Evaluation of Prescriptions Using WHO Indicators in Public Health Care Sector of Dhaka, Bangladesh

A project submitted

by

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This study is dedicated to my parents and my teachers from whom I got the support and inspiration to complete this work.

Certification statement

This is to certify that, the project titled 'Evaluation of Prescriptions Using WHO Indicators in Public Health Care Sector in Dhaka, Bangladesh' submitted for the completion of the precondition for the degree of Bachelor of Pharmacy from the Department of Pharmacy, BRAC University. This contains my personal work under the supervision of Fabliha Ahmed Chowdhury, Lecturer, Department of Pharmacy, BRAC University and proper acknowledgement goes to those from whom I got the ideas.

Signed,

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Counter signed by the supervisor

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Abstract

Standardization of medical treatment is actually a broad aspect, however in spite of that; World Health Organization (WHO) has developed a number of indicators to assess the quality of health care. The indicators are categorized in three different groups: prescribing indicators, patient care indicators and facility indicators. In this study, we aimed on the evaluation of prescribing indicators in four different public hospitals in Dhaka, Bangladesh. The hospitals are: Dhaka Medical College, Shaheed Suhrawardy Medical College, National Institute of Cancer Research & Hospital and National Institute of Diseases of the Chest and Hospital. We collected 50 prescriptions from each hospital and in total of 200 prescriptions were collected and assessed. After analysis we found that on average of 6.16 drugs are prescribed per encounter where the standard value is 1.6-1.8; about 51% prescription contained one or more antibiotic where the standard value is 20.0%-26.8%; about 46% encounters were with one or more injections even though the standard value is just 13.4%-24.1%; only 14.7% drugs were prescribed using generic names whereas the value should be 100% and lastly 41.3% drugs were prescribed from Essential Drug List but the standard is 100%. This study contains lists of different type of injections and antibiotic drugs prescribed to the individuals. From this study we can conclude that we are in need of strict scrutiny on the prescribing methods of our country, so that we can help in achieving the ideal environment for medical treatment.

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Abbreviations

ADE- Adverse Drug Events

CAP- Community Acquired Pneumonia

DGDA- Directorate General of Drug Administration

DH- District Hospitals

EDL- Essential Drug List

FDA- Food and Drug Administration

HBV- Hepatitis B Virus

HCV- Hepatitis C Virus

HIV- Human Immunodeficiency Virus

JAMA- Journal of the American Medical Association

NIPORT- National Institute of Population Research and Training

NSAID- Nonsteroidal Antinflammatory Drugs

PCR- Polymerase Chain Reaction

UHC- Upazila Health Complex

USAID- United States Agency for International Development

USAN- United States Adopted Names

WHO- World Health Organization

Chapter 1: Introduction

The medical prescription is a legitimate, authoritative record. The prescription order is an essential exchange between the doctor and the patient. Prescription writing is both a craftsmanship and science, which should be aced by the medicinal expert. "Prescription," gets from "pre" (before) and "script" (writing, written), which indicates that it is a request that must be composed down previously or for the readiness and administration of a drug (Cook., 1936). A prescription is characterized as a human services program implemented by a doctor as guidelines that oversee the arrangement of administer to an individual patient. Medicines can be utilized as a measure of the nature of therapeutic instruction and recognition of the laws and directions. The essence of a decent medicine composing is to guarantee that the prescriber should know precisely which tranquilize detailing and measurements to apportion, and the patient has express composed guidelines for self-organization of the recommended medicate. Endorsing is additionally used to portray certain exercises which incorporate conveyance of medications and gadgets. It is utilized to depict composed data accommodated patients or any guidance (Laing et al., 2001).

The indicators of prescribing practice measure the execution of medicinal services suppliers in a few key measurements identified with the fitting utilization of drugs. The indicators depend on the practices saw in an example of clinical experiences occurring at outpatient health offices for the treatment of intense or constant disease. These experiences can be watched reflectively, from information recorded in authentic medicinal records, or they can be watched tentatively, from a gathering of patients going to the center on the day the information are gathered (Cook, 1936).

The indicators don't require the accumulation of any data on signs and side effects. Since the examples of clinical experiences cover broad spectrum of medical issues, the center recommending indicators measure general endorsing propensities inside a given setting, autonomous of particular determinations (WHO., 1994). Honestly, numerous basic inquiries in tranquilize utilize need to do with whether medicinal services suppliers take after suitable symptomatic systems and whether they select items and measurement calendars to fit fundamental medical issues. Be that as it may, deciding the nature of analysis and assessing the sufficiency of medication decisions is an intricate endeavor by and by, and past the extent of the

center indicators. After a first medication utilize examine with chosen indicators has been completed to decide general endorsing execution, it will ordinarily be important to embrace more medical issue particular examinations and make an evaluation of the nature of analysis and treatment (WHO, 1994).

Around the world, the greater part of all drugs are recommended, apportioned, or sold improperly, and half of patients fail to take them accurately. Also, around 33% of the total population needs access to essential medicines (Laing et al., 2003). Arbitrary prescribing is a global problem. This can lead to unsafe treatment, worsening of diseases or illness along with higher expenses.

Figure 1.1: Prescription

The irrational use of medications is an issue, and to oversee it the World Health Organization (WHO) assembled a universal conference in Nairobi, Kenya, in 1985 to create helpful guidelines. According to report of the conference "patients receive medications appropriate to

their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community"(WHO., 1985).

The WHO has established three core fundamentals to improve the rational use of medicines. These fundamentals include prescribing indicators, patient care indicators, and healthcare facility specific indicators. The prescribing indicators constitutes a group of measured parameters which are

1. Average number of drugs per encounter,

2. Percentage of encounters with antibiotics,

3. Percentage of encounters with injection,

4. Percentage of drugs prescribed by generic name, and

5. Percentage of drugs from the essential drug list or formulary (EDL)

Overview of these indicators regarding the situation in different countries is discussed below in the sub chapters.

1.1 Polypharmacy

The use of multiple drugs, frequently named polypharmacy, is perceived as an undeniably difficult issue in the present medicinal services framework. The US General Bookkeeping Office reports critical grimness and mortality related with unseemly polypharmacy. Furthermore, polypharmacy is perceived as a costly practice: the US Centre for Medicare and Medicaid Administrations appraises that polypharmacy costs its country's health plan more than US$50 billion every year (Berenbeim, 2002)

The utilization of various drugs, regularly alluded to as polypharmacy is normal in the older population with multimorbidity, as at least one drug might be utilized to treat each condition (Bushardt et al., 2008). Polypharmacy is related with unfriendly results including mortality, falls, unfavorable medication responses, expanded length of remain in healing center and readmission to clinic not long after release. The danger of adverse effects and harmful increments with expanding quantities of medicines .Damage can come about because of a large number of variables including drug-sedate connections and medication sickness communications. More

established patients are at much more serious danger of unfriendly impacts because of diminished renal and hepatic capacity, bring down slender weight, reduced hearing, vision, insight and portability (Masnoon et al., 2017).

While in numerous occurrences the utilization of various medicines or polypharmacy might be clinically suitable, it is vital to recognize patients with improper polypharmacy that may put patients at expanded danger of antagonistic occasions and weakness results. Studies have

Figure 1.2: Practice of polypharmacy

recommended a move towards embracing the term 'proper polypharmacy' with a specific end goal to separate between the endorsing of 'many' and 'too much' medications rather than a basic numerical tally of drugs, which is of constrained an incentive by and by. Keeping in mind the end goal to make this refinement amongst suitable and unseemly polypharmacy, the term polypharmacy should be obviously characterized. We in this manner directed a deliberate audit to investigate the meanings of polypharmacy in existing writing. We furthermore planned to investigate whether articles separated amongst fitting and unseemly polypharmacy and how this qualification was made.

Shockingly, there are numerous negative outcomes related with polypharmacy. , In particular, the weight of taking different solutions has been related with more prominent human services costs and an expanded danger of adverse drug events (ADEs), drug non-adherence, drug-interactions, diminished functional capacity and various geriatric disorders.

Polypharmacy adds to medical care expenses to both the patient and the medicinal services framework. A review companion think about found that polypharmacy was related with an expanded danger of taking a conceivably improper medicine and an expanded danger of outpatient visits, and hospitalization with an inexact 30% expansion in therapeutic expenses . Another investigation directed in Sweden announced that those taking at least 5 solutions had a 6.2% expansion in doctor prescribed medication use and those taking at least 10 prescriptions had a 7.3% increment (Tomson et al., 1992).

In 2005, it was assessed that more than 4.3 million social medical care visits were credited to an ADE. It has been accounted for that up to 35% of outpatients and 40% of hospitalized elderly experience an ADE. Besides, around 10% of crisis room visits are ascribed to an ADE. In a populace based examination, outpatients taking at least 5 medicines had a 88% expanded danger of encountering an ADE contrasted with the individuals who were taking less meds. In nursing home occupants, rates of ADEs have been noted to be twice as high in patients taking at least 9 solutions contrasted with those taking less. Another examination assessing spontaneous hospitalizations in more established veterans found that a patient taking in excess of 5 pharmaceuticals was just about 4 times as prone to be hospitalized from ADE. As one may expect, regular medication classes related with ADEs incorporate anticoagulants, NSAIDs, cardiovascular meds, diuretics, anti-infection agents, anticonvulsants, benzodiazepines, and hypoglycemic medicines. (Alic et al., 2011)

With the increase in extent of elderly individuals, different issues identified with their health are likewise on the ascent. Elderly patients demonstrate numerous ailment state; duplicative recommending result attributable to different prescribers; and in patients with inherent correspondence issues, misdiagnosis, hazy medication signs and utilization of medications without signs can happen. Consequently, drug specialists can possibly have an expansive impact in fighting this issue through an assortment of interventions (Golchin et al., 2015).

More seasoned grown-ups with polypharmacy are inclined to sedate communications. In an imminent accomplice investigation of more established hospitalized grown-ups taking at least 5 prescriptions, the pervasiveness of a potential hepatic cytochrome chemical intervened, sedate medication association was 80%. The likelihood of a medication tranquilizes cooperation expanded with the quantity of medications. Specifically, a patient taking 5-9 meds had half

likelihood though the hazard expanded to 100% when a patient was observed to take at least 20 pharmaceuticals. In an investigation of network staying elderly grown-ups, right around half of patients had a potential medication sedate cooperation. Medication sedate collaborations are an incessant reason for preventable ADEs and prescription related hospitalizations. Thus professionals should keep the likelihood of a medication sedate cooperation at the top of the priority list while endorsing any new solutions (Bushardt et al., 2008).

Polypharmacy has been and dependably will be basic among the elderly populace due to the need to treat the different ailment expresses that create as a patient ages. Sadly with this increment in the utilization of different drugs accompanies an expanded hazard for negative wellbeing results, for example, higher medicinal services costs, drug non adherence, diminished useful status and geriatric disorders. More execution ponders are expected to demonstrate that down to earth use of the strategies appeared to move forward polypharmacy issues canscattered to the different restorative settings where more established grown-ups get mind. According to a study in 2014, the average number of drugs per prescription was 4.89 in Bangladesh (Sultana et al., 2015). We can evaluate whether there has been any change between the timeframe of the studies.

For avoiding polypharmacy the patient should always be concerned of which medicine is being prescribed to him/her. In case confusion they should seek help from the prescriber. Before prescribing the patient should mention whether s/he is taking any medication for allergy or any kind of supplements. The patient should always be aware of what medicine is for which purpose in the list so that they can be totally understood about the purpose of their medicine use. Lastly patients should complete the courses of all the medicines and should not stop in the middle of taking any course (Onder et al., 2017).

Figure 1.3: Suggestions for managing polypharmacy (Onder et al., 2017)

In contrast to different countries' practice on prescribing antibiotics by the medical practitioners following chart is shown.

