

Study on Drug Selling Pattern In Bangladesh

Dissertation Submitted to the Department of Pharmacy for the
Partial Fulfillment of the Bachelor Degree of Pharmacy (B. PHARM)

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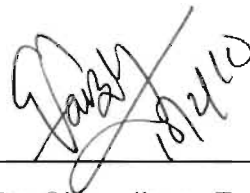
Study on the Drug Selling Pattern in Bangladesh

CERTIFICATE

This is to certify that, the thesis "Study on the Drug Selling Pattern in Bangladesh" submitted to the Department of Pharmacy, East West University, 43, Mohakhali C/A, Dhaka; in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy (B. Pharm.) was carried out by Md.Tanzim Islam (ID# 2005-2-70-022) under our guidance and supervision and no part of the thesis has been submitted for any other degree. We further certify that, all the sources of information and other facilities availed of in this connection is duly acknowledged.



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Abstract

In Bangladesh tendency of the mass people to buy medicines without proper prescription. Undoubtedly this is not a healthy practice to adopt. Government published the "Essential Drug List" or "EDL" in 1982 along with the National Drug Policy (NDP). The NDP stated that no medicine of any kind can be manufactured for sale or be imported, distributed or sold unless it is registered with the licensing authority; and no person, being a retailer, is allowed to sell any drug without the personal supervision of a pharmacist registered in any Register of the Pharmacy Council of Bangladesh. Despite substantial progress in drug manufacturing, irrational drug use, inappropriate prescribing, inadequate access to essential drugs, and uncontrolled price are major problems affecting the total health care system badly in Bangladesh. One can get any drugs from anywhere. So in real sense, there is still no 'Prescription Only Drug' in Bangladesh at present. Drug selling pattern is a powerful indicator of rational use of drugs. To find out the picture of Drug Selling Pattern in Bangladesh, a survey program was conducted in three areas namely Dinajpur, Nator and Nowakhali. In case of conducting the program, urban and rural both areas were considered to perform the study. Firstly, the data was collected from those areas with the help of a prepared sample collection form and, then the analysis of the data and finding out the subjected outcomes. The main objective of the study was to improve the drug selling pattern and enhance the rational use of drug to ensure the proper public health.



Part- 01

Introduction

1.1 Introduction :

Human civilization and medicine are inseparable, because medication fulfills one of our most basic needs. The aim of the drug therapy or medication is to prevent, cure or control various disease states. In dawn of the history, man saw the patient as a victim of evil forces or of a god's anger, thus disease as punishment for sin. Diseases thus came in mysterious ways that called for supernatural as well as natural countermeasures. The healing practitioner, be a shaman or priest, best knew how to command the spirit and what substances from the nature would convey or reinforce the balancing power. Thus through experiences over the thousands of years man came to know some herbs that are powerful to heal bad spirits or diseases. As man made his way through remote times or places, he shielded himself against disease as best as he could, reaching out, often blindly, toward the resources of the nature but in the process gradually elaborating pharmaceutical theories, techniques and implements.

In general, Drug is the single active chemical entity present in a medicine as well as in a dosage form that is used for diagnosis, prevention, treatment or cure of a disease. But the World Health Organization (WHO) provided a more comprehensive definition of drug in 1966. According to WHO, "Drug is any substance or product that is used or is intended to be used to modify or explore physiological system or pathological state for the benefit of the recipient". [1] The United States Food and Drug Administration defines drug in another way. According to the FD&C Act; it defines drugs, in part, by their intended use, as "articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease" and "articles (other than food) intended to affect the

structure or any function of the body of man or other animals" [2] Medicines are the result of the area of knowledge that comprises both the science of body system and their diseases and treatment. The advanced medical science as well as the branch of medicinal science offers almost all types of medicines for treatments that can cure human body. Moreover, it also includes preventive systems that help on preventing many diseases, for example, vaccinations. Beside this, curing or prevention of some disease or healing a wound, medicines, at times, is also used to maintain good health. For example, anti-diabetic and cardiovascular drugs that are must have to take regularly by patients for maintaining good health.

Though, medicines are considered as blessings for human being and are considered one of the basic needs for us but we should remember that no drug has been discovered yet without side effects and adverse reactions. Thus we should be careful to use medicines other wise it would be turned into curse instead of blessing. Every person has a different body system and the interaction between drug and body differs from person to person and to every medicine considering the subjective body system. Thus, taking any medicine or combining two medicines without any recommendation or prescription can be risky due to drug interaction and the adverse effects as well as toxicity. Thus every individual should consult with health professionals before taking any kind of medicine. Not all the drugs have similar action on the body and do not also possess similar toxicity. The Legal considerations divided Drugs mainly into two classes: [3]

a) Over-the-counter (OTC) drugs: medications are sold without restriction as they are considered safe, effective, patient well tolerated enough

that most people will not hurt themselves accidentally by taking it as instructed and which may be available without special restrictions and can be bought without any prescription.

b) Prescription only medicine (POM): these are the drugs with narrow safety margin, possess greater chance of toxicity and these must be prescribed by a licensed medical practitioner to use by the patients or consumers.

The International Narcotics Control Board of the United Nations imposes a world law of prohibition of certain medications. They publish a lengthy list of chemicals and plants whose trade and consumption (where applicable) is forbidden.

1.2.1 Evolution of apothecaries trade : ^[4]

At present, we have various kinds of medication systems such as Allopathic medicine, Homeopathic medicine, Unani medicine, Ayurvedic medicine, several herbal, different traditional medicines etc. the herbal and Traditional medicines come from different kinds of plants sources, and the plants had been used for medicinal purposes since a long before recorded history. The Most important pharmaceutical record is the "Ebers Papyrus" (1500 B.C.) in Egypt , a collection of 800 prescriptions and mentioning 700 drugs. In Greece, Hippocrates (460-377 B. C.) introduced scientific pharmacy and medicine . He is known as father of medicine. Galen (130-200 A.D.) practiced and taught both pharmacy and medicine in Rome. Ibn Sina (980 A.D.) is another great scientist and physician from Parsia who invented various palatable dosages form of medicine. With the advancement of technology, today medicine has the

power of curing almost any disease, except a few that are still incurable.

Despite the lack of efficacy of the pharmaceutical preparation that were available in the 19th century the apothecaries trades flourished ; then, as now physicians felt themselves obliged to issue prescriptions to stisify the expectations of their patients for some token of remedial intent. Early in 19th century when many small apothecary business existed to satisfy the demand on the local business, afew enterprising chemists undertook the task of isolating the active substances from plant extract.

The first apothecary business to move into large- scale production and marketing of pharmaceuticals was the old established Darmstadt firm Merck, founded in 1668. this development in 1827 was stimulated by the advances in purification of natural products. Merck was closly followed in this astute business move by other German and Swiss – based apothecary business; giving rise to some which later also become giant pharmaceutical companies, such as Schering and Bochringer. The American pharmaceutical industries emerged in middle of 19th century. Squibb began in 1858; soon after came Park Devis (1866) and Eli Lilly (1876) . The move into pharmaceuticals was also followed by several chemical companies such as Bayer, Hoechst, Agfa, Sandoz, Geigy and others. Nevertheless, several decades passed before the inventions coming from the iondustry began to make a major impact on the treatment of disease.

1.2.2 Development of pharmacy in Bangladesh:

In the beginning of the current century drug industry was non-existent in

Bangladesh and Indian subcontinent. All the pharmaceuticals were being imported from abroad. After the 1st World War the situations were changed; both Indian and foreign, sprang up to produce pharmaceuticals at cheaper rates to compete with imported products. Naturally some of these were of the inferior quality and harmful for public health. Then Government implemented the Drug Act 1940 to regulate the import, manufacture, distribution and sale of drugs in the country. This act was modified and adopted by the Pakistan Government in 1957. Similarly in Bangladesh it was adopted in 1974 with some modifications.

In response to WHO's essential drugs concept such as access to essential medicines, quality of all medicines and rational use of drugs, Bangladesh pioneered a National Drug Policy (NDP) in 1982. Main objectives of this policy were to ensure easy accessibility to essential drugs with affordable price, standard quality of drugs and rational use of drugs through appropriate prescribing and dispensing the health care professionals. In the earlier years, till nearly a decade after independence, the pharmaceutical market was more or less controlled by multinational companies. In 1981, there were 166 licensed pharmaceutical manufacturers in the country, but local production was dominated by eight multinational companies (MNCs) which manufactured about 75% of the products. There were 25 medium sized local companies which manufactured 15% of the products and the remaining 10% were produced by other 133 small local companies. All these companies were mainly engaged in formulation out of imported raw materials involving an expenditure of Tk 600 million in foreign exchange. In spite of having 166 local pharmaceutical production units, the country had to spend nearly Tk 300 million on importing

finished medicinal products. A positive impact of the Drug (Control) Ordinance of 1982 was that the limited available foreign currency was exclusively utilized for import of pharmaceutical raw materials and finished drugs, which are not produced in the country. The value of locally produced medicines rose from Tk 1.1 billion in 1981 to Tk 16.9 billion in 1999. At present, 95% of the total demand of medicinal products is met by local production. Local companies (LCs) increased their share from 25% to 70% on total annual production between 1981 and 2000. ^[5]

Bangladesh prepared its first Essential Drug List (EDL) in 1982 along with National Drug Policy. This list included 150 drugs. The basic Essential Drug List was subdivided into three levels. These three levels along with the number of permitted drugs for the respective levels are as follows:

1. 12 drugs for use by the village level health workers
2. Additional 33 drugs (total 45 drugs) for Primary Health Care to Upazila Health Complex Level, and
3. Additional 105 drugs (total 150 drugs) for use up to Tertiary Level care.

Main focus of this policy were to ensure easy accessibility to essential drugs with affordable price, standard quality of drugs and rational use of drugs through appropriate prescribing and dispensing by the health care professionals as well as by the drug dispenser also ^[6].

In 2005, Bangladesh declared another National Drug Policy, which was an amendment of the previous one, but did not include any EDL. At April 2008

Government declared 2nd Essential Drug List which contains 209 drugs. There are several regulations that have been made in the country but no strong infrastructure has been yet established to enforce these regulations and practically, there is still no 'Prescription Only Drug' in Bangladesh at present. One can get any drugs from anywhere. Only need is money; no prescription indeed. These resulted in serious misuse of the Over the Counter (OTC) drugs. One report estimates that there are four million drug misusers in the South Asian region, with Bangladesh accounting for nearly 500,000. Self-medications in a population with low literacy level like Bangladesh are very challenging, which poses risks such as incorrect diagnosis, absence of knowledge of alternative treatments, irrational use of drugs and neglecting side effects and drug interactions. Study showed that around 30-40% of disadvantaged populations undertake self-medications for managing illness^[7].

1.3.1 Essential Drugs and Rational Use :^[8]

The rational use of medicines requires that patients receive medications appropriate to their needs in doses that meet their individual requirements, for an adequate period of time, and at the lowest cost to them and their community. Unfortunately, the irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that only about half of all patients take them correctly. Fig. 1 shows data from the WHO Policy and Standards of Medicine database of drug use surveys done in developing and transitional countries in Asia, Africa and Latin America. According to the survey, only about 40% of patients treated at primary health care level (mostly in the public sector)

were treated in compliance with standard treatment guidelines.

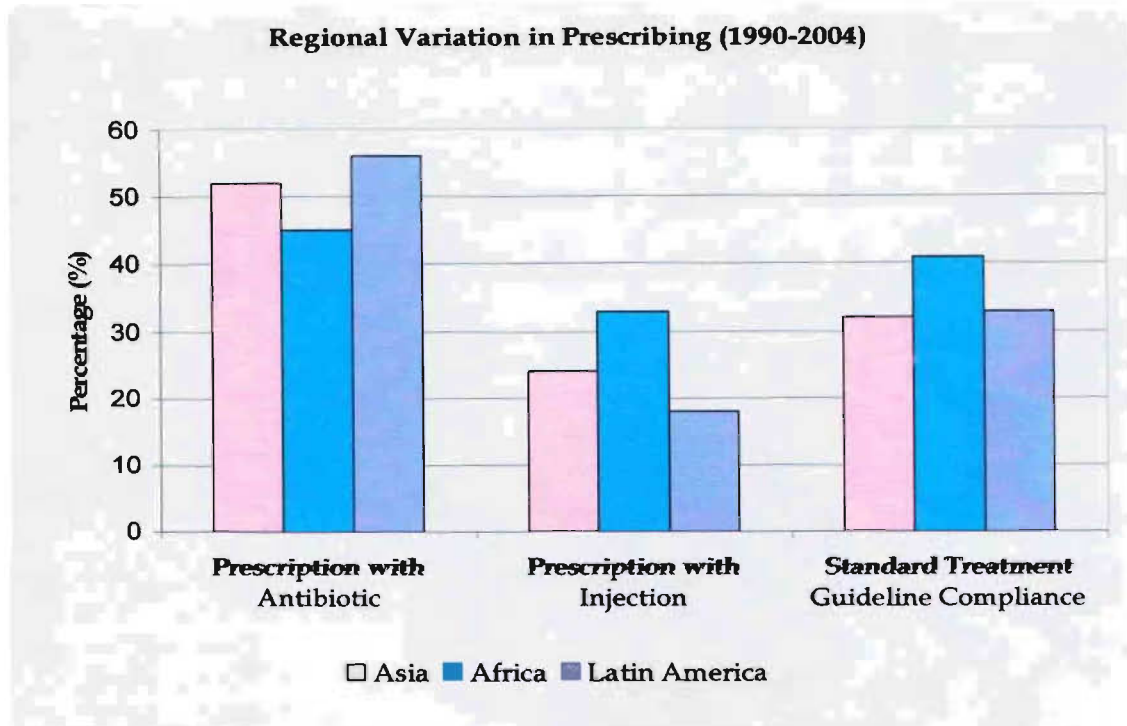
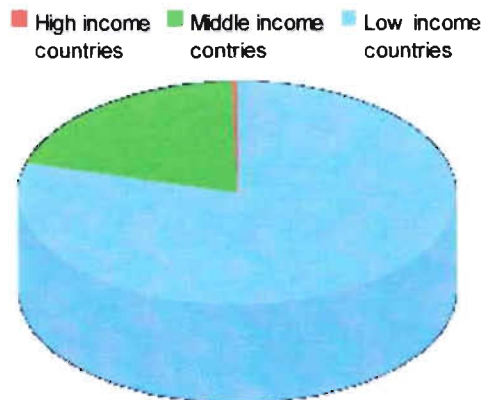


Figure 01: Regional Variation in Prescribing 1990-2004

The overuse, under use, or misuse of medicines results in wastage of scarce resources and widespread health hazards. Thus, rational use of medicines would bring health care within the reach of the poor by reducing costs. Access to health care and, therefore, to essential medicines is a human right. Essential medicines are those that satisfy the priority health care needs of the population. Thus, if they are available, affordable, are of good quality and used properly, medicines can offer simple, cost-effective answers to many health problems. There is, therefore, a need to develop educational strategies for health care practitioners and consumers in the rational use of medicines. It has been stated in the WHO Essential Medicines Strategy 2004- 2007 that up to 50% of the medicines in the world may be wasted due to inappropriate prescribing and patients' failure to comply with appropriate treatment regimens. This appears to

be a colossal waste of resources and misuse of medicines in a situation where lack of access to life-saving and health-supporting medicines for two billion poor people of the world stands as a direct contradiction to the fundamental principle of health as a human right. In 1999, WHO estimated that roughly 80% of the global population without access to essential medicines was living in low income countries (Fig. 2). In contrast, only 0.3 percent of those lacking



access to essential medicines lived in high-income countries. What is most disturbing is that even though a large percentage of the health expenditure in these countries is on medicines, the medicines that do reach the people are not well utilized.

