THE PRESCRIBING PATTERN OF ANTIULCERANTS AMONG THE SPECIALIST DOCTOR'S OF DIFFERENT AREAS OF BANGLADESH

A thesis paper submitted to the Department of Pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.

Submitted By

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DEDICATION

This Research Paper Is Dedicated To My Beloved Parents,
Without Whom I am Incomplete.

DECLARATION BY THE CANDIDATE

I, Lutfun Nahar Chowdhury, hereby declare that this thesis, entitled **"The Prescribing Pattern Of Antiulcerants Among The Specialist Doctor's Of Different Areas Of Bangladesh."** submitted to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of Bachelor of Pharmacy (Honors) is a genuine & authentic research work carried out by me. The contents of this thesis paper, in full or in parts, have not been submitted to any other institute or University for the award of any degree or Diploma of Fellowship.

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CERTIFICATION BY THE SUPERVISOR

This is to certify that the dissertation, entitled **"The Prescribing Pattern Of Antiulcerants Among The Specialist Doctor's Of Different Areas Of Bangladesh"** is a legal research work done by Lutfun Nahar Chowdhury (ID: 2012-1-70-036), in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy.

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List of Abbreviation

PPI	**Proton Pump Inhibitor**
EDL	**Essential Drug List**
HPNSDP	**Health, Population, and Nutrition Sector Development Programme**
NGOs	**Nongovernmental organizations**
DGHS	**Directorates General of Health Services**
DGFP	**Directorates General of Health FamilyPlanning**
DOTS	**Directly Observed Treatment Strategy**
AIDS	**Acquired Immunodeficiency Syndrome**
MRs	**Medical Representatives**
WHO	**World Health Organization**
EE	**Erosive Esophagitis**
GERD	**Gastroesophageal Reflux Disease**
DDIs	**Drug-drug Interactions**
FDA	**Food And Drug Adminstration**
OTC	**Over the Counter**
NSAID	**Nonsteroidal Anti-Inflammatory Drug**

ABSTRACT

The prescribing pattern of medicines among the doctors including specialist in Bangladesh is going to the class of irrationality due to the presence of lots of drugs with different brand name but generic names are same and also for the competition of the leading pharmaceutical campanies to gain the larger portion of market now a days. Promoting the rational use of medicines would definitely help mankind to fight the diseases and illness for better tomorrow. The objective of this study to see the prescribing pattern of antiulcerants among the specialist doctors' of different areas of Bangladesh.By focusing and influencing the present situation of prescribing pattern of antiulcerants among specialty doctors the samples was collected randomly from different parts of Bangladesh likeDhaka,Chittagong,Comilla,Kustia etc.In our study 1600 prescription was randomly collected. Among them 1192 prescription out of 1600 contain antiulcerants and the percentage is 74.5%.The percentage of antiulcerant containing prescription in each specialty shows that medicine accommodate the highest area of 66.33% and then the pediatrics, gastroliver, dermatology, orthopedics, gyanecology, ENT as the number of medicine related prescription is high in this study.The drugs in the prescriptions included in the EDL (Essential drug list)are omeprazole and ranitidine.Among the 1192 number of prescription containgantiulcerants only 59.98% specialty doctors followed EDL drug list and 40.02% did not follow EDL.The percentage distribution of EDL among specialty doctors is higher in orthopedics (86.61%), then in medicine (75.22%), gastroliver (70.50%) and dermatology (67.02%).The percentage of antiulcerant prescribes among their own specialty shows that orthopeditians (90.55%) prescribes highest percentage for their frequent treatment procedures. The most prescribed generics are omeprazole (65%), esomeprazole (20%),ranitidine (7%) etc. The share of different companies in Bangladesh shows that the top ranked company like Square(23.07%)**,**Eskayf (21.22%),Incepta(13.25%),Beximco (8.14%), Healthcare (7.80%), ACI (6.21%) etc. holds larger area in Bangladesh in antiulcerant marketing and other holds a very few percentage in total of 100%.These data gives us the idea about what type of medicines are frequently prescribed by the physicians and the present condition of medical business and whatshould be the directions for future generations to overcome it.

Keywords: Antiulcerants, EDL, Prescription, Gastro liver, Orthopedics, Promotional,

Distribution, Specialist.

Chapter One:

INTRODUCTION

1.1. INTRODUCTION

Bangladesh is one of the most densely populated countries in the world. It is a unitary state and parliamentary democracy. Health and education levels are relatively low, although they have improved recently as poverty levels have decreased. Bangladesh faces a number of major challenges, including poverty, corruption, overpopulation and vulnerability to climate change. However, it has been lauded by the international community for its progress on the Human Development Index. Bangladesh has made more notable gains in a number of indicators than some of its neighbours with higher per capita income, such as India and Pakistan. The joint donor funded Health, Population, and Nutrition Sector Development Programme (HPNSDP) has contributed to significant improvement in a number of health indicators including reduction in under-five mortality, immunization coverage, maternal mortality and total fertility. Despite current economic growth, poverty and income inequality remain persistent challenges in Bangladesh. Simultaneous with the demographic transition, Bangladesh is undergoing the health transition and manifesting the double burden of disease attributable to the emergence of noncommunicable diseases. The health system of Bangladesh is a pluralistic system with four key actors that define the structure and function of the system:

- Government,
- Private sector,
- Nongovernmental organizations (NGOs) and
- Donor agencies.

1.2.Health care system in Bangladesh

The Government or public sector is the first key actor which by constitution is responsible not only for policy and regulation but for provision of comprehensive health services, including financing and employment of health staff.

The Ministry of Health and Family Welfare, through the two Directorates General of Health Services (DGHS) and Family Planning (DGFP), manages a dual system of general health and family planning services through district hospitals, Upazila Health Complexes (with 10 to 50 beds) at subdistrict level, Union Health and Family Welfare Centres at union level, and community clinics at ward level.

The role of NGOs is growing as donors are channeling significant and increasing amounts of funding directly to them. In 2007, 9% of total health expenditure was managed by NGOs, up from 6% in 1997. As a response to both external and internal pressures, partnerships between the Government and NGOs in the areas of financing, planning, service delivery, capacity building,

and monitoring and evaluation have produced some health gains. The Bangladesh public health system remains highly centralized, with planning undertaken by the Ministry of Health and Family Welfare and little authority delegated to local levels.

According to the latest Bangladesh National Health Accounts, Bangladesh spends US$ 2.3 billion on health or US$ 16.20 per person per year, of which 64% comes through out-of-pocket payments. While, according to WHO estimates, Bangladesh currently spends US$ 26.60 per person on health per year. Public funding for health is the main prepayment mechanism with scope for risk pooling, which constitutes 26% of total health expenditure.

During 2007–2013, the number of both hospitals and total number of beds in the public sector has steadily increased. The number of beds in PHC (primary health care) facilities at upazila level and below reached 18 880 across 472 facilities in 2013, and 27 053 in 126 facilities at secondary and tertiary level.

At present there are 64434 registered doctors, 6034 dentists, 30516 nurses, and 27000 nursemidwives in the country (cumulative figures unadjusted for attrition due to deaths, retirements, migration, change of profession, or inactivity). In the public sector, the Ministry of Health and Family Welfare is the main agency providing public health services, including health promotion and preventive services.

The public health services include:

• Programmes for the control of tuberculosis, now covering all upazilas with the Directly Observed Treatment Strategy (DOTS);

• The National Leprosy Elimination Programme, which reduced prevalence rates to 0.24/10 000 by 2010; the Malaria and Parasitic Disease Control Programme which targets approximately 11 million people in high risk areas;

• Kala-azar (visceral leishmaniasis) control which has now expanded to cover 27 districts; and

• The HIV/AIDS programme which has managed to keep the incidence of HIV below 1% among high-risk populations.

1.3. National Health Policy

(i) Strengthening primary health and emergency care for all,

(ii) Expanding the availability of client-centred, equity-focused and high quality health care services, and

(iii) Motivating people to seek care based on rights for health. (Vaughan,2000; Adams et al., 2013)

1.4. Disease Pattern in Bangladesh

Bangladesh has one of the highest growth rates in the world. The fertility rate is extremely high in the country's society beacuse of patriarchal issues that request women to bear children and work in rural, menial jobs. Bangladesh's population is highly rural with urban centers being limited. It also has a high risk of infectious diseases like typhoid fever,respiratory diseases,UTI's diarrhea and hepatitis A & E.

This is because the country health system is extremely poor and underdeveloped.Most women dont receive medical treatment, while some of them spent their entire their lives without making contact with a medical professional. Health problems abound,springing from poor water quality and prevalence of infectious diseases. Common diseases such as Malaria and dengue were rampant in Bangladesh. Malnutrition in Bangladesh has been a persistent problem for the poverty-stricken country.

The world Bank estimates that Bangladesh is ranked 1st in the world of the number of children suffering from malnutrition.In Bangladesh 26% of the population are under nourishedand & 46% of suffers from moderate to severe underweight problem.43% of children under 5 years old are stunted. One in five preschool age children are vitamin A deficient and one in two are anemic. More than 45% of rural families and 76% of urban families were below the acceptable caloric intake level. According to the World Bank, about one -third of babies in Bangladesh are born with low birth weight, increasing infant mortality rate and leads to increasing risk of diabetes and heart ailments in adulthood. According to UNICEF, one neonate dies in Bangladesh every three to four minutes, 120000 neonates die every year.(A.A Moghal, 2015)

1.5. Prescribing pattern in Bangladesh

The total number of registered physicians in Bangladesh is 32,498 thus making one physician for every 4000 people (WHO,2000). In the absence of enough qualified doctors, drugs are often prescribed by unqualified health workers and people can get any drug from any drug store without a prescription. Each day new drugs with higher cost are coming into market in large scale. Family/ individuals have to spend big amounts of money for purchasing drugs. For example, Bangladesh spent 5,500 cores in health only in the year 1996-1997, out of which total spending on drugs was tk 2,700 cores. But it was found that the family/individuals had to spend

tk. 2500 cores which are about 90.7% of total spending on drugs. Government and other sources spent only tk.250 cores for drugs. (Bangladesh national health accounts 1996-1997).

Prescriptions may include orders to perform by a patient care taker,nurse, pharmacist or other therapist. Commonly the term prescription is usedto mean an order to take certain medication.The outpatient departmentsof the hospital havebeen chosen by both rural and urban population of different classes and socio economic back ground daily come to these outpatient departments from various parts of Bangladesh to take treatment of their common diseases. The prescribing pattern of the outpatient departments of tertiary level hospitals are often copied by community practitioners and health workers.

The rational use of drugs is an essential element in achieving quality of health and medical carefor patient and the community and this must be the important concern of practitioners.Use of antimicrobial without any valid reasonis most common in Bangladesh. This is the reason why antibiotic resistance is growing up. Over the counter medicines have emergedas drugs of serious misuse across Bangladesh,and other neighboring countries. One report estimates that there are 4 million drugmiss users in the south Asian region, where Bangladesh accounts for half million of the total.Along the common practices of self medication,almost every drug store salesperson is illegally involved in the recommendation and sells of prescription only medicines in Bangladesh.

(A.A Moghal, 2015)

1.6. Drug promotion or impact of pharmaceutical industries on prescribing medicines

Drug promotion or impact of pharmaceutical industries on prescribing medicines refers to all informational and persuasive activities by manufacturers and distributors, the effect of which is to induce the prescription, supply, purchase and/or use of medicinal drugs. There are many tactics for drug promotion that were adopted by pharmaceutical companies including:

- Physicians-targeted promotions,
- Direct to consumer advertising,
- Unethical recruitment of physicians,
- Researchers' conflicts of interest, and
- Data manipulation in clinical trials.

However physician targeted promotion is the most common tactic for drug promotion since physicians are effectively the gatekeepers to drug sales. It has been estimated that 84% of pharmaceutical marketing is directed toward physicians. This tactic includes items such as free samples, journal advertisements and visits from medical representatives to physicians.