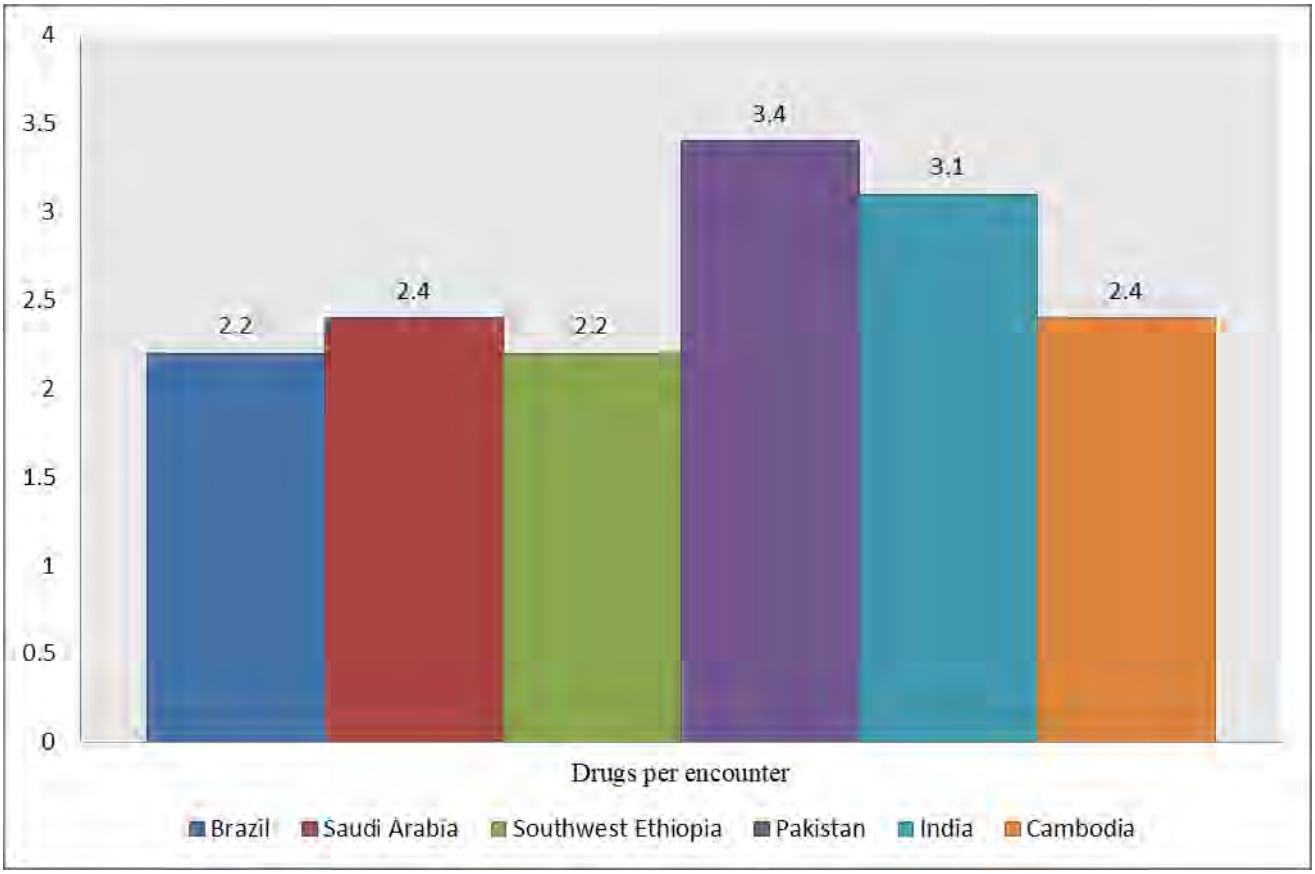

Figure 1.4: Drugs per encounter in different countries (Lopes, 1996, El Mahalli, 2012, Angamo et al., 2011, Atif et al., 2016, Chareonkul et al., 2002, Kshirsagar et al., 1998)

In figure 1.1.3 we can see different countries around the world has different statistical data of drugs per encounter. As of WHO the range should be within 1.6-18 drugs per encounter, none of the countries meet the standard value. As of being developed country in Saudi Arabia about 2.4 drugs are prescribed (El Mahalli, 2012). In Brazil, a developing country in South America, the average amount of 2.2 drugs was prescribed there (Lopes, 1996). In case of our neighboring countries, In India (Chareonkul et al., 2002) and Pakistan (Atif et al., 2016) the average of 3.1 and 3.4 drugs are prescribed respectively. Cambodia is another Asian country with the lower economy growth than Bangladesh (World Bank, 2016). The average number of drugs prescribed in Cambodia is 2.4 (Kshirsagar et al., 1998). In Southwest Ethiopia, an African under developed

country (World Bank, 2016) the average number of drugs prescribed there is 2.2 (Angamo et al., 2011).

1.2 Rational use of antibiotics

Antibiotics are vital medications. They regularly are viewed as wonder drugs. It is hard to exaggerate the advantages of penicillin and different antibiotics in treating bacterial contaminations, keeping the spread of malady and lessening genuine entanglements of disease.

Antibiotics changed medical practice and have spared endless lives over the previous century. According to a May 2016 study published in the Journal of the American Medical Association (JAMA), "Nearly one-third of the antibiotics prescribed in the United States aren't appropriate for the conditions being treated"

In any case, a few medications that used to be standard medicines for bacterial contaminations are presently less powerful or don't work by any stretch of the imagination. At the point when an antibiotic never again affects a specific strain of microorganisms, those microbes are said to be antibiotic resistant. The overuse and abuse of antibiotics are key components adding to anti-microbial resistance. The overall population, specialists and hospitals all play a part in guaranteeing appropriate utilization of the prescriptions and limiting the improvement of anti-toxin obstruction (Levy, 1998).

Antibiotic resistance is one of the greatest dangers to worldwide health safety, sustenance security, and advancement today. This can influence anybody, of all ages, in any nation. Antibiotic resistance can happen normally, yet abuse of antibiotic drugs in people is quickening the procedure (Davies, J. & Davies, D., 2010).

Antibiotic resistance is quickened by not only the abuse and abuse of antibiotics; it can be accelerated by bad infection prevention method and control as well.

Incorrectly prescribed antibiotics also contribute to the raise of antibiotic resistance. It has been found from the studies that, "treatment indication, choice of agent, or duration of antibiotic therapy is incorrect in 30% to 50% of cases" (Freiden et al., 2013). A study in United States finds that a pathogen was defined in only 7.6% of 17,435 patients hospitalized with community-acquired pneumonia (CAP) (Luyt et al., 2014).Whereas researchers in Sweden were able to

identify the likely pathogen in 89% of patients with CAP by the use of molecular diagnostic methods (polymerase chain reaction [PCR] and semi quantitative PCR).

Furthermore, about 30% to 60% of the antibiotics prescribed in intensive care units have been found to be pointless, unsuitable, or suboptimal (Lyut et al., 2014).

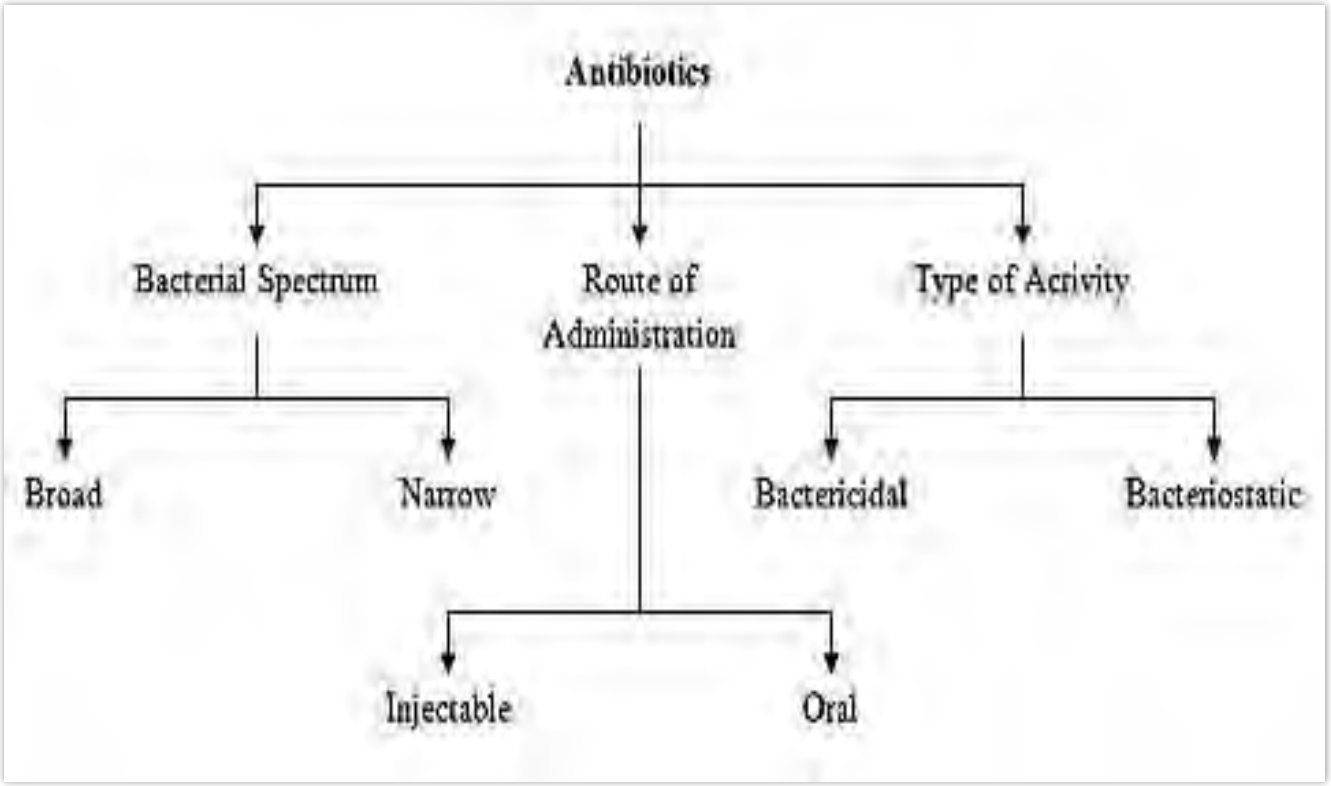

Figure 1.5: Classification of antibiotics

Aside from the classification shown in figure 1.2.1 antibiotics can also be classified on the basis of their chemical structure. A same kind of efficiency, toxicity and adverse effects is shown by the same structural group.

Inappropriately prescribed antibiotics have doubtful therapeutic advantage and it can also expose patients to potential difficulties of antibiotic therapy. The growth of antibiotic resistance can be triggered by subinhibitory antibiotic medication by promoting genetic alterations, for example alterations in gene expression and mutagenesis. Changes in antibiotic-induced gene expression can lead to escalation of virulence (Levy., 1998)

Both doctors and patients are accountable for antibiotic resistance; there is a straight link between use and misuse of antibiotics and the development of antibiotic resistance. In the case of medical practitioners, it is most probable due to practice of inappropriate prescribing. On the contrary In the situation of patients, it is most likely due to overusing or not completing full course of treatment. Antibiotic resistance can also grow by self-medication by the patients, or keeping part of the uncompleted course for another time or purchase from pharmacies without a prescription. Consequently, confirming suitable use of antibiotics is essential to reduce the resistance.

Dr. Vincenza Snow from American College of Physicians said, “Doctors often feel pressured to prescribe antibiotics when they are not needed because patients demand them.”

According to Dr. Ralph Gonzales of the University of Colorado Health Sciences Center, "If we can lower our total antibiotic consumption by 20 or 30 percent, we can show an effect in changing the rate of prevalence in these resistance organisms."

A study by Johns Hopkins University investigated that 67% of hospitalized patients in Bangladesh received antibiotics, despite the fact that in no less than half of the cases they were not required (Roess., 2005). All the resistant microbes imperil the prevention and treatment of infectious therapeutic conditions, minor to major surgeries, for example, organ transplantation, cesarean sections, hip replacements, abdominal surgeries, oncological chemotherapy, diabetes management with slanted health services cost, lengthier stays in healing facilities and intensive care arrangements. We can determine how much antibiotics are being prescribed in contrast to the standard set by WHO.

In figure 1.2.2 we can see the development of antibiotic drug over the few decades. The change in fighting antibiotic started in 1940 with the discovery of Penicillin. The following decades were tremendous for discovering of many other antibiotics. (Davies, J., & Davies, D.,2010)