Figure 02: Distribution (%) of country income groups without access to essential medicines in 1999

1.3.2 Aspects of Irrational Drug Use: ^[1]

1. Diagnosis:

1. Inadequate examination of patient
2. Incomplete communication between patient and doctor
3. Lack of documented medical history
4. Inadequate laboratory Resources

2. Prescribing:

1. Extravagant prescribing
2. Over-prescribing
3. Incorrect prescribing
4. Under-prescribing
5. Multiple prescribing or prescribers

3. Dispensing:

1. Incorrect interpretation of the prescription
2. Retrieval of wrong ingredients
3. Inaccurate counting, compounding, or pouring
4. Inadequate labeling
5. Unsanitary procedures
6. Packaging:
 - Poor-quality packaging materials
 - Odd package size, which may require repackaging
 - Unappealing package

4. Patient adherence:

- a. Poor labeling
- b. Inadequate verbal instructions
- c. Inadequate counseling to encourage adherence
- d. Inadequate follow-up/support of patients
- e. Treatments or instructions that do not consider the consider the patient's beliefs, environment, or culture or culture
- f. Fast development of resistance if adherence < 90%< 90%
- g. Treatment failure likely if adherence <95%

- h. High incidence of toxicities
- i. Waste of financial resources

1.3.3 Hazards of Irrational Use of Drugs: ^[9]

Irrational use of drugs may lead to:-

1. Ineffective and unsafe treatment
2. Exacerbation or prolongation of illness.
3. Distress and harm to patient
4. Increase the cost of treatment

1.3.4 Promoting rational use of medicines: ^[10]

Irrational use of medicines is a serious problem worldwide. Policies to promote rational use of medicines need to address the prescribers, dispensers and consumers of medicines as well as manufacturers and sellers, and traditional healers. All these actors have an important influence on how drugs are used. A variety of strategies and interventions are needed to influence medicine use .

The core interventions for promoting the rational use of medicines are:

- (1) A mandated multi-disciplinary national body to coordinate medicine-use policies
- (2) Clinical guidelines (standard treatment guidelines, prescribing policies)
- (3) Essential medicines list based on treatment of choice
- (4) Drugs and therapeutics committees in districts and hospitals
- (5) Problem-based pharmacotherapy training in undergraduate curricula

- (6) Continuing in-service medical education as a licensure requirement
- (7) Supervision, audit and feedback
- (8) Independent information on medicines
- (9) Public education about medicines
- (10) Avoidance of perverse financial incentives
- (11) Appropriate and enforced regulation
- (12) Sufficient government expenditure to ensure availability of medicines and staff

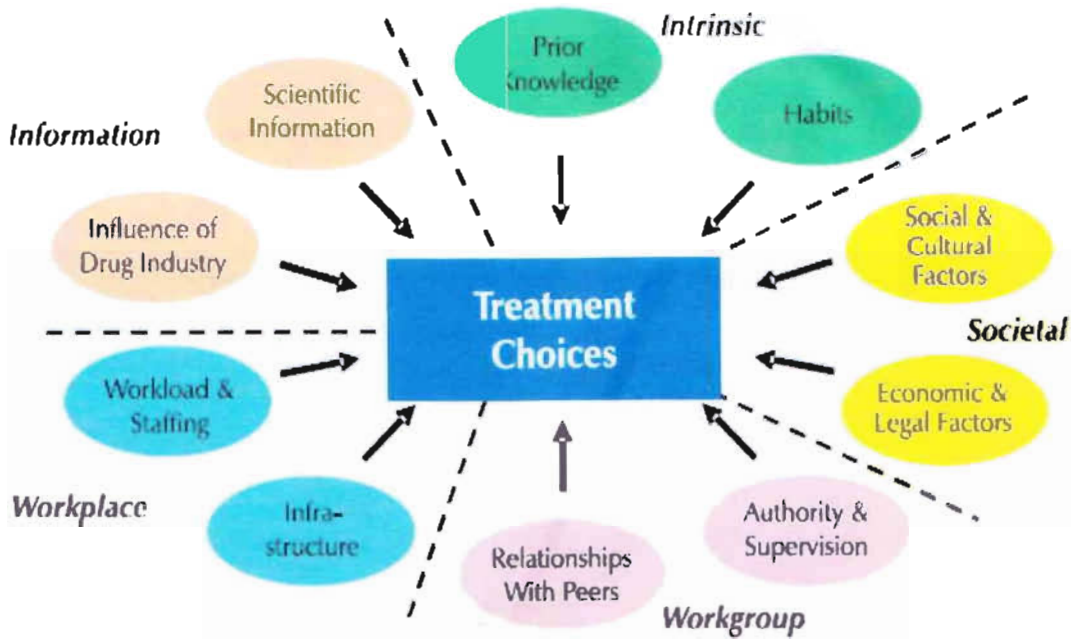
1.4.1 The Role of Education in the Rational Use of Medicines.^[8]

The importance of providing reliable information on the use of medicines to professionals, both during their education as well as an ongoing activity during their professional career, should be recognized. In addition, patients need to be provided information about the medicines being prescribed. This needs to be fully recognized as a tool for promoting better use of medicines. It is expected that there would be a change in the situation if these two activities are undertaken aggressively. The current wastage of medicines due to irrational prescribing and erratic compliance would be reduced and more people, particularly the poor, would receive medicines and take them properly.

It is not that the poor are not spending on medicines, but today, a large proportion of this expenditure is unnecessary and wasteful, very often leading to impoverishment. A good programme on the rational use of medicines complemented by a programme providing information and education for all concerned in the proper use of medicines would go a long way in improving this situation.

Presently, most governments and private organizations are reluctant to allocate resources for this component because they may not have realized the importance of providing such information. It should be clearly understood that all efforts made in other areas, for example, the large percentage of resources allocated for purchase of medicines, establishment of distribution systems and quality assurance mechanisms, would be largely wasted if the medicines are not prescribed and taken as they should be. More emphasis should be placed on these last two important steps, which if improved, could render the whole system more effective and less wasteful than it is now.

Educational strategies are very important in promoting the rational use of medicines. However, educational strategies alone will not be sufficient to ensure continued rational use of medicines. There are many other factors that influence the use of medicines and unless these are addressed, it will not be possible to change provider and consumer behaviour concerning drug use. Fig. 3 illustrates the different factors which influence the use of medicines. Health professionals are influenced by prior knowledge, habits, workplace conditions, access to information, their relationship with peers and whether they are supervised. Consumers are likewise influenced by their knowledge, access to information and social and cultural factors.



Source: WHO/INRUD course on promoting rational use of medicines, data on website (<http://www.who.int/medicines>)

Figure 03: Factors that influence the use of medicines

Educational strategies such as training, workshops, posters and printed materials aim to inform and persuade providers and patients. Nevertheless, it is important to understand the other strategies available as educational strategies are unlikely to have sustained long-term impact without implementation of other appropriate strategies. Managerial strategies aim to guide decision-making. For example, supplying only essential medicines in public sector facilities makes it much more likely that only essential medicines will be used in the public sector. Economic strategies aim to provide financial incentives to institutions, providers and patients. Unfortunately, many health systems incorporate perverse economic incentives which actually promote irrational use of medicines. For example, prescribers who must earn their income from the selling of medicines are likely to prescribe more medicines and more costly medicines than those

who do not earn their income from selling medicines. Hospitals that make money from selling medicines are more likely to sell more costly medicines. Some of these medicines may not actually be needed by the patients. Regulatory strategies aim to restrict choices by law. The drug regulatory authority is responsible for many of these restrictions which would include registering drugs for marketing, licencing prescribers and drug outlets, and regulating drug promotional activities.

To improve use of medicines in developing countries, a variety of educational and administrative approaches have been tried targeting both professionals and the public. The strategies to improve the use of medicines are shown in Fig. 4.

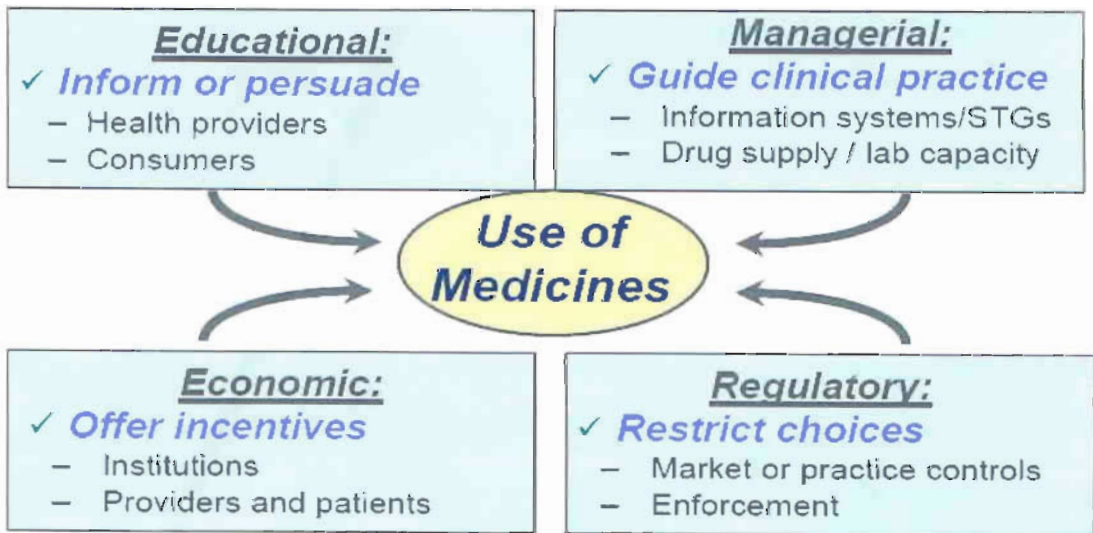


Figure 04: Strategies to improve the use of medicines^[11]

At the Second International Conference on Improving Use of Medicines, at Chiang Mai, Thailand in 2004, the WHO Regional Director for South-East Asia, Dr Samlee Plianbangchang, stated that “A drug should not be seen simply as a chemical but a chemical plus the information for its correct use. Often,

prescribers do not always have unbiased information such as formularies or standard treatment guidelines. On this issue, one important factor may be that health care systems do not always provide for effective education, either for health personnel or to the public. The point in this regard is on supplying drugs, with little or no emphasis on ensuring their rational use. Providing the right information should be an essential part of the drug supply system to fully ensure rational use, but unfortunately this is rarely done. The drug information that is readily available is from the pharmaceutical companies. These are primarily aimed at promoting the use of specific products, but not necessarily for the health benefit of the people.” .



Part – 02

Study Background

2.1 Present Scenario of Bangladesh:

Bangladesh is considered a Least Developing Country (LDC) with a population of 15 Cores (approximately). More than 75% of the total population lives in rural areas. About 36% of the population continue to live below the national poverty line (<US\$1/day). Basic needs of living particularly health and education remain largely unmet and only less than 40% of the population has access to basic healthcare.^{[12][13]} Beside this, around 26% of professional posts in rural areas remain vacant and there is high rate of absenteeism (about 40%). Thus treatments in the rural areas are mainly (about 45%) provided by unqualified health personnel including medical assistants, mid-wives, village doctors, community health workers and mostly by the chemists of the pharmacies in comparison to that by qualified medical graduates (only 10-20%).^[14]

To support rational use of drug, Bangladesh Government carried out the establishment of the National Drug Policy and Drug Ordinance (Drug Control Ordinance, 1982) prior to the introduction of EDL to control the manufacture, import, distribution, and sale of drugs in the country. This Ordinance Stated that no medicine of any kind can be manufactured for sale or be imported, distributed or sold unless it is registered with the licensing authority; and no person, being a retailer, is allowed to sell any drug without the personal supervision of a pharmacist registered in any Register of the Pharmacy Council of Bangladesh.

Despite substantial progress in drug manufacturing, irrational drug use, inappropriate prescribing, inadequate access to essential drugs, and uncontrolled price are major problems affecting the total health care system badly of Bangladesh.^[15]

2.1.2 Present Scenario of Health Care System:

The average distribution of health workers (per 1000 population) in Bangladesh is physicians 0.26, nurses 0.14 and pharmacist 0.06. Beside this, per capita total expenditure on health is only of US\$ 2.84 in contrast to US\$ 30-40 per capita, which is the margin requirement for essential health interventions in low-income countries^[16].

Though majority of the population live in rural areas, the government healthcare system remains a very minor source of health care there^[17]. The rate of vacant professional posts in rural areas remains above 26% and there is high rate of absenteeism (about 40%). Thus treatments in the rural areas are mainly (about 45%) provided by unqualified health personnel including medical assistants, mid-wives, village doctors, community health workers and mostly by the chemists of the pharmacies in comparison to that by qualified medical graduates (only 10-20%). Because of their qualification, poly pharmacy, over-prescribing and inappropriate prescribing are very common in the country due to unethical practices of both health professionals and drug manufacturers.

Many people in Bangladesh are too poor to afford a visit of doctor and have poor accessibility to health care. Thus they often rely on medical advice from unregistered or non professional persons. There is no exception even in the town also. As a result, powerful prescribe only medicines (POMs) are routinely and illegally sold over the counter.

There are several regulations that have been made in the country but no strong infrastructure has been yet established to enforce these regulations and practically, there is still no 'Prescription Only Drug' in Bangladesh at present. One can get any drugs from anywhere. Only need is money; no prescription indeed. These resulted in serious misuse of the Over the Counter (OTC) drugs. One report estimates that there are four million drug misusers in the South Asian region, with Bangladesh accounting for nearly 500,000. Self-medications in a population with low literacy level like Bangladesh are very challenging, which poses risks such as incorrect diagnosis, absence of knowledge of alternative treatments, irrational use of drugs and neglecting side effects and drug interactions. Study showed that around 30-40% of disadvantaged populations undertake self-medications for managing illness^[18]. In many developing and developed countries; community and retail pharmacies are the main sources of drugs. The importance of this role and its implications has been addressed and stressed worldwide. The Government of Republic Bangladesh also tried to introduce and establish Retail pharmacy in 1976 but failed due to protest from the association of the drug stores owners.

2.1.3 Domestic Drug Distribution: ^[19]

Bangladesh's drug distribution marketplace is composed of small independent pharmacies. This structure combined with an under-regulated industry, few firms manufacturing pharmaceuticals and companies competing to sell branded generics based on brand names provides ample opportunity for the sale of low-quality drugs at higher prices and this partly explains why the quality of drugs available for sale varies significantly in Bangladesh.