Pharmaceutical companies use the service of medical sales representatives in marketing their products. These sales representatives need to be adequately trained and possess sufficient medical and technical knowledge to present information about the products in an accurate and responsible manner. The medical representative (MRs) should not only be able to provide accurate information, but should also not to exaggerate the capabilities of the product . Interactions between physicians and MRs are inevitable and desirable, but may create conflicts of interest for physicians. So it is the practitioner's duty to get the information from MRS but should take care not to be unduly influenced by their sales pitch. (EM Mikhael,2013)

1.7. Marketing of pharmaceutical products strategy:

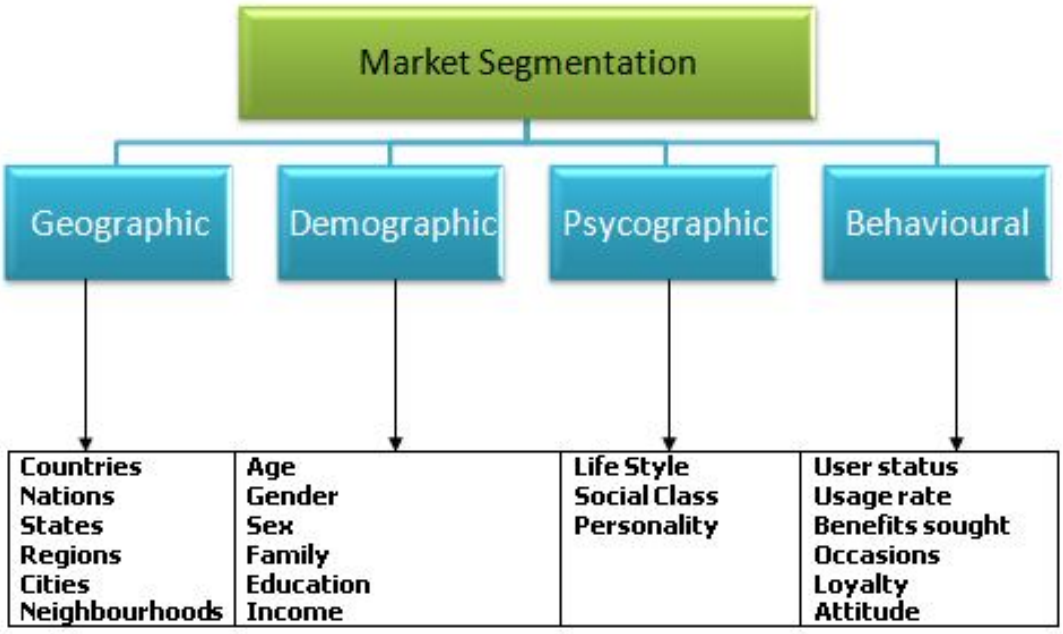
The pharmaceutical market in Bangladesh is highly concentrated (top ten control around 70 % of the market). Due to high competition aggressive marketing strategies are adopted for greater market share, which sometimes cross limit. There is lack of data on this aspect in Bangladesh.

This exploratory study aimed to fill this gap by investigating current promotional practices of the pharmaceutical companies including the role of their medical representatives (MR).This qualitative study was conducted as part of a larger study to explore the status of governance in health sector in 2009. Data were collected from Dhaka, Chittagong and Bogra districts through in-depth interview (healthcare providers and MRs), observation (physician-MR interaction), and round table discussion (chief executives and top management of the pharmaceutical companies).

A comprehensive training curriculum for the MRs prepares the newly recruited science graduates for generating enough prescriptions by catering to the identified needs and demands of the physicians expressed or otherwise and thus grab higher market-share for the companies they represent. Approaches such as inducements, persuasion, emotional blackmail, serving family members, etc. are used. The type, quantity and quality of inducements offered to the physicians depend upon his/her capacity to produce prescriptions.

This study was done as part of a larger study by Bangladesh Health Watch 2016 which explored issues related to governance in the health sector including the pharmaceutical sector . It aimed to investigate the extent of ethical procedures followed in the marketing practices of the pharmaceutical companies and the role of their MRs in this process. Findings reveal a structured and evidence-based drug promotion strategy instituted by the pharmaceutical companies which frequently violates ethics. (Mohiuddin et al., 2015)

1.8.Pharmaceutical companies segmented their programmes for prescribing drugs in different sectors like as below:



1.9. Rational uses of medicines

Definition: Rational use of drugs means "Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community." (WHO,1985).

Irrational use of medicines is a global problem. It has been estimated that less than half of all medicines are prescribed, dispensed or sold inappropriately and that less than half of all patients take their medicines as prescribed or dispensed. Irrational use of medicines can harm patients in terms of poor patient outcome, unnecessary adverse reactions and wastage of resources, often out of pocket payments by patients.

WHO selected some drug use indicators for primary health care facilities (WHO, 1993)

They are:

1) Prescribing Indicators:

- The average number of medicines prescribed per patient encounter.
- The percentage of medicines prescribed by generic name.

- The percentage encounters with an antiulcerants prescribed.
- The percentage encounters with an injection prescribed.
- The percentage of medicines prescribed from essential medicines list or formulary.

2) Patient Care Indicators:

- The average consultation time.
- The average dispensing time.
- The percentage of medicines actually dispensed.
- The percentage of medicines adequately labeled.
- The percentage of patients with knowledge of correct doses.

3) Facility Indicators:

- The availability of essential medicines list or formulary to practitioners.
- The availability of clinical guidelines.

4) Complementary Drug Use Indicators:

- The average medicine cost per encounter and percentage of prescriptions in accordance with clinical guideline. (KA Holloway - 2011)

Table:1.1.The overall findings for the WHO core prescribing Indicators

Prescribing Indicators	Findings
1. Average number of drugs per prescription	3.8
2. Percentage of drugs prescribed by generic name	0.0
3. Percentage of encounters with an antibiotic prescribed	6.7
4. Percentage of encounters with an injection prescribed	3.3
5. Percentage of drugs prescribed from national essential drug List	4.3

6. Percentage of encounters with an antiulcerant prescribe	97.3
7. Percentage of encounters with a NSAID prescribed	97.0
8. Percentage of encounters with a calcium preparation prescribed	67.3

(KA Holloway - 2011)

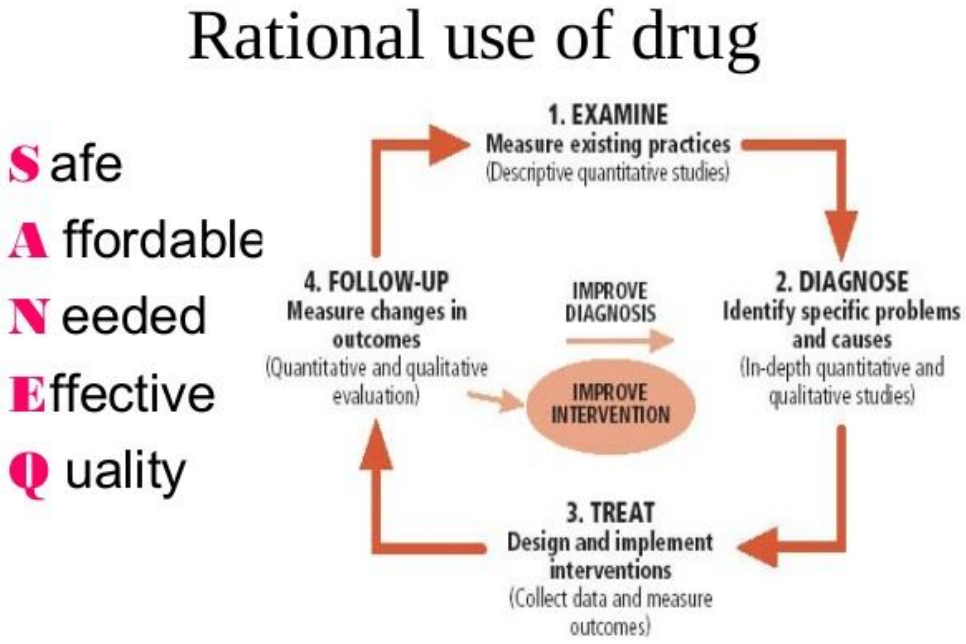


Figure 1.1: A comprehensive diagram of different steps of rational use of drug

1.10.Mechanism of action of antiulcerants (PPIS)

Proton pump inhibitors act by irreversibly blocking the hydrogen/potassium adenosine triphosphatase enzyme system (the H+/K+ ATPase, or, more commonly, the gastric proton pump) of the gastric parietal cells.The proton pump is the terminal stage in gastric acid secretion, being directly responsible for secreting H+ ions into the gastric lumen, making it an ideal target for inhibiting acid secretion.Targeting the terminal step in acid production, as well as the irreversible nature of the inhibition, results in a class of drugs that are significantly more effective than H2 antagonists and reduce gastric acid secretion by up to 99%. ("Irreversibility" refers to the effect on a single copy of the proton pump; the effect on the overall human digestive system is reversible, as the proton pump protein is rendered non-functional and can be replaced with new copies.)

Decreasing the acid in the stomach can aid the healing of duodenal ulcers and reduce the pain from indigestion and heartburn. Stomach acids are needed however to digest proteins, vitamin B12, calcium, and other nutrients. Too little stomach acid causes the condition hypochlorhydria.

The PPIs are given in an inactive form, which is neutrally charged (lipophilic) and readily crosses cell membranes into intracellular compartments (like the parietal cell canaliculus) with acidic environments. In an acid environment, the inactive drug is protonated and rearranges into its active form. As described above, the active form will covalently and irreversibly bind to the gastric proton pump, deactivating it.(Philip O. Katz,2005)

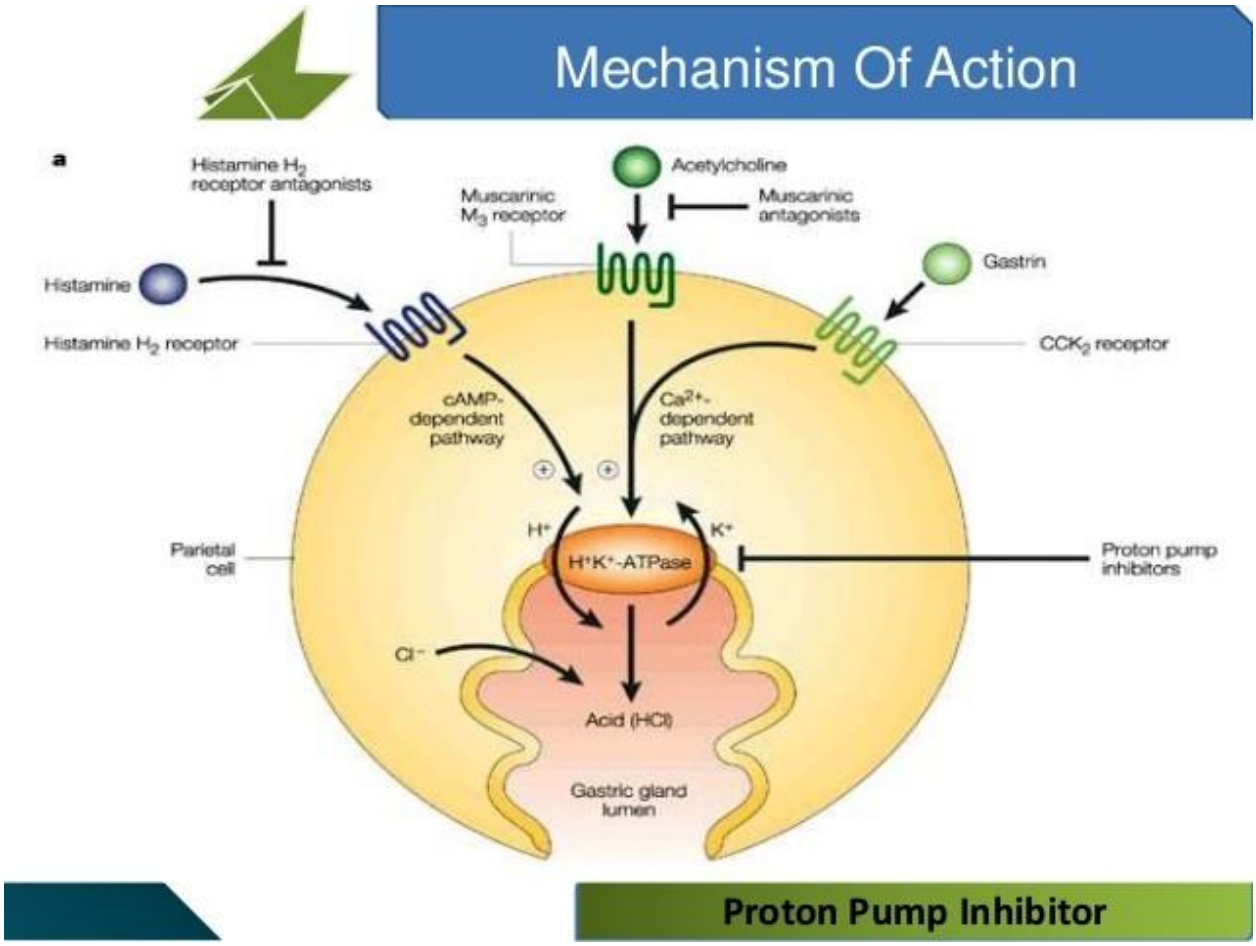


Figure.1.2: Mechanism of action of antiulcerants.