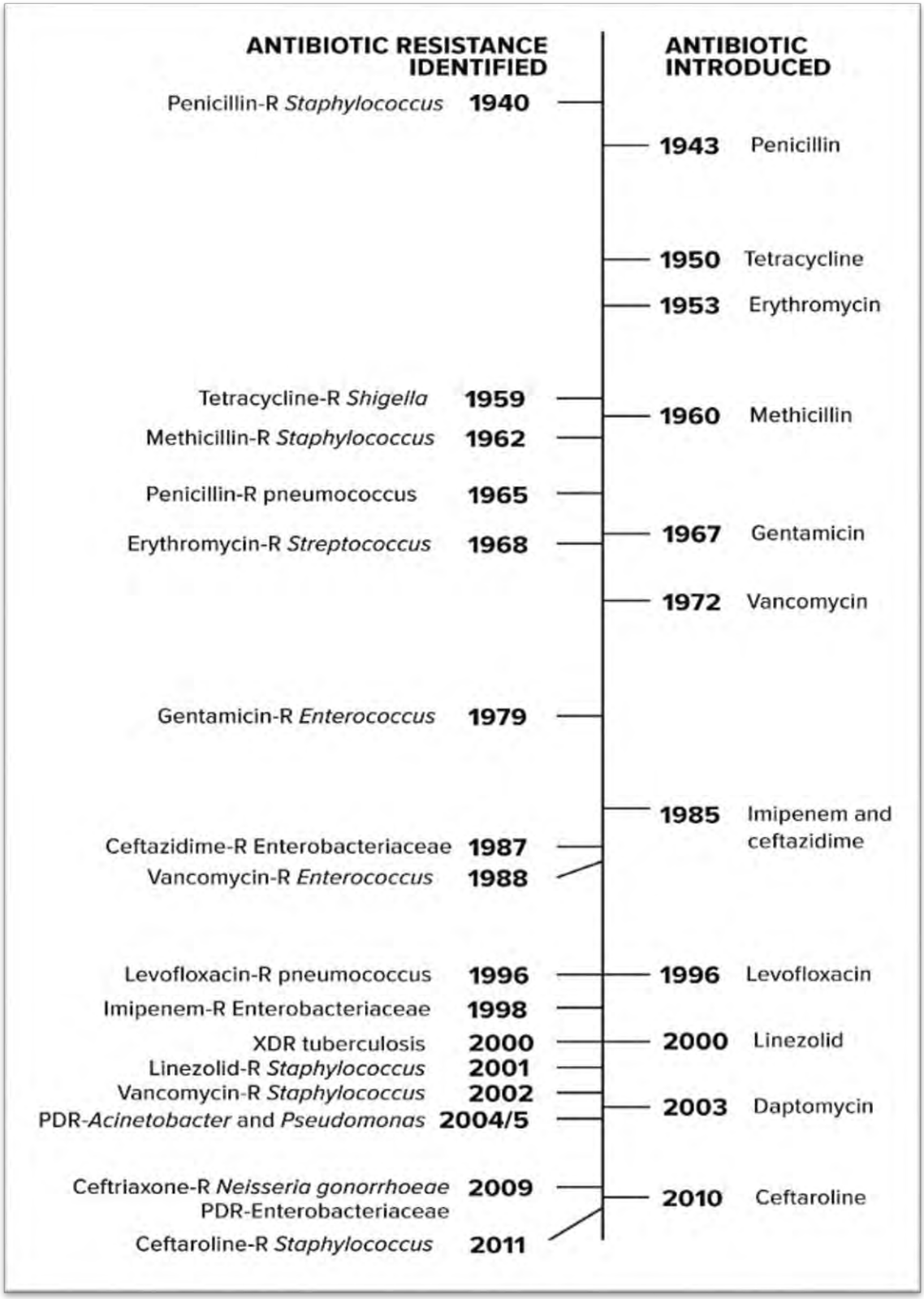

Figure 1.6: Development of antibiotics

In contrast to different countries' practice on prescribing antibiotics by the medical practitioners following chart is shown.

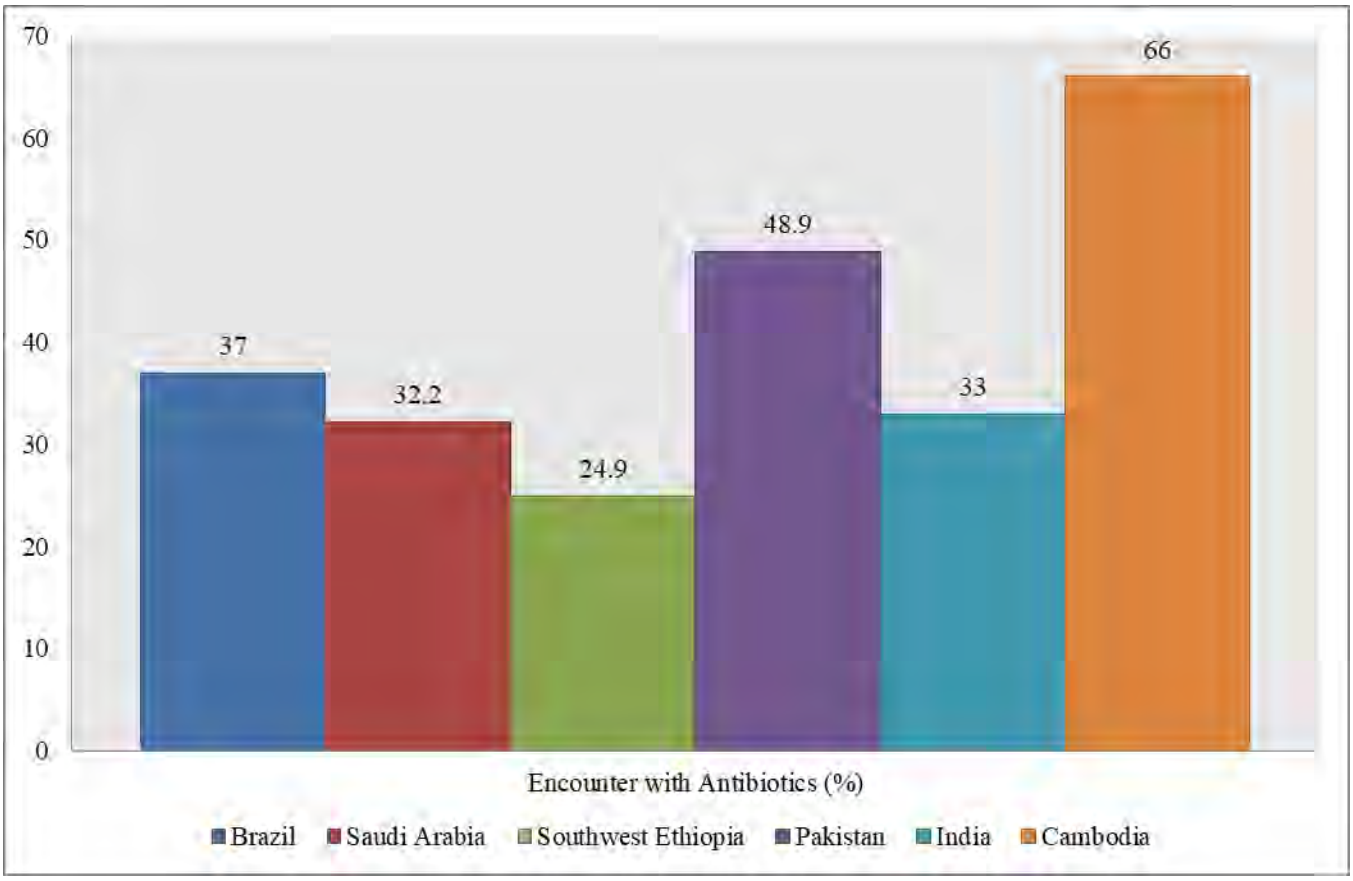

Figure 1.7: Percentage of prescribing antibiotics per encounter (Lopes, 1996, El Mahalli, 2012, Angamo et al., 2011, Atif et al., 2016, Chareonkul et al., 2002, Kshirsagar et al., 1998)

In the figure 1.2.2 we can see different countries around the world has different statistical data of percentage of antibiotics prescribed. As of WHO the range should be within 20% to 26.8%. As of being developed country in Saudi Arabia about 32.2% patients received injections (El Mahalli, 2012). In Brazil, a developing country in South America, the average amount of 37% patients was prescribed injections (Lopes, 1996). In case of our neighboring countries, In India (Kshirsagar et al., 1998) and Pakistan(Atif et al., 2016) the average of 33% and 48.9% patients received injections. Cambodia is another Asian country with the lower economy growth than Bangladesh (World Bank, 2016). 66% of the patients received injection in their prescription (Chareonkul et al., 2002). In Southwest Ethiopia, an African under developed country (World

Bank, 2016) the average number of 24.9% patients were prescribed injections (Angamo et al., 2011). In the discussion chapter the comparison between these countries' result with the result found from this study is discussed.

1.3 Rational use of injection

In healthcare, an injection is the presentation of a medication, vaccine, preventative or other therapeutic agents into the body utilizing a needle and syringe. Injections are among the most widely recognized medicinal services methodology all through the world.

It is of essential significance that injections are carried out securely, i.e. in a way that does not hurt the patient or uncover the human services specialist to unnecessary hazard, and does not bring about waste that is dangerous for the community. The utilization of sterile equipment for all injections is fundamental (Chowdhury et al., 2011).

Risky injection practices have an essential risk of spreading three avoidable primary blood borne viral viruses; human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). Inclination of injections over oral medications and broad abuse of injections in numerous creating nations has for some time been of great concern to health experts and the World Health Organization, however so far minimal systematic research has been led into this overall practice. Available evidence proposes that the habit of practice of injections in developing countries is common and frequently pointless (Kane et al., 1999).

Irrational use of injections and absence of safe practice during the administration of injection have been reported for around the world. Superfluous and perilous infusion utilization expand the financial burden as well as responsible for spreading blood borne sicknesses including HIV, HBV and HCV (Kane et al., 1999). According to a study conducted by United Nation Population Fund (2005), the per capita total expenditure on health care in Bangladesh is very lower than the minimum that is required for the essential health care in low income countries. As a matter of

fact, rational use of injections is not also well monitored in Bangladesh as in other developing countries of the world. In a study conducted from January 2009 to June 2009 in Bangladesh the average number of injections prescribed per patient was 2.44 (Shill et al., 2011). In contrast to the nearest country India it was slightly lower, which was 3 in 2005 (Murhekar et al., 2005). In another study conducted in 2014 by Sultana and others, the percentage of use of antibiotics was 78% in contrast to the standard of 15-20% set by WHO. With this assessment we can compare the recent situation with the mentioned study.

Figure 1.8: Injection

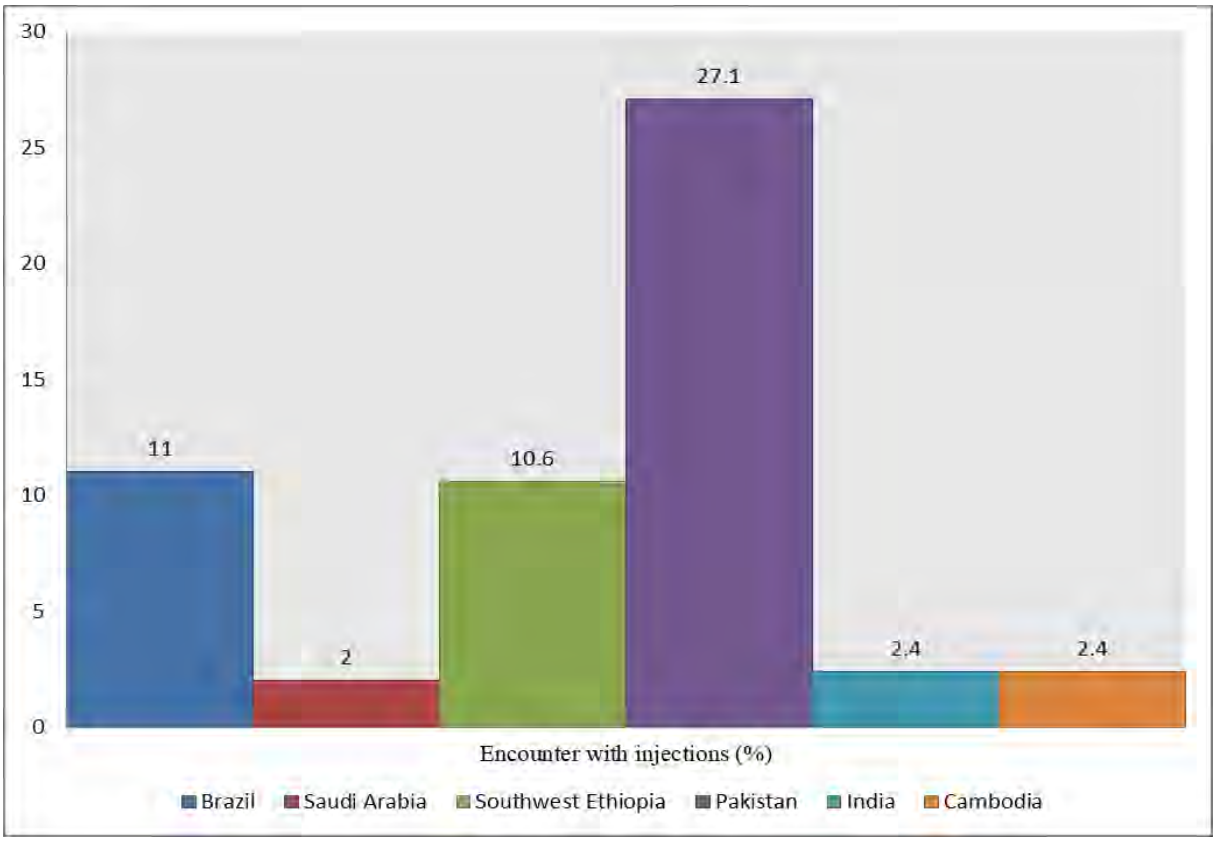

Figure 1.9: Percentage of encounter with injections in different countries (Lopes, 1996, El Mahalli, 2012, Angamo et al., 2011, Atif et al., 2016, Chareonkul et al., 2002, Kshirsagar et al., 1998)

In figure 1.3.2 we can see different countries around the world has different statistical data of percentage of injections prescribed. As of WHO the range should be within 13.4% to 24.1%. As of being developed country in Saudi Arabia about 2% patients received injections (El Mahalli, 2012). In Brazil, a developing country in South America, the average amount of 11% patients was prescribed injections (Lopes, 1996).In case of our neighboring countries, In India (Kshirsagar et al., 1998) and Pakistan (Atif et al., 2016) the average of 2.4% and 27.1% patients received injections. Cambodia is another Asian country with the lower economy growth than Bangladesh (World Bank, 2016). 2.4% of the patients received injection in their prescription (Chareonkul et al., 2002). In Southwest Ethiopia, an African under developed country (World Bank, 2016) the average number of 10.6% patients were prescribed injections (Angamo et al., 2011).