Pharmaceutical firms can sell their products to private sector pharmacies, the government and its public health care facilities, or to international organizations operating in Bangladesh (e.g., UNICEF). Government sales are not as profitable as private sector sales because the government pays less, on consignment, and at times, after considerable delay. Pharmaceutical firms nevertheless still target public facilities because doctors become acquainted with the firms' drugs and then prescribe them in their private practices. And, because drugs are not readily available at public facilities, patients receiving treatment there may still go to a private pharmacy to procure the required drugs. Without these public sector connections, many firms would turn more attention to the private sector. Although there are approximately 200,000 private pharmacies in Bangladesh, the government lists officially only 76,000 pharmacies. The rests are illegal, without a license or a licensed pharmacist on staff. Pharmacists have varying education levels and many lack adequate training. For example, a visit to four pharmacies in Dhaka and ten pharmacies in the bordering Gazipur, Narayanganj, Keranigonj and Manikgonj Districts revealed that each had one professional pharmacist, who

had four years of coursework; while the two medium-sized pharmacies visited had one person with a year's training and several untrained coworkers, all of whom were working as pharmacists. Rural pharmacies may have pharmacists with high school education and approximately two weeks training. The Bangladesh Pharmacist Society is currently implementing the first phase of a three-phased program to improve skills of pharmacists. The program should be completed in seven to eight years.

Most pharmacies are individual shops, though some chains are starting to develop, especially in urban areas. Large pharmacies visited reported buying medicines according to sales trends, e.g., what sells the most. The medium and small pharmacies visited reported linkages with a medical doctor. Their sales were therefore usually skewed towards that medical professional's preferences. Several brands of each drug, with variable quality levels, are on the market. In urban areas, the visited pharmacies tended to sell higher quality brands, whereas in more rural areas, pharmacies visited tended to sell lower quality, lower cost brands. This may be due to a district's political sway influencing brand selection. The pharmacies visited tended to have brands associated with people who held power in that district. Those more distant from the city center also had increasingly more Ayurvedic and herbal medicines.

A significant number of drug consumers obtain drugs without a prescription. When consumers lack a prescription, they will usually either ask a pharmacist for a specific drug or describe their ailment to a pharmacist who diagnoses the

problem and recommends a drug on the spot. Popular products include a variety of antibiotics, painkillers, and gastric remedies. Consumers purchase one to ten tablets or capsules at a time. The quantity of drugs purchased often depends more on the consumer's finances of than on the required dose of medicine.

2.1.4 Prescription Patterns of Drugs:

In reality, there is no mechanism or legislation exists in the country for assessing the competence of prescribing medical practitioners. No legal action is taken against them even if a serious mistake leads to a fatal outcome. The relatives of the victim accept it as fate, and no complaint is lodged. A medical practitioner can prescribe anything from vitamins to Vincristine, for anything from the common cold to cancer ^[20]. Inappropriate prescriptions are readily available due to poor consulting period (a mean of only 54 seconds!) of doctors in Bangladesh ^[21]. It is estimated that more than half of medicines are inappropriately prescribed, dispensed or sold ^[22]. Moreover, polypharmacy is very common among the rural medical practitioners with antibiotics and vitamins prescribed widely ^[23].

The prescription procedure of antibiotics in Bangladesh is less than ideal as prior identification of the pathogens and its sensitivity to the drug is rarely determined before the drug is prescribed ^[24]. The situation is very alarming in the rural areas. For example, one survey conducted among rural medical practitioners with an average of 11 years' experience showed 60% of antibiotics prescriptions

written based on the symptoms alone^[25]. All antimicrobial agents were prescribed mainly on the patient's complaints, and all available antibiotics were prescribed in inappropriate doses and duration as has been showed in another similar survey [26].

Children are mostly affected by inappropriate antibiotics prescribing in Bangladesh. In a study it was showed 26% of purchased drugs were antibiotics for children aged 0-4 year(s) and 48% of antibiotics were purchased in quantities of less than a single day's dose^[27]. Pneumonia and diarrhea are the two most common infectious diseases among children in Bangladesh with the annual deaths of about 230,000 children due to diarrhea^[28]. But the percentages of appropriate antimicrobial treatment of pneumonia, and diarrhea were 57.1% and 67.8% respectively as shown in one study^[29]. Misuse of drugs in the treatment of acute diarrhea among under-five children is highly prevalent and WHO-recommended treatments were seen in only 26.7% of cases and metronidazole was prescribed in all 38.6% cases^[30]. Multiple and inappropriate antimicrobial drugs is the most common treatment errors in dysentery with failure to recommend use of oral dehydration solution^[31]. Over-statements and misinformation is very common in Bangladesh, which greatly influences doctors' prescribing behaviors. Currently, drug companies are the only organizations in Bangladesh to provide information to health personnel and the information supplied is often not consonant with recommendations from public health bodies^[32]. Along with bribe in the form

of cash, a large number of doctors accept various gifts including free air ticket for foreign trips, computers, mobile phones, air conditioners, television, table lamps, telephones, towels, calendars, paperweights, pens and what not. Ultimate result is prescriptions of inappropriate or unnecessary and expensive medicines^[33].

2.1.5 Uses of Prescription Drugs:

The drug use studies involving outcomes, adverse reactions and bioavailability in Bengali population has never been seriously looked into in Bangladesh^[34]. Like all other developing countries, irrational and inappropriate use of medicines is very common in Bangladesh^[35]. Recent study showed that about half of the antibiotics were sold without any prescriptions, and even ordinary people without any knowledge of medicine asked the drug seller for specific antibiotics. Almost every drug store salespersons illegally recommends and sells prescription medicines people often do not buy all the drugs as prescribed for them because of financial constraint. Moreover, self-medication is a common practice among laypeople^[36]. Unjustified combination of vitamins and minerals are still extensively available violating the principles of NDP, which restricts the production and marketing of these types of combination products. Recently, many pharmaceutical manufacturers have launched one such combination containing 32 ingredients including selenium, vanadium, molybdenum, tin and other less important or unnecessary minerals. But the socio-demographic conditions of Bangladesh clearly outweighs the

justification of this type of combination products as most of the nutritional deficiencies are caused due to Vitamin A or B-complex, iron, calcium, iodine, or zinc deficiency. Deficiencies due to selenium, vanadium or tin are seldom diagnosed in Bangladesh, if ever. British pharmacopoeia clearly indicates that there is no justification for prescribing multiple ingredient vitamin preparation [37]. As single agent Vitamin A and ergometrine are dispensed inappropriately in more than 60% of the cases [38]. In addition, drug like syntocinon (a hormonal injection which is given to pregnant women to ease labor) is being sold or used indiscriminately in home deliveries in rural Bangladesh, which is readily available without prescription there [39]. The NDP clearly indicates that no company can market a drug of similar benefits as of the existing one with minor chemical difference. But at present, there are captopril, cilazapril, enalapril, fosinopril, lisinopril, perindopril, and ramipril in use in Bangladesh [40].

2.1.6 Over the Counter (OTC) Drug Uses:

In real sense, there is no 'prescription only drug' in Bangladesh at present. One can get any drugs from anywhere. Only need is money; no prescription indeed [21]. Over the counter (OTC) drugs have emerged recently as drugs of serious misuse across Bangladesh, and other neighboring countries. One report estimates that there are four million drug misusers in the South Asian region, with Bangladesh accounting for nearly 500,000 [41]. Self-medications in a population with low literacy level like Bangladesh are very challenging, which poses risks such as incorrect diagnosis, absence of knowledge of

alternative treatments, irrational use of drugs and neglecting side effects and drug interactions. Study showed that around 30-40% of disadvantaged population including the women, elderly, ethnic minorities, poor / ultra-poor undertake self-medications for managing illness ^[42].

2.1.7 Availability and Accessibility of Essential Drugs:

Sustained availability of essential drugs is one of the pre-requisites for a health system to be function well, since it is a common practice by the patients to bypass the nearby health care facilities that is unable to provide at least the prescribed drugs ^[43]. Though the official documents showed that about 80% of the people of Bangladesh had sustainable access to affordable essential drugs in Bangladesh ^[44] but such data has been countered by numerous evidences of frequent and persistent unavailability of essential drugs in the government health facilities. For instance, one study conducted in four district hospitals and one medical college hospital showed that only 8% of household outpatients reported the receipt of the prescribed medicines from those respective Health Care Facilities. Some 42% of hospital interviewed outpatients got all the prescribed medicines. Most of the inpatients (86%) reported paying for medicines from outside ^[45]. As with rural areas, unavailability of essential drugs the urban government health facilities are often very common. One report showed that two large hospitals (Sir Salimullah Medical College and Mitford Hospital) in the capital (Dhaka) city had been operating without essential medicines for eight weeks ^[46].

2.1.8 Price of Available Drugs:

The stated aim of the NDP is to ensure that common people can get the essential and necessary drugs easily and to ensure the quality and safety of these essential drugs. It identified 150 essential drugs for controlled pricing. Since 1993, the number of the price-controlled essential drugs has been reduced to 117 primary health care drugs ^[43]. Maximum retail price (MRP) of the essential drugs will be fixed by the Directorate, Drug Administration, according to the existing drug policy. In case of others, company price is approved by the same authority. Price of essential drugs in Bangladesh is virtually uncontrolled. The drug regulating authority does not negotiate the price rather only approves the prices sought by the pharmaceuticals companies ^[47].

Recently, a strong syndicate of top 20 drug manufacturers has pushed up the prices of medicines almost double than the previous ones of some 18 varieties of essential drugs immediately before declaration of revised drug policy to legalize the price hike ^[48]. Wilderness of price discrimination has become rampant now days. For example, the price of ciprofloxacin tablets ranges from Tk. 8-Tk.14 (US\$ 0.11-0.2) per tablet. But one mid-level company supplies the same medicine to medical college/university hospitals at Tk 2.5 (US\$ 0.04) per tablet. The supplied tablets have been tested subsequently and proved to be of standard quality. Obviously, the actual production cost of this antibiotic is less than Tk. 2.5 Per tablet. But amazingly, some companies are making a profit of not less than Tk 12 (US\$ 0.17) for per

tablet ^[53]. Another example of uncontrolled price can be evident for dexamethasone eye drop, which is available at Tk. 24 -Tk. 90 (US\$ 0.34-1.29) per 5ml. Again, for diclofenac eye drops are available at Tk. 40-Tk. 200 (US\$ 0.57-2.86) ^[49].

2.1.9 Quality of Marketed Drugs:

Though article 17 of the Drug (Control) Ordinance, 1982 says: "Whoever manufactures or sells any sub-standard drug shall be punishable with rigorous imprisonment for a term which may extend to five years, or with fine which may extend to one lakh taka, or with both", unfortunately, there is no single instance of any legal prosecution till date against any illegal traders in the country ^[50].

Report in the media regarding Drug and manufacturing aspects showed that among all the pharmaceutical manufacturers only 20 to 25 companies are producing quality medicines in the country ^[51]. At present, there are more than 250 pharmaceutical companies are involved in the manufacturing of medicine which clearly guides us to the raising of the question about the quality of the products manufactured by the remainder manufacturers. In practical view, they are mainly involved in the production of fake/substandard or imitating renowned brands of various drugs.

At present; fake, substandard or spurious drugs have been flooded all over Bangladesh. Testing conducted by the drug regulating body found 69% paracetamol tablets and 80% ampicillin capsules as substandard from some

small manufacturers ^[52]. In its annual testing of 5000 drug samples in 2004, the Public Health and Drug Testing Laboratory (PHDTL) detected 300 drugs that are either counterfeit or of very poor quality. Significantly, these include many popular antibiotics and lifesaving drugs ^[53]. Similarly, report in 1999 from the drug regulating authority mentioned that 102 drugs out of 6517 registered drug samples found below standard. In 1998, it was 260 out of 5920 registered drug samples ^[50].

Using the advantage of scarce drug testing facilities, many of the drugs are entering into the market without any valid quality assessment procedures. Besides, there are many brands existing in the market having active ingredients less than the specifications. A recent assay involving 15 brands of ciprofloxacin showed that 47% of the collected samples containing active ingredient less than the required specification ^[52]. Apart from fake or substandard drugs, the use of date-expired or drugs with tampered dates in Bangladesh can not be ignored. This is of especially alarming in the rural areas due to high rate of illiteracy. But regrettably, increased number of renowned private hospitals in the capital city (Dhaka) have been fined by a mobile in charge because of possessing least 15 life-saving medicines with expired dates ^[54].

Appropriate storage conditions for storing drugs are very crucial in tropical countries like Bangladesh where heat, light or moisture may degrade the drug molecules easily. But most drug manufacturers in the country lack

suitable storage facilities and enclose medicines in such low quality foils that it is impossible for them to retain their potency up to indicated shelf-life [53].

Use of counterfeit, substandard and expired drugs is very threatening to human life. Along with substantial damage of different organs as well as health, these can even cause death. For example, contaminated Paracetamol elixir with diethylene glycol killed around 223 children in Bangladesh in 1992 [55]. Adulteration of antibiotics poses risks not only to human body but also for the environment. Along with the risk for therapeutic failure, counterfeit antibiotics can produce chance of potential antibiotic resistance. Counterfeiting of drugs in Bangladesh has flourished because of poor supervision and control and unethical practices of most of the officials of drug regulating authority [56]. Substandard or fake versions of life-saving drugs are alarmingly prevalent in Bangladesh markets. In some cases, it is around 70% to 80%. The value of fake and contraband drugs the market is estimated to be around US \$100-US\$150 million in Bangladesh [56].

Drug management, as an integral part is still remaining in primitive level even after the implementation of the NDP more than two decades before. Thousands of unnecessary drugs are present in the market including many multivitamin and mineral preparations. Illegal drugstores are prevalent elsewhere that accounts more than the legal ones. Due to lack of any controlling mechanism prescribing practices of the medical practitioners are very

rampant everywhere in the country. About half of the medications are prescribed inappropriately and polypharmacy is very common. Antibiotics, vitamins and minerals are widely prescribed. Irrational prescribing practices are predominant in the rural areas.



Part- 03

Literature Review

3. Literature Review:

Large research-based multinational corporations (MNCs) dominate the industry in revenue, whereas generic firms are starting to dominate in volume. Pharmaceutical manufacturing is a technically challenging but potentially financially rewarding industry. From 1993-1997, the average return on assets for the industry globally was 10.96% (California State University 2007). In 2006, the industry was estimated at \$643 billion in terms of total sales (IMS Health 2006).

In every country the pharmaceuticals industry is being controlled by a well established regulatory board. Presently the pharmaceuticals industry in Bangladesh is being controlled by the Drug Ordinance of 1982. At present, there are 231 Allopathic companies operating in Bangladesh (Drug Administration, 2007).

Bangladeshi pharmaceutical firms focus primarily on branded generic final formulations using imported APIs. About 80% of the drugs sold in Bangladesh are generics and 20% are patented drugs. The country manufactures about 450 generic drugs for 5,300 registered brands which have 8,300 different forms of dosages and strengths. These include a wide range of products from anti-ulcerants, flouroquinolones, anti-rheumatic non-steroid drugs, non-narcotic analgesics, antihistamines, and oral anti-diabetic drugs. Some larger firms are also starting to produce anti-cancer and anti-retroviral drugs (Sampath 2007).