1.11. Rational use of PPI'S

Proton pump inhibitors (PPIs) are drugs which irreversibly inhibit proton pump (H+/K+ ATPase) function and are the most potent gastric acid-suppressing agents in clinical use.

There is now a substantial body of evidence showing improved efficacy of PPIs over the histamine H2 receptor antagonists and other drugs in acid-related disorders.

Omeprazole -20 mg/day, lansoprazole- 30 mg/day, pantoprazole- 40 mg/day or rabeprazole- 20 mg/day for 2 to 4 weeks are more effective than standard doses of H2-receptor antagonists in healing duodenal and gastric ulcers.

Patients with gastric ulcers should receive standard doses of PPIs as for duodenal ulcers but for a longer time period (4 to 8 weeks). There is no conclusive evidence to support the use of a

particular PPI over another for either duodenal or gastric ulcer healing. For Helicobacter pylori-positive duodenal ulceration, a combination of a PPI and 2 antibacterials will eradicate H. pylori in over 90% of cases and significantly reduce ulcer recurrence. Patients with H. pylori-positive gastric ulcers should be managed similarly.

PPIs also have efficacy advantages over ranitidine and misoprostol and are better tolerated than misoprostol in patients taking nonsteroidal anti-inflammatory drugs (NSAIDs). In endoscopically proven gastro-esophageal reflux disease, standard daily doses of the PPIs are more effective than H2-receptor antagonists for healing, and patients should receive a 4 to 8 week course of treatment. For severe reflux, with ulceration and/or restriction formation, a higher dose regimen (omeprazole 40 mg, lansoprazole 60 mg, pantoprazole 80 mg or rabeprazole 40 mg daily) appears to yield better healing rates.

There is little evidence that PPIs lead to resolution of Barrett's esophagus or a reduction of subsequent adenocarcinoma development, but PPIs are indicated in healing of any associated ulceration. In Zollinger-Ellison syndrome, PPIs have become the treatment of choice for the management of gastric acid hypersecretion. (Richardson P, 2016)

1.12. Indications of antiulcerents in different illness:

PPIs are used for the prevention and treatment of gastric acid related conditions. The FDA-approved indications for use include:

• Healing of erosive esophagitis (EE);

• Maintenance of healed EE;

• Treatment of gastroesophageal reflux disease (GERD);

• Risk reduction for gastric ulcer (GU) associated with nonsteroidal anti-inflammatory drugs (NSAIDs);

•Helicobacter pylori(H. pylori) eradication to reduce the risk of duodenal ulcer (DU) recurrence, in combination with antibiotics;

• Pathological hypersecretory conditions, including Zollinger-Ellison (ZE) syndrome; and

• Short-term treatment and maintenance of DUs.

1.13. Necessities of antiulcerents in different illness:

Table.1.2:Necessities of antiulcerents in different illness

Diseases	First choice	Alternatives
Erosive esophagitis	Pentpprazole,omiprazole,esomiprazole,lansoprazole	Dexlansoprazole,rabeprazole
GERD	Pentpprazole,omiprazole,esomiprazole,lansoprazole	None
H.pylori	Omiprazole,esomiprazole,lansoprazole	Rabeprazole
Active gastic ulcer	Rabeprazole, omiprazole, lansoprazole, ranitidine	None
Active duodenal ulcer	Rabeprazole, omiprazole, lansoprazole	None
NSAID associated gastric ulcer	Esomiprazole,lansoprazole	Rabeprazole
Upper GI bleed	Omiprazole,ranitidine.	None

(Bpac.org.nz, 2016)

1.14. Side effects of antiulcerants:

PPIs are well-tolerated, and some side effects may go away with continued use of the drug. However, contact your health care provider if any side effect becomes bothersome. Sometimes a change in dose or switch to another PPI may alleviate the problem. The side effects of all the different PPIs are very similar. The most common side effects include:

- Headache
- Stomach Pain
- Nausea
- Diarrhea
- Vomiting
- Gas
- Constipation

Although not common, serious allergic reactions may occur. Contact your health care provider if you experience any of the following symptoms:

- Rash
- Trouble breathing
- Face Swelling
- Throat Tightness

PPIs can cause fractures. In May 2010, the U.S. Food and Drug Administration (FDA) warned about the possible increased risk of fractures with PPI use. Information from studies suggests that PPIs may be associated with an increased risk of hip, wrist, and spine fractures. People who were at the greatest risk were those on high doses or used PPIs for at least one year or more. The FDA is recommending that prescribers consider shorter courses of treatment and lower doses as appropriate to treat a person's condition. People at risk for osteoporosis should be monitored by their health care provider and take adequate calcium and vitamin D supplements.

In March 2011, the FDA warned that using PPIs for more than a year may cause low magnesium levels. Symptoms of low magnesium include muscle spasms, tremors, irregular heartbeats, and seizures. However, not everyone with low magnesium will experience these symptoms.

The FDA recommends that health care professionals consider checking magnesium levels prior to therapy in people:

- Expected to be on long-term PPI therapy.
- On PPI therapy plus Digoxin, diuretics, or other medications that lower magnesium.

People who have uncontrolled GERD may be at risk for Barrett's esophagus — a condition in which the cells in the esophagus change. Although it is rare, a small number of people with Barrett's esophagus may develop esophageal cancer. PPIs are used to treat acid reflux associated with Barrett's esophagus and may lower the risk of cellular changes in the esophagus that can lead to cancer.

On the other hand, there has been speculation that long-term treatment with PPIs may increase the risk of cancer. However, the evidence is not conclusive. More research needs to be done regarding PPI therapy and the link to cancer. However, people on long-term PPIs should be reassessed periodically to make certain the benefits from the medication continue to outweigh the risks. (Harvard health,2011)

1.15. Drug-drug interaction profiles of proton pump inhibitors:

- Proton pump inhibitors (PPIs) are widely prescribed for the treatment of gastric acid-related disorders and the eradication of Helicobacter pylori.

- In addition, they are routinely prescribed for the prevention of gastrointestinal bleeding in patients receiving a dual antiplatelet therapy consisting of clopidogrel and aspirin (acetylsalicylic acid) after myocardial infarction or percutaneous coronary intervention and stenting. Because PPIsare given to these patients for long periods, there is a concern about the potential for clinically significant drug-drug interactions (DDIs) with concomitantly administered medications.

- PPIs give rise to profound and long-lasting elevation of intragastric pH, it is not surprising that they interfere with the absorption of concurrent medications.

- Drug solubility may be substantially reduced at neutral pH compared with acidic conditions. In this context, PPIs have been shown to reduce the bioavailability of many clinically relevant drugs (e.g. ketoconazole, atazanavir) by 50% or more compared with the control values.

- After the introduction of omeprazole (a prototype PPI) into the market, it was reported that omeprazole was associated with 30% and 10% reductions in systemic clearance of diazepam and phenytoin, respectively.

- In vitro studies demonstrating the inhibitory effects of omeprazole on the metabolism of these drugs with human liver microsomes gave a mechanistic explanation for the DDIs.

- Numerous subsequent studies have been performed to investigate the DDI potential of PPIs associated with the metabolic inhibition of cytochrome P450 (CYP) enzyme activities; however, most such attempts have failed to find clinically relevant results. Nevertheless, recent large-scale clinical trials have raised concerns about possible DDIs between PPIs and an antiplatelet drug, clopidogrel. There is a possibility that PPIs may elicit detrimental effects by inhibiting CYP2C19-dominated metabolism of clopidogrel to its active metabolite.

- Non-steroidal anti-inflammatory drugs (NSAIDs), such as Advil/Motrin (ibuprofen) or Aleve (naproxen) while patient’s on a PPI causes some severe problems in now a days. The problem is that NSAIDs can increase the risk of bleeding and getting ulcers -- things

that a PPI user may be at risk for. However, for people who need an NSAID for a specific condition, such as arthritis, a PPI may be given with it to prevent an ulcer.(Ogawa R.2010)

1.16. Patient knowledge and community pharmacy aspects in Bangladesh:

- Consumer satisfaction is an integral component of the quality of primary health care.
- Determining consumer perception of patient-centred services provides a perspective through which standards of care can be identified.
- Enabling the pharmacist's role to be judged for overall quality and satisfaction for improvements to be made accordingly.
- Increasing consumer knowledge about the contribution of the community pharmacist in health care can help to make consumers more aware of how community pharmacists can use their drug and disease knowledge in the improvement of care.
- At the same time, community pharmacists in primary care face difficult choices in balancing the commercial and professional aspects of their profession.In most countries, community pharmacy is run on a profit basis and is not subsidised by the state; therefore for community pharmacists to survive, profit is a must.
- The dual commercial/professional role of the community pharmacist is a subject of continual discussion. Community pharmacists taking a business-oriented approach and placing profit before the consumer's needs will perceive giving advice and explanations on the correct use of medications as a waste of time and as not directly involving additional financial remuneration, and will therefore devote less time to patients.
- It is the community pharmacist's professional responsibility to appreciate the factors governing the safe and effective use of medicines, question patients about their symptoms and related factors, recommend the most appropriate products and communicate with physicians and other healthcare professionals.
- A pharmacist convinced that a particular product could jeopardise a consumer's health, has the responsibility of refusing to dispense the product. Such a refusal, supported by a well-founded and rational explanation offered in a language the consumer can

understand, is a success of the professional aspect of community pharmacy over the business aspect.The projection by community pharmacists of a patient-centred service will support positive consumer perception which should in turn provide financial stability in the long term.

The majority of the consumers (75%) confirmed that they would rely on the community pharmacist's choice when purchasing a non-prescription medication. When looking for health advice, only 11% of the consumers would first consult the community pharmacist, with 76% first consulting the physician.