1.4 Importance of prescribing drugs with generic name

Drugs frequently have a few names. At the point when a medication is first found, it is given a compound name, which depicts the nuclear or sub-atomic structure of the medication. The chemical name is therefore more often than not excessively perplexing and lumbering for general utilize. Next, a shorthand adaptation of the substance name or a code name, (for example, RU 486) is produced for simple reference among analysts (Sambrook, 2017).

At the point when a medication is endorsed by the Food and Drug Administration (FDA—the U.S. government agency in charge of guaranteeing that medications promoted in the United States are protected and viable), it is given a

- Generic(official) name
- Brand (proprietary or trademark or exchange) name

Figure 1.10: Example of generic name

For instance, phenytoin is the generic name and Dilantin is a brand name for a similar drug.

The generic name is appointed, in the United States, by an official body—the United States Adopted Names (USAN) Council.

The brand name is produced by the company asking for approval of the medication and distinguishes it as the select property of that organization.

At the point when a medication is under patent protection, the company markets it under its brand name. At the point when the medication is off-patent (no longer protected by patent), the company may showcase its item under either the generic name or brand name. Different company that document for endorsement to showcase the off-patent medication must utilize a similar generic name however can make their own particular brand name. Subsequently, a similar generic medication may be sold under either the generic name (for instance, ibuprofen) or one of numerous brand names, (such as, Advil or Motrin) (Sambrook, 2017).

Generic and brand names must be unique to keep one medication from being mixed up for another when drugs are endorsed and medicines are administered. To save this possible confusion, the FDA must agree to each proposed mark name (Moin, 2016).

Government authorities, specialists, scientists, and other people who expound on the new compound utilize the medication's generic name since it alludes to the medication itself, not to a specific organization's image of the medication or a particular item. In any case, specialists frequently utilize the brand name on solutions, since it is less demanding to recall and specialists as a rule find out about new medications by the brand name (Steinman et al., 2007).

Generic names are typically more confused and harder to recall than mark names. Numerous generic names are a shorthand variant of the medication's synthetic name, structure, or equation. Conversely, brand names are generally catchy, frequently identified with the drugs' intended use (Sambrook, 2017).

According to a study conducted by WHO in 2014 in Bangladesh, "The percentage of drug prescribed by generic name in the public sector was 17% in tertiary hospitals, 48-59% in district hospitals (DHs) and upazila health complexes (UHCs)." Irrational use of medicine still remains a very serious problem. The high practice of prescribing brand name over generic name is a great issue in Bangladesh. The medical practitioners tend to prescribe drugs using brand names in

Bangladesh. In a study conducted in 2014 by Sultana and others, there were no drugs prescribed with generic names. It is important to note that drugs should be prescribed in their generic names to avoid confusion. Although there are both advantages and disadvantages of generic prescribing, there is more to gain than to lose by this practice, especially in a teaching hospital which has a dual responsibility of providing patient service as well as medical education.

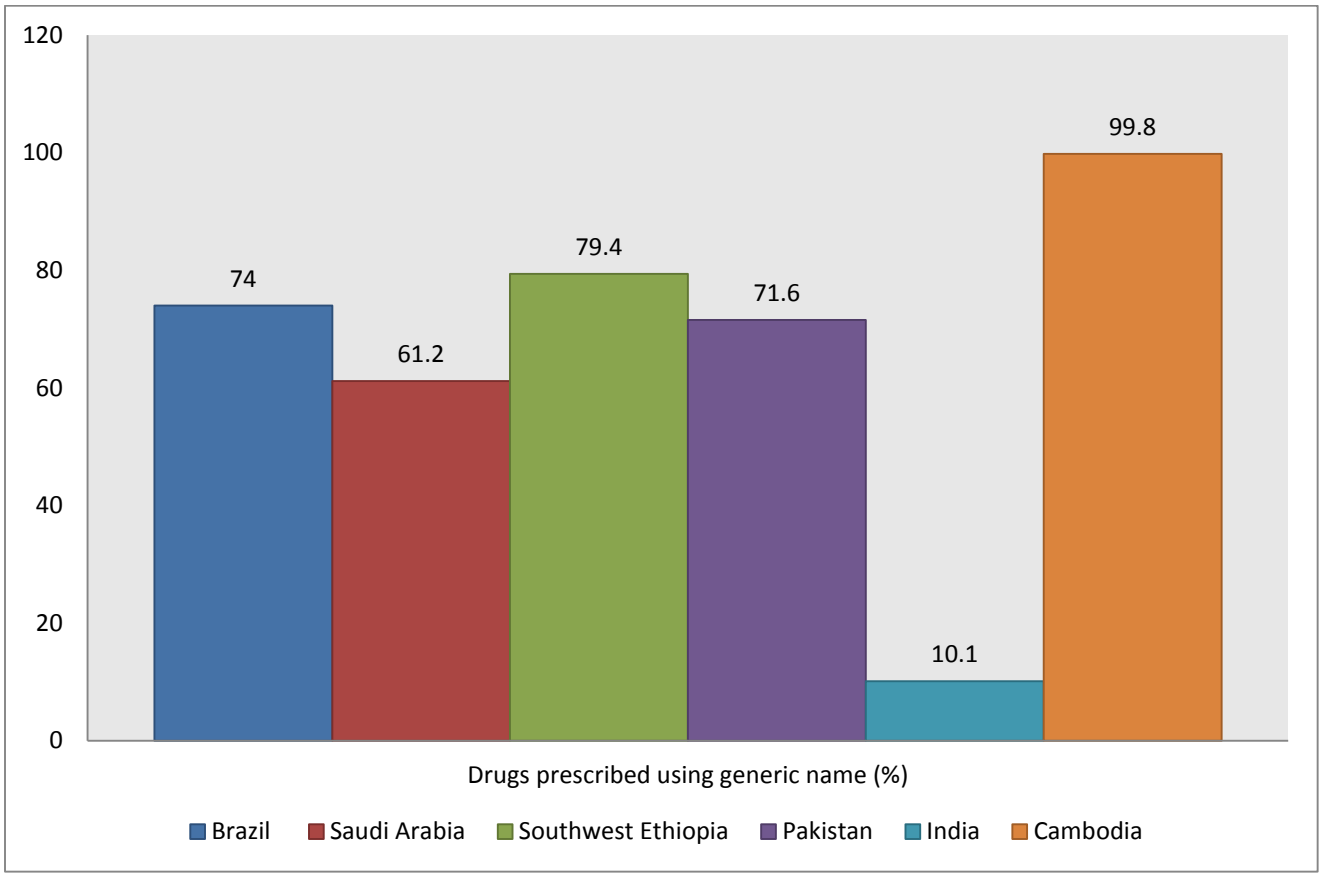

Figure 1.11: Drugs using generic name per encounter in different countries (in percentage) (Lopes, 1996, El Mahalli, 2012, Angamo et al., 2011, Atif et al., 2016, Chareonkul et al., 2002, Kshirsagar et al., 1998)

In figure 1.4.2 we can see different countries around the world has different statistical data of drugs prescribed using generic name. As of WHO the standard value is 100% which means every drugs prescribed should be prescribed with generic names. As of being developed country in Saudi Arabia 61.2% drugs are prescribed with generic names (El Mahalli, 2012). In Brazil, a developing country in South America, 74% drugs are prescribed there with generic names (Lopes, 1996). In case of our neighboring countries, In India (Kshirsagar et al., 1998) and

Pakistan (Atif et al., 2016) 10.1% and 71.6% drugs are prescribed with generic names respectively. Cambodia is another Asian country with the lower economy growth than Bangladesh (World Bank, 2016). Percentage of drugs prescribed in Cambodia with generic names is 99.8% (Chareonkul et al., 2002). In Southwest Ethiopia, an African under developed country (World Bank, 2016) the percentage of drugs prescribed with generic name there is 79.4% (Angamo et al., 2011). In the discussion chapter the comparison between these countries' result with the result found from this study is discussed.

1.5 Importance of essential drug list

In 1975 the World Health Assembly presented the ideas of "essential drugs" and "national drug policy", and they rapidly turned out to be a piece of the worldwide general health phenomena. The Health Assembly was expanding on points of reference set in Scandinavia, North America and some developing nations, for example, Papua New Guinea, Peru, Srilanka, and the United Republic of Tanzania, with the expectation that they would give an approach to start shutting the colossal hole between the individuals who were profiting from the pharmaceutical harvest of the mid-1900s and the individuals who were most certainly not. In October 1977, WHO delivered the principal Demonstration of List of Essential Drugs and in 1978 the Revelation of Alma-Ata distinguished "provision of Essential Drugs" as one of the eight components of essential human services. As per the present WHO Master Board of trustees on the Determination and Utilization of Essential Drugs, ‘‘Essential medicines are those that satisfy the priority health needs of the population. They are selected with due regard to disease prevalence, evidence of efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford. The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations; exactly which medicines are regarded as essential remains a national responsibility’’ (WHO, 1995).

Essential drugs are those that fulfill the need medicinal services needs of the populace and offer a cost effective solution for the issues of medication stock out in healthcare system of developing countries. They ought to be chosen by the predominance of disease, moderateness of social insurance framework/quiet, with guaranteed quality and accessibility in the suitable

measurements shapes. World Health Organization gauges that almost 2 billion individuals around the globe need consistent access to Essential Drugs, and over half of the populace living in various nations in Africa, has no entrance to basic medications when they require them (WHO, 1993). Numerous creating nations have a constrained spending assignment to medicinal services framework, in this manner affecting medication acquirements. The uses for sedate buys through proper choice and obtainment methods must be upgraded to guarantee the accessibility of fundamental medications and basic medications list at human services offices. Despite the fact that the majority of the nations' distribute a basic pharmaceuticals list, yet at the same time the accessibility of prescriptions at open medicinal services offices is under inquiry. Prescribers can treat their patients in a more normal manner on the off chance that they have access to Essential Drug List without interruption of the supply chain (Laing et al., 2001).

It is recommended highly to prescribe most of the drugs from the Essential Drug List. The standard percentage is 100% for use of drugs from EDL. Every country has each EDL according to their need. A standard list is also provided by WHO.

In 2016, Directorate General of Drug Administration (DGDA) published new drug policy. In this drug policy a new list of Essential Drug List was included.

In figure 1.5.1 we can see different countries around the world has different statistical data of drugs prescribed from Essential Drug List. As of WHO the standard value is 100% which means all the drugs prescribed should be from Essential Drug List. As of being developed country in Saudi Arabia about 99.2% drugs are prescribed from Essential Drug List (El Mahalli, 2012). In Brazil, a developing country in South America, 78% drugs are prescribed there from Essential Drug List (Lopes, 1996). In case of our neighboring countries, In India (Kshirsagar M et al., 1998) and Pakistan (Atif et al., 2016) 65.2% and 93.4% drugs are prescribed from EDL respectively. Cambodia is another Asian country with the lower economy growth than Bangladesh (World Bank, 2016). The average number of drugs prescribed from EDL in Cambodia is 99.7% (Chareonkul C et al., 2002). In Southwest Ethiopia, an African under developed country (World Bank, 2016), the average number of drugs prescribed from Essential Drug List is 90.3% (Angamo MT et al., 2011).