Domestically, Bangladeshi firms generate 82% of the market in pharmaceuticals; locally based MNCs account for 13%, and the final 5% is imported. Although 235 pharmaceutical companies are registered in Bangladesh, only about 85 are actively producing drugs. The top 30 to 40 companies dominate almost the entire market; the top 10 hold 70% of domestic market share; and the top two, Beximco and Square, capture over 25% of the market (Chowdhury 2006).

Bangladesh drug market is flooded with over 8,000 formulations compared to 117 essential drugs and 100 supplementary drugs listed on the essential drug list. Among 231 allopathic drug manufacturers, top 30 companies are considered as large scale units and these are enjoying major share of the total market. Interestingly, Bangladesh owns about 70.9% of generic medicines in terms of total sales among the 48 least developed countries of the world. At present there are about 30,000 illegal and more than 70,000 illegal drugstores according to the Bangladesh chemist and druggist association, Bangladesh. These are alleged to sell substandard or fake, poor quality, smuggled and adulterated medicines. Most of them are selling medicines without registered doctors' prescription. (Islam MS 2006)

In real sense, there is no 'prescription only drug' in Bangladesh at present. One can get any drugs from anywhere. Only need is money; no prescription indeed (Islam, Goldman, Kunin, 1996). Over the counter (OTC) drugs have emerged recently as drugs of serious misuse across Bangladesh, and other neighboring

countries. Self-care is a predominant therapeutic activity consisting 30-40% of the disadvantaged populations including women, elderly, ethnic minorities and poor in Bangladesh (Ahmed, 2005).

Self-medications in a country with low literacy level like Bangladesh is very important where prescription medicines are freely available. This may pose serious risks related to inappropriate and irrational personal use of medicines. Like all other developing countries, irrational and inappropriate use of medicines is very common in Bangladesh (Ronsmans, Islam, Bennish, 1996).

Self-medication as a mean of self-care through the purchase of over-the-counter (OTC) medicines is, and always has been common in the society for a wide variety of minor ailments, such as headaches, colds and indigestion. But such products can often be misused or abused (Wazaify, 2005).

One report estimates that there are four million drug misusers in the South Asian region, with Bangladesh accounting for nearly 500,000 (Mudur, 1999). Self-medication in a population with low literacy level like Bangladesh are very challenging, which poses risks such as incorrect diagnosis, absence of knowledge of alternative treatments, irrational use of drugs and neglecting side effects and drug interactions. Study showed that around 30%-- 40% of disadvantaged population including the women, elderly, ethnic minorities, poor / ultra-poor undertake self-medication for managing illness (Ahmed, 2005).

About half of the antibiotics were sold without any prescriptions, and even ordinary people without any knowledge of medicine asked the drug seller for specific antibiotics (Mamun, Tabassum, 2006).

One study conducted in four district hospitals and one medical college hospital showed that only 8% of household reported outpatients reported receipt of the prescribed medicines from the facilities. Some 42% of hospital interviewed outpatients got all the prescribed medicines. Most of the inpatients (86%) reported paying for medicines from outside. (Omer K. 2003)

Children are mostly affected by inappropriate antibiotics prescribing in Bangladesh. In a study it was showed 26% of purchased drugs were antibiotics for children aged 0-4 year(s) and 48% of antibiotics were purchased in quantities of less than a single day's dose. Pneumonia and diarrhea are the two most common infectious diseases among children in Bangladesh with the annual deaths of about 230,000 children due to diarrhea. But the percentages of appropriate antimicrobial treatment of pneumonia, and diarrhea were 57.1% and 67.8% respectively as shown in one study. Misuse of drugs in the treatment of acute diarrhea among under-five children is highly prevalent and WHO-recommended treatments were seen in only 26.7% of cases and metronidazole was prescribed in all 38.6% cases. Multiple and inappropriate antimicrobial drugs is the most common treatment errors in dysentery with failure to recommend use of oral dehydration solution. (Calicut Medical Journal 2006)

The per-capita annual drug expenditure in Bangladesh remains extremely low at \$4 compared to \$9, \$28, \$191 and \$412 for China, Mexico, United States and Japan respectively (Source: WHO report, 2005). This is expected to increase as healthcare awareness rises and as increasing urbanization leads to sales growth of the more expensive lifestyle segment drugs. The per capita expenditure of Govt. for public health is gradually increasing and stood at USD \$ 4 in 2004. In the health sector, Govt. has made an allocation of BDT 3,732 crore combining revenue and development in the budget of 2004-05, which is around 59% higher than the previous year (ADB annual report, 2005).

Part – 04

Study Objective

4.1 Aim of the Study:

Use of several medicines for treating a single disease and inappropriate prescribing are very common practice throughout the country due to unethical practices of both health professionals and drug Dispensers. In real sense, there is still no 'Prescription Only Drug' in Bangladesh at present. Every one can get any drugs from anywhere in terms of money and it does not require any prescription even. Study showed that around 30-40% of population including the women, elderly, ethnic minorities, poor / ultra-poor living in the rural areas take self-medications for managing illness.

In many developing and developed countries, community and retail pharmacies are the main source of drugs. The importance of this role and its implications has been addressed and stressed worldwide. Even though, Bangladesh was the first country among the world to introduce National Drug Policy; but rational use of drug has not been established in the country. At present there are approximately 30,000 legal and more than 75,000 illegal drug stores are operating business within the country by non-qualified personnel. Any one can buy any medicine from these drug stores only in terms of money; no legal prescription is required here.

4.1.2 General Objectives:

The study on "Drug Selling Pattern in Bangladesh" has been carried out with intension to figure out the drug selling pattern (percent of prescribed drug sold) in Bangladesh that is an important indicator to measure the rational use of Drug in

Bangladesh. Despite this, it was also considered to find out the comparative drug selling pattern among different areas as well as to Dinajpur, Nator and Noakhali districts.

4.1.3 Specific Objectives:

Beside the general objectives, the specific findings of the study carried out are as follows:

1. Percent of Prescription and Non-prescription Sell.
2. Area wise distribution of the drug selling pattern.
3. Patient Compliance Regarding Different Dosage Form, e.g. Tablet, Capsule following the hierarchy of their percent sells.
4. Patient Compliance Regarding Different Types of Dosage Form, e.g. Solid, Liquid following the hierarchy of their percent sells.
5. Use Pattern of Injections.
6. Selling pattern of suppository.
7. Percent of Aerosol & Dusting Sold.
8. Percent of Unani and Ayurvedic Medicine sold.
9. Percent of Herbal Medicine sold.
10. Percent sell of Sex Stimulants Vs % of Nerve tonic, Digestant and Others
11. Percent sell of Paracetamol Vs % of Diclofenac.

12. Percent of Drug Sold per Encounter (1, 2, 3, 4....).
13. Percent sell of National and Multinational Companies.
14. Percent sell of Imported Drugs.
15. Percent sell of Different Companies (hierarchy of Top 10 companies and their percent sell).
16. Percent sell of Different Companies in different areas

Part- 05

Methodology

5 Methodology

5.1 Definitions:

Urban Area:

The District towns were considered as urban area.

Rural Area:

Areas, relatively uncivilized or having lack of civilization activity than that of their respective district city were considered as the rural areas.

Prescription Sell:

Drugs that were sold by the prescription of a registered physician or health care professionals have been considered as the Prescription Sell. According to the study, physicians having at least an M.B.B.S degree have been considered as the registered physician. The study excludes those personals having other qualifications except M.B.B.S or higher, e.g. Paramedic Doctors, Village level Health Workers, Rural Medical Practitioners (RMPs) etc.

Non Prescription Sell:

Any medicine or drug that have been sold without prescription by the qualified health professionals or self medication, the drugs sold after the recommendation by the chemist or the shop keeper has been considered as the Non Prescription Sell.



Beside this, if any body having prescription but did not brought or showed the copy to the retailer during purchasing of the medicines has been considered as Non Prescription Sell.

5.2 Design of the Study:

The study was performed randomly and designed with intension to cover the collection of data from three different districts that almost covers the population of every class. Data was collected from urban and rural as ratio 2:1. In urban and rural both area drugstores were randomly selected to collect the data.

Every patient was considering as single sample. We collected information about the drugs which patients buy from the drugstores.

5.3 Selection of Area for Data Collection:

After selection of the strategy to collect sample randomly on the basis of the developed method, the following sampling areas were considered from which collection of sample were carried out:

a. Dinajpur :

- i. Urban Area: Hospital road, Charubabu road and Bahadur bazar.
- ii. Rural Area: Dos mile and Cheradangi.

b. Nator :

- i. Urban Area: Nicha Bazar and Hospital Road
- ii. Rural Area: Bagati and Shingra.

c. Noakhali:

- i. Urban Area: Chowmuhoni and Maizdi
- ii. Rural Area: Duha Hat and Rajgonj

5.4 Length of the Study Period:

The study as well as collection of sample was carried throughout a period of twelve months, from January 09 to December 09.

5.5 Collection of Data:

The data of our interest was the-

- i. Type of Sell (whether Prescription or Non-Prescription)
- ii. Brand Name(s) of the drug(s) sold
- iii. Generic Name(s) of the drug(s) sold
- iv. Dosage form(s) of the drug(s) sold
- v. Manufacturer(s) of the drug(s) sold

The data collection tool had the options to collect the above parameters. Using these parameters of the data, the study has been carried out.

5.6 Data Collection Tool:

A format containing the option of type of sell, Brand Name, Generic Name, Dosage Form and Types of dosage Form etc had been prepared prior to the data collection that was used as the measure for collection of data and has been included in the annexure (annexure 01).

5.7 Sample Size:

The study has been carried out with a total sample of 900. The distribution of the samples is as follows:

a. Dinajpur: 300

i. Urban Area:

Hospital Road : 75

Charubabu Road : 75

Bahadur Bazar : 50

ii. Rural Area:

Dos Maile : 50

Cheradangi : 50

b. Nator: 300

i. Urban Area:

Nicha Bazar : 100

Hospital Road : 100

ii. Rural Area:

Bagati : 50

Shingra : 50

c. Noakhali: 300

i. Urban Area:

Choumuhoni : 100

Maizdi : 100

ii. Rural Area:

Rajgonj : 50

Duha Hat : 50

5.8 Data Counting:

Data counting for the study has been performed with a prepared data counting format. The format has been included in the Annexure (annexure 02).

5.9 Data Processing and Analysis:

The upgraded version of Microsoft Office 2003 has been utilized for data processing, analysis as well as for the preparation of the graphs.



Part- 06

Result and Discussion

6. Result and Discussion:

The major object of the study was to find out the Drug Selling Pattern in Bangladesh and the area wise distribution of the selling pattern. Both the major and minor finding outs of the study are as follows:

6.1 Drug Selling Pattern in Bangladesh:

The study on the Drug Selling Pattern carried out has shown that only 34.67% of the drugs were sold by their prescription and 65.33% of the drugs were sold without any prescription. The selling pattern of drug in Bangladesh can be shown by the following figure (Fig. 05) along with respective Data table (Table 01).

Table 01: % prescription and Non-Prescription sell of drug.

Category	Percent Sold
Prescription Sell	34.67
Non-Prescription Sell	65.33

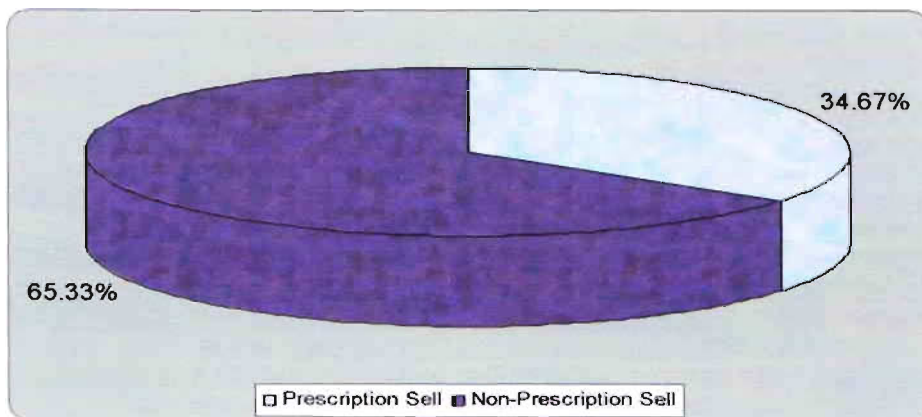


Figure05: Drug selling pattern in Bangladesh

6.1.2 Drug selling Pattern of Urban and Rural area in Bangladesh:

The health care policy is supposed to be implemented in urban area more strictly than rural area. But the selling pattern of drugs does not seem much better in urban area. According to the study performed, only 40.83% of urban and 22.33% of rural areas drugs were sold by the prescription.

Table 02: Drug selling Pattern in urban and rural area

Area	% of Prescription Sell	% of Non-Prescription Sell
Urban	40.83	59.17
Rural	22.33	77.67

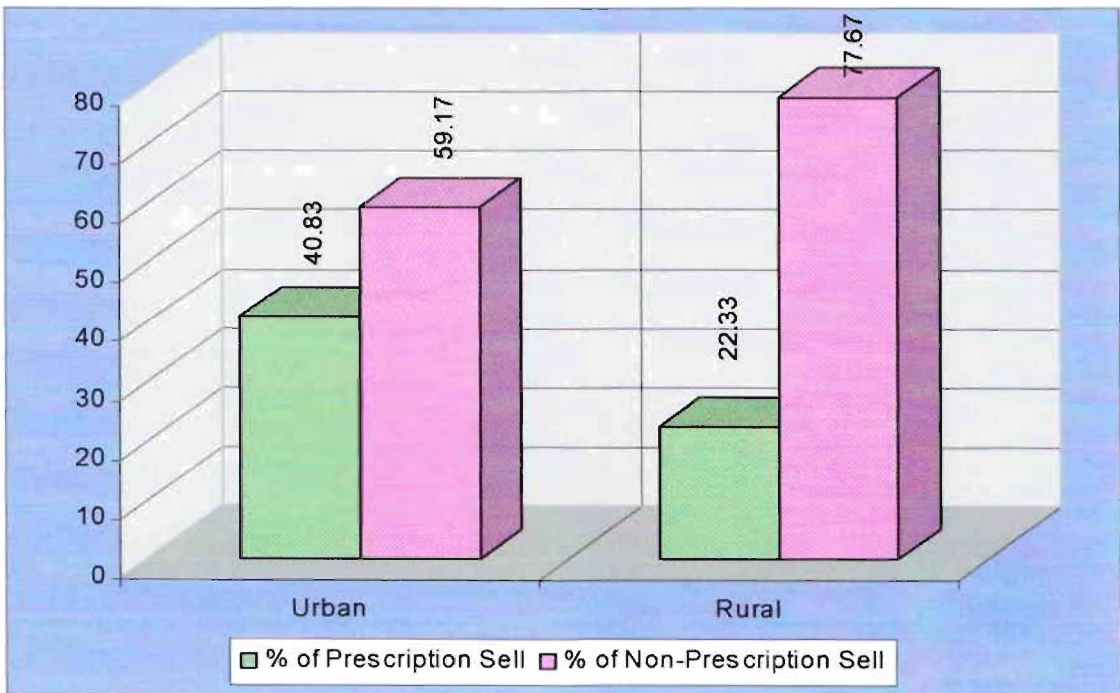


Figure 06: Drug selling Pattern in urban and rural area

6.1.3 Drug Selling pattern in Different Districts:

During the study period, it was found that only 41.67%, 38.67%, and 23.67% of the drugs were sold by the prescription in Dinajpur, Nator and Noakhali respectively; and 58.33%, 61.33% and 76.33% of the drugs were sold without any prescription in those respective areas. The comparative selling pattern of drugs has been shown in the figure below:

Table 03: Data of Drug Selling pattern in Different Districts

Area	% of Prescription Sell	% of Non-Prescription Sell
1. Dinajpur	41.67	58.33
2. Nator	38.67	61.33
3. Noakhali	23.67	76.33

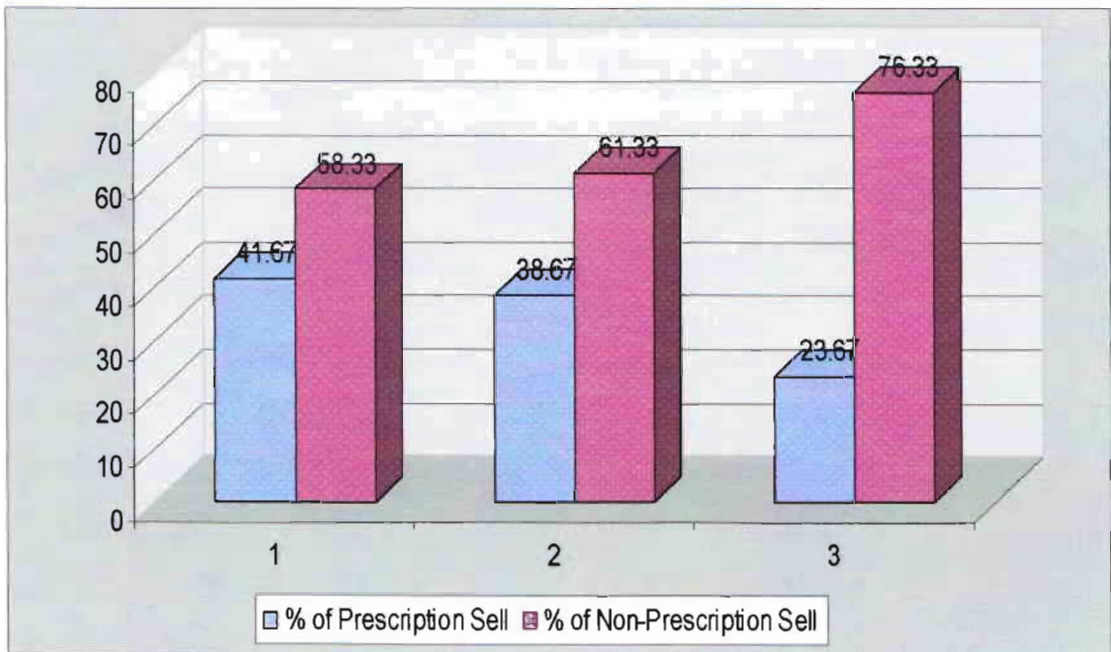


Figure 07: District wise Distribution of Drug Selling Pattern

6.2.1 Patient Compliance Regarding Different Dosage Form and Their

Types:

Drugs are formulated into different types of dosage forms but not all the types are equally well accepted by both the patient and by the physicians. The popularity of each class considering their percent sold during the study period was found has been shown below in the table and their popularity hierarchy has been shown in the figure (Figure 08) below:

Table 04: Data of percent of different dosage form sold

Types of Dosage form	% Sold	Types of Dosage form	% Sold
Solid	82.58	Other	2.18
Liquid	8.43	Semi-Solid	1.76
Parenteral	3.82	Ophthalmic	1.21

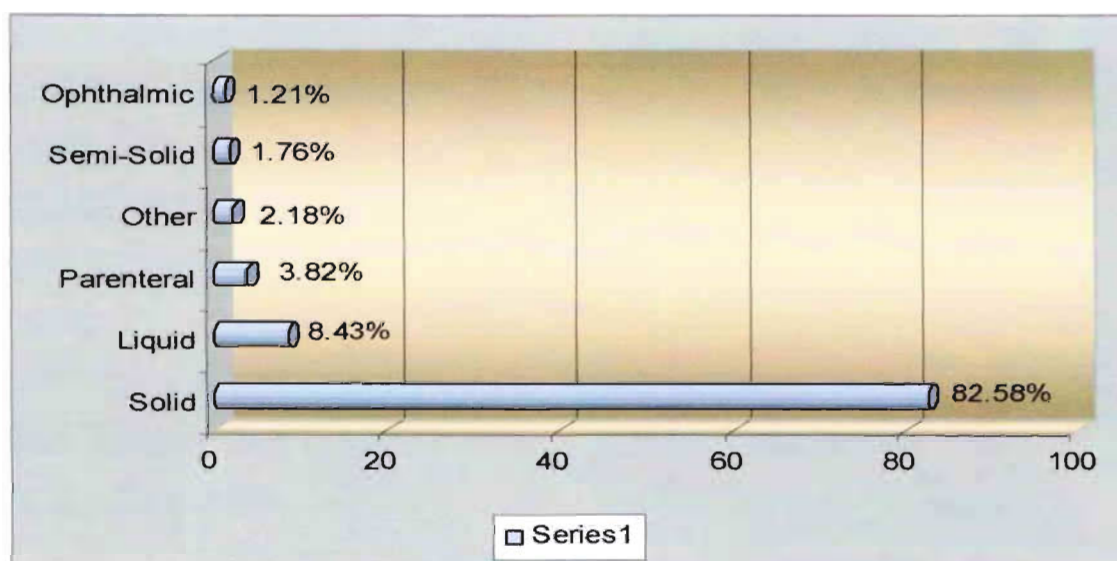


Figure 08: Study of Percent cell of Sold Popular Types of Dosage Form

6.2.2 Percent sell of top five popular dosage forms:

Pharmaceutical Science has developed and formulated a number of dosage forms like tablet, capsule, ointment, suppository, syrup, suspension, eye Drop, nasal drop, ampoule, vial, aerosol, dusting powder etc. The hierarchy of popularity of top five dosage form on the basis of their sell during the study period has been shown (on the basic of their percent sold) in the figure below

Table 05: Percent sell of top five popular dosage forms

Dosage Form	% Sold
Tablet	61.9
Capsule	18.1
Syrup	6.31
Suspension	2.55
Chew Tab	2.12

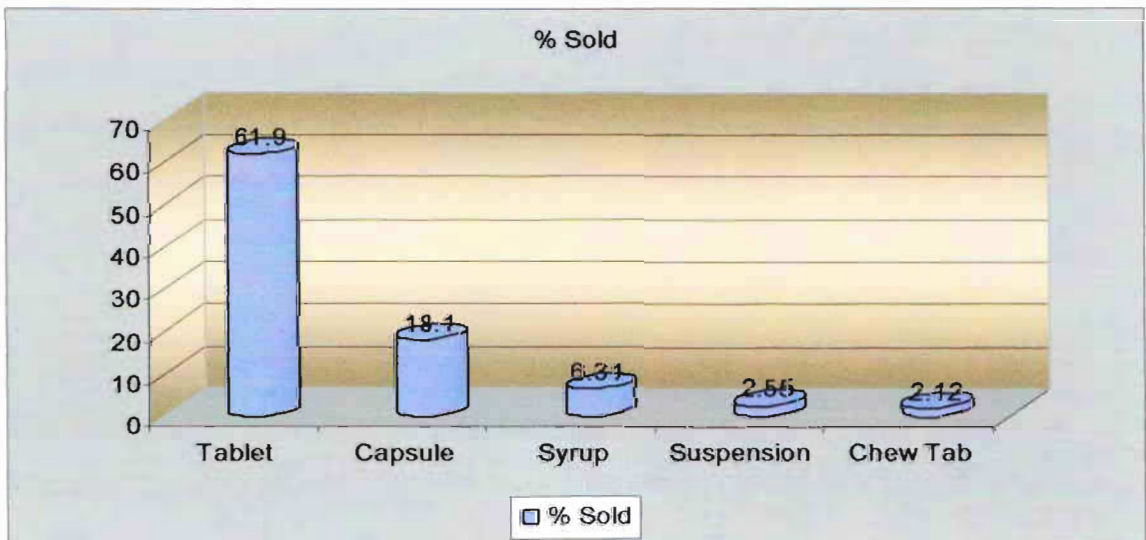


Figure 09: Top five Popular Dosage Forms on the basis of Percent sell

6.3.1 Use Pattern of Injections:

Injections are one of the most important dosage forms and use of injections is one of the powerful indicators. Through injections, drugs are directly introduced at the systemic circulation. These are very much useful incase of emergency and life saving case but not well accepted by the patient due to the associated pain. During the study period, it was found that only 3.82% of the injections were sold between total items (Figure 00).

Table 06: Data of percent of injection sold

Category	% Value
Other item Sold	96.18
Injection Sold	3.82

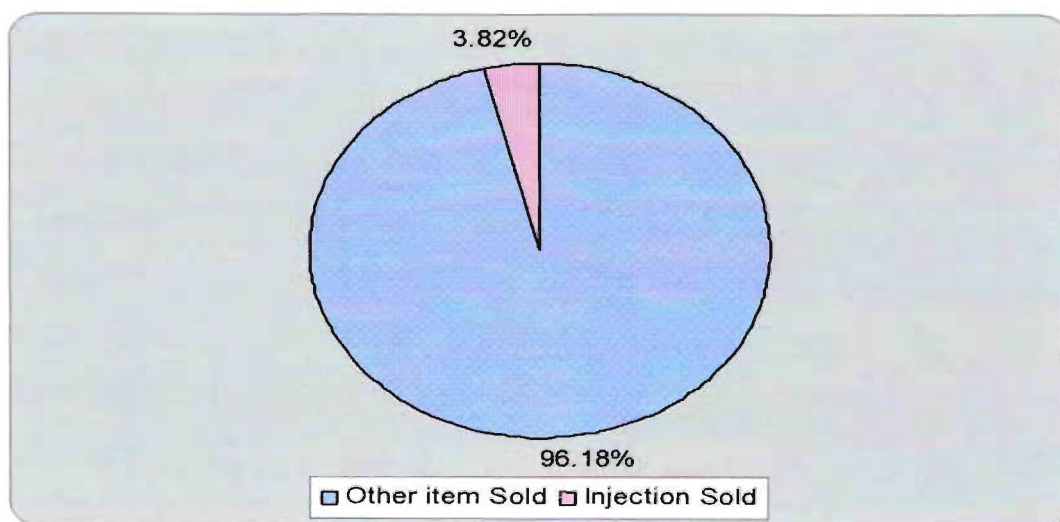


Figure 10: Percent of Injection Sold

6.3.2 Percent of prescribed and non-prescribed injections items sold:

Around 92.1% were prescribed and the rest 7.9% was sold without prescription.

A little percent of injection was sold without prescription during the study period.

The selling pattern of injections is shown in the following figure (Figure 00):

Table 07: Percent of prescribed and non-prescribed injections items sold

Category	% Value
Prescribed Injection	92.1
Non-Prescribed Injection	7.9

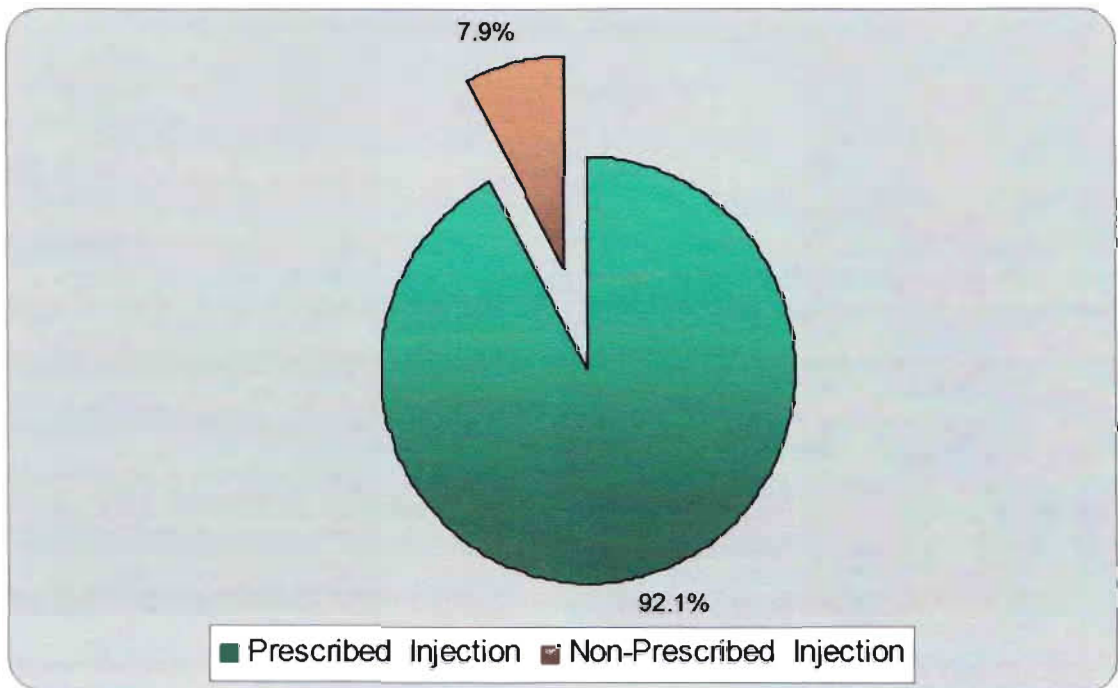


Figure 11: Percent sell of prescribed and non-prescribed injections

The prescribing behavior of injections by the physician was found in the study is shown in the figure (Figure 00) below:

Table 08: Percent of prescription sample containing injections

Category	% Value
Prescribed Sample without Injection	81.41
Prescribed Sample Containing Injection	18.59

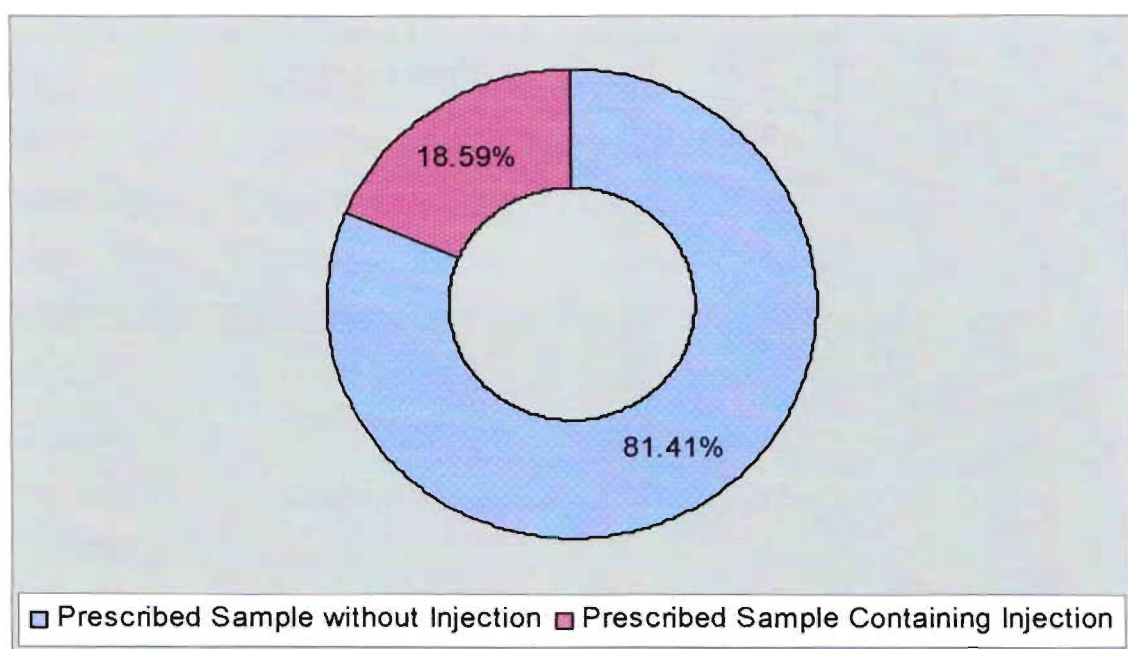


Figure 12: Percent of Prescribed Sample Containing Injections

6.4 Selling Pattern of Suppository:

Suppository is another one if the dosage forms that enables prompt onset of action by delivering the drug directly into systemic circulation but is not of patient

compliance due to its embarrassing administration. So suppository has not achieved that much well acceptability by the patients and physicians.