Other sources of advice were from a family member or friend (10%) and the internet (4%).The majority of the consumers (80%) would seek advice from a community pharmacist when their condition was not serious enough to visit a physician, 15% would ask the community pharmacist for advice when they had no time to wait for a physician's appointment, 13% found it easier to talk to a community pharmacist and 6% of the consumers opted for the community pharmacist's advice since no fee is charged. (F.Wirth,2011)

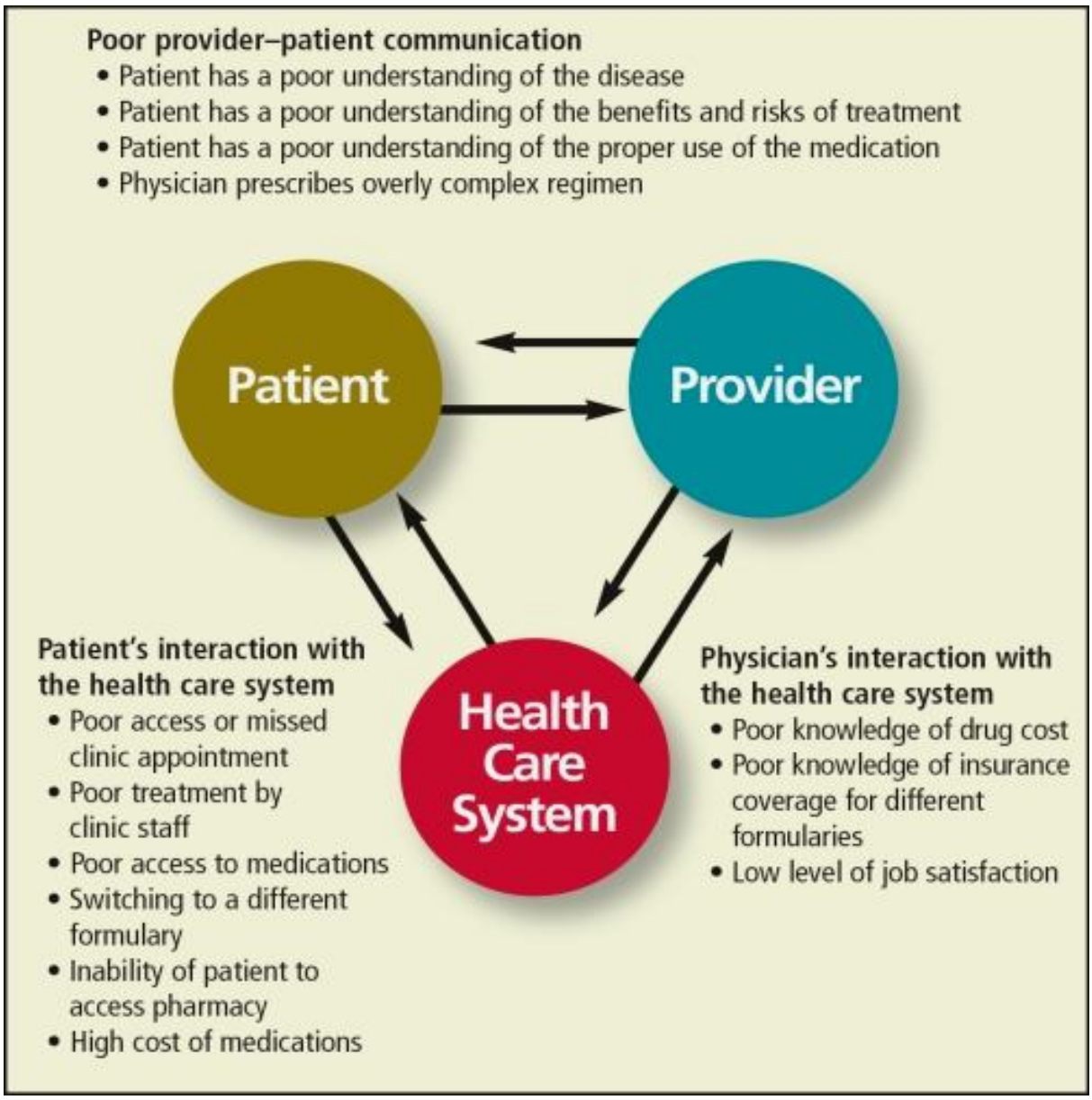


Figure.1.3: A schematic diagram of patient-healthcare-provider (pharmacist) system.

1.17.The list of the companies in Bangladesh marketing antiulcerants:

Drug name	Companies
Esomeprazole	Aristopharma Ltd.
	Zenith Pharmaceuticals Ltd.
	Incepta Pharmaceuticals Ltd.
	Eskayef Bangladesh Ltd.
	Opsonin Pharma Ltd.
	Radiant Pharmaceuticals Ltd.
	Acme Laboratories Ltd.
	Renata Limited
	Sandoz/Novartis (Bangladesh) Ltd.
	Square Pharmaceuticals Ltd.
	Beximco Pharmaceuticals Ltd.
	Healthcare Pharmaceuticals Ltd.
	Drug International Ltd.
Lansoprazole	Drug International Ltd.
	IBN SINA Pharmaceutical Industry Ltd
	Square Pharmaceuticals Ltd.
	Acme Laboratories Ltd.
	Ambee Pharmaceuticals Ltd.
	Kemiko Pharmaceuticals Ltd.
	Ziska Pharmaceuticals Ltd.
	General Pharmaceuticals Ltd.
	Desh Pharmaceuticals (Pvt) Ltd.
Omeprazole	NOVO Healthcare & Pharma Ltd.
	Decent Pharma Laboratories Ltd.
	Hudson Pharmaceuticals Ltd.
	Drug International Ltd.
	Elixir Pharmaceuticals Ltd.
	Eskayef Bangladesh Ltd
	Asiatic Laboratories Ltd.
	Popular Pharmaceuticals Ltd.
	Incepta Pharmaceuticals Ltd
	Navana Pharmaceuticals Ltd.
	Healthcare Pharmaceuticals Ltd.

	Pacific Pharmaceuticals Ltd.
	ACI Ltd.
	Sanofi-aventis Bangladesh Ltd
Pantoprazole	Asiatic Laboratories Ltd.
	Pacific Pharmaceuticals Ltd.
	BIOPHARMA Laboratories Limited
	ACI Ltd.
	Beximco Pharmaceuticals Ltd.
	Ziska Pharmaceuticals Ltd
	Popular Pharmaceuticals Ltd.
	Apollo Pharmaceutical Laboratories Ltd.
	Square Pharmaceuticals Ltd
	Jayson Pharmaceuticals Ltd.
	Gaco Pharmaceutical Ltd.
Rabeprazole	Beximco Pharmaceuticals Ltd.
	Opsonin Pharma Ltd.
	ACI Ltd.
	Incepta Pharmaceuticals Ltd.
Ranitidine	Asiatic Laboratories Ltd
	Sanofi-aventis Bangladesh Ltd
	General Pharmaceuticals Ltd.
	Apollo Pharmaceutical Laboratories Ltd.
	Aristopharma Ltd.
	Beximco Pharmaceuticals Ltd.
	Square Pharmaceutical Ltd.
	Ziska Pharmaceuticals Ltd.
	ACME Laboratories Ltd.
	Opsonin Pharma Ltd.

Table.1.4: The companies in Bangladesh marketing antiulcerants

1.18. Consequences of irrational use of antiulcerants:

Irrational drug use occurs when there is over-prescribing, extravagant prescribing, incorrect prescribing, under-prescribing, and multiple prescribing. Multiple prescribing is often referred to as "Polypharmacy". In addition to these, irrational drug use also occurs when inadequate instructions are given to the patient. This leads to low compliance since the patient is then unable to take the drugs properly.

The World Health Organization (WHO) defines drug utilization research as "the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences".

Drug utilization research studies conducted in the inpatient settings are effective tools that help in evaluating the drug prescribing trends, efficiency of hospital formularies.Proton pump inhibitors (PPI) indicated in the treatment of acid related dyspepsia and peptic ulcers are one of the most frequently prescribed classes of drugs in the world.

However because of their High efficacy & easy availability irrational use and unnecessary exposure is high. When prescribed in such a large volume the adverse effects like hypomanganesemia and *Clostridium difficile* associated diarrhoea increases proportionally.

Long-term use of a proton pump inhibitor may lead to Gastric carcinoids and increases the risk of hip fractures. Moreover parenteral PPIs are costly thereby increasing the economic burden on the patients.

Proton pump inhibitors were used in 54% of inpatients in this study. However majority of prescriptions had no clear indications. And PPIs were most commonly prescribed with antimicrobial agents (68%). Awareness about PPI indications, adverse effects and economic burden should be created so that appropriate prescription will improve the patient care at low cost. (R Patil ,2015)

1.19. Factors Underlying Irrational Use of Drugs

Many different factors affect the irrational use of drugs. In addition, different cultures view drugs in different ways, and this can affect the way drugs are used.

The major forces can be categorized as those deriving from patients, prescribers, the workplace, the supply system including industry influences, regulation, drug information and misinformation, and combinations of these factors.

•Patients

- Drug misinformation
- Misleading beliefs
- Patient demands/expectations

- **Prescribers**

- Lack of education and training
- Inappropriate role models
- Lack of objective drug information
- Generalization of limited experience
- Misleading beliefs about drugs efficacy

- **Workplace**

- Heavy patient load
- Pressure to prescribe
- Lack of adequate lab capacity
- Insufficient staffing

- **Drug Supply System**

- Unreliable suppliers
- Drug shortages
- Expired drugs supplied

- **Drug Regulation**

- Nonessential drugs available
- Informal prescribers
- Lack of regulation enforcement

- **Industry**

- Promotional activities
- Misleading claims

1.20. Impact of Irrational use of Drugs

This can be seen in many ways:

- Reduction in the quality of drug therapy leading to increased morbidity and mortality.
- Waste of resources leading to reduced availability of other vital drugs and increased costs.
- Increased risk of unwanted effects such as adverse drug reactions and the emergence of drug resistance.
- Psychosocial impact, such as when patients come to believe that there is "a pill for every ill", which may cause an apparent increased demand for drugs. (Icm.tn.gov, 2016)

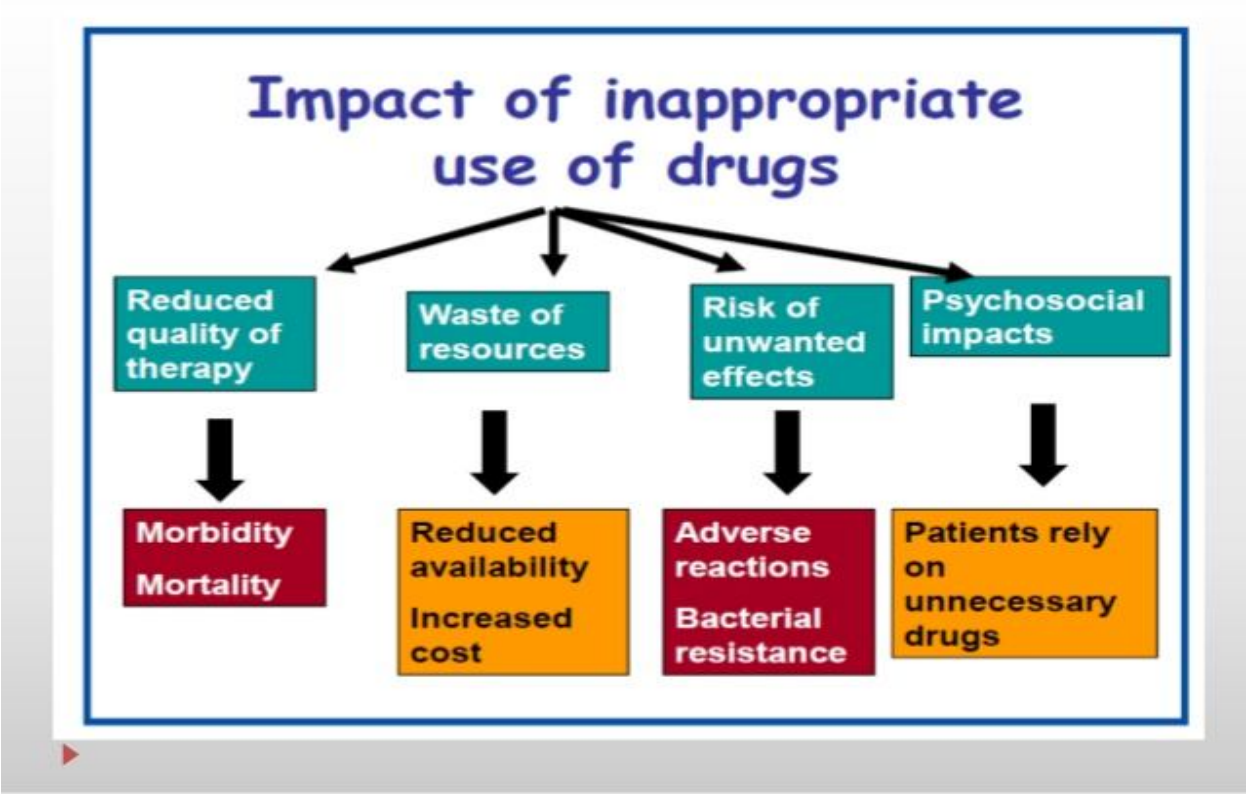


Figure.1.4: A schematic diagram of impact of irrational use of drugs

Chapter Two:

OBJECTIVE & LIMITATIONS

OBJECTIVES

- The prescribing pattern of medicines amomg the doctors including specialist in Bangladesh is going to the class of irrationality due to the presence of lots of drugs with different brand name but generic names are same and also for the competition of the leading pharmaceutical campanies to gain the larger portion of market now a days.
- This leads to a serious drug interactions and also decreased the benefit or efficacy levels of drug and finally causes resistance. Promoting the rational use of medicines would definitely help mankind to fight the diseases and illness for better tomorrow. The objective of this study to see the prescribing pattern of antiulcerants among the specialist doctors' of different areas of Bangladesh specially
    - Adherence with the EDL
    - Mostly prescribed generics
    - Mostly prescribed brands of antiulcerants

LIMITATIONS

1) Shortage of time for sample collecting.