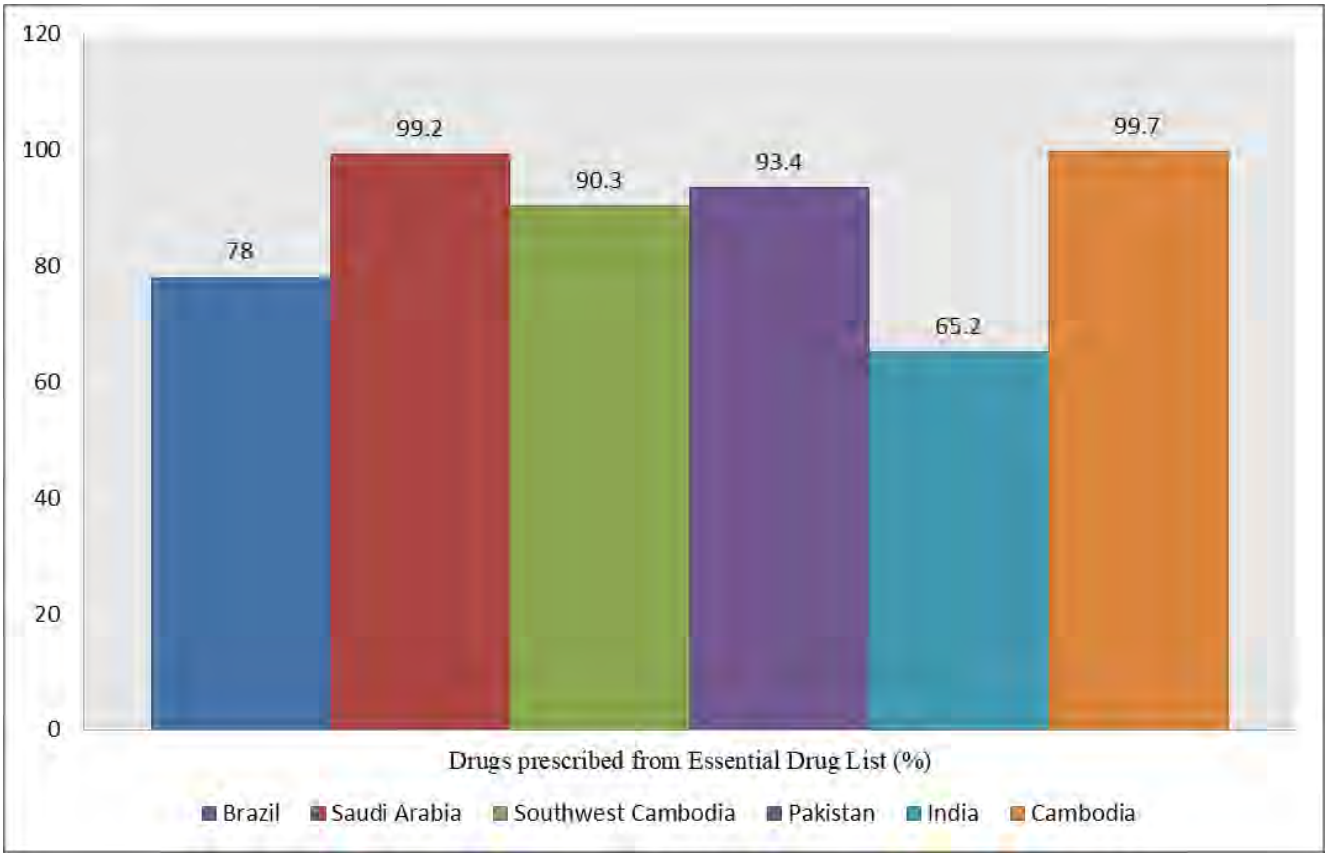

Figure 1.12: Drugs prescribed from Essential Drug List in different countries (in percentage) (Lopes, 1996, El Mahalli, 2012, Angamo et al., 2011, Atif et al., 2016, Chareonkul et al., 2002, Kshirsagar et al., 1998)

Chapter 2: Rationale

Bangladesh is a densely populated country. It has a population of 160 million (WHO, 2015). Dhaka is the capital of Bangladesh. For this study Dhaka has been chosen due to its being not only the capital city, but also being the largest in the country. In Bangladesh there are only 3 physicians available and only average of 2.8 nurses and midwives available for every 10000 population (WHO, 2015).

In 2016, According to World Population Review, the population is 18.237 million in the Greater Dhaka Area. The survey took place in four public hospitals of Dhaka, Bangladesh. According to the 'Bangladesh Health Facility Survey 2014' conducted by National Institute of Population Research and Training (NIPORT) and funded by Government of the People's Republic of Bangladesh and U.S Agency for International Development (USAID), Bangladesh, there are 5437 health facilities situated in Dhaka division which contributes total of 28% of the whole 19184 facilities of Bangladesh.

As Dhaka is the central city of Bangladesh, aside from the population of Dhaka people around other districts come to Dhaka for healthcare services. The public healthcare service in Dhaka is relatively cheaper than the private healthcare service. As every one in four people in Bangladesh is living below the poverty line (World Bank, 2016), they demand the healthcare service from the public hospitals. The treatment facility of these hospitals is satisfactory. For this study we chose public hospitals over private hospitals in Dhaka because of its high gathering of the patients and this study has not been conducted in this area. Preciously not only that, this study has also never been conducted in public healthcare service in Dhaka. This study is important for the evaluation of the healthcare facility of Bangladesh as we can gather the information about the practice of prescribing drugs.

Chapter 3: Methodology

3.1: Type of study

This study is carried out on survey which is performed by collecting prescription. No particular disease was concentrated. The prescriptions were written by doctors, on duty medical practitioners and specialists. The survey was conducted in a manner that either the prescribers or the patients do not feel immured.

For this study 200 prescriptions were collected. Roughly 50 prescriptions were collected from the major choice of hospitals. There was no predetermination of the quantity for the samples.

The prescriptions were collected by taking photos of them initially with the permission of the patients.

The purpose behind the study to the respondents was explained and got their assent before data collection.

3.2 Place and duration of study

Hospitals for this survey were randomly chosen. The major Hospitals are

- Shaheed Suhrawardy Medical College,
- Dhaka Medical College,
- National Institute of Cancer Research and
- National Institute of Chest Disease and Hospital.

In this study the patients were cardiac patient, cancer patient, general patients and others.

As this project is part of undergraduate program in BRAC University, the survey took three months from January, 2018 to March, 2018.

3.3 Data analysis process

The process of how we proceeded to analyze the data is given below-

- Prescriptions were collected by taking photographs
- Each prescriptions were given serial number

- The indicators were checked thoroughly
- The necessary data were taken in a spreadsheet of Microsoft excel
- The data were checked and inputted carefully
- The total of each indicators were summed for the process of the calculation
- The data were examined according to the formula provided by World Health Organization.

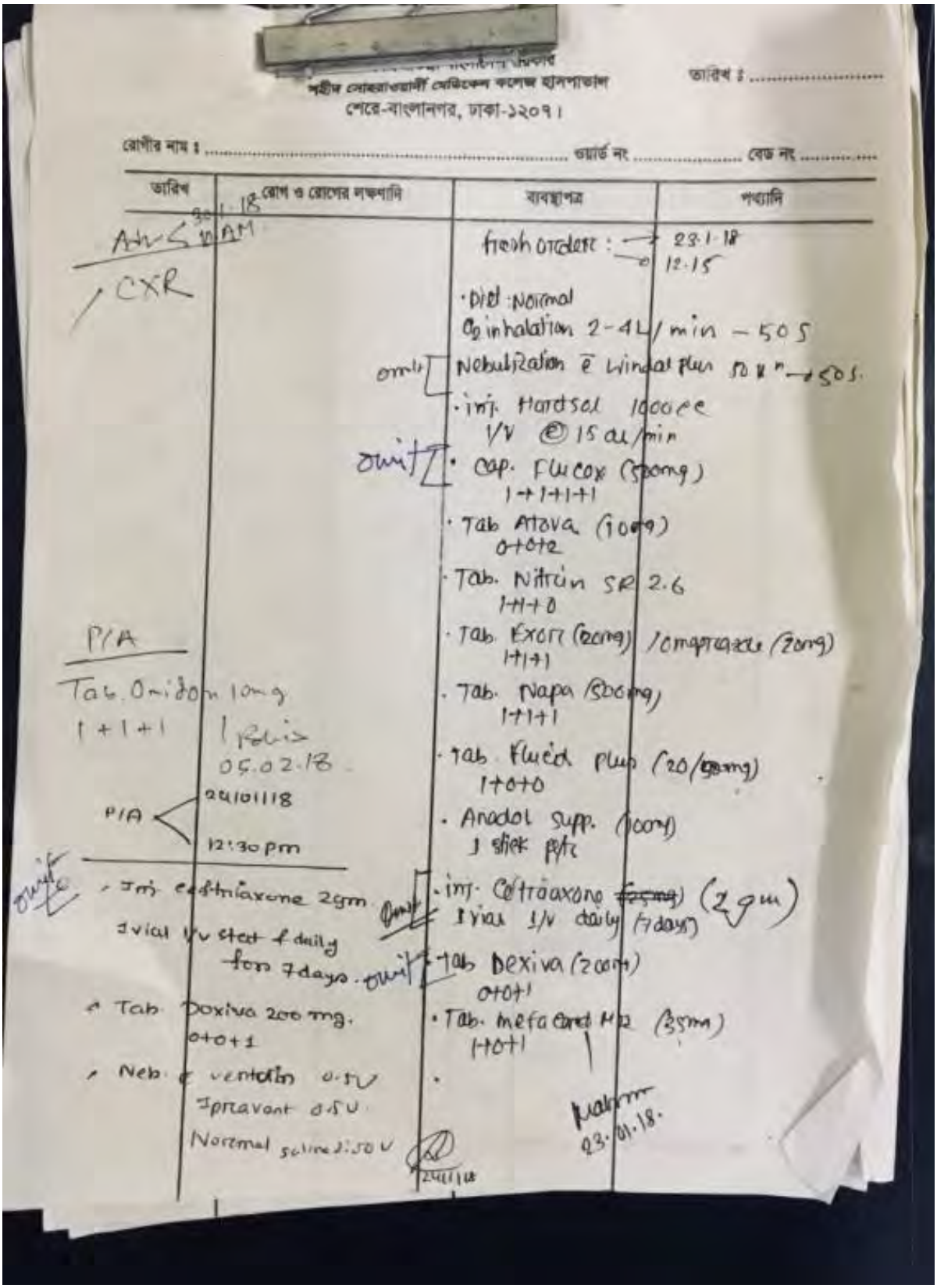

Figure 3.2: Sample prescription

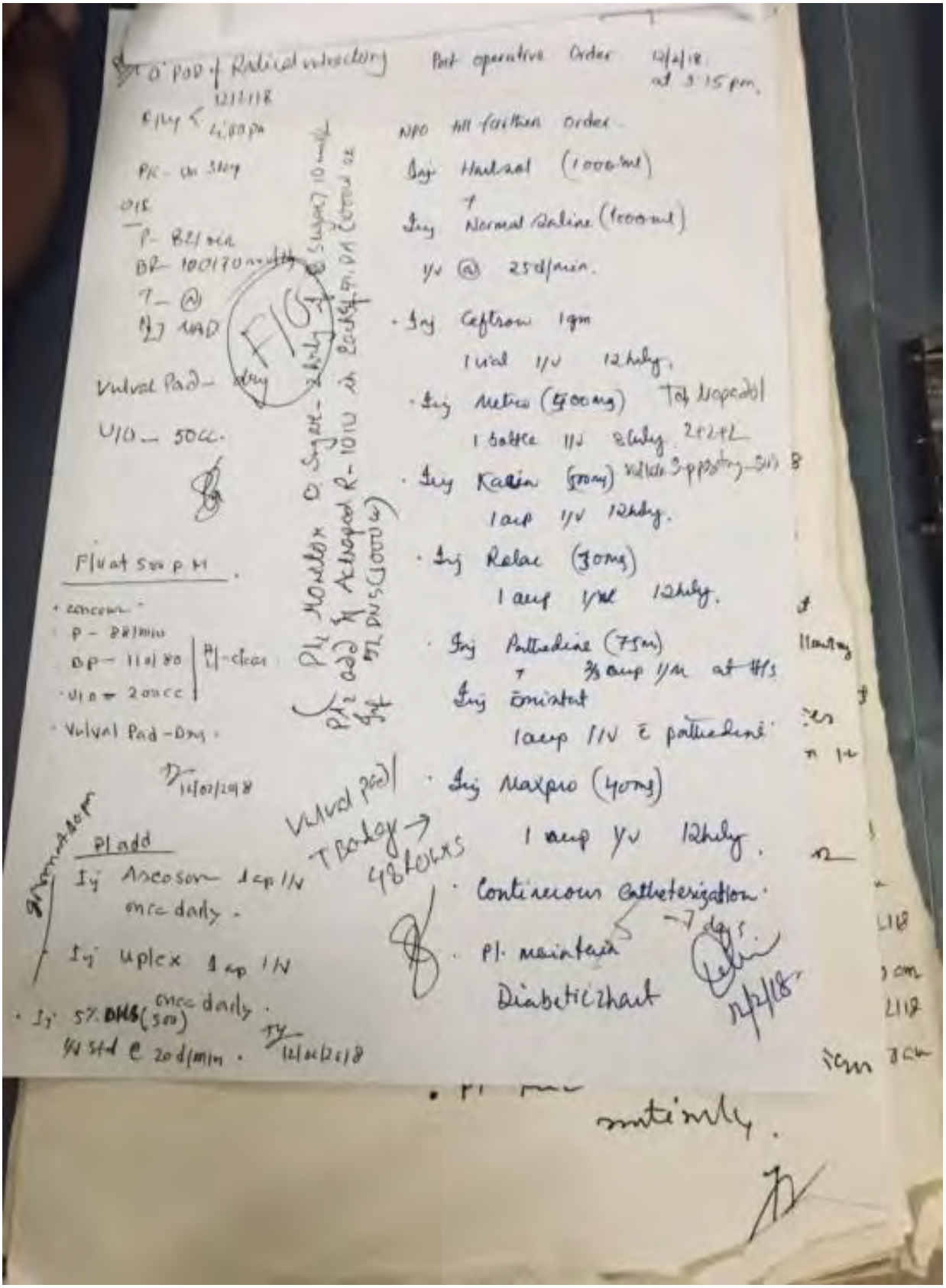

Figure 3.2: Sample Prescription

Chapter four: Result

The necessary data were calculated according to the formula provided by the World Health Organization. The formulas for the calculation are given below.

