reason may be that though there are several colleges running Diploma in pharmacy course under CTEVT in this province [38]. However, There was just one college affiliated to IOM, TU running bachelor in pharmacy course in the eastern region of Nepal [39] and only few hundred of graduate had completed the course so far, recently Purbanchal University have established the four year bachelor in pharmacy program in 2018, this shows that there are less number of qualified graduated in this province so the number may be less. However, it is mandatory that Community pharmacies

should be managed by fully qualified pharmacists for rational drug use and to promote medication safety [2]. Dispensing by unauthorized personnel can promote antibiotics resistance [31]. Non trained pharmacy staffs almost have no or very little basic information regarding proper use of antimicrobials and they are not aware of the complexity of misuse of antimicrobials.

Antibiotics belongs to category “b” under section 17 of categorization of drug act, antibiotics should be sold only upon the receipt of valid prescription of a Physician and can be sold only by a registered pharmacist or assistant pharmacist or registered professional in Nepal pharmacy Council. [19]; however in our study it showed that one third of the drug dispensers in the study area are providing antibiotics without prescription. This somewhat aligns with the study in Bara and Parsa districts of Nepal where two third of the drug dispensers are providing antibiotics without prescription [5]. Drug dispensing without prescription has also been seen in Kathmandu (34%), Bhaktapur (44%), Lalitpur (50%), and Bara and Parsa (66.5%) districts of Nepal [32] [5]. Not only in Nepal, similar practices are reported in Bengalaguru (45%), China (55.0%), Bangladesh (22.70), and several other countries [12, 24]. Nonprescription sales of antibiotics are associated with very short course and inappropriate drug and dose choices. Such issues of antibiotics are not used appropriately. This type of action may be due to commercial attitude of pharmacies, financial incentives, public unawareness and poor monitoring regulation. This kind of irrational practice increases the treatment cost, reduce the quality of drug therapy, cause treatment failure and emerge antibiotic resistance [9]. We also noted some good practice as compared to previous study in two districts of Nepal such as intention to informing the patients to adhere and complete the dosage regimen (94.5% vs. 20%) and conducting follow-up feedback after dispensing antibiotics (65.4% vs. 44%).²⁷This response was significant based on work experience and qualification ($p < 0.001$ and $p = 0.042$ respectively). Taking feedback after dispensing is important task of community pharmacist as taking feedback can assure the patients understanding, reduce medication error, and improve safety as well. There may be drug interactions, drug intolerance or the patients may be facing adverse effect of drug that may not be resolved leading to treatment failure. In our study 92.3% of the dispensers suggest the patients to take appropriate drugs when the patient asks for antibiotics rather than

giving them as they ask. Also dispensers are aware of the importance of completing antibiotics courses as most of drug dispensers replied negatively to stop taking antibiotics when symptoms subside, it was similar to that of Egypt [4]. This shows concern of dispensers to achieve desired therapeutic effect in patients. Most of drug dispensers in our study suggest to follow the drug dosage regimen adherence and course completion which is rational practice.

In our study 76.9% of drug dispensers were aware that there may be a problem in dispensing antibiotics without prescription. In a similar study in Egypt 80% of participants and 77.2% in Saudi Arabia has admitted that dispensing antibiotics without prescription lead to irrational drug use [4,9]. 73.1% of the dispensers have the knowledge that inappropriate dispensing of antibiotics promotes towards antimicrobial resistance and this response was significantly associated with qualification and work experiences, 26.9% of drug dispensers are not aware of associated antimicrobial resistance. Antibiotic resistance is an unavoidable consequence of misuse of antibiotic [33,34]. Only 67.3% of the drug dispensers know that misuse of antibiotics may lead to loss of sensitivity of antibiotics to specific pathogens. Studies show that misuse of antibiotics can cause loss of sensitivity to specific pathogens [10]. This finding coincides with the findings obtained in the study conducted in Punjab, Pakistan, where 68.5% of the pharmacists are aware that misuse of antibiotics can lead to a loss of sensitivity of an antibiotic towards specific pathogens [27]. 34.3% of the dispensers responded that antibiotics are indicated to reduce any kind of pain and inflammation. In Egypt only 15.6% of participants agreed that antibiotics are indicated to reduce any kind of pain and inflammation [4], also it is reported that 64% of community pharmacist in China consider that conditions such as colds and influenza are treated using antibiotics. [28]. This shows that dispensers are often unaware about the medical conditions in which antibiotics are required and over expectation of antibiotics for the treatment of any kind of pain and inflammation. This shows that need of effective educational program is to be indicated to the community dispenser as well as to the drug dispenser to educate regarding the proper utilization and the indication for antibiotic use. In our study, work experience and qualification had a significant influence on response regarding the perception that antibiotic is indicated to reduce pain and inflammation ($p < 0.001$ and $p = 0.017$ respectively). This