2) We cannot cover all the area of Bangladesh for prescription analysis.

3) We cannot collect some prescription from the sample collection point due to patient incompliance.

4) We could not collect the sample of any admitted patient due to legal issue.

Chapter Three:

METHODOLOGY

2. METHODOLOGY

2.1. Aim of the Study

The objective of this study to see the prescribing pattern of antiulcerants among the specialist doctor's of different areas of Bangladesh.

2.2. Selection of the area

Selecting proper area for survey is a crucial part for getting perfect data,which represent the actual condition. Our captial citydhaka is the living place of 22 million people,as the most ancient city like other facilities, the health facilities of Dhaka are better than other cities of Bangladesh. People from all part of our country come here for the treatment of their diseases. So dhaka was selected for my survey work.There are many govt. hospitals and hundreds of private clinics in dhaka city.So majorities of prescription are collected from Dhaka city and also collect prescription from the outside in Dhaka.

2.3. In this survey the prescription were collected from the following hospital:

- Al-Raji hospital, Banashree,Dhaka
- Farazi hospital ,Banashree,Dhaka
- Orthopedic hospital,Mirpure Dhaka
- Kurmitola General Hospital, Cantonment, Dhaka
- Bangabandhu Sheikh Mujib Medical University (BSMMU)
- Dhaka Shishu Hospital
- Uttara Crescent Hospital
- Popular Diagnostic Centre Ltd.
- IbnSina D. Lab. & Consultation Center, Badda
- Community Based Medical College, Mymensingh
- Upazila Health Complex,Lalmohan, Bhola.
- Chittagong medical college hospital
- Kushtia medical college hospital

2.4. Duration of survey

Duration of survey was 10 months commencing from June 2015 to April 2016. To complete the survey in time, a work schedule was prepared depending on different tasks of the study. One month was spent for selection of topic, development of the protocol. Subsequent months were spent on official correspondence, data collection, data analysis, report writing and submission of report.

2.5. Sampling design

A sampling design is a definite plan for obtaining a sample from a given area randomly.It refers to the technique of the procedure the researchers would adopt in selecting items for the sample.

In this survey the prescription are collected from both outdoor and indoor patient in the hospital.the patients who are visiting general practitioner and specialist doctors also counted.during the period of sampling certain information are extract from the prescriptions to be collected. The information was related to the prescribing of the drugs for specific disorder from which specific disease are recognized.

2.6. Annexure

Some photos of prescription were given into the annexure.

2.7. Inclusion Criteria

In my study both pediatric and geriatric patients are included and the prescription that bears significant impact on
Patient age: 1 day to old aged
Patient sex: Both male and female
Doctors: having specialization on any discipline
Area: Dhaka,comilla,Chittagong, Mymensingh, kushtia, Bhola etc.
Specifically on the number of medicins like antiulcerantsprescribing frequency have been included.

2.8. Study Population

From June 2015 through April 2016, total of 1600 prescriptions are collected from government and non-government hospitals specifically from specialist doctors of both male and female patients.

2.9. Data processing and graphical representation

Finally all the collected raw data are processed and represented were analyzed using Statistical Package for Social Sciences (SPSS) for Windows (Version 16; Chicago, IL) and Office excel (Version 2007).

2.10. Materials

In any kind of thesis work certain kinds of materials are required to express the whole thing. Here certain software has helped me to achieve my goal. Drug data and specialist on specific diseases data were computed using MS-Excel, SPSS and DIMS software. The results were expressed as proportions or as percentages.

2.11. Ethics

This study was done in a manner without conflicting the ethical issues. Ethical consideration was checked by the research supervisor with the research policy of the East West University. We do not disturb or harm anybody during the data collection and valued them accordingly.

Chapter Four:

LITERATURE REVIEW

4. LITERATURE REVIEW

4.1. Rational use related studies

4.1.1) Prescribing practices to evaluate rational use of medicines in the opd of orthopedics in a private medical college hospital

The study was conducted in the Outpatient Department (OPD) of Orthopaedics in a tertiary care private teaching hospital. Dhaka,Bangladesh in between January to March '2012.The average number of drugs per encounter was 3.78 and no single drug was prescribed by generic name. Use often antibiotic and an injection was in 6.67% and 3.33% of encounters respectively. Only 4.32% drugs were rescribed from national essential drug list (EDL). Percentage of encounters with a NSAID, an antiulcerant and a calcium preparation prescribed were 97%, 97.33% and 67.33% respectively. The patterns of drug prescribing in the OPD of orthopaedics did not fulfill the WHO criteria for rational use of medicine.(Afsan et al., 2013)

4.1.2) The rational use of proton pump inhibitors in a geriatric center

The rational use of proton pump inhibitors in a geriatric center with 300 beds attached to a second class hospital. It was observed unsuitable use of PPI related with indication and drug dosage. It is important to incorporate clinical pharmacists in geriatric centers teams to ensure and promote the rational use of medicines. PPI were prescribed in 80% patients (242/300). Omeprazole prescribing patients no 197 and esomeprazole prescribing Patients no 45. Gastrointestinal diagnosis was 77/197 (39%) and 11/45 (24%).They performed a cross descriptive study in all patients of a geriatric center with PPI treatment in July 2014. It was re-evaluated 42,5% patients (51/120) whose indication was unknown: 19.6% (10/51) were suspended, on 58.8% (30/51) doses were changed to 20mg/24h. The remaining 11 patients were not changed without a clear scientific reason. Esomeprazole was limited to patients with nasogastric tube, as it is the only which allows such administration.It was observed unsuitable use of PPI related with indication and drug dosage. It is important to incorporate clinical pharmacists in geriatric centers teams to ensure and promote the rational use of medicines.

(Rico-Gutierrez et al., 2015)

4.1.3) Evaluation of prescribing pattern of the doctors for rational drug therapy in a tertiary care hospital

The study was carried out prospectively over a period of six months in the department general medicine of our tertiary care hospital. On that study 288 prescriptions were analyzed. Total no. of drugs in 288 prescriptions is 2559. Therefore average number of drugs/prescription is 8.8.

Drugs were prescribed by generic names in 4.16% of cases, drugs on EDL are only 36.92% and fixed dose combinations are 35.87% of total drugs. Dosage forms used were mostly oral 84.40%. Injectables were only 12.07% and topical forms were least 0.58%. Basic information of patient was written in 100% prescriptions. Complete diagnoses were written in 73.26% prescriptions. Only 86.80% prescriptions were legible and only 72.56% prescriptions were complete in terms of dose, route, strength, frequency and dosage forms. Disease pattern seen was variable. Diseases of cardiovascular system were maximum 33.33% followed by diseases of respiratory system 22.91% and diseases of endocrine system 11.45%. The most common drug groups prescribed were multivitamins, minerals & enzymes, antiulcer drugs. and antibiotics. The incidence of polypharmacy was also common. (Adiga et al., 2009)

4.2. Prescription pattern analysis related studies

4.2.1) Prescription pattern analysis of physicians in selected area for most occurring diseases

Bangladesh has one of the highest population growth rates in the world. The country's health system is extremely poor and underdeveloped.It has a high risk of infectiuos diseases like typhoid fever, respiratory diseases, diarrhea and hepatitis A & E. A suvey on prescribing pattern was done for a period of up to 6 months in the selected area of the Dhaka city.This paper represents a brief review on disease patttern especially in Respiratory, Cardiovascular and Alimentary tract system, which types of drugs are prescribed & irrational practice of drugs in those places.Respiratory disorders are most common disorders in Bangladesh.In common cold, Antibiotic is highly used where the percentage is 11.76%.We can use bronchodilator for Asthma which is highly usable and where the percentage is 21%. In case of pneumonia, Antibiotic is highly used where the percentage is 20%. For Cardiovascular diseases (CVD) are one of the major health problems throughout the world. Beta blocker is highly prescribed drug for cardiovascular patients where the percentage is 38.46%.In case of Alimentary tract disorder the most common disase is peptic ulcer.Here PPI is highly used where the percentage is 61.9%.The health system of Bangladesh is regulated by health professionals such as physicians, pharmacist etc.In the absence of enough qualified doctors,drugs are often prescribed by unqualified health workers. People can get any drug from any drug store without a prescription.Medically inappropriate and economically inefficient use of medicines is observed throughout the Bangladesh.The prescribing pattern of the outpatient departments of tertiary level hospital are often copied by community practitioners and health workers. (Moghal, 2015)

4.2.2) Patterns of prescription and drug dispensing

The study was done to analyze the patterns of prescriptions and drug dispensing using World Health Organization core drug use indicators and some additional indices. Data were collected

prospectively by scrutinizing the prescriptions written by pediatric resident doctors and by interviewing parents of 500 outpatient children. The average number of drugs per encounter was 2.9 and 73.4% drugs were prescribed by generic name. Majority of drugs prescribed were in the form of syrups (60.8%). Use of antiulcerants (39.6% of encounters) was frequent, but injection use (0.2% of encounters) was very low. A high number of drugs prescribed (90.3%) conformed to a model list of essential drugs and were dispensed (76.9%) by the hospital pharmacy. Certain drugs (5.7%) prescribed as syrups were not dispensed, although they were available in tablet form. Most parents (80.8%) knew the correct dosages, but only 18.5% of drugs were adequately labeled. No copy of an essential drugs list was available. The availability of key drugs was 85%. Interventions to rectify over prescription antibiotics and syrup formulations, inadequate labeling of drugs and lack of access to an essential drugs list are necessary to further improve rational drug use in our facility. (Karande, 2005)

4.2.3) Prescribing patterns of a garment medical centre in Bangladesh

The aim of the study was to audit the prescription and dispensing pattern in a garment medical center to observe the rational use of drug. To find out the current status of the prescribing and dispensing practices and identify factors underlying irrational prescription writing in a Garment medical center for factory workers in Gajipur and to sensitize the future prescribers about the rational prescriptions, this study was carried out. A cross-sectional descriptive study was carried out to analyze the patterns of prescriptions by using World Health Organization, WHO- core drug prescribing indicators and some additional indices. A total of 300 prescriptions of the patients (garment workers) who had attended in Hannan Textile and Garment Medical Centre, Board Bazar, Dhaka, Bangladesh in between January and November'2008 were considered for analysis. The average number of drugs per prescription was 3.1 andnno single drug was prescribed by generic name. Use of antibiotic (50% of encounters) was frequent. Only 50.75% drugs were prescribed from national essential drug list (EDL). Percentage of encounters with an antiulcerant, a NSAID and a multivitamin & multimineral prescribed were 41.67%, 46.67% and 23.67% respectively.(Afsan et al., 2014)

4.2.4)Prescription pattern of acid suppressive medications in Bangladesh

Gastrointestinal disorders, specifically acid-related disorders including gastroesophageal reflux disease (GERD), peptic ulcer disease (PUD), and dyspepsia are very common in Bangladesh. About 16% of patients are suffering from gastrointestinal acid related disorders .According to 4P data (Product, Place, price & Promotion) from 4P Marketing Consultancy, Bangladesh, June, 2012 it is reported that 16.71% of patients are suffering from gastrointestinal acid related disorders. The results demonstrated 16.71% of this patient population had acid-related disorders, where male patients is 15.42%, Female patients is 17.73% and different aged group patients is in

different percentages. Current treatment guidelines for acid-related diseases (ARDs) recommend first-line treatment with a proton pump inhibitor (PPI) to reduce gastric acid production. PPIs are indicated in the management of gastroesophageal reflux disease (reflux esophagitis, nonerosive reflux disease), peptic ulcer (gastric and duodenal ulcer, non-steroidal anti-inflammatory drug (NSAID)-associated ulcer, bleeding ulcer), functional dyspepsia, and in association with Helicobacter pylori eradication therapy when needed. Currently, PPIs (omeprazole, lansoprazole, pantoprazole, rabeprazole and esomeprazole) are widely used for the treatment of ARDs. All 5 PPIs are effective. However, there are differences in PPI pharmacokinetic and pharmacodynamic profiles that might influence their clinical utility. In Bangladesh total anti ulcerants market value is very large with high growth. According to IMS data, 4Q 2011, Total antiulcerant market is about 12090 million Tk with 31.64 % growth. Antiulcerant market share is 14%. Absolutely this share is very high. Whereas only Proton Pump inhibitors' market is 9500 million taka with 37.71 % growth. (T. Hossain, 2012)

4.3 Irrational use related studies

4.3.1) Irrational drug use based on self medication for some common clinical conditions in an educated population

The study was conducted in two private sector institutes for higher education in Karachi from Jan 2011-June 2011. A pretested questionnaire containing open-ended and closeended items was administered to female students and teachers.The tendency to self diagnose and self medicate (63.78%) is more than seeking appropriate medical treatment (36.21%). The most common condition treated by self medication is Headache (96.52%) and the most common condition in which appropriate medical treatment sought, is Respiratory infection(58.70%).Self medication is also reported in fever (80%), GI infections (61.30%), menstrual pain (73.91%), allergies (72.61%), cough (71.30%), minor cuts/wounds (85%) and (54.57%) in anemia/fatigue and general weak. Irrational drug use of OTC medicines and antibiotics commonly prevail in the educated population instigating the abuse potential and relative hazard. The effective regulation, control and pharmacovigilance are required in line with core intervention policies of WHO.