The study was conducted in 4 different public hospitals in Dhaka, Bangladesh. From January 2018 to March 2018 this survey was conducted. The total amount of encounters was counted 200. From total of 200 prescriptions surveyed the total amount of drugs prescribed was 1232. The total amount of encounters with antibiotics prescribed was 102. The total amount of encounters with injections prescribed out of these 200 prescriptions was 92. Out of the prescribed 1232 drugs only 181 drugs were prescribed with generic name. Lastly drugs prescribed from Essential Drug List were 510.

The conducted result is shown below with appropriate diagrams.

1. **Average number of drugs per encounter**

To count the average number of drugs per encounter we counted all the encounters even if there were no drugs prescribed. Then during these encounters the total number of drugs prescribed was counted. Then the total amount of drugs was divided by the amount of encounters to express the average number of drugs.

Let's denote the number of encounter as 'B' and the total number of drugs prescribed in these encounter as 'A'. So, if we consider the average number of drugs per encounter as 'C'. Then,

C = A/B

So, here number of encounter, B= 200

And total number of drugs prescribed during these encounters, A= 1232

So average number of drugs, C= A/B

= 1232/200

= 6.16

So **the average number of 6.16 drugs per encounter found from the study.**

2. Percentage of encounters with antibiotic

Firtly, to count the percentage of encounters with antibiotics we carefully counted the total amount of patients who were prescribed one or multiple antibiotics (L). Then that amount is divided by the total number of encounters (B) and then we multiply the result by 100.

So, the formula stands as, percentage of antibiotics, G= (L/A)*100%

Here

Total number of patients who received antibiotics, L= 102

Total number of encounter, A= 200

So, % Antibiotics, G= (L/A) x 100%

= (102/200) x 100%

= 51%

So from this study total of **51% patients received antibiotic drugs.**

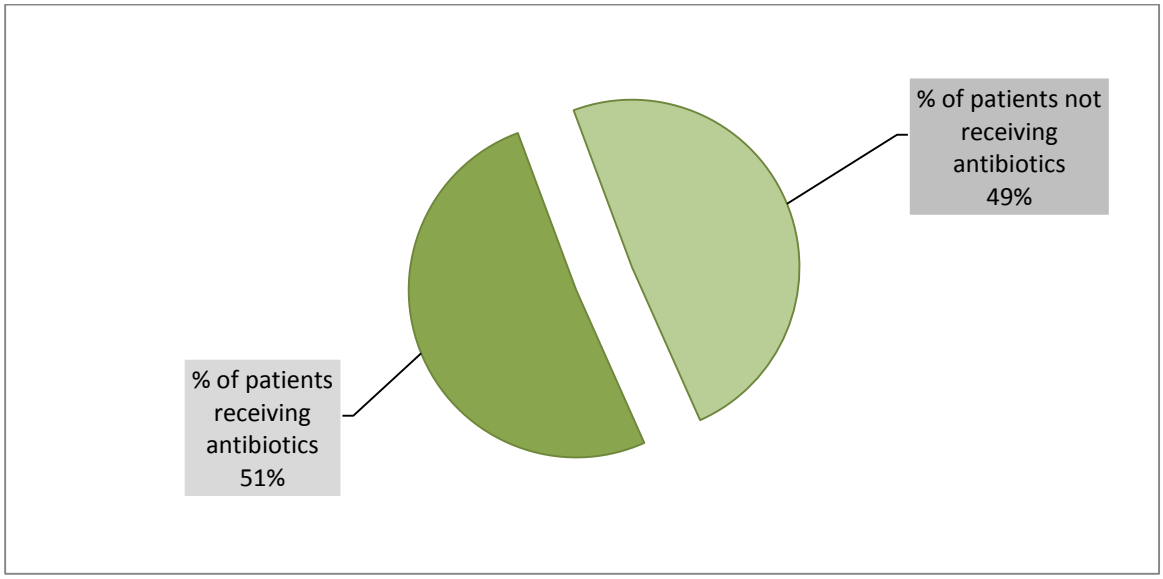

Figure 4.1: Percentage of patients receiving antibiotics

3. Percentage of encounters with injection

To count the percentage of encounters with injections we first counted the total amount of patients who received one or many injections (I). Then we divided the result by the total number of encounters (B) and lastly multiplied by 100 to make a percentage.

So the formula stands as, Percentage of injections, J = (I/B)*100%

Here,

Number of patients who received injections, I= 92

Total number of encounters, B= 200

So,

% Injections, J= (I/B)* 100%

= (92/200)* 100%

= 46%

So, from this study total of **46% patients received injections.**

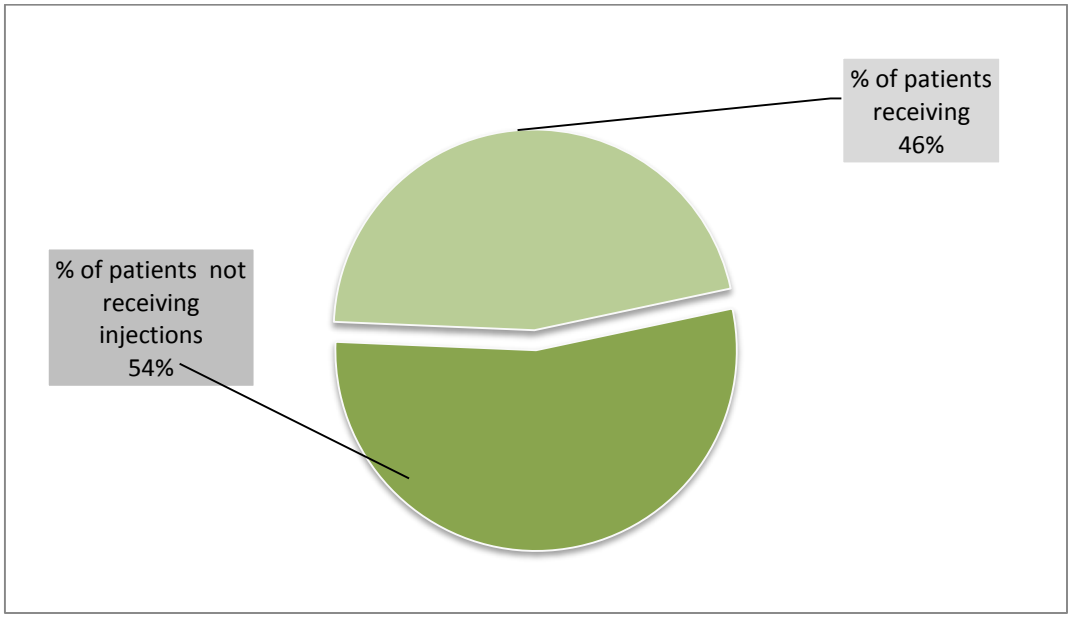

Figure 4.2: Percentage of patients receiving injections

4. Percentage of drugs prescribed by generic name

Firstly, the total amount of drugs prescribed with generic names (T) was counted. Then the amount was divided by the total amount of drugs prescribed (A), and lastly the result was multiplied by 100.

So the formula stands as, percentage of drugs prescribed by generic name, K= (T/A)*100%

Here,

Total number of drugs prescribed with generic name, T= 181

Total number of drugs prescribed, A= 1232

So,

% Prescribed as generic, K= (T/A)*100%

= (181/1232)*100%

= 14.7%

So, from this study total of **14.7% drugs were prescribed with generic name.**

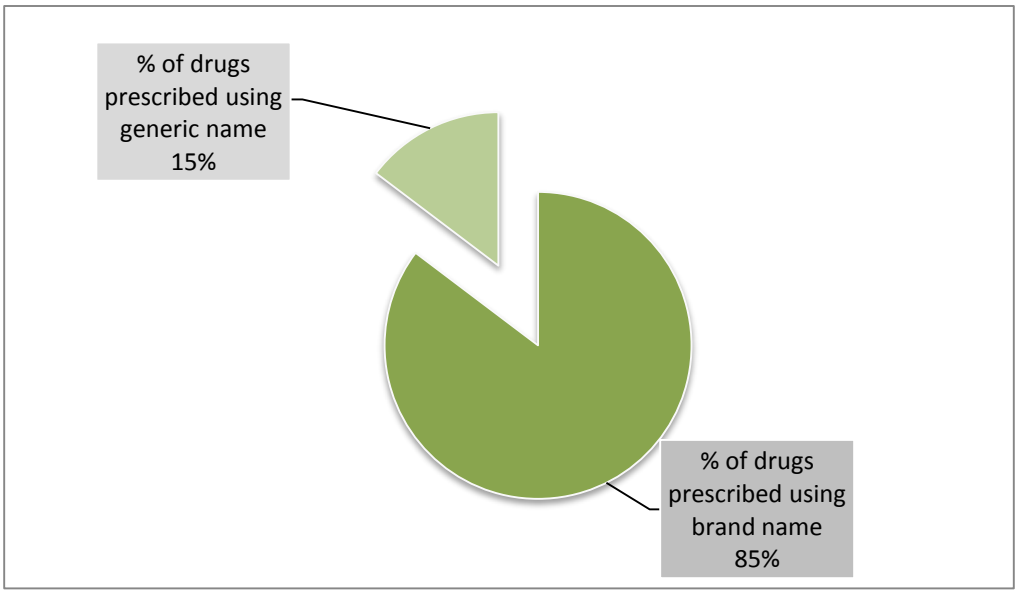

Figure 4.3: Percentage of Drugs prescribed with generic name

5: Percentage of drugs prescribed from essential drugs list (K)

First, we counted the total amount of drugs prescribed from EDL (Z). Then we divided the amount by the total amount of drugs prescribed (A). Lastly, we multiplied the result by 100.

So the formula stands as, percentage of drugs from essential drug list, D = (Z/A)*100%

Here

Total number of drugs prescribed from EDL, Z= 510

Total number of drugs prescribed, A= 1232

So

% Drugs from essential drug list, D= (Z/A)* 100%

= (510/1232)* 100%

= 41.3%

So, from this study total of **41.3% drugs were prescribed from Essential Drug List.**

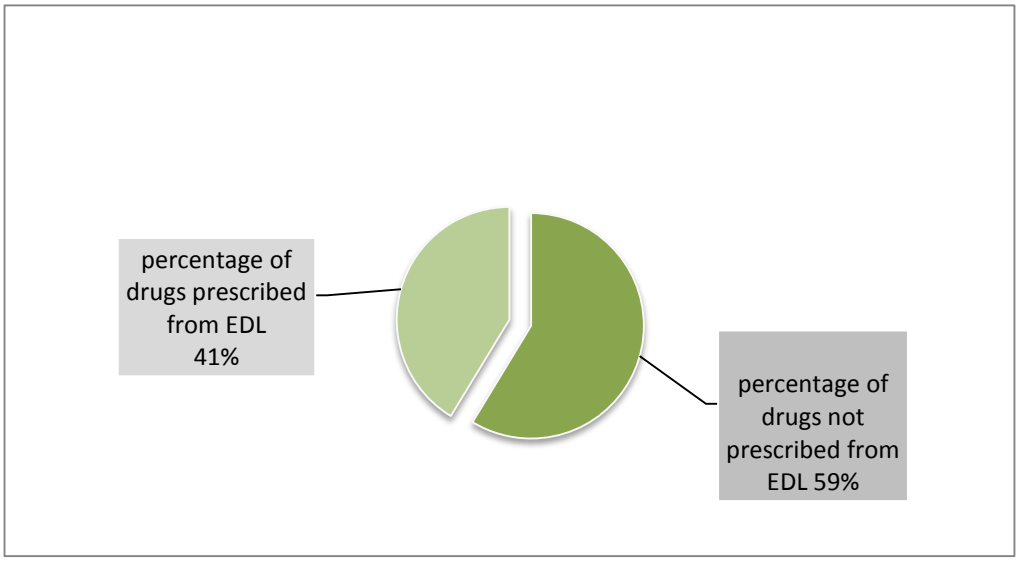

Figure 4.4: Percentage of drugs prescribed from Essential Drug List

The following table contains the result found from the survey. The result was prepared with the help of the formulary given by World Health Organizations. The ideal measures of the indicators are also provided in the table.

Table 4.1: Result from the survey

Prescribing Indicator assessed	Average/Percent	Standard derived/Ideal
Drugs per encounter	6.16	(1.6-1.8)
Encounter with Antibiotics	51%	(20.0-26.8)%
Encounter with Injection	46%	(13.4-24.1)%
Drugs prescribed by Generic name	14.7%	100%
Drugs from Essential Drug List	41.3%	100%

From Table 4.1 we can see that, the average number of drugs prescribed was 6.16 whereas the ideal number is between 1.6-1.8. The percentage of patients receiving antibiotics was 51% which should be within the range of 20.0% to26.8%. The percent of encounter with the injection found in this study was 46%. The standard for this indication is (13.4-24.1)%. Percent of drugs prescribed by generic name was 14.7%, whereas the standard is 100%. Lastly percent of drugs prescribed from Essential Drug List was 41.3%. The standard is 100% for this indication.