During the study period it was found that the sell of suppository was only 1.57% of the total sell.

Table 09: Percent sell of suppository

Category	% Value
Others Item Sold	99.51
Suppository Sold	0.49

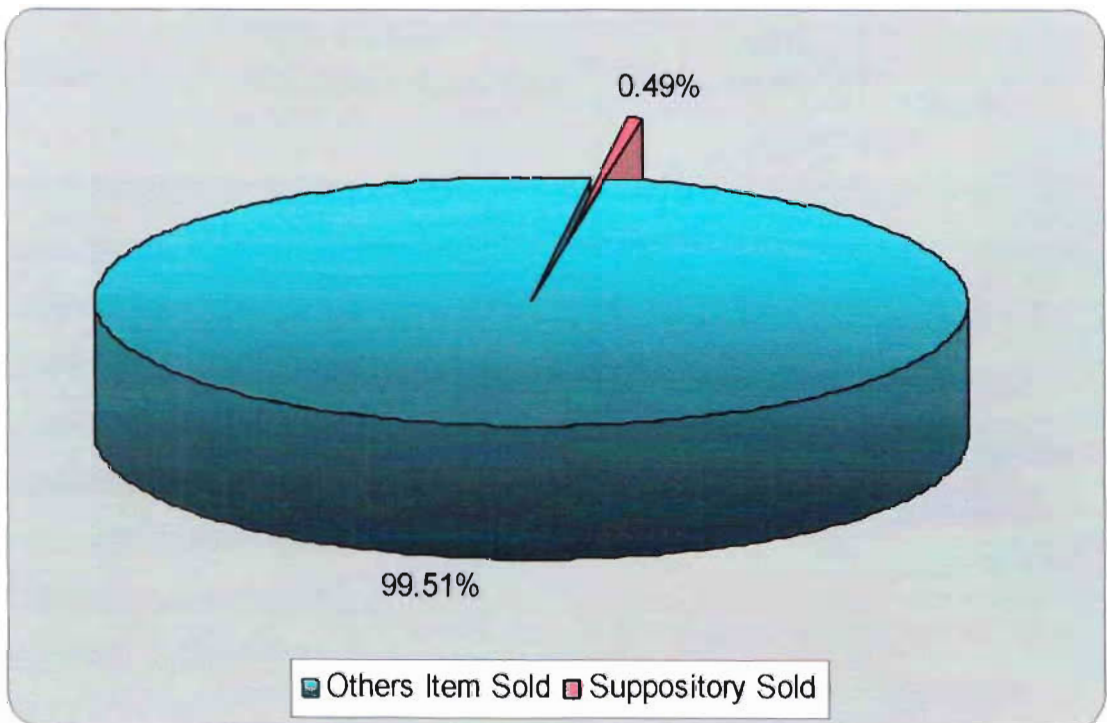


Figure 13: Percent sell of Suppository

6.5 Sells of Aerosol and Dusting Powder:

In previous CFCs were used in aerosol as propellant in aerosols and thus the use of aerosol was discouraged by the Montreal Protocol that came into force in 1989. But still the use of aerosol is seen and during the study period sells of Aerosol was of 0.30% of the total item sold.

Dusting powder is one of another dosage form that is cheap as well as patient convenience also but the use of dusting powder is seen rarely. It was found during the study period that only 0.12% Dusting Powder was sold of the total item.

Table 10: Percent sell of both Aerosol and Dusting Powder

Category	% Value
Aerosol Sold	0.70
Dusting Powder Sold	0.12

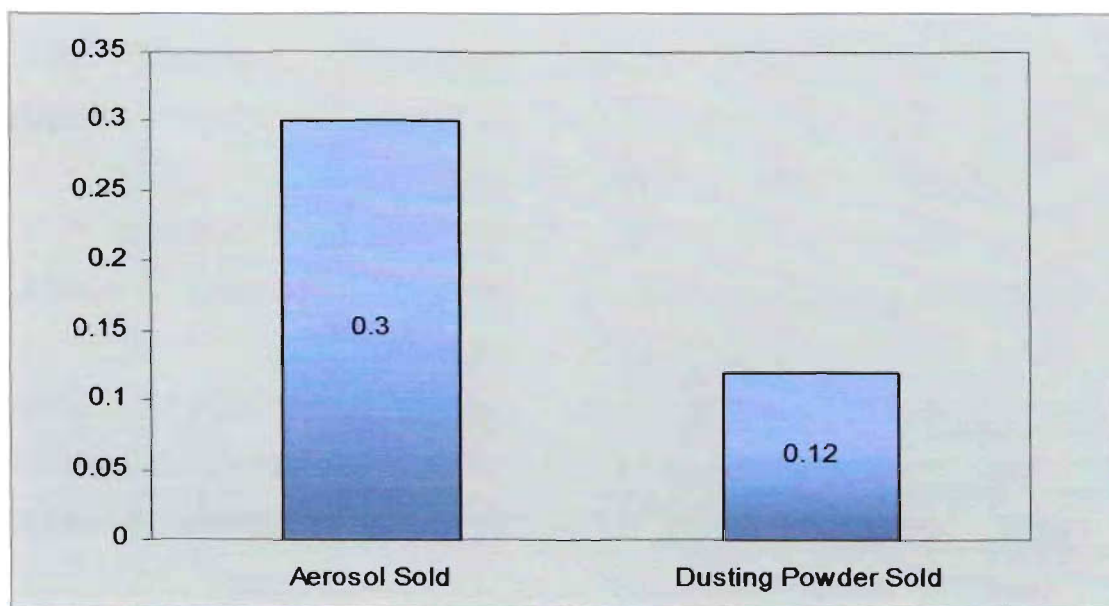


Figure 14: Percent sell of Aerosol and Dusting Powder

6.6 Unani and Ayurvedic Medicine:

The importance of traditional medicine which is regarded as part of rural culture has began increasing attention through attempts to find alternatives to modern medicine to cure diseases without minimum chance of side effects. Unani and Ayurvedic medicines are two most famous and established traditional medication systems. The comparison of the percent sell of these systems from the study performed showed the percent sell of Unani 1.67% and Ayurvedic 0.27% of the total sell.

Table 11: Percent of Unani and Ayurvedic Medicine Sold

Category	% Sold
Unani Medicine	0.79
Ayurvedic Medicine	0.30

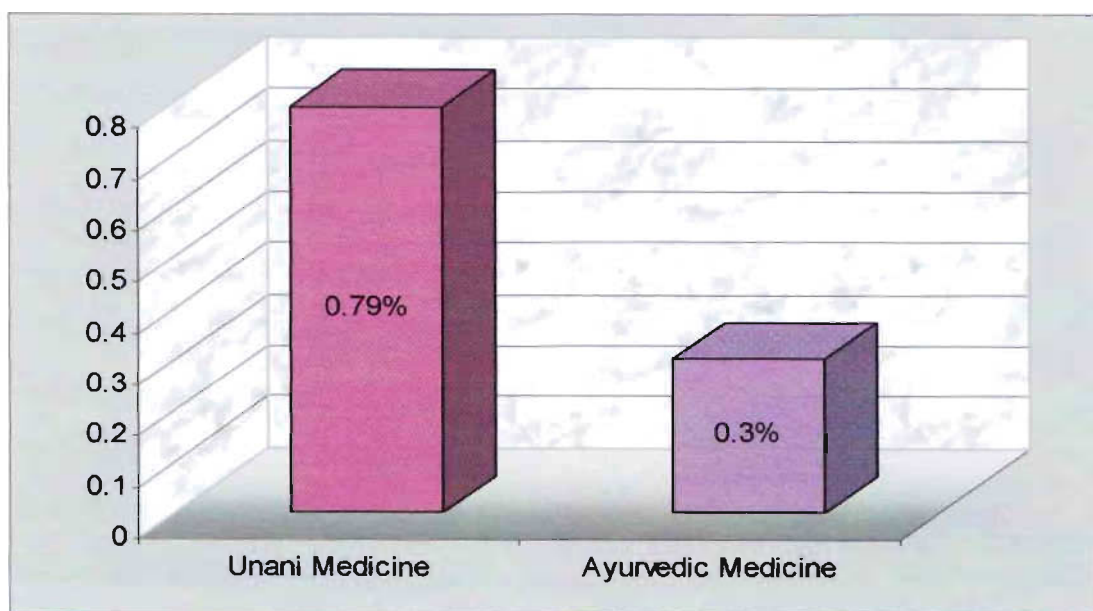


Figure 15: Percent sell of Unani and Ayurvedic Medicine.

6.7 Herbal Medicine:

Herbal preparations are the recent interest of the manufacturer, physicians and the patient to treat disease with allopathic medicine of natural origin. During the study period it was found that the total sell of Herbal product is 0.73%.

Table 12: Percent sell of Herbal Medicine

Category	% Value
Other Items Sold	99.27
Herbal Medicine Sold	0.73

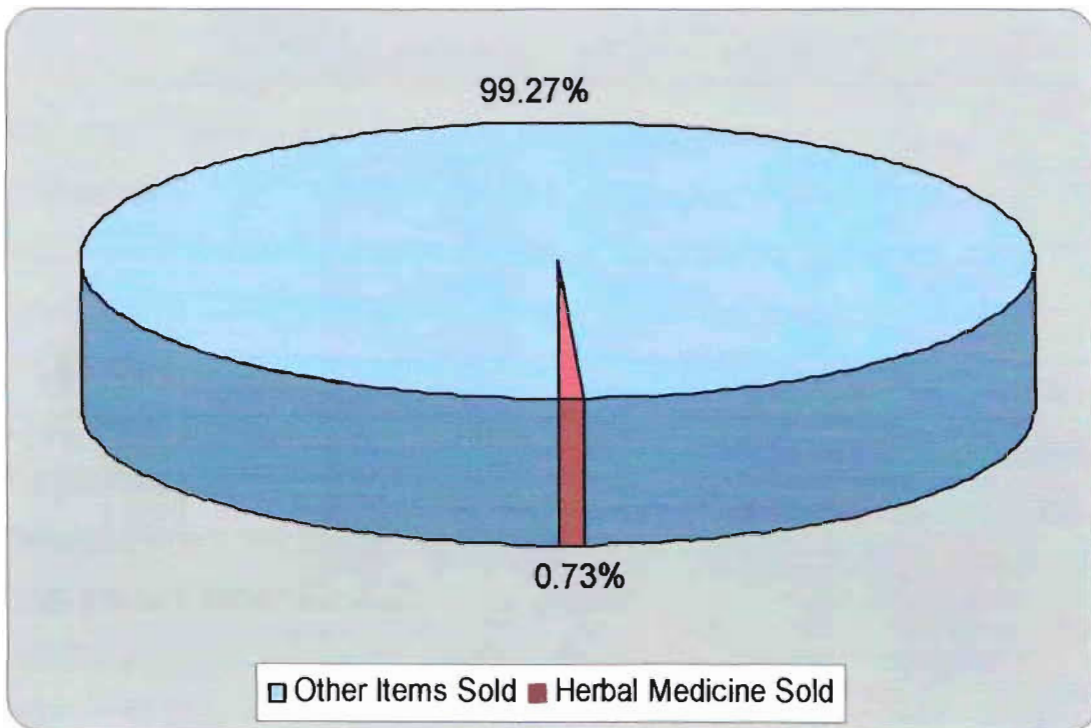


Figure 16: Percent sell of Herbal Medicine

6.8 Percent Sell of Sex Stimulant versus Nerve Tonic, Digestant and Others:

Sex Stimulants from both Unani and Ayurvedic medicine systems are one of the most popular items in Bangladesh. The other popular classes include Nerve tonic, Digestant, Vitamin etc. The comparative study from the survey carried out have shown that the percent sell of Sex Stimulants was 0.73% and the percent sell of Nerve tonic, Digestant and others were 0.42% of the total sell of medicine.

Table 13: Percent sell of Sex Stimulant versus Nerve Tonic, Digestant and Others

Category	% Sell
Sex Stimulant	0.73
Nerve tonic, Digestant and Others	0.42

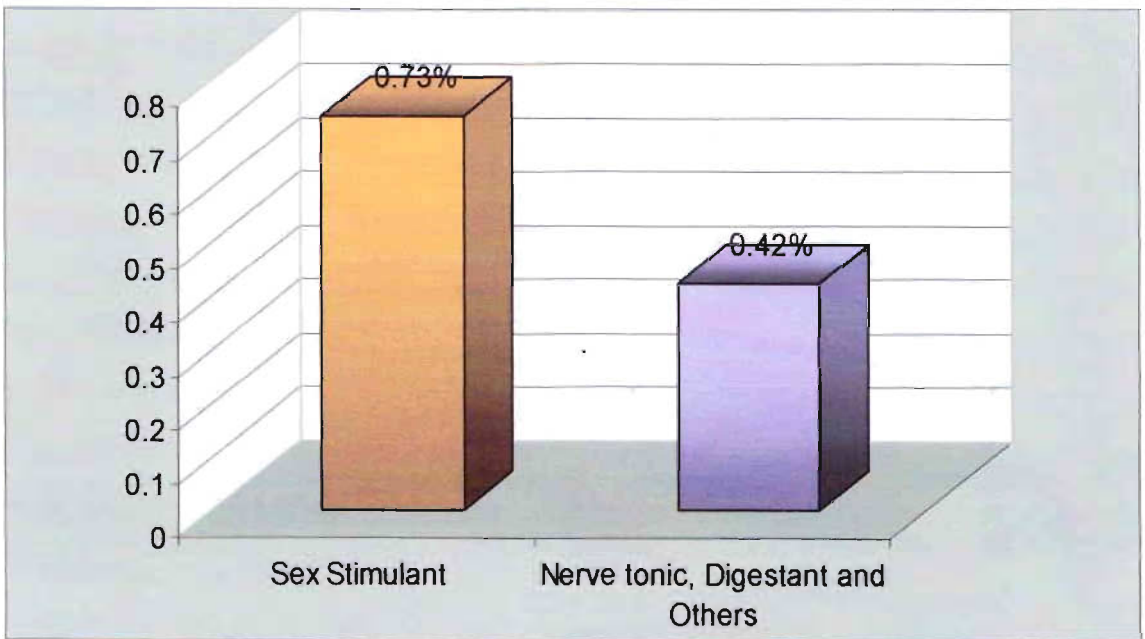


Figure 17: Percent sell of Sex stimulant versus Nerve Tonic, Digestant and Others

6.9 Paracetamol and Diclofenac:

Both Paracetamol and Diclofenac are two most frequently used NSAIDs that are also included in the Essential Drug List. During the study period, it was found that the percent sell of Paracetamol and Diclofenac was 4.73% and 2.18% respectively of the total sell.