(Nusrat B,2012)

4.3.2) Irrational use of proton pump inhibitors in general practice

A prospective observational drug-utilization study of PPIs was conducted for two months in the inpatients of General Medicine and General Surgery wards. The sample size of study was (n=100). The case sheets of the patients were reviewed for PPIs prescription and relevant data

was taken. A five point Likert scale with validated Reflux Disease Diagnostic Questionnaire (RDQ) having 12 items was used for evaluating symptoms score for assessing efficacy of PPIs. A total of 46.72% inpatients were on proton pump inhibitors, in surgery (47.52%) and medicine wards (46.01%). The indications for PPIs therapy were acute gastritis (4%) , Gastro Esophageal reflux disease (5%), Duodenal ulcer(1%), co-administration with Non Steroidal Anti-Inflammatory Drugs(32%). PPIs were prescribed irrationally in 58 % of patients without any valid indication. The incidence of polypharmacy was high, average number of drugs per prescription was 4.93. Proton pump inhibitors should be used more judiciously and awareness should be created among the clinicians in the hospital so that appropriate prescription of PPIs will improve the patient care at low cost. (Nousheen, 2014)

4.3.3) Evaluation and analysis of the medication of proton pump inhibitors in the patients admitted into No. 411 Hospital of PLA

A Retrospective analysis was made on the medical histories of the patients admitted into the hospital for treatment from July 2011 to June 2014, by using the Hospital Information System (HIS). The rationality was analyzed by taking into consideration the indications, dosage and administration, and drug interactions. The criteria for judging rationality included packaged insert of product and standard therapeutic guidance for PPIs. There were 14878 PPI medical histories, accounting for 26.68% of all the medical histories in the hospital. The Gastroenterology Department (7543 medical histories) and the Burns and Plastic Surgery Department (7412 medical histories) had relatively high PPI consumption rates, accounting for 50.70% and 49.82%, respectively. In the 527 medical histories sampled at random, irrational medications of PPIs were: irrational drug indications (accounting for 23.60%), irrational treatment courses (accounting for 13.15%), irrational dosage and administration (accounting for 33.85%) and irrational drug interaction (accounting for 29.40%). There existed irrational utilization of PPIs in the inpatients of the hospital. A prudent policy should be adopted in the clinical utilization of PPIs and be sure to use them rationally. (Wu G,2015)

Chapter Five:

RESULT & DISCUSSION

5. RESULT AND DISCUSSION

In our study 1600 prescription was randomly collected. Among them the different number of prescription of different specialist is give below:

Table.5.1. The number of prescription distribution in different specialist

Different section of prescription	Prescription number	Total
Medicine	916	
Pediatrics	157	
Orthopedics	127	
Gastroliver	139	1600
Gyanecology	97	
ENT	70	
Dermatology	94	

5.2. Percentage of prescription containing antiulcerant drug

On this survey 1192 prescription out of 1600 contain antiulcerants .

The percentage is 74.5%

Table.5.3. Percentage of antiulcerant containing prescription in each specialty

Specialty	Percentage
Medicine	**63.33%**
Pediatrics	**9.65%**
Orthopedics	**5.54%**
Gastroliver	**6.88%**
Gyanecology	**4.45%**
ENT	**4.36%**
Dermatology	**5.79%**

The above percentage of antiulcerant containing prescription in each specialty shows that medicine accommodate the highest area of 66.33% and then the pediatrics, gastroliver, dermatology, orthopedics, gyanecology, ENT as the number of medicine related prescription is high in this study.

5.4. The pie chart of only antiulecrant containing prescription

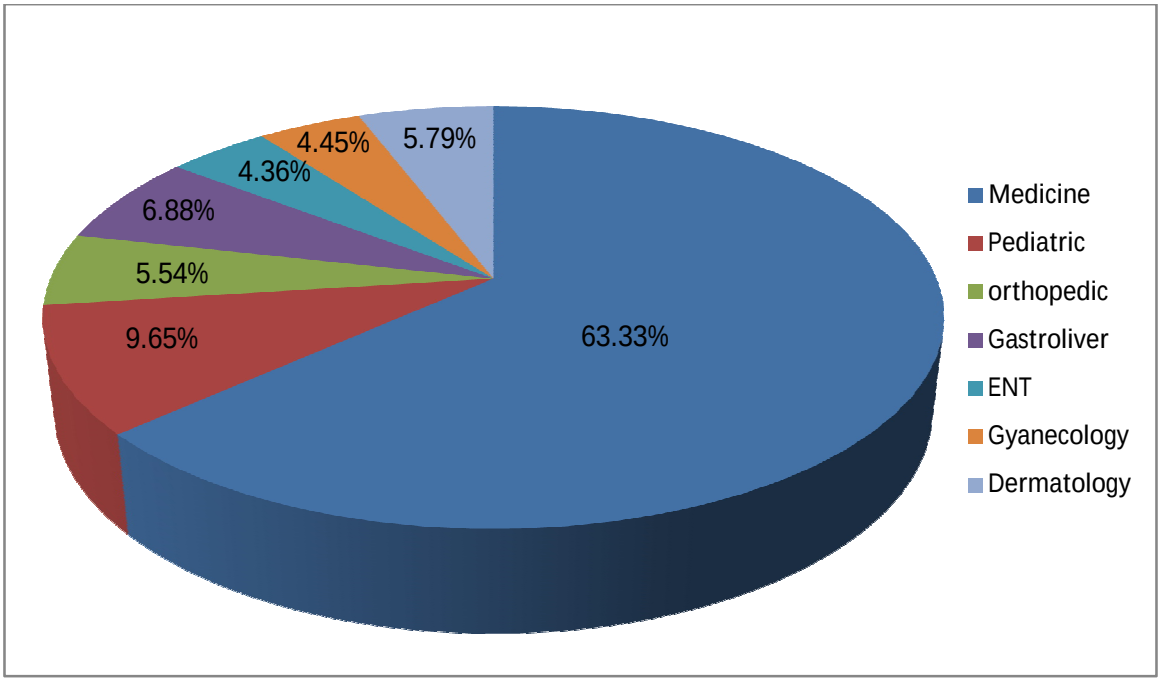


Figure.5.1. The percentage of antiulcerants by different specialist doctors in Bangladesh

From the above statstical analysisthe percentage of antiulcerants in medicine specialist is the highest one (63.33%) and the paediatric is the second (9.65%), third one is gastroliver (6.88%). Others are the less frequent in prescribing antiulcerants. On this study the highest area recognizes medicine specialist.

5.5. The drugs in the prescriptions included in the EDL (Essential drug list)

EDL contains two antiulcerants , those are omeprazole and ranitidine.

Table.5.6. Percentage distribution of prescription those followed EDL

Status	Number of prescription (n=1192)	Percentage
Followed	**715**	**59.98%**
Not followed	**477**	**40.02%**

"n= number of prescription containing antiulcerants".

Among the 1192 number of prescription containg antiulcerants only 59.98% specialty followed EDL drug list and 40.02% does not follow EDL. This results in irrationalty of the antiulcerants in modern medical science.

Table.5.7. Percentage distribution of EDL following among specialist doctors

Speciality name	Total number of prescription	Number of prescription followed EDL	Percentage
Medicine	916	689	75.22%
Pediatrics	157	27	17.20%
Orthopedics	127	110	86.61%
Gastroliver	139	98	70.50%
Gyanecology	97	51	52.58%
ENT	70	22	31.43%
Dermatology	94	63	67.02%

The percentage distribution of EDL among specialty doctors is higher in orthopedics (86.61%), then in medicine (75.22%), gastroliver (70.50%) and dermatology (67.02%). Others are less

frequent in prescribing EDL included antiulcerants. This results that the orthopeditian and medicine specialist prescribed highest amount of EDL antiulcerants in modern time.

5.8. The chart of distribution of EDL following among specialist doctors

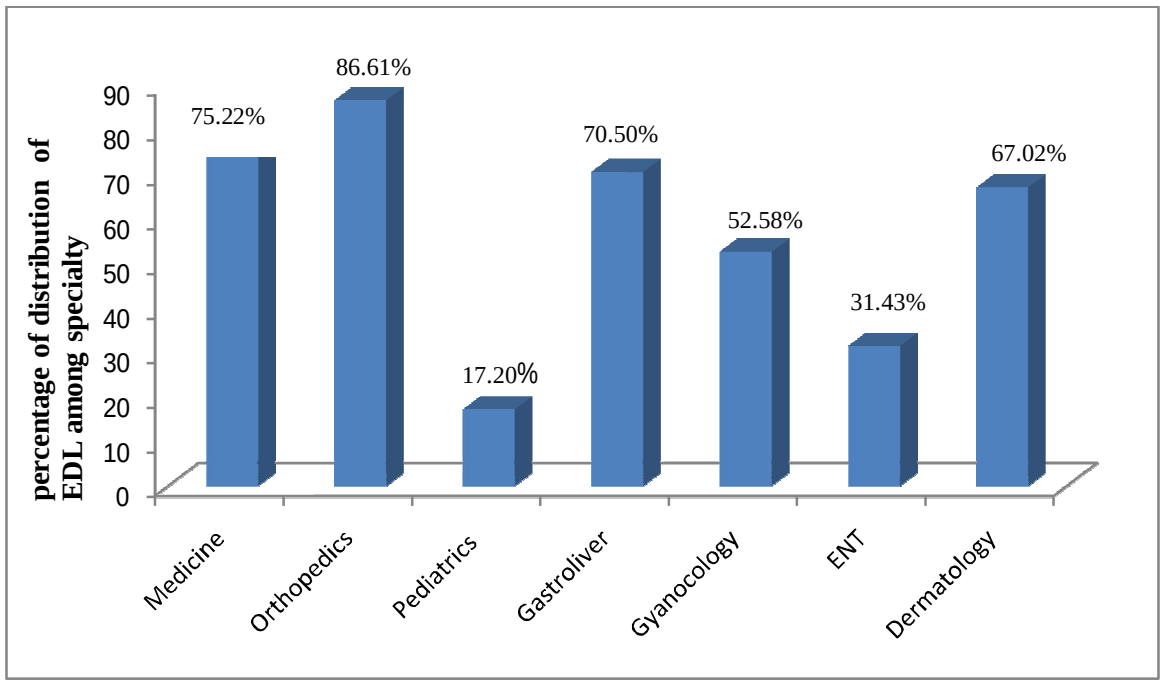


Figure.5.2. The percentage of prescribing EDL antiulcerants by different specialist doctors in Bangladesh

According to statistical analysis, we can found that 86.61 % EDL containing prescription coming from orthopedics,75.22% from medicine,70.50% from gastroliver,67.02% from dermatology, 52.58% from gyaenocology and vey less amount from ENT of 31.43%,pediatrics of 17.20%.