The following antibiotics were commonly found during this study

Table 4.2: Commonly prescribed antibiotics

Prescribed Antibiotic	Quantity	Percentage %
Ceftriaxone	38	20.21 %
Amikacin	12	6.38 %
Cephradine	4	2.12 %
Clindamycine	2	1.06 %
Levofloxacin	4	2.12 %
Nitrofurantoin	4	2.12 %
Cefuroxime	30	15.95 %
Albendazole	8	4.25 %
Flucloxacillin	36	19.14 %
ciprofloxacillin	4	2.12 %
Metronidazole	16	8.51 %
Fluconazole	6	3.19 %
Myconazole Nitrate	4	2.12 %
Doxycycine	4	2.12 %
Linezolid	2	1.06 %
Amoxycillin	4	2.12 %
Cephalosporin	8	4.25 %
Acyclovir	2	1.06%
Total=	188	100 %

The following list contains the most commonly prescribed injections

Table 4.3: Commonly prescribed injections

Prescribed Injections	Quantity	Percentage %
Cefuroxime	5	2.87 %
Amikacin	6	3.45 %
Tetanus vaccine	8	4.60 %
Tiemonium Methyl Sulfate TMS	4	2.30 %
Tranexamic acid	5	2.87 %
Ceftriaxone	14	8.05 %
Epoitin	9	5.17 %
Tramadol Hydrochloride	9	5.17 %
Saline	11	6.32 %
Vitamin	6	3.45 %
Ondansetron	10	5.75 %
amino acid	9	5.17 %
Glucose	4	2.30 %
Omeprazole	7	4.02 %
Flucloxacillin	6	3.45 %
Calcium chloride, Potassium Chloride, Sodium Chloride, Sodium Lactate solution	7	4.02 %
Insulin	5	2.87 %
Diazepam	2	1.15 %
Meropenem	2	1.15 %
Morphine Sulfate	3	1.72 %
Ketorolac Tromethamine	5	2.87 %
Metronidazole	6	3.45 %
Docetaxel	5	2.87 %
Ranitidin	2	1.15 %

Prescribed Injections	Quantity	Percentage %
Dexamethasone	8	4.60 %
Deoxycholic acid	5	2.87 %
Fluoroucil	6	3.45 %
Mepiridine	5	2.87 %
Total	174	100 %

Chapter five: Discussion and Conclusion

According to this study we were able to achieve the result of different indicators set by WHO and the comparison of the result among with the different countries based on different geography and economy is discussed below.

Average number of drugs prescribed:

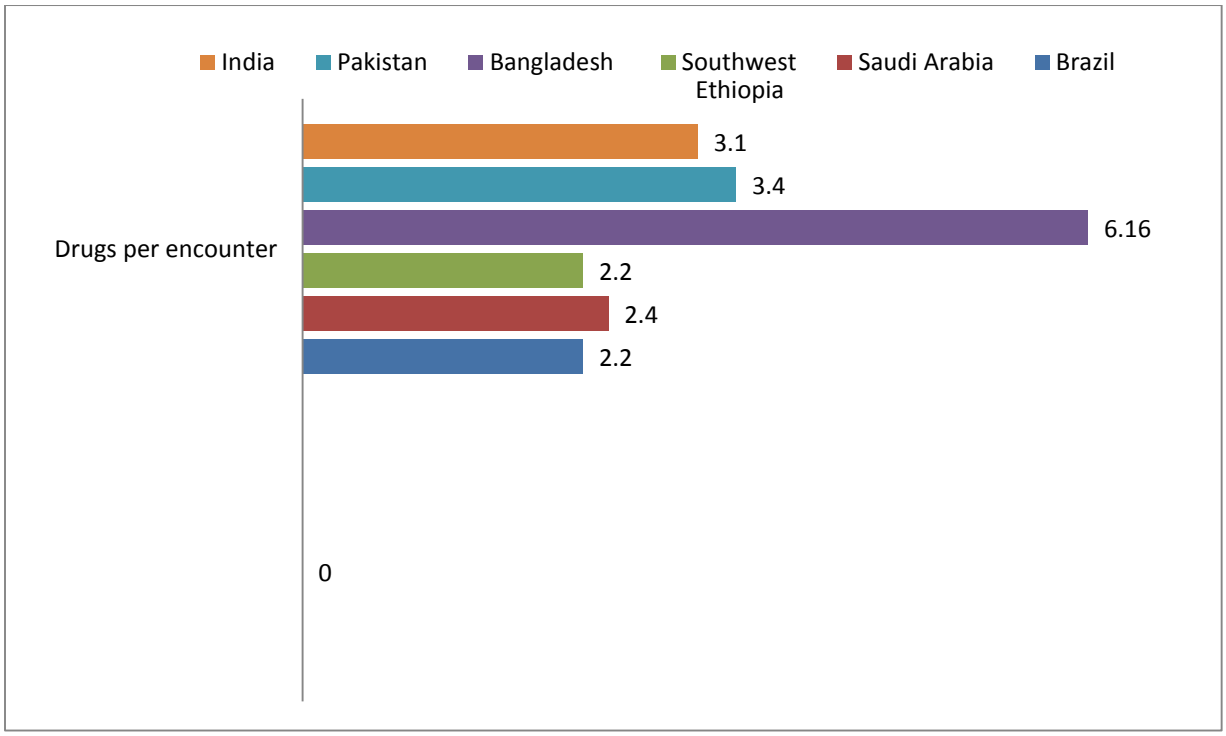

Figure 5.1: Comparison of drugs per encounter in different countries

In this study we found that the average number of drugs prescribed per encounter is 6.16. The standard is 1.6-1.8. The result we found is so much higher than the standard. In a similar study performed in our neighboring country India the result is 3.1 (Kshirsagar M et al., 1998). Even though the result from there is higher than the standard value but the difference from the standard is very low unlike Bangladesh. In Pakistan the result is also much lower than Bangladesh which is 3.4 (Atif et al., 2016). In Saudi Arabia, one of the leading and developed countries in the world, the study shows that the average number of drugs prescribed there is 2.4 (El Mahalli, 2012). Even though the result is not standard but it is closer to the standard value. In Brazil, a developing country in South America and in Southwest Ethiopia, an underdeveloped country in Africa the study shows the similar result which is 2.2 (Lopes, 1996; Angamo MT et al., 2011).

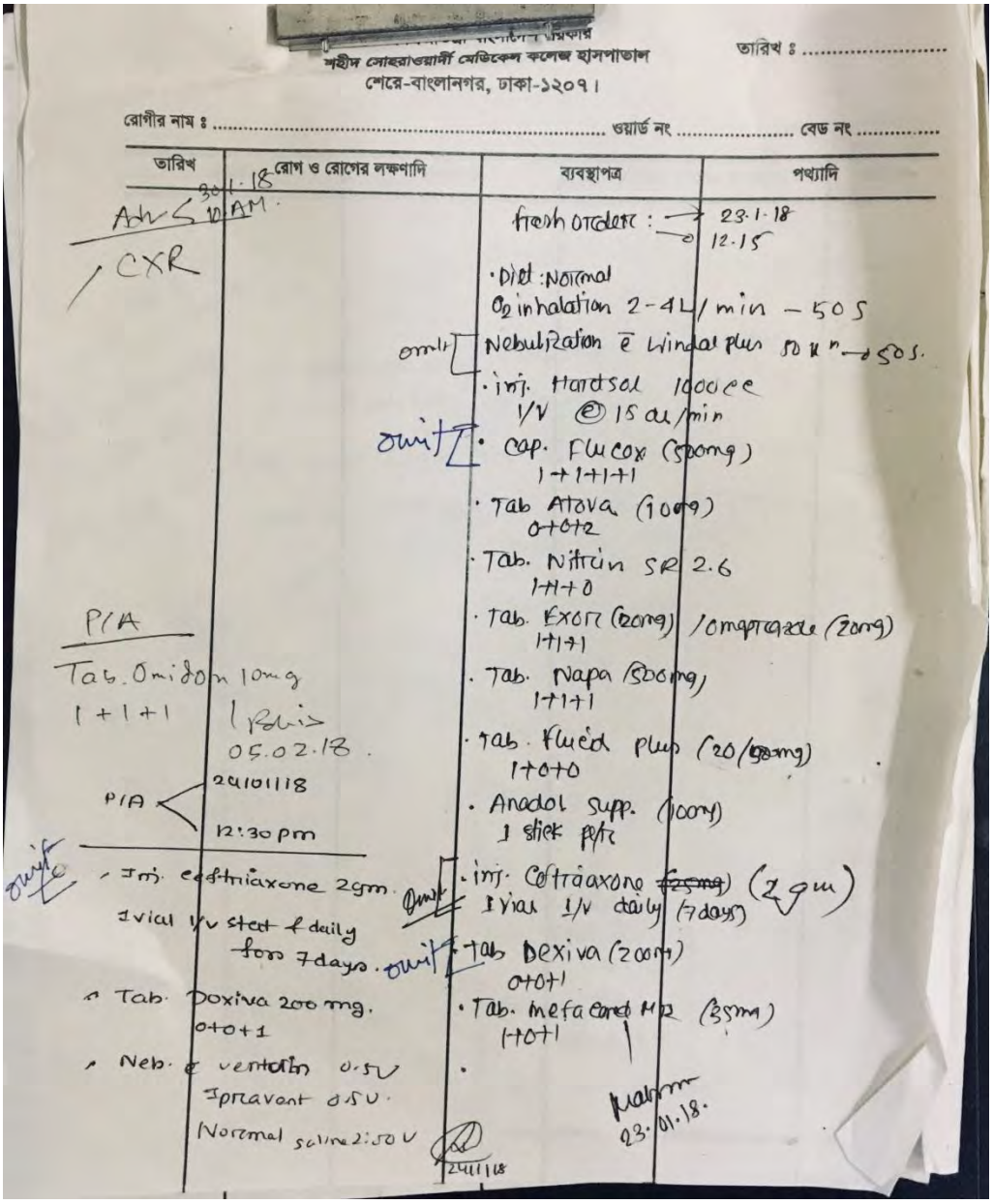

Figure 5.3: Example of polypharmacy practice

In the figure 5.2 the practice of poly pharmacy is seen. The prescription is collected from the study we conducted. This particular prescription shows that there are more than 10 drugs are prescribed for an individual patient. Often the reason of practice of polypharmacy in Bangladesh is, patients do not get satisfaction from fewer amounts of drugs. Due to the dissatisfaction of the patients the prescriber has to prescribe more drugs to please them. Sometimes the unnecessary drugs contain placebo drugs or multivitamins.

Encounter with antibiotics:

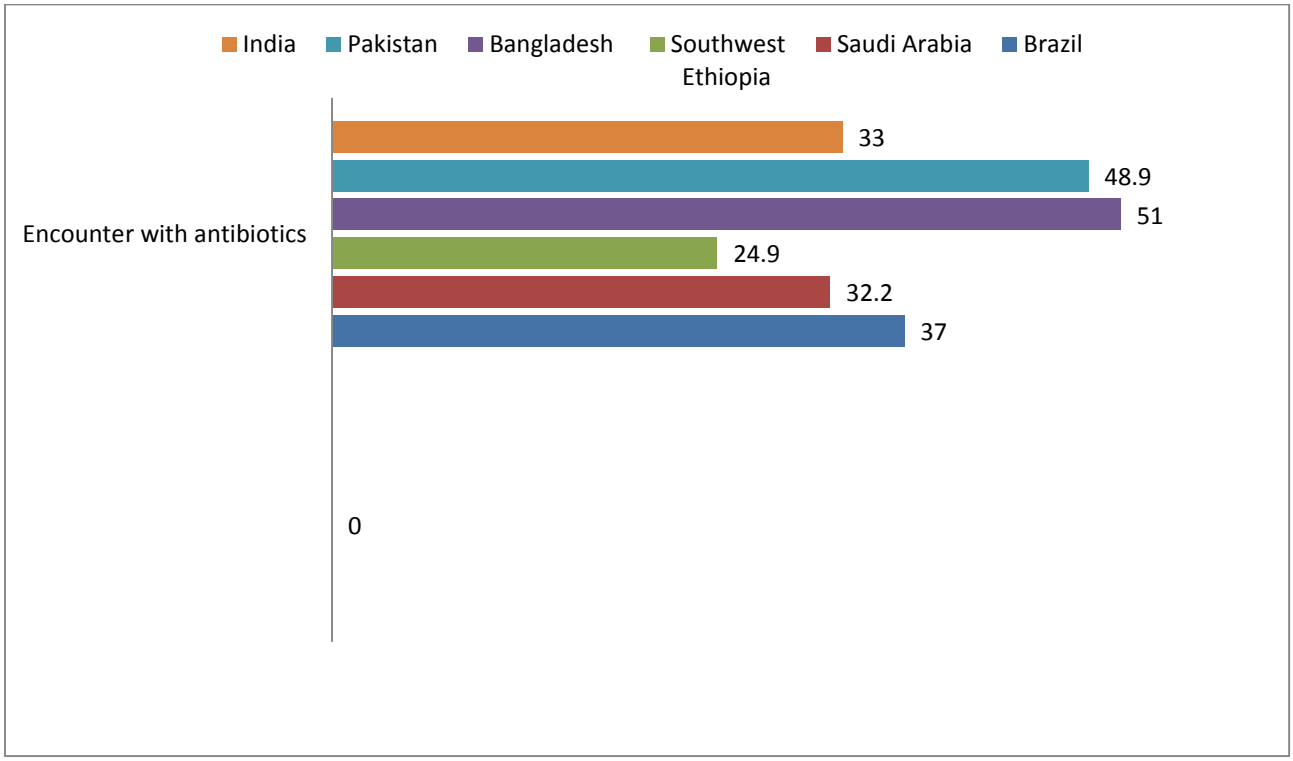

Figure 5.3: Comparison of percentage of encounter with antibiotics in different countries

In this study we found that the percentage of antibiotics is 51%. That means, around 51% patients from this study received one or multiple antibiotics in their prescription. The standard is 20.0% to 26.8%. The result we found is so much higher than the standard. In a similar study performed in our neighboring country India the result is 33% (Kshirsagar et al., 1998). Even though the result from there is higher than the standard value but the difference from the standard is very low unlike Bangladesh. In Pakistan the result is also lower than Bangladesh which is 48.9% (Atif et al., 2016).