may reflect the incompetency of the majority of pharmacy personnel in the community pharmacy setting. It is also possible that the non-pharmacy dispensing work force in the community pharmacy might have contributed to this incompetency. Nevertheless, it shows that the community pharmacy personnel could benefit from interventions such as education and awareness program on the proper use of antibiotics, though it is crucial that the regulatory bodies urgently improve their monitoring and supervision of the pharmacies to prevent further health hazards.

Furthermore, 86.5% of the drug dispensers strongly agreed that pharmacists should stop dispensing antibiotics without prescription, inspite of having the attitude to dispense antibiotics only upon the receipt of valid prescription 34.9% of study population dispense antibiotics without prescription. This attitude of drug dispensers may be influenced because 62.8% of the drug dispensers in our study strongly agree that refusing dispensing without prescription will negatively affect sales and profits, as this may cause loss in their business. This finding coincides with the finding obtain in another study in Egypt [4]. Also, 88.1% of the drug dispensers in our study agreed that the patients will try to obtain the antibiotics from other pharmacies when they refuse to dispense antibiotics without prescription similar practice was found in a study in Saudi Arabia [40]. This type of practice of patients may be because there is practice of providing antibiotics without prescriptions in some of the community pharmacies who are more of profit oriented rather than providing patient care services also may be due to practice of self-medication or due to lack of awareness on antibiotic use and resistance. 46.8% of dispensers said that they would dispense alternate of same drug in case of non-availability, the response was significantly associated with work experience ($p=0.007$). Similar finding was obtained in India where 56% of pharmacist would substitute brands in case of non-availability of medicines [3]. Brand substitution is the substitution of medicinal products that has same active pharmaceutical ingredients, dosage, safety, strength, quality and performance characteristics [30]. There may be risk of sensitivity or intolerance to inactive ingredients, this must be considered while substitution is made. There is the case of evidence of breakthrough seizures in the case of epileptics due to generic substitution [35]. Such conditions should always be considered. There are guidelines

for brand substitution is some countries [36] such policies should be made available in Nepal too as Nepal may benefit on issue of brand substitution from such policies.

Majority of dispensers has the attitude to give partial medicines in the cases where the patient has insufficient money. This habit of partial medicines dispensing cannot assure patient compliance, furthermore the patients may stop taking antibiotics when the symptoms subsides these practices may contribute to growing health hazards of antibiotic resistance, which may add to increased treatment cost, treatment failure as well [9]. In low-income countries like Nepal, an out-of-pocket payment is the principle means of health care financing [41]. Though the government had started health social security schemes since 2015, its effective implementation is still a major challenge [42]. Therefore, the understanding of pharmacy personnel that an incomplete course of antibiotics could be given to the patients is more likely to affect the patient compliance and the overall outcome of the therapy. Furthermore, the patients may also stop taking antibiotics when the symptoms subside which might contribute to growing health hazards of antibiotic resistance [16]. However, not giving a full course (for entire duration) of medicines by some pharmacy personnel is a unique problem of developing countries where people face financial hardship and also lack proper awareness regarding the rational use of antibiotics [3]. Curbing such problem requires a comprehensive health system measure that promotes both access to and quality use of medicines.

CHAPTER V

5. Conclusion and Recommendation

5.1 Conclusion

Although there is a specified provision in Drug Act, Nepal for the dispensing of antibiotics but dispensing antibiotics without prescriptions by non-pharmacists was seen. Dispensing without prescription may result in potential clinical risk. Provision should be made for the more involvement of professionally trained pharmacists in the community pharmacy. Dispensing without prescription may result in potential clinical risk. Drug dispensers in this area lack the knowledge about the indicated use and misuse of antibiotics. Perception of drug dispensers was associated with inappropriate dispensing of antibiotics. These practices of dispensing antibiotics may add burden to the existing antibiotics resistance that is growing worldwide. Department of Drug Administration under the Ministry of Health, Nepal should adopt strict strategies to monitor dispensing practices in the pharmacies and also regulate the process of dispensing antibiotics without prescription. Drug dispensers should be more aware on the consequences of antibiotic dispensing without a prescription regardless the business benefit behind it. There is the need to promote the rational use of antibiotics. More intensive efforts to educate drug retailers on their role in dispensing, along with increased enforcement of existing regulations, must be pursued.