Table 14: Percent sell of Paracetamol and Diclofenac

Category	% Sell
Paracetamol	4.73
Diclofenac	2.18



Figure 18: Percent sell of Paracetamol and Diclofenac

6.10 Number of Drug Sold per Encounter:

The percent of number of drug sold per encounter calculated from the study carried out is as follows (Table 19):

Table 15: Percent of Number of Drug Sold per Encounter.

No. of Drugs per Encounter	% Sell	No. of Drugs per Encounter	% Sell
1 Drug	53.44	6 Drugs	0.67
2 Drugs	25	7 Drugs	0.11
3 Drugs	12.33	8 Drugs	0.11
4 Drugs	6.11	9 Drugs and more	0
5 Drugs	2.22		

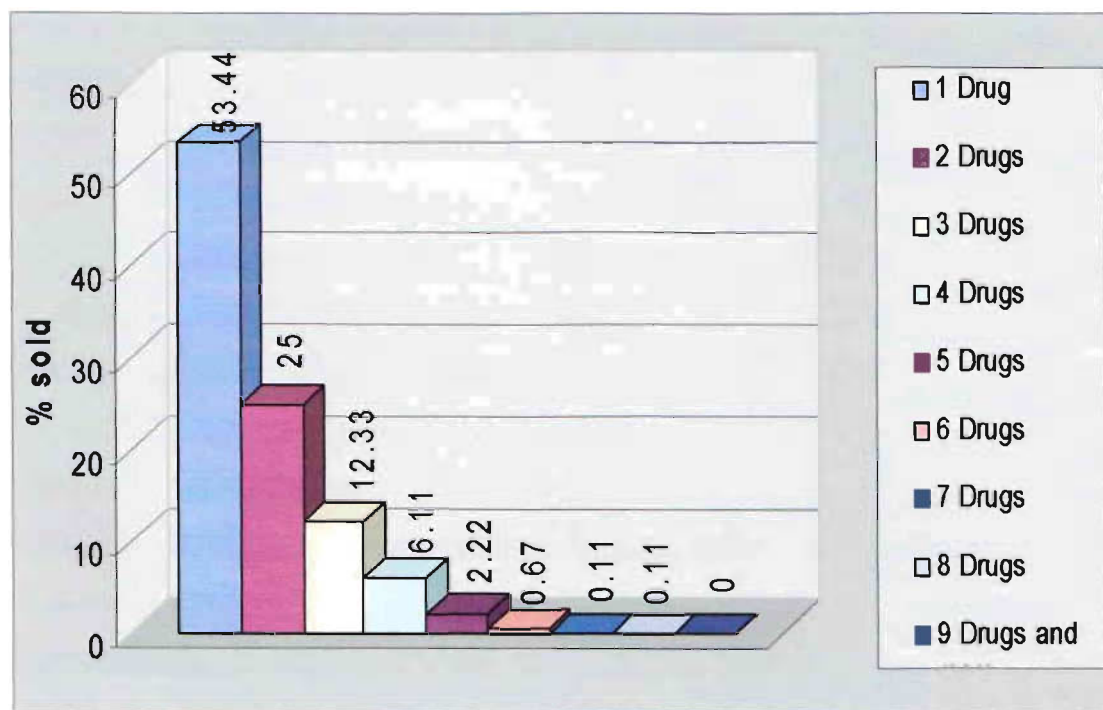


Figure 19: Percent of number of drug sold per encounter

6.11.1 Top Most Selling Companies and Their Market Share:

The drug market in Bangladesh is mainly dominated by top 30 companies. In terms of the National Percent sell of the companies, the study indicates 58.50% of the total market is captured by the ten (10) companies. Top ten selling companies and their market share during study period are given below:

Table 16: Top ten selling companies and their market share

Company	% Sell	Company	% Sell
Square	16.53	Drug Int.	4.25
Acme	6.80	Opsonin	4.13
Incepta	5.76	Aristo	3.70
SKF	5.34	Reneta	3.52
Beximco	5.04	ACI	3.34

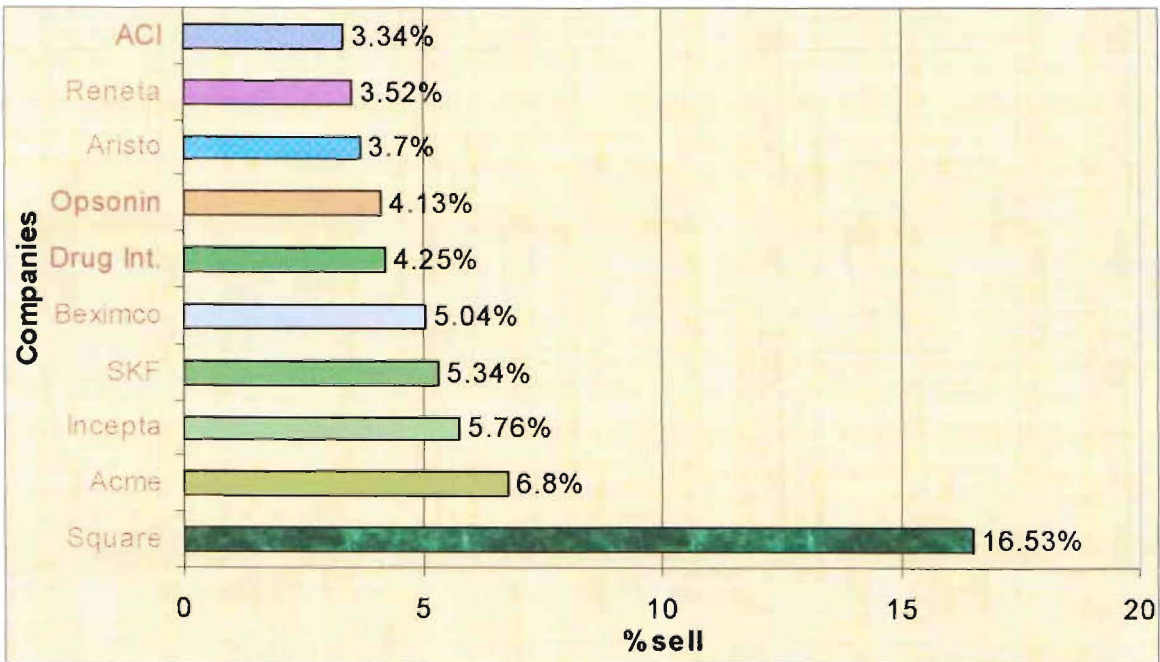


Figure20: Market share of top 10 selling Companies

6.11.2 Status of the Companies in Dinajpur:

In Case of the drug market of Dinajpur, ten companies are controlling 68.12% of the market in terms of selling their product. Top ten selling companies and their market share during study period in Dinajpur are given bellow:

Table 17: Top ten selling companies and their market share in Dinajpur

Company	% Sell	Company	% Sell
Square	23.87	Opsonine	5.40
Acme	8.89	Aristo	3.66
Renata	5.57	Beximco	3.31
Incepta	5.40	Drug Int.	3.31
SKF	5.40	Orion	3.31

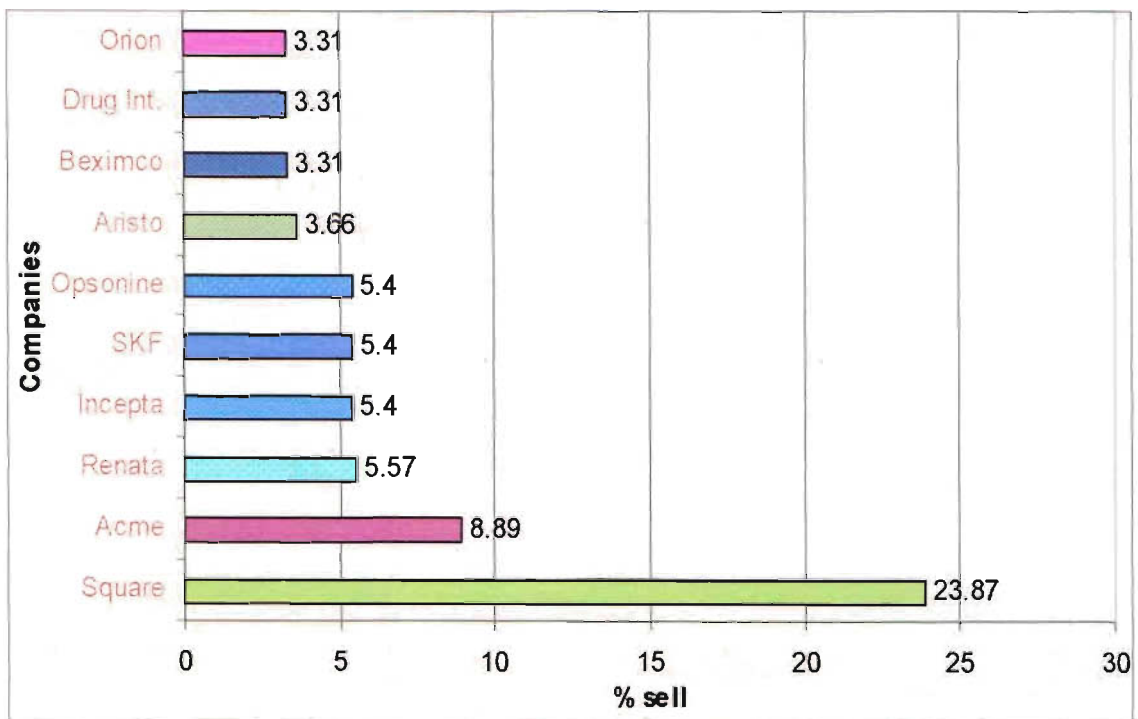


Figure 21: Top ten selling companies and their market share in Dinajpur

6.11.3 Status of the Companies in Nator:

In Case of the drug market of Nator, ten companies are controlling 65.27% of the market in terms of selling their product. Top ten selling companies and their market share during study period in Nator are given below:

Table 18: Top ten selling companies and their market share in Nator

Company	% Sell	Company	% Sell
Square	15.27	SKF	4.39
Acme	12.21	Aristo	4.01
Incepta	8.40	ACI	3.63
Beximco	6.30	GSK	3.44
Drug Int.	4.96	Reneta	2.67

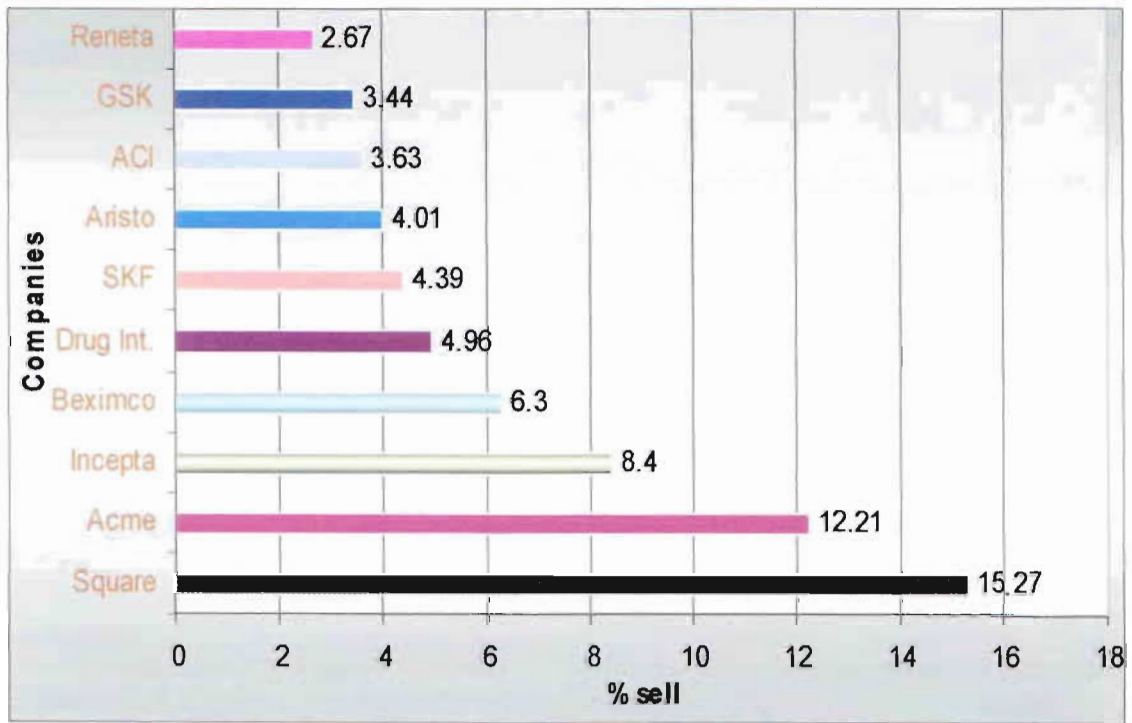


Figure 22: Top ten selling companies and their market share in Nator

6.11.4 Status of the Companies in Noakhali:

In Case of the drug market of Noakhali, ten companies are controlling 63.09% of the market in terms of selling their product. Top ten selling companies and their market share during study period in Noakhali are given bellow:

Table 19: Top ten selling companies and their market share in Noakhali

Company	% Sell	Company	% Sell
Square	15.66	Opsonin	5.09
Beximco	8.00	Aristo	4.36
Incepta	6.18	ACI	4.18
SKF	6.18	Orion	3.45
Drug Int.	5.82	Bio-Pharma	3.27