Table.5.9. Percentage of antiulcerant prescribes among their own specialty

Name	Total number of prescription collected of the specialty	Number of prescription containing antiulcerant of the specialty	Percentage of antiulcerant prescribes
Medicine	**916**	**755**	**82.42%**
Orthopedic	**127**	**115**	**90.55%**
Gastroliver	**139**	**66**	**47.48%**
Pediatric	**157**	**82**	**52.23%**
ENT	**70**	**53**	**75.71%**
Gynecology	**97**	**52**	**53.60%**
Dermatology	**94**	**69**	**73.40%**

The percentage of antiulcerant prescribes among their own specialty shows that orthopeditians (90.55%) prescribes highest percentage for their frequent treatment procedures. It should be adjusted and justified. On the other hand medicine (82.42%) is the second one, ENT (75.71%) is the third one and others hold the fewer percentage compare to the other percentage of specialty.

Table.5.10. Percentage of generics of prescribing antiulcerants

Prescribed generics	Percentage
Omeprazole	**65%**
Esomeprazole	**20%**
Ranitidine	**7%**

Pantoprazole	**5%**
Rabeprazole	**2%**
Lansoprazole	**1%**

From the above analysis It is found that, the first preferred generic is Omeprazole, second Esomeprazole, third Ranitidine etc. as below-

Omeprazole > Esomeprazole > Ranitidine > Pantoprazole > Rabeprazole > Lansoprazole.

5.11. Share of different pharmaceutical companies

Table.5.11.The share of antiulcerants of different companies from the prescription I have collected.

Pharmaceutical company	Number of prescription (n=1192)	Percentage
Square pharmaceuticals Ltd.	**275**	**23.07%**
Eskayf Bangladesh Ltd.	**253**	**21.22%**
Incepta pharmaceuticals Ltd.	**158**	**13.25%**
Beximco pharmaceuticals Ltd.	**97**	**8.14%**
Healthcare pharmaceuticals Ltd.	**93**	**7.80%**
ACI Ltd.	**74**	**6.21%**
Radiant pharmaceuticals Ltd	**51**	**4.28%**
Popular pharmaceuticals Ltd.	**48**	**4.03%**
Opsonin pharma Ltd.	**37**	**3.10%**

Renata Limited	**25**	**2.10%**
Drug international Ltd.	**21**	**1.76%**
Asiatic laboratories	**20**	**1.68%**
General pharmaceuticals ltd.	**20**	**1.68%**
Orion laboratories ltd.	**5**	**0.42%**
Becon pharmaceuticals ltd.	**4**	**0.34%**
Elixir pharmaceuticals ltd.	**3**	**0.25%**
Rasa pharmaceuticals ltd.	**2**	**0.17%**
Acme laboratories ltd.	**2**	**0.17%**
Navana pharmaceutical ltd.	**2**	**0.17%**
Ambee pharmaceuticals ltd.	**2**	**0.17%**

The above distribution of antiulcerant sales in Bangladesh shows that the top ranked company like Square, Eskayf, Incepta, Beximco, Healthcare, ACI, Radiant etc. holds the large area in Bangladesh in antiulcerant marketing and other holds a very few percentage in total 100%.

DISCUSSION

The health care system in Bangladesh shows various irrationality among the renowned specialist doctors'. Our study and statistical analysis describes various points and reviews about these factors which give knowledge how much frequently or infrequently antiulcerants drugs are given in different patients especially both 1 day to older aged people. Our study contains 1600 prescriptions in total was randomly collected of different specialists among Bangladesh. Among them medicine contains 916 prescription, pediatrics contains 157 prescriptions, gastroliver contains 139 prescriptions, orthopedic contains 127 prescriptions, gyanecology contains 97 prescriptions, dermatology contains 94 prescriptions and ENT contains 70 prescriptions.

On this survey 1192 prescription out of 1600 contain antiulcerants and the percentage is 74.5%.

One analysis shows that among the 1192 prescription, antiulcerants prescribing frequency among different specialist are Medicine -63.33%%,Dermatologist - 5.79%,orthopedics-5.54%,ENT-4.36%,Gastroliver-6.88%,Gynaecologist-4.45%,Paediatrics -9.65% etc.

Essential medicines are those that satisfy the priority health care needs of the population. 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. EDL contains two antiulcerants of this study , those are omeprazole and ranitidine. Among the 1192 number of prescription containg antiulcerants only 59.98% specialty followed EDL drug list and 40.02% does not follow EDL. This results in irrationality of the antiulcerants in modern medical science.

The percentage distribution of EDL among specialty doctors is higher in orthopedics (86.61%), then in medicine (75.22%), gastroliver (70.50%) and dermatology (67.02%). Others are less frequent in prescribing EDL included antiulcerants. This results that the orthopeditian and medicine specialist prescribed highest amount of EDL antiulcerants in modern time.

From the total collected data, we can estimate the % of preferred molecules for gastrointestinal acid related disorders. The estimation is given below. It is found that from the survey statistical analysis, the first preferred molecules is Omeprazole, second Esomeprazole, third Ranitidine etc. as below-

Omeprazole >Esomeprazole > Ranitidine > Pantoprazole > Rabeprazole > Lansoprazole.

From the Percentage of antiulcerant prescribes among their own specialty 90.55% of orthopedicians prescribe antiulcerant. This is a higher percentage of antiulcerant prescriptions. It should be adjusted and justified. On the other hand medicine (82.42%) is the second one, ENT (75.71%) is the third one and others hold the fewer percentage compare to the other percentage of specialty.

The sales distribution of antiulcrants also provides a huge impact on prescribing pattern of antiulcerants in different specialist doctors. There are many pharmaceuticals that promote their products on the root level to the higher level by thoroughly and aggressively marketing strategy.

The pharmaceutical market in Bangladesh is highly concentrated (top ten control around 70 % of the market). Due to high competition aggressive marketing strategies are adopted for greater market share, which sometimes cross limit.

The distribution of antiulcerant sales in Bangladesh shows that the top ranked company like Square, Eskayf, Incepta, Beximco, Healthcare, ACI, Radiant etc. holds the large area in Bangladesh in antiulcerant marketing and other holds a very few percentage in total 100%. Other companies are also valuable for the rationality among the prescribers so that they can maintain the EDL drug list in case of both rich and poor patients in Bangladesh.

Chapter Six:

CONCLUSION & FUTURE DIRCETION

CONCLUSION AND FUTURE DIRECTION

In this study different areas of Bangladesh are visited and prescriptions are collected from the hospitals and finally we can understand that proton pump inhibitors are the first choice of prescribers for acid related disorder. Different types of proton pump inhibitors like- Omeprazole, Esomeprazole, Lansoprazole, Pantoprazole, Ranitidine and Rabeprazole are prescribed in different patients group and acid related diseases. From PPIs most of the prescribers preferred Omeprazole for its trusted efficacy & safety profile. But day by day Esomeprazole prescription is increasing in locally and abroad. Its market is growing day by day for its superior intra-gastric pH control, least side effects. Still now Ranitidine market is large but there is lowest prescription accept in injection. It is consumed by patients as OTC drug. These antiulcerants are irrationally prescribed among the prescribers class. The irrationality can also come from the concept of the percentage following EDL in prescribing antiulcerants or not.The companies are promoting antiulcerants aggressively which will make the prescribers confused sometimes for better treatment. The percentages of doctor maintain the EDL list of PPIS' is less frequent which will hamper our economy in coming future. This study will help to judge the irrationality of prescribing antiulcerants among specific doctors in different areas of Bangladesh. So the prescription containing PPIS in specific prescribers record should be deeply studied corresponding to patient's illness to identify irrational or forced prescription.

Chapter Seven:

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ANNXURE

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Sex: M / F
Date : 09 FEB 2016
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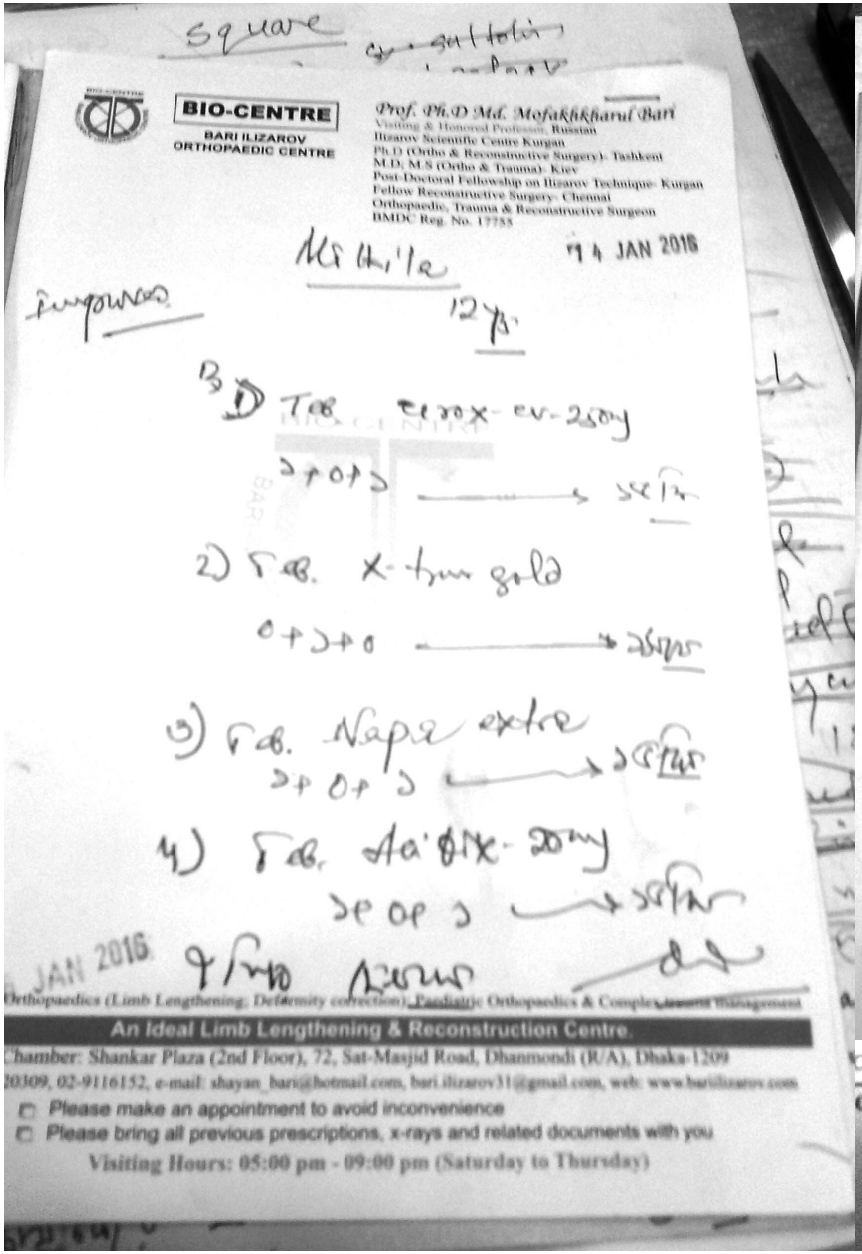
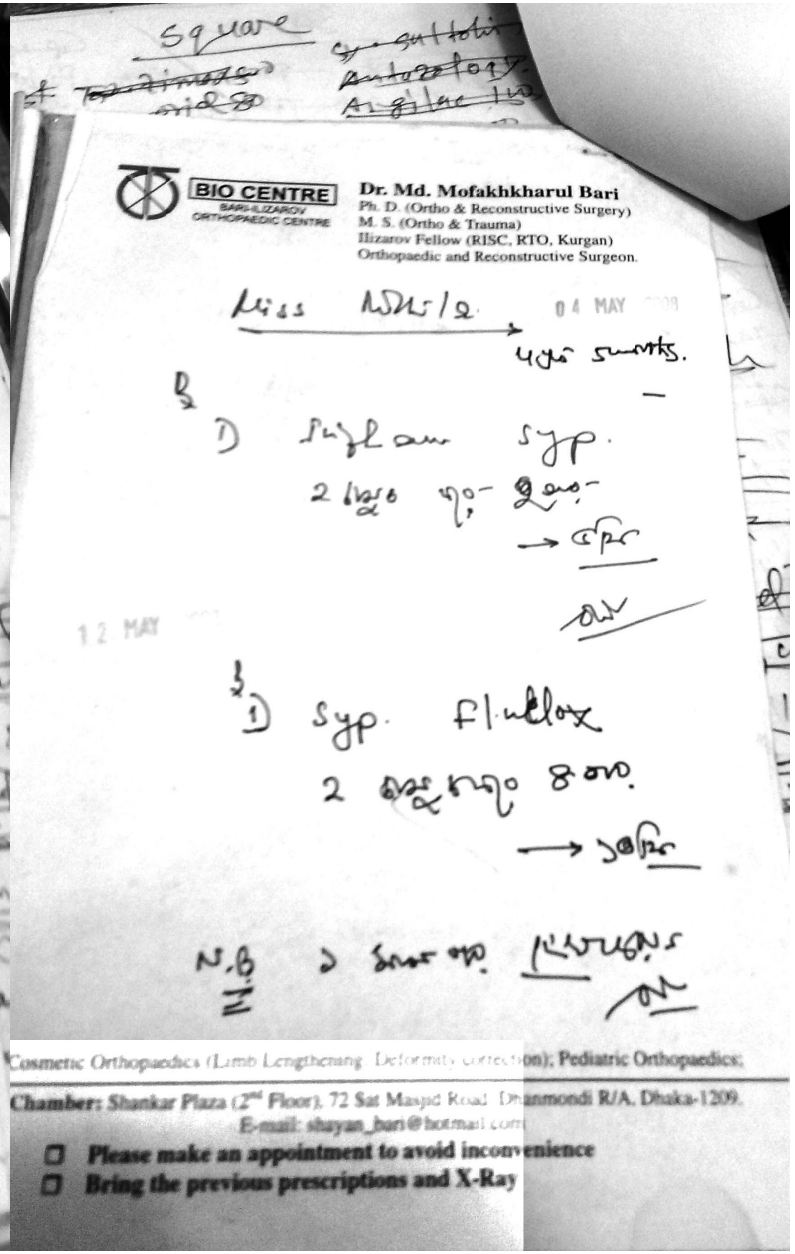
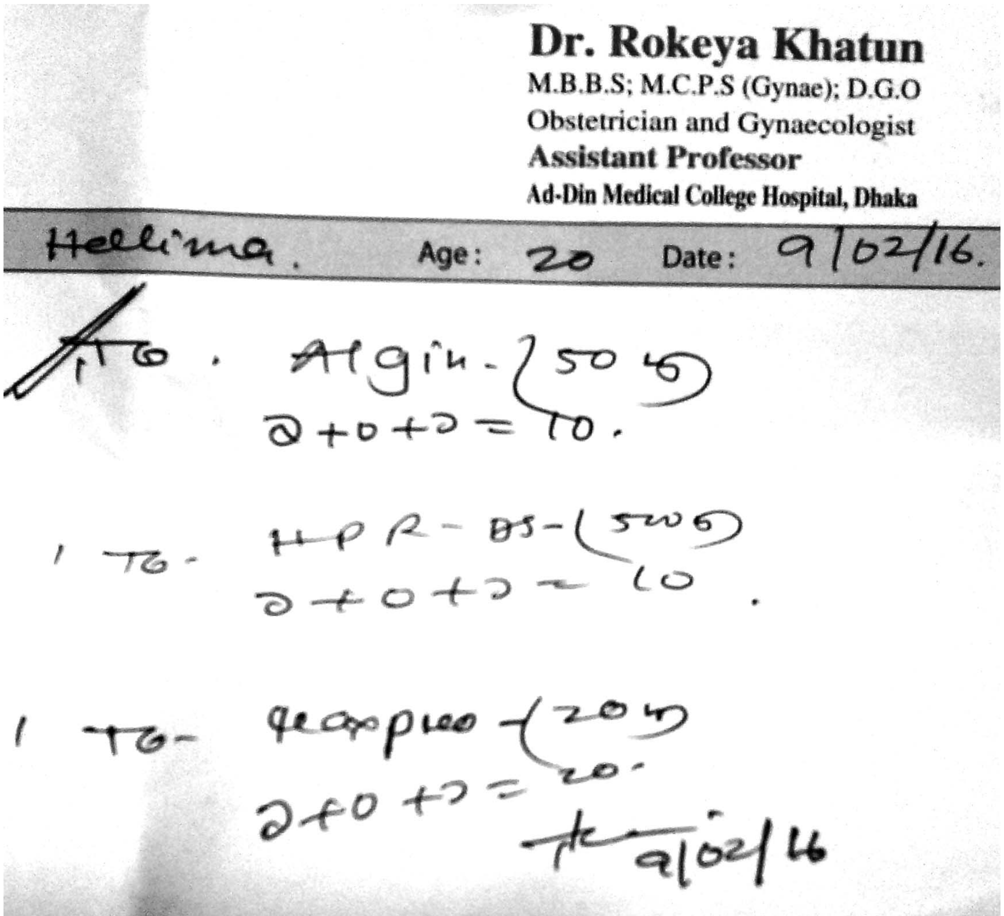
খাবারের পরে।
খাবারের পূর্বে।
09 FEB 2016

Prof. DR.D .Md. Mofakkharul Bari
BIO-CENTRE
BARI ILIZAROV
ORTHOPAEDIC CENTRE
09 FEB 2016
An Ideal Limb Lengthening & Reconstruction Centre.



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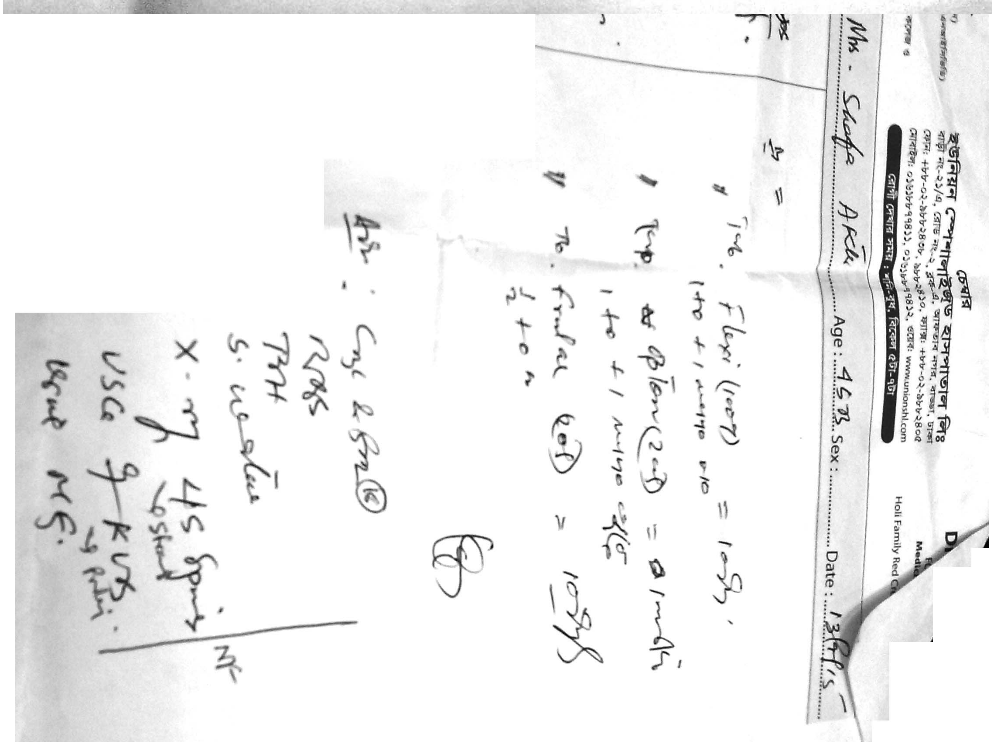
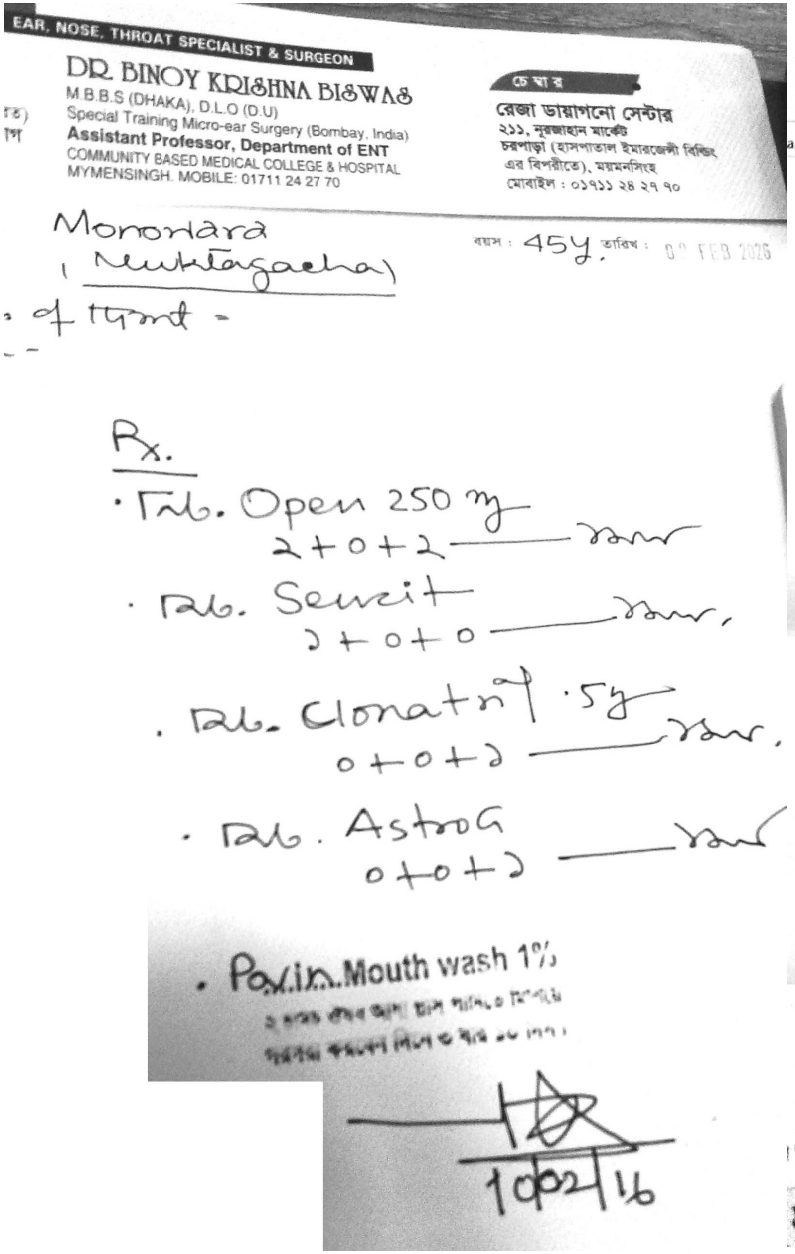
Date: 9/02/16.





EAR, NOSE, THROAT SPECIALIST & SURGEON

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চে ম্বা র
রেজা ডায়াগনো সেন্টার
২১১, নুরজাহান মার্কেট
চরপাড়া (হাসপাতাল ইমারজেন্সী বিল্ডিং
এর বিপরীতে), ময়মনসিংহ
মোবাইল : ০১৭১১ ২৪ ২৭ ৭০

Monwara
Nuktagacha

বয়স : 45y. তারিখ : 0° FEB 2026

Rx.

- Tab. Open 250 mg
  2+0+2 —— ৯দিন
- Tab. Sewit
  1+0+0 —— ৯দিন,
- Tab. Clonatral .5g
  0+0+1 —— ৯দিন,
- Tab. Astrog
  0+0+1 —— ৯দিন

- Povin. Mouth wash 1%

10/02/26

ডাঃ এহ্‌সানুল করিম
এমবিবিএস (ঢাকা)
বঙ্গবন্ধু শেখ মুজিব মেডিক্যাল বিশ্ববিদ্যালয়
নবজাতক, শিশু ও মেডিসিন চিকিৎসক
E-mail : ahsanulkarim.dr@gmail.com

Name : Mithila Age : 4k y Wt : 12k Date : 0

Rx

- Syp. Napa
  ১½ চামচ × ৩-৪ বার — জ্বর থাকলে
- Syp. Cib. 3
  বেলনে ১ চামচ × ২ বার — ৭দিন

প্রয়োজন হলে