5.2 Strengths and limitations

There are certain limitations to our study. We used a self-administered questionnaire to assess the data and the responses relied on the participants' ability to recall and their cognition. This could lead to potential recall bias and/or response bias. Another limitation is that, we conducted this study in three selected districts of Eastern Nepal and thus, the findings may not be generalizable. We also could not assess the influence of AMS training on responses due to unavailability of AMS training record at community level in this area. We did not conduct a predictive analysis and therefore, the influences of variables are rather independent or unadjusted. Despite these limitations, to the best of our knowledge, this is probably the first study to

assess the understanding of community pharmacy personnel towards antibiotic dispensing practice using questionnaire that was face and content validated.

5.3 Recommendation:

1. Our study revealed that a significant proportion of pharmacy personnel were from a non-pharmacy background and thus, highlights that community pharmacies are violating the legal obligation that these pharmacies are to be managed by authorized pharmacy personnel. The regulatory bodies need to urgently address this issue as this may contribute to several irrationalities.
2. Nepal government can initiate antimicrobial stewardship policy and program to improve rational use of antimicrobials, minimize harm to patients and reduce the possibility of antimicrobial resistance.
3. Explain the expectation and appropriateness of antibiotics use to the general public/patients.
4. extend the pharmacists' role in health education and promotion, and responsibility in prohibiting antibiotic dispensing without prescription
5. Further studies should be carried out to find the perception of drug dispensers in Nepal.

6. References

1. AL-Rukban, OM; Rizvi ,RM,. "Pharmacist's Knowledge, Attitude and Practices towards Written Prescription in Dispensing and Substitution of Drugs in Riyadh." MAJMAAH JOURNAL OF HEALTH SCIENCE, 2014, 2, 2.
2. K.C.,Bhuwan; Alrasheedy, AA; Izham, M; Ibrahim, M. "Do community pharmacist in Nepal have a role in adverse drug reaction reporting system?" Australasian Medical Journal, 2013, 6, 2, 100-103.
3. Soumya, R; Devarashetty,V;Jayanthi, CR; Sushma, M. "Drug dispensing practices at pharmacies in Bengaluru: a cross sectional study", Indian Journal of Pharmacology, 2016,48, 4, 360-364.
4. El-din, MZ;, Samy, F; Mohamed, A; Hamdy, F; Yasse, Salwa ; Moataz,E; "Egyptian community pharmacists' attitudes and practices towards antibiotic resistance; a cross sectional survey in Greater Cairo." Current Medical Research and Opinion, 2019, 35, 6, 939-946.
5. Ansari, M. "Evaluation of community pharmacies regarding dispensing practices of antibiotics in two districts of central Nepal." PLoS ONE, 2017 12(9): e0183907. <https://doi.org/10.1371/journal.pone.0183907>
6. Morgan, DJ; Okeke, IN; Laxminarayan, R; Perencevich, EN; Weisenberg, S. "Non-prescription antimicrobial use worldwide: a systematic review, Lancet Infectious Diseases." September 2011, 11, 9, 692-701.
7. World health organization. Antibiotic resistance: multi country awareness survey 2015.
8. Wachter, DdA; Joshi, MP; Rimal.B; "Antibiotic dispensing by drug retailers in Kathmandu, Nepal." Tropical Medicine and International Health,1999, 4, 11, 782-788
9. Abdulhak ,AAB; Tannir, MAAI, Almansor, MA; Almohaya, MS; Onazi, AS; Marei, MA.. "Non prescribed sale of antibiotics in Riyadh, Saudi Arabia: A Cross Sectional Study." BMC Public Health 2011, 11:538
10. Ghimire, S; Nepal, Sushil; Bhandari, S; Nepal, P; Palaian, S. "A prospective surveillance of drug prescribing and dispensing in a teaching hospital in western Nepal." Journal of the Pakistan Medical Association, October 2009, 59(10),726-31
11. Belkina, T; Warafi, AAL; Eltom, EH; , Tadjieva, N; Kubena ,A; Vlcek, Jiri. "Antibiotic use and knowledge in the community of Yemen, Saudi Arabia and Uzbekistan." J Infect Dev Ctries 2014; 8(4),424-429.
12. Awad, AI; Aboud,EAW. "Knowledge, Attitude and Practise towards Antibiotic use among the Public in Kuwait." PLoS ONE, 10(2): e0117910. doi:10.1371/journal.pone.0117910
13. World Health Organization. The Evolving Threat of Antimicrobial Resistance: Options for Action. Geneva: WHO; 2012.