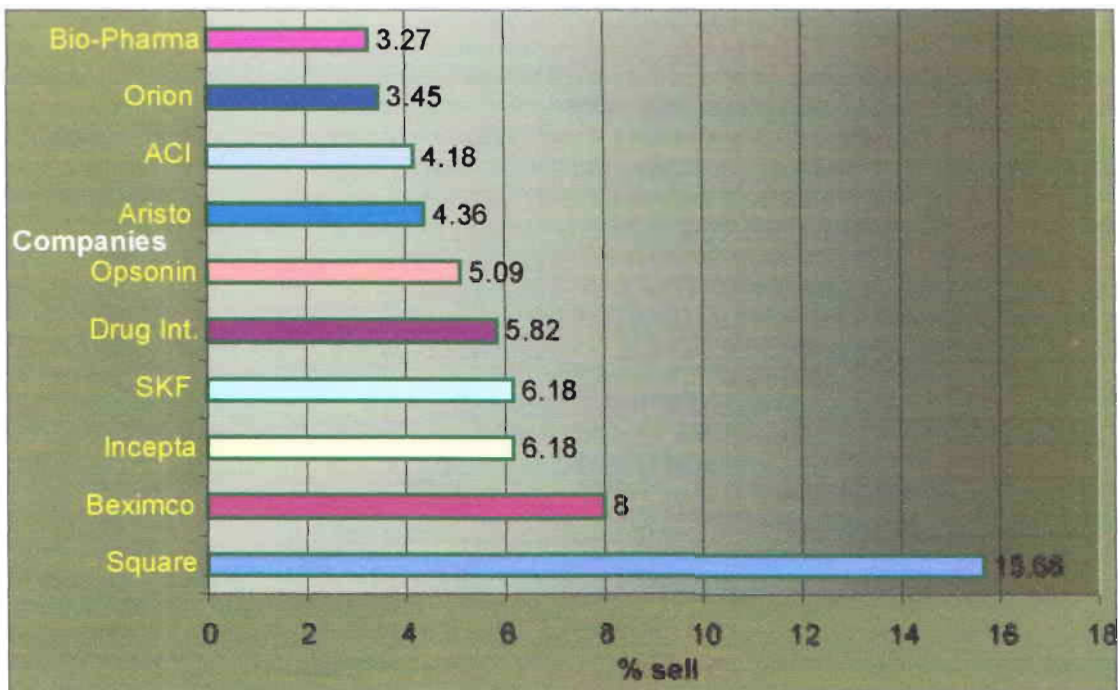


Figure 23: Top ten selling companies and their market share in Noakhali

6.12 Market Share of National and Multinational Companies:

After the liberation of Bangladesh, the drug market of Bangladesh was mostly dominated by the Multinational companies but the implementation of Drug Control Ordinance 1982 totally reversed the situation. It was found during the study period that the market share of the multinational companies is only 7.46% whereas the share of national companies is 92.54%.

Table 20: Market Share of National and Multinational Companies.

Category	% Value
Sell Of National Companies	92.54
Sell Of Multi-National Companies	7.46

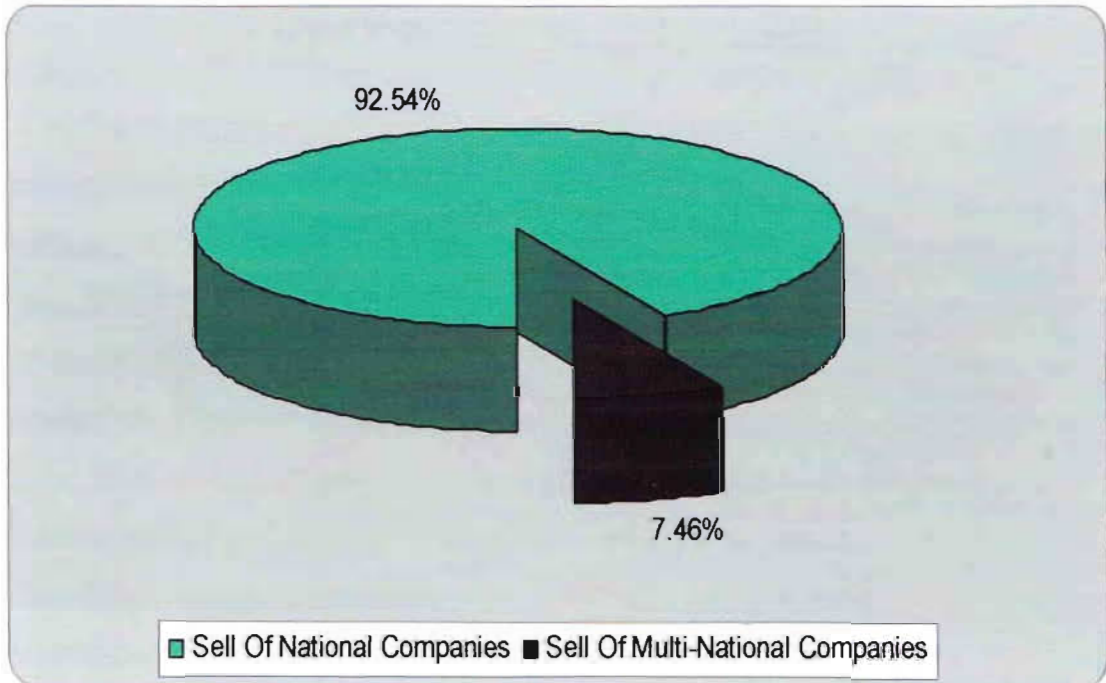


Figure 24: Percent Sell of National and Multinational companies

6.13 Imported Drugs:

The local demand of medicine was met mainly by importing the medicines from abroad, prior of the introduction of the Drug Control Ordinance 1982. But at present the drug industry of the country have grown enough to meet the demand of medicine by the nation. It has been found from the study that, only 0.91% of the sophisticated and high technology medicines are sold by importing them from abroad and the rests 99.01% of medicines are being manufactured in the country.

Table 21: Percent of Imported and Locally manufactured medicines sold.

Category	Value
% of Manufactured Drug	99.09
% of Imported Drug	0.91

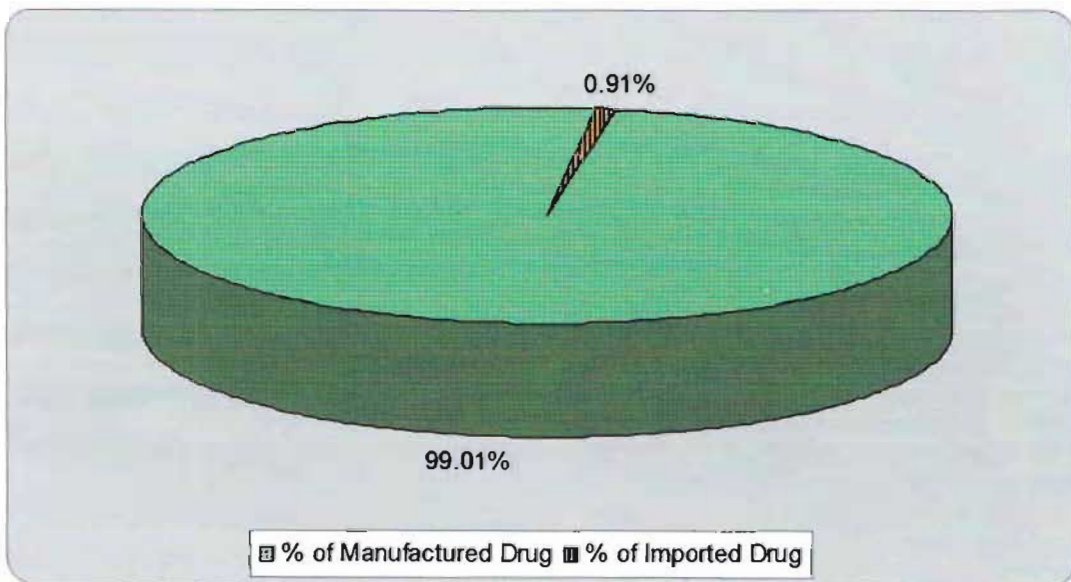


Figure 25: Percent of Imported and Locally manufactured medicines sold



Part- 7

Repotr Summary

7.1 Report Summary:

The study has been carried out to find out the selling pattern of drug in Bangladesh. The studies have been performed with 900 samples collected from Dinajpur, Nator and Noakhali. During sample collection, it was considered to collect the sample from both urban and from the respective rural area of that urban.

The total percent of prescription sell found was 34.67% and non-prescription sell 65.33%. The prescription sell in urban area was 40.83% and the respective rural area was 22.33%. On Other hand, non-prescription sell of urban area was found 59.17% and rural area was 77.67%. The area wise comparative percent of prescription sell found in Dinajpur 41.67%, Nator 38.67% and Noakhali 23.67%. And the non-prescription sell were Dinajpur 58.33, Nator 61.33% and Noakhali 76.33%.

The hierarchy of the popularity of the types of dosage forms found was- Solid (82.58%), Liquid (8.43%), Parenteral (3.82%), others (2.18%), Semi-solid (1.76%) and Ophthalmic (1.21%); and similarly the hierarchy found for the top five popular dosage forms were- Tablet (61.9%), Capsule (18.18%), Syrup (6.31%), Suspension (2.55%) and Chew Tablet (2.12%).

The percent of injection sold, found during the study period was 3.82% of the total sell among which the percent sell of prescribed injection was 92.10% and the percent of non-prescribed injection was 7.90%. More over, the percent of prescribed sample containing injection was 18.59%.

Being a non popular dosage form, the percent of suppository sold was only 0.49%. The percent sell of aerosol and dusting powder found was 0.70% and 0.12%.

According to the study performed among the all traditional medicines sold, the percent sell of Unani medicine, Ayurvedic medicine and Herbal medicine was 0.79%, 0.30% and 0.73% respectively. There were 0.73% sex stimulants and 0.42% Nerve tonic, Digestant, Vitamins and others were sold.

Beside these, it was found from the study that percent sell of Paracetamol and Diclofenac was 4.73% and 2.18% respectively. The study also indicated that the percent of sample containing one, two, three, four, five six, seven, eight, nine or above drug was 53.44%, 25%, 12.33%, 6.11%, 2.22%, 0.67%, 0.11%, 0.11%, and 0.0% respectively.

The market share of national companies was 92.54% and multinational companies were 7.46%. It was found from the study that only 0.91% of the total sell was of imported drugs.

With accordance with the study performed, the market share of top ten selling companies is 58.50% and their individual share is- Square 16.53%, Acme 6.58%, Incepta 5.76%, SKF 5.34%, Beximco 5.04, Drug Int. 4.25%, Opsonin 4.13%, Aristo Pharma 3.70%, Reneta 3.52% and ACI 3.34%.

In case of Dinajpur, the market share of the top ten selling companies according to the study is 68.12% and their individual share is- Square 23.87%, Acme

8.89%, Reneta 5.57%, Incepta 5.40%, SKF 5.40%, Opsonin 5.40%, Aristo 3.66, Beximco 3.31%, Drug International 3.31% and Orion 3.31%.

In case of Nator, the market share of the top ten selling companies according to the study is 65.27% and their individual share is- Square 15.27%, Acme 12.21%, Incepta 8.40%, Beximco 6.30%, Drug International 4.96%, SKF 4.39%, Aristo 4.01%, ACI 3.63, GSK 3.44 and Reneta 2.67%.

In case of Noakhali, the market share of the top ten selling companies according to the study is 63.09% and their individual share is- Square 15.66%, Beximco 8.00%, Incepta 6.18%, SKF 6.18, Drug International 5.82%, Opsonin 5.09%, Aristo Pharma 4.36%, ACI 4.18%, Orion 4.35% and Bio-Pharma 3.27%.

Part- 08

Conclusion

8.1 Conclusion:

This types of field works covers a variety of educational approaches for the population; namely, the public, health professionals, students in schools and universities and finally political leaders, policy makers and planners, where it could play an important role in improving the use of medicines. Patterns of drug prescribing, uses, availability, affordability and dispensing in Bangladesh are very crucial at present. The existing systems should be reformed in order to ensure better utilizations of therapeutic drugs in the country. Thus, there are some common areas that need to be emphasized to promote the rational use of medicines-

- Standard treatment guidelines
- Essential drugs list
- Pharmacy and therapeutic committees
- Problem-based basic professional training
- Targeted in-service training of health workers

Some of the interventions which need further testing but should be supported:

- Interaction of health providers and consumers on proper use of medicines
- Training of pharmacists and drug sellers
- Educating the public about medicines by consumer organizations

Issues that require a long term equity approach:

- Improving prescribing in the private sector
- Monitoring key pharmaceutical indicators in health and regulatory sector's reform

The primary objective of this survey is to give an overview of the regional

situation with regard to the rational use of medicines . It aims to sensitize four categories of persons who need to understand and believe in the rational use of medicines and become actively involved in supporting and observing the principles and practices of the rational use of medicines.

These categories of people are:

- The public
- All categories of health professionals
- Persons undergoing general education, and
- Policy makers, political leaders, planners and bureaucrats.

The document also reviews the challenges, and identifies what needs to be done to create awareness and educate people in order to motivate them to find practical, realistic and innovative solutions and implement programmes and activities in order to ensure the rational use of medicines. It is hoped that this document would initiate more activities in this neglected area and would lead to better use of medicines by all concerned, including the poor and the marginalized groups in the population.



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Part- 10

Annexure

Annexure 02

Name of Researcher:

Location of Shop:

Thana:

District:

#No of Sample:

#Prescription:

#Non-Prescription:

Solid	Tablet			
	Chew Tab			
	Capsule			
Semi-Solid	Ointment			
	Cream			
	Suppo.			
Liquid	Syrup			
	Suspension			
Ophth	Eye Oint		Ear Drop	
	Eye Drop		Nasal Drop	
Injec	Infusion			
	Ampoules			
	Vials			
Others	Aerosol			
	Dusting			
	Miscell			

Sample Containing No. of Medicine

01		06	
02		07	
03		08	
04		09	
05		10	

No. Sample Containing Both Allopathic & Traditional Medicine

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No. Sample Containing Different Traditional Medication

Sex Stimulants		
Nerve Tonic, Digestive & Others		

No. Sample Containing Unani & Ayurvedic Medicine

Ayurvedic		
Unani		

No. Sample Containing Paracetamol and Diclofenac

Paracetamol		
Diclofenac		
Acoclofenac		

No. Sample Containing Suppository

Total:

Prescribed		
Non-Prescribed		

#Prescription containing Injection:

#Herbal medicine Sold:

Annexure 03

Companies

ACI
Acme
Alcon
Amico
Apex
Aristo
Asiatic
Aventis
Beacon
Benham
Belsen
Beximco
Bio-Pharma
Bristol
Bufco
Chemist Lab
Decent
Delta
Dr.'s Chemi
Drug Int.
Edruc
Fisons
Gaco
General
GSK
Globe
Hamdard
Health Care
Hudson
Ibn Sina
Incepta
Jayson
Modi-Mundi
Mystic
Navana
Novartis
Novo H.C
Novo N.disk

Nuvista
Opsonin
Organon
Orion
Oweshadhi
Pacific
Paraugs
Peoples
Popular
Proteety
Radiant
Rangs
Reneta
Rephco
Roche
Sandoz
Serveier
Smsl-Alamin
Silva
SKF
SMC
Square
Sun
Tasty Foods
Tech.Drugs
Unimed
Universal
White Horse
Ziska