In Saudi Arabia, one of the leading and developed countries in the world, the study shows that 32.2% of the patients received antibiotics (El Mahalli, 2012). Even though the result is not standard but it is closer to the standard value. In Brazil, a developing country in South America the result is 37% (Lopes, 1996).

Surprisingly the result in Southwest Ethiopia which is an under developed country in Africa, the result is 24.9% (Angamo et al., 2011). That means the result there is within the standard range.

Encounter with injections:

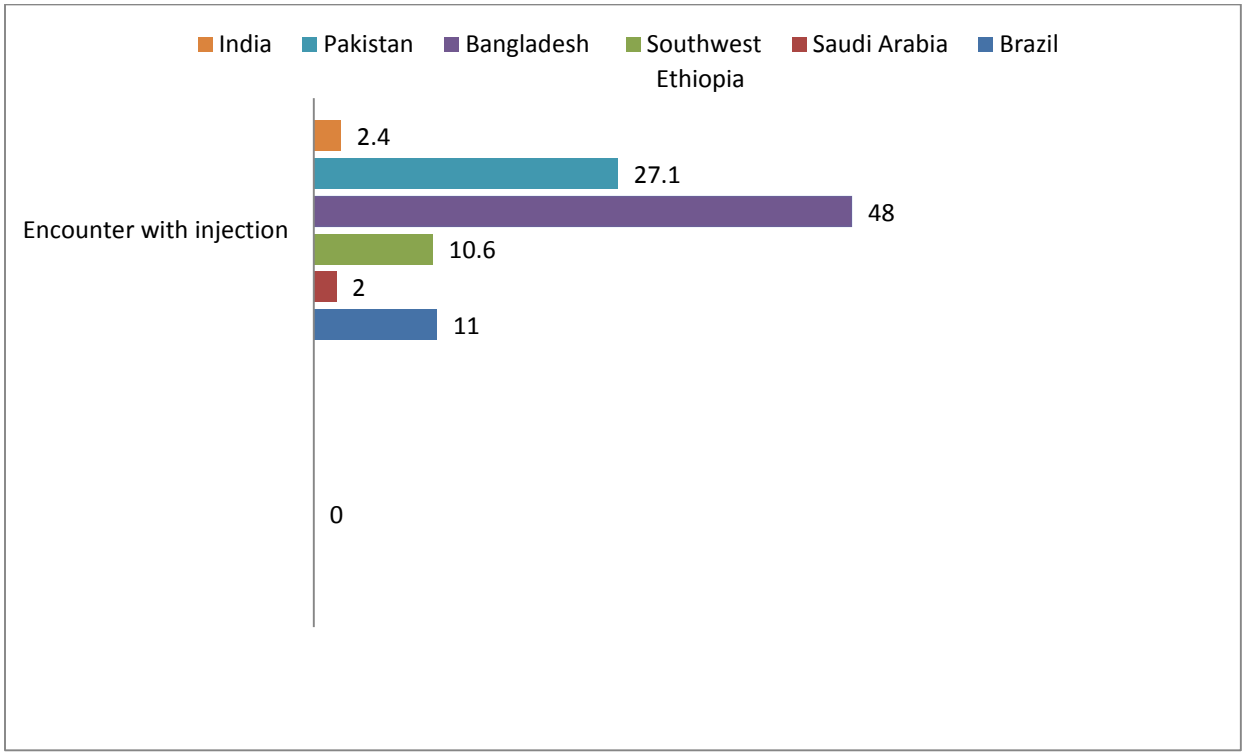

Figure 5.4: Comparison of percentage of encounter with injections in different countries

In this study we found that the percentage of injection is 46%. That means, around 46% patients from this study received one or multiple injection in their prescription. The standard is 13.4% to 24.1%. The result we found is so much higher than the standard. In a similar study performed in our neighboring country India the result is 2.4% which is on the contrary lower than the standard value (Kshirsagar et al., 1998). In Pakistan the result is also lower than Bangladesh which is 27.1% (Atif et al., 2016). The result there may not be in the ideal range but the deficit is very low from the standard.

In Saudi Arabia, one of the leading and developed countries in the world, the study shows that only 2% of the patients received injections, which is very low to the standard value (El Mahalli, 2012). In Brazil, a developing country in South America the result is 11%, which is very close to the standard value (Lopes, 1996).

The result in Southwest Ethiopia, an under developed country in Africa, the result is 10.6% (Angamo et al., 2011). That means the result there is around the standard range.

Use of Generic name:

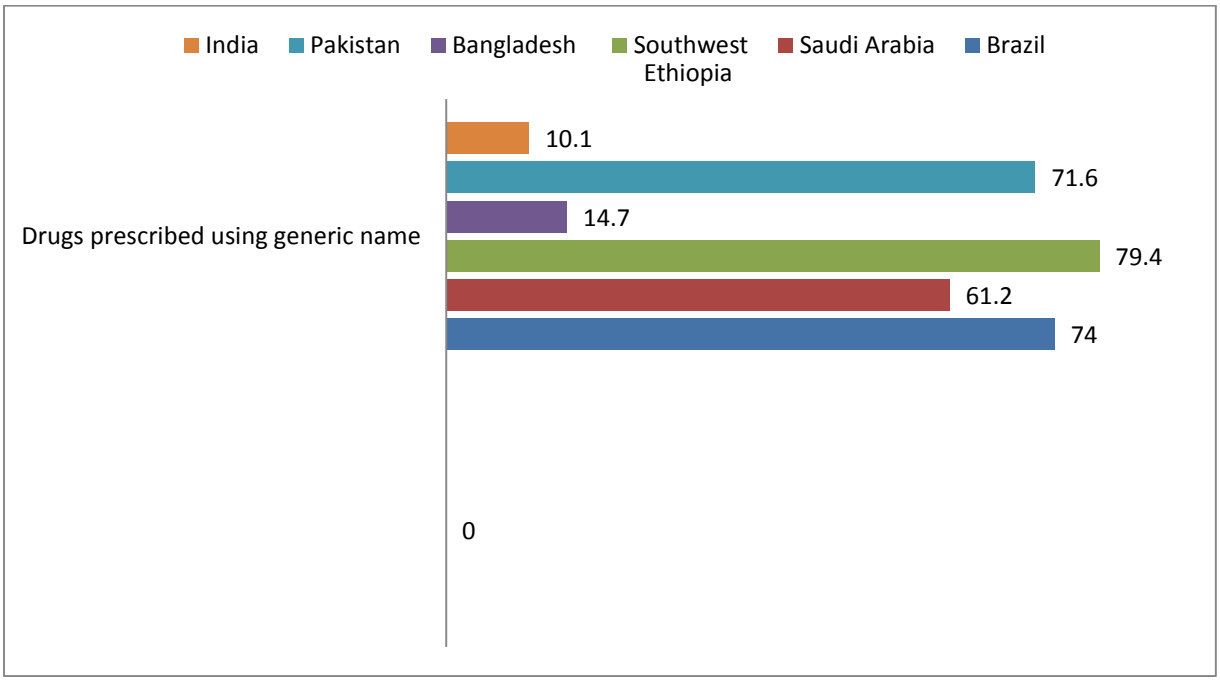

Figure 5.5: Comparison of percentage of use of generic name in different countries

In this study we found that the percentage of drugs prescribed using generic name is 14.7%. That means, out of 1232 drugs prescribed in the total of 200 encounters during the study only 181 drugs were prescribed using the generic name of the drugs. The standard is 100%. The result we found is so much lower than the standard value. In a similar study performed in our neighboring country India the result is 10.1%, which is below than the result we found in Bangladesh (Kshirsagar et al., 1998). In Pakistan the result is better than Bangladesh which is 71% (Atif et al., 2016).

In Saudi Arabia, one of the leading and developed countries in the world, the study shows that 61.2% drugs are prescribed using generic name (El Mahalli, 2012). Even though the result is not standard but it is better than the result we found in Bangladesh. In Brazil, a developing country in South America, the result is 74% (Lopes., 1996).

The result in Southwest Ethiopia, an under developed country in Africa, the result is 79.4% (Angamo et al., 2011). That means the result there is not within the standard range but in comparison the result is so much better.

Use of drugs from Essential Drug List:

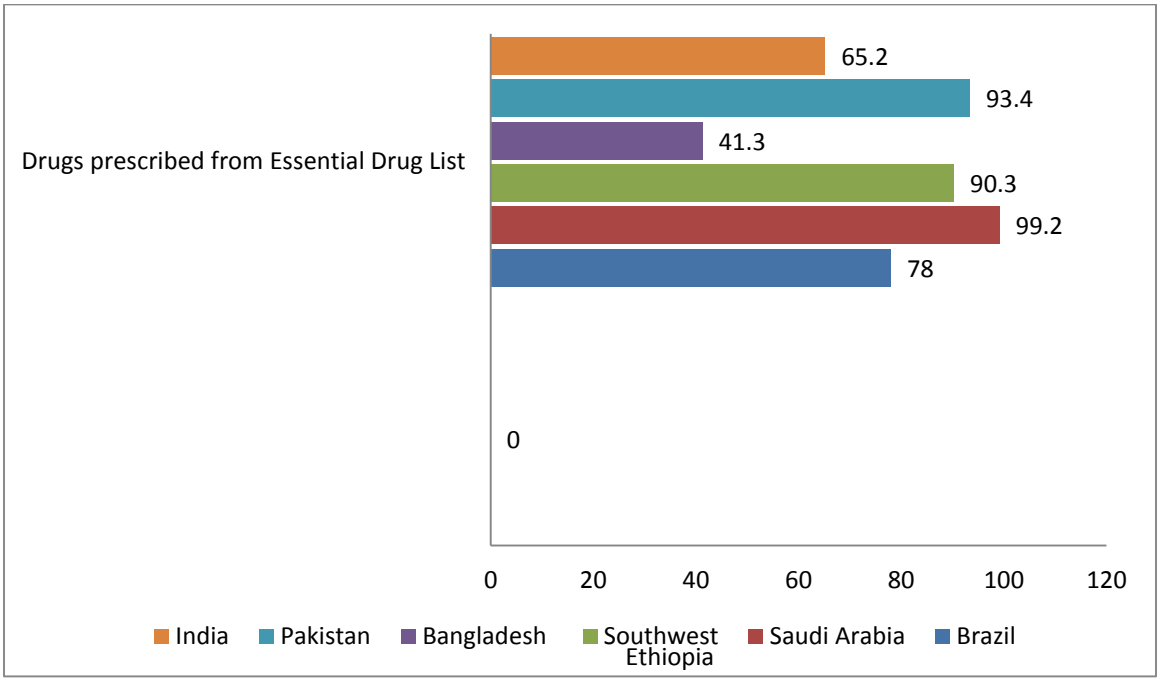

Figure 5.6: Comparison of percentage of drugs prescribed from Essential Drug List in different countries

In this study we found that the percentage of drugs prescribed from Essential Drug List is 41.3%. That means, out of 1232 drugs prescribed in the total of 200 encounters during the study only 510 drugs were prescribed using the generic name of the drugs. The standard is 100%. The result we found is so much lower than the standard value. In a similar study performed in our neighboring country India the result is 65.2%, which is higher than the result we found in Bangladesh (Kshirsagar et al., 1998). In Pakistan the result is also better than Bangladesh which is 93.4% which is much satisfactory (Atif et al., 2016).

In Saudi Arabia, one of the leading and developed countries in the world, the study shows that 99.2% drugs are prescribed from Essential Drug List (El Mahalli, 2012). That means almost every drug during the study was prescribed from Essential Drug List. In Brazil, a developing country in South America, the result is 78% (Lopes, 1996).

The result in Southwest Ethiopia, an under developed country in Africa, the result is 90.3% (Angamo et al., 2011). That means the result there is not standard range but in comparison with Bangladesh the result is so much better.

This study helped us to understand the situation of prescribing indicators in Bangladesh. Shockingly the result was not satisfactory at all. The government should take proper initiatives to ensure that the indicators of the prescriptions are thoroughly maintained throughout the country. The aim of the study was to create awareness about the situation regarding improper prescribing practice. We had to complete this study within 6 months but we have further plan to extend the study by surveying for a longer period of time so that we can have clearer vision.

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