14. World Health Organization. Antimicrobial resistance: global report on surveillance 2014. http://apps.who.int/iris/bitstream/10665/112642/1/9789241564748_eng.pdf.
15. Klein, EY; Boeckel, TPV; Martinez, EM; , Pant, S; Gandra,S; Levin, SA; Goossens, H; Laxminarayan, R. "Global increase and geographic convergence in antibiotic consumption between 2000 to 2015." PNAS Plus 2018 Apr 10; 115(15): E3463–E3470.
16. Basnyat, B; Pokharel, P; Dixit, S; Giri ,S. " Antibiotic Use, Its Resistance in Nepal and Recommendations for Action: A situation Analysis." Journal of Nepal Health Research Council, 2015 May- Aug;13 (30):102-11.
17. Saha, S; Hossain, MT. "Evaluation of medicines dispensing pattern of private pharmacies in Rajshahi, Bangladesh." BMC Health Services Research 2017, 17:136
18. National antibiotic treatment guidelines. Ministry of Health and Population 2014, Government of Nepal, Kathmandu, Nepal.
19. Drug act 2035, Nepal.
20. BYJU'S Learning app, <https://byjus.com/chemistry/antimicrobial-agents/>
21. KD,Tripathi. 2019. Essentials of Medical Pharmacology. New Delhi. Jaypee Brothers Medical Press
22. <https://apps.who.int/medicinedocs/en/d/Jh2995e/1.6.2.html>
23. Essential Medicines and Health Products Information Portal , A World Health Organization Resource
<https://apps.who.int/medicinedocs/en/d/Jh2995e/1.6.2.html>
24. Roque, Fatima; Soares, S; Breitenfeld, L; Gonzalez-Gonzalez, C; Figueiras A; Herdeiro, MT. "Portuguse Community Pharmacist's Attitude to and Knowledge of Antibiotic Misuse: Questionnaire Development and Reliability." PLOS ONE, March 5,2014.
25. Lenjisa, JL; Mosisa, B; Woldu, MA; Negassa, DE. "Analysis of Dispensing Practices at Community Pharmacy Settings in Ambo Town, West Shewa, Ethiopia." 2015, 5:1 DOI: 10.4172/2161-0711.1000329
26. Hoxha, I; Malaj, Admir; Tako, Rea; Malaj, L. " Survey of how antibiotics are dispensed in community pharmacies in Albania." International Journal of Research and Development in Pharmacy and Life Sciences, April-May 2015, 4,3, 1545-1548.
27. Sarwar, MR; Sadiq,A; Iftikhar, S; Sadiq, T. "Knowledge of community pharmacists about antibiotics, and their perceptions and practices regarding antimicrobial stewardship: a crosssectional study in Punjab, Pakistan." Infection and Drug Resistance 2018:11
28. Chang, J; Ye, D; Lv, B; Jiang, M; Zhu, S; Yan, K; Tian, Y; Fang, Y. "Sale of antibiotics without a prescription at community pharmacies in urban China: a multicentre cross sectional survey. " AntimicrobChemother 2017; 72: 1235–1242

29. Eureka, R. "Pharmacy Practice in Nepal." *The Canadian Journal of Hospital Pharmacy*, 2016 Nov-Dec; 69(6), 493–500.
30. <https://simplywellblog.org/2018/09/18/the-pros-and-cons-of-using-generic-drugs/>
31. Acharya ,KP; Wilson, RT. "Antimicrobial Resistance in Nepal, *Frontiers in Medicine*" 6:105.
32. Shrestha, R; Ghale, A. " Study of good pharmacy practice in community pharmacy of three districts of Kathmandu valley, Nepal. " *International Journal of Scientific Reports*, 2018 October , 4(10):240-245.
33. Nepal, A; Hendrie, D; Robinson, S. "Survey of the pattern of antibiotic dispensing in private pharmacies in Nepal." *BMJ Open* 2019; 9:e032422. doi:10.1136/ bmjopen-2019-032422
34. Dahal, RH; Chaudhary DK. "Microbial Infections and Antimicrobial Resistance in Nepal: Current Trends and Recommendation." *The Open Microbiology Journal*, 2018, 12,230-242.
35. Berg, MJ1; Gross, RA; Tomaszewski, KJ; Zingaro, WM; Haskins, LS. "Generic substitution in the treatment of epilepsy: case evidence of breakthrough seizures." *Neurology*. 2008 Aug 12; 71(7),525-30.
36. Kalisch, LM; Roughead, EE; Gilbert, AL. "Pharmaceutical brand substitution in Australia– are there multiple switches per prescription?" *Aust NZ J Public Health*. 2007; 31:348-52)
37. Baburam, Humagain. "National Annual health review 2073/74." Nepal Pharmacy Council.
38. www.ctevt.org.np
39. <https://www.stc.edu.np/>
40. Hadi, MA; Karami, NA; Al-Muwalid, AS. "Community pharmacists' knowledge, attitude, and practices towards dispensing antibiotics without prescription (DAwP): a cross-sectional survey in Makkah Province, Saudi Arabia." *Int J Infect Dis*. 2016; 47:95–100.
41. Mills, A. "Health care systems in low- and middle-income countries." *N Engl J Med*. 2014; 370(6):552–557. doi:10.1056/NEJMra1110897
42. Mishra, SR; Khanal, P; Karki, DK; Kallestrup, P; Enemark, U. "National health insurance policy in Nepal: challenges for implementation." *Glob Health Action*. 2015 Aug 21; 8:28763. doi: 10.3402/gha.v8.28763.

ANNEX 1

Questionnaire

Category A

Put tick () sign.

1. Gender
 - a. M
 - b. F
2. Age years
3. Work experience
 - a. <1 yr
 - b. 1-5yrs
 - c. 5-10
 - d. >10yrs
4. Qualifications
 - a. CMA
 - b. Orientation
 - c. Diploma Pharmacy
 - d. Bachelor Pharmacy
 - e. Masters in Pharmacy
 - g. Others (specify)
.....
5. Location of pharmacy
 - a. ward no.....
 - b. VDC/MUN.....
 - c. District.....
 - d. Zone.....
6. Pharmacy registration status
 - a. registered
 - b. non- registered
 - c. expired
 - d. others (specify).....

Category B

1. Do you dispense antibiotics without prescription?
 - a. Yes
 - b. No
2. Do you think dispensing antibiotics without a valid prescription is a problem?
 - a. Yes
 - b. No
3. Do you ask patients if they have any drug allergies before dispensing antibiotics?
 - a. Yes
 - b. No
4. Do you ask patients if they are on any other medicines before dispensing antibiotics?
 - a. Yes
 - b. No

5. Do you advise patients to adhere to their antibiotics dosage regimen and its course completion?
 - a. Yes
 - b.No
6. Do you take follow up- feedback after dispensing antibiotics?
 - a. Yes
 - b. No
7. What would you do if a patient asks for antibiotics without prescription?
 - a. Ask for prescription
 - b. Dispense without prescription
 - c. Others (please specify).....
8. Do you think that an inappropriate dispensing of antibiotic could promote Antimicrobial Resistance
 - a. Yes
 - b. No
9. What would you do if the prescribed brand of antibiotic is not available in your pharmacy?
 - a. Replace with other brand
 - b. Refer to other pharmacy
 - c. Take advice from the prescriber
10. Do you agree that pharmacy personnel should not be dispensing antibiotics without a valid prescription
 - a. I agree
 - b. I don't agree
 - c. others (specify).....
11. Do you think that refusing to dispense antibiotics without Prescription negatively affects sales and profits of the pharmacy?
 - a. Yes
 - b. No
12. Do you think that patients would try to obtain antibiotics from another pharmacy if you refuse to dispense them without a valid prescription?
 - a. Yes
 - b. No
13. What will you do if the patient with the valid prescription for antibiotics does not have sufficient money for its full course?
 - a. Replace with cheaper brand
 - b. Reduce the quantity of antibiotics
14. From which source do you get information about antibiotics?
 - a. Medicine Index (MI)
 - b. Medical Representatives (MR)
 - c. None
 - d. Others (please specify).....

15. Which antibiotics do you dispense more frequently? (*You can tick more than one response*)

- a. Amoxicillin
- b. Ampicillin+Cloxacillin
- c. Amoxicillin +Clavulanic acid
- d. Cefixime
- e. Ceftriaxone
- f. Ciprofloxacin
- g. Ofloxacin
- h. Azithromycin
- i. Roxithromycin
- j. Cotrimoxazole
- k. Others (please specify).....

16. Do you agree that misuse of antibiotics can lead to a loss of sensitivity of an antibiotic to a specific pathogen?

- a. Yes
- b. No

17. Do you suggest patients to stop taking antibiotics if their symptoms would subside?

- a. Yes
- b.No

18. Do you think that antibiotics are indicated to reduce pain and inflammation?

- a. Yes
- b. No

19. Do you think that it is legal to dispense antibiotics without a valid prescription in Nepal?

- a. Yes
- b. No

प्रश्नावली

समूह -क

सहि (✓) चिन्ह लगाउनुहोस् ।

१. लिङ्ग

क. पुरुष

ख. महिला

२. उमेर वर्ष

३. कार्य अनुभव

क. १ वर्ष वा कम

ख. १-५ वर्ष

ग. ५-१० वर्ष

घ. >१० वर्ष

४. शैक्षिक योग्यता

क. सि.एम.ए

ख. ओरिएन्टेसन

ग. डिप्लोम फार्मेसी

घ. वि फार्मेसी

ड. एम. फार्मेसी

अन्य (उल्लेख गर्नुहोस्) -----

५. फार्मेसीको ठेगाना

वडा नं. -----

न.पा / गा.पा -----

जिल्ला -----

अञ्चल -----

६. फार्मेसी दर्ता स्थिति

क. दर्ता गरिएको

ख. दर्ता नगरिएको

ग. म्याद सकिएको

घ. अन्य (उल्लेख गर्नुहोस्) -----

समूह (ख)

१. के तपाईं पुर्जा विना एन्टिबायोटिक वितरण गर्नु हुन्छ?

क. गर्छु

ख. गर्दिन

२. के तपाईंले पुर्जा विना एन्टिबायोटिक वितरण गर्दा केही समस्या हुनसक्छ त ?

क. हुन सक्छ

ख. हुँदैन

३. पुर्जा बिना एन्टिबायोटिक वितरण गर्दा के तपाई त्यो विरामीलाई त्यस औषधीको एलर्जी छ वा छैन सोध्नुहुन्छ?
- क. सोध्छु ख. सोधिदैन
४. औषधी वितरण गर्दा विरामीले अरु कुनै औषधी वा एन्टिबायोटिक खाएको छ वा छैन भने प्रश्न गर्नुहुन्छ।
- क. गर्छु ख. गर्दिन
५. एन्टिबायोटिक वितरण गर्दा के तपाईले विरामीलाई स्वास्थ्य कर्मीको परामर्श बमोजिम औषधी सेवन गर्ने र पूरा अवधिसम्म खाने परामर्श दिनुहुन्छ?
- क. दिन्छु ख. दिन्न
६. एन्टिबायोटिक वितरण गरिसकेपछि के तपाई त्यसको केही समय पछि विरामीसँग त्यसको उपयोग सबन्धी प्रतिक्रिया लिनुहुन्छ?
- क. लिन्छु ख. लिदिन
७. विरामीले पुर्जा बिना एन्टिबायोटिक मागे तपाई के गर्नुहुन्छ?
- क. पूजा माग्छु ख. पुजा बिना औषधी दिन्छु ग. अन्य (उल्लेख गर्नुहोस्)....
८. पुर्जा बिना एन्टिबायोटिक दिँदा त्यसले एन्टिबायोटिक रिसिस्टेन्स गराउन सक्छ त?
- क. गराउन सक्छ ख. गराउँदैन
९. पुर्जामा लेखिएको ब्राण्डको एन्टिबायोटिक तपाईसँग नभए के गर्नुहुन्छ?
- क. अर्को ब्राण्डको दिन्छु ख. अर्को औषधी पसल पठाइदिन्छु
- ग. डाक्टरसँग सल्लाह लिन्छु।
१०. फार्मासिस्टले पुर्जा बिना एन्टिबायोटिक वितरण गर्न रोक्नु पर्छ भन्ने कुरामा सहमत हुनुहुन्छ?
- क. सहमत छु ख. सहमत छैन ग. अन्य -उल्लेख गर्नुहोस्)
११. पूजा बिना औषधी वितरण नगर्दा त्यसको असर बिक्री र त्यसबाट हुने नाफामा नकारात्मक असर पर्दछ?
- क. पर्छ ख. पर्दैन
१२. यदि विरामीलाई एन्टिबायोटिकको आवश्यकता महशुस भयो र औषधी विक्रेताले सो नदिएमा विरामीले सो एन्टिबायोटिक अर्को पसलबाट लिन्छन्।
- क. लिन्छन् ख. लिदैनन्

१३. विरामीसँग पर्याप्त पैसा छैन भने के गर्नुहुन्छ?

क. सस्तो ब्राण्डको त्यही औषधीसँग परिवर्तन गरिदिन्छु

ख. रकम बमोजिमको आंशिक औषधी दिन्छु

१४. औषधीसँग सम्बन्धित सूचनाहरु कहाँबाट पाउनुहुन्छ ?

क. औषधी सम्बन्धित पुस्तकहरु ख. मेडिकल रिप्रेसेन्टेटिभ (MR)

ग. अनलाईन डाटावेस घ. अन्य (उल्लेख गर्नुहोस)

१५. तपाईंको पसलमा कुन एन्टिबायोटिक धेरै बिक्रि हुन्छ ।

a. Amoxicillin b. Ampicillin+Cloxacillin c. Amoxicillin +Clavulanic acid

d. Cefixime e. Ceftriaxone f. Ciprofloxacin g. Ofloxacin

h. Azithromycin i. Roxithromycin j. Cotrimoxazole

k. Others (please specify).....

१६. एन्टिबायोटिकको दुरुपयोगले सुक्ष्म जिवाणु प्रतिको प्रभावकारिता हटाउन सक्छ भन्ने कुरामा सहमत हुनुहुन्छ?

क. सहमत छु ख. सहमत छैन

१७. औषधी अवधि पुरा नगरी विरामीको लक्ष्यन ठिक भएमा एन्टिबायोटिक खान बन्द गरिदिए हुन्छ वा हुदैन?

क. हुन्छ ख. हुँदैन

१८. कुनै प्रकारको दुखाई र सुन्निएको कम गर्न एन्टिबायोटिक उपकारी हुन्छ ?

क. हुन्छ ख. हुँदैन

१९. नेपालमा बिना पूर्जा एन्टिबायोटिक वितरण गर्न कानुन रुपमा पाईन्छ वा पाईदैन?

क. पाईन्छ ख. पाईदैन

ANNEX 2

INFORMED CONSENT FORM

This informed Consent Form is for the community pharmacist who will take part in the research in Community pharmacy personnel's perception, attitude and dispensing practice towards antibiotics in Selected Districts of Terai Region of Province-1, Eastern Nepal .

Name of Investigator: Ms. Nikita Goswami, Dr. Prasanna Dahal, Dr. Shyam Mallik.

Name of Organization: Purbanchal University College of Medical and Allied Sciences.

Name of Sponsor: Nepal Health Research Council.

Title of research: Community pharmacy personnel's perception, attitude and dispensing practice towards antibiotics in Selected Districts of Terai Region of Province-1, Eastern Nepal.

Introduction

I am Nikita Goswami. I am student of Purbanchal University College of Medical and Allied Science (PUCMAS) conducting research on “**Community pharmacy personnel's perception, attitude and dispensing practice towards antibiotics in Selected Districts of Terai Region of Province-1, Eastern Nepal.**”

I am going to give you information about the research and I request you to be part of my research. It is your decision whether or not to participate in the research .

Purpose of the research

The purpose of this study is to determine the attitude and dispensing practice of retail community pharmacist in the selected districts.

Type of Research Intervention

The research will not involve any type of intervention to the retail community pharmacist. Community pharmacist will be asked questions as per the questionnaire.

For the study it is compulsory to help the participants and it is important to answer the questions for the research. It is your decision to choose to take part in the research. It will take around 10-15 minutes. The information provided by the participant will be kept confidential. Your privacy and confidentiality is maintained and will be maintained. You can contact me in my number 9815904106.

Participant selection

The registered retail community pharmacies of Jhapa, Morang and Sunsari district will be eligible for the study.

Procedures and Protocol

1. We will explain to you all about the research including its benefit and risk about this study. We will also answer all the queries that you have.
2. Then we will take consent from you.
3. After getting consent from you, we will ask you the questionnaire.
4. If you cannot manage the time we will leave the questionnaire to you and collect it the next day.
5. All the information's that we receive will be kept strictly secret.

Duration: We will be taking 10-15 minutes only for getting information about and your details.

Risks: Since the study does not involve any intervention by the researcher and all the data will be kept strictly secret, there is no risk to you.

Benefits: If you take part in this study, the informations obtained from the research will be valuable to know the attitude and dispensing practice of antibiotics use in selected districts.

Reimbursements: We are sorry to inform you that you will not be providing any type of financial assistance.

Confidentiality: All the information that we receive will be kept strictly secret.

PARTICIPANT INFORMED CONSENT FORM

Title of the research: Community pharmacy personnel's perception, attitude and dispensing practice towards antibiotics in Selected Districts of Terai Region of Province-1, Eastern Nepal.

Name of the candidate: **Age:**.....

Address: **Mobile number:**

The content of the information sheet dated that was provided have been read carefully by me /explained in detail to me, in a language that I comprehend, and have fully understood the contents. I confirm that I have had the opportunity to ask questions.

The nature and purpose of the study and its potential risks/ benefit and expected duration of the study, and other relevant details of the study have been explained to me in detail. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal right being affected.

I understand that the information collected about me from my participation in this research. I give permission to collect the information.

I hereby give consent to take part in the above study. The consent form has been signed by me when I was not under the influence of any drugs.

Signature of Participant: _____


Signature of Researcher: _____

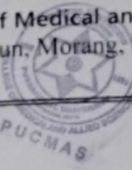
Date: _____

Signature of Witness: _____

ANNEX 3

RECOMMENDATION LETTER FROM UNIVERSITY

 **Purbanchal University**
College of Medical and Allied Science (PUCMAS)
Gothgaun, Morang, Province No. 1, Nepal

Ref No. *LoC/062/068* 

Date: 14th Mangsir, 2075

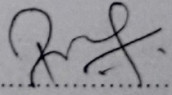
To,
The Chairperson
Nepal Health Research Council
Ramshah Path, Kathmandu

Subject: Recommendation letter

We proud to share that Purbanchal University, College of Medical and Allied Science started Master's program in Pharmacy in 2073. We have 9 students in M. Pharmacy program. Ms. Nikita Goswami is one of the registered students of M.Pharmacy 2nd year (3rd semester) of this constituent college.

Ms. Goswami expressed her interest to apply for the NHRC Post Graduate Research Grant. She has been preparing proposal for her thesis entitled "Antibiotics Dispensing Attitude and Practice Of Retail Community Pharmacy In Three Major Districts Of Terai Region of Province 1, Eastern Nepal." We would like to certify that she is in the thesis year of her M.Pharmacy program. We highly recommend her proposal for submission to NHRC.

We, thank you in advanced for your positive consideration toward our student's proposal. If you have any query, please feel free to contact me.


.....
Dr Prasanna Dahal
Assistant Professor
Coordinator
M.Pharmacy II Year

ANNEX 4

ETHICAL APPROVAL LETTER FROM NHRC



Government of Nepal
Nepal Health Research Council (NHRC)



Ref. No.: 2500

20 February 2019

Ms. Nikita Goswami
Principal Investigator
Purbanchal University college of Medical and Allied Sciences (PUCMAS)
Morang

Ref: **Approval of thesis proposal entitled Attitude and dispensing practice of antibiotics by retail community pharmacist in selected districts of Terai region of Province-1, Eastern Nepal**

Dear **Ms. Goswami,**

It is my pleasure to inform you that the above-mentioned proposal submitted on **29 January 2019** (Reg. no. **82/2019**) has been approved by Nepal Health Research Council (NHRC) National Ethical Guidelines for Health Research in Nepal, Standard Operating Procedures Section 'C' point no. 6.3 through Expedited Review Procedures.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol. Expiration date of this proposal is **August 2019**.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and **submit progress report in between and full or summary report upon completion**.

As per your thesis proposal, the total research budget is **Rs. 35,000.00**. The processing fee was waived as the researcher had received by NHRC Grant.

If you have any questions, please contact the Ethical Review M & E Section at NHRC.

Thanking you,


Prof. Dr. Anjani Kumar Jha
Executive Chairman

Tel: +977 1 4254220, Fax: +977 1 4262469, Ramshah Path, PO Box: 7626, Kathmandu, Nepal
Website: <http://www.nhrc.org.np>, E-mail: nhrc@nhrc.org.np

ANNEX 5

A. WORK PLAN AND SCHEDULE

Activities/Months	March 2019	April 2019	May 2019	June 2019	July 2019	August 2019
Literature Review						
Field Visit and data Collections						
Data Analysis and Data interpretation						
Manuscript writing						

B. BUDGET PLAN:

Sn	Activities	Expenses
1	Stationary Cost/Printing	10000.00
2	Travel Expenses for data collection	15,000.00
3	Report writing and Draft Preparation	5000
4	Miscellaneous costs	5000
Total		35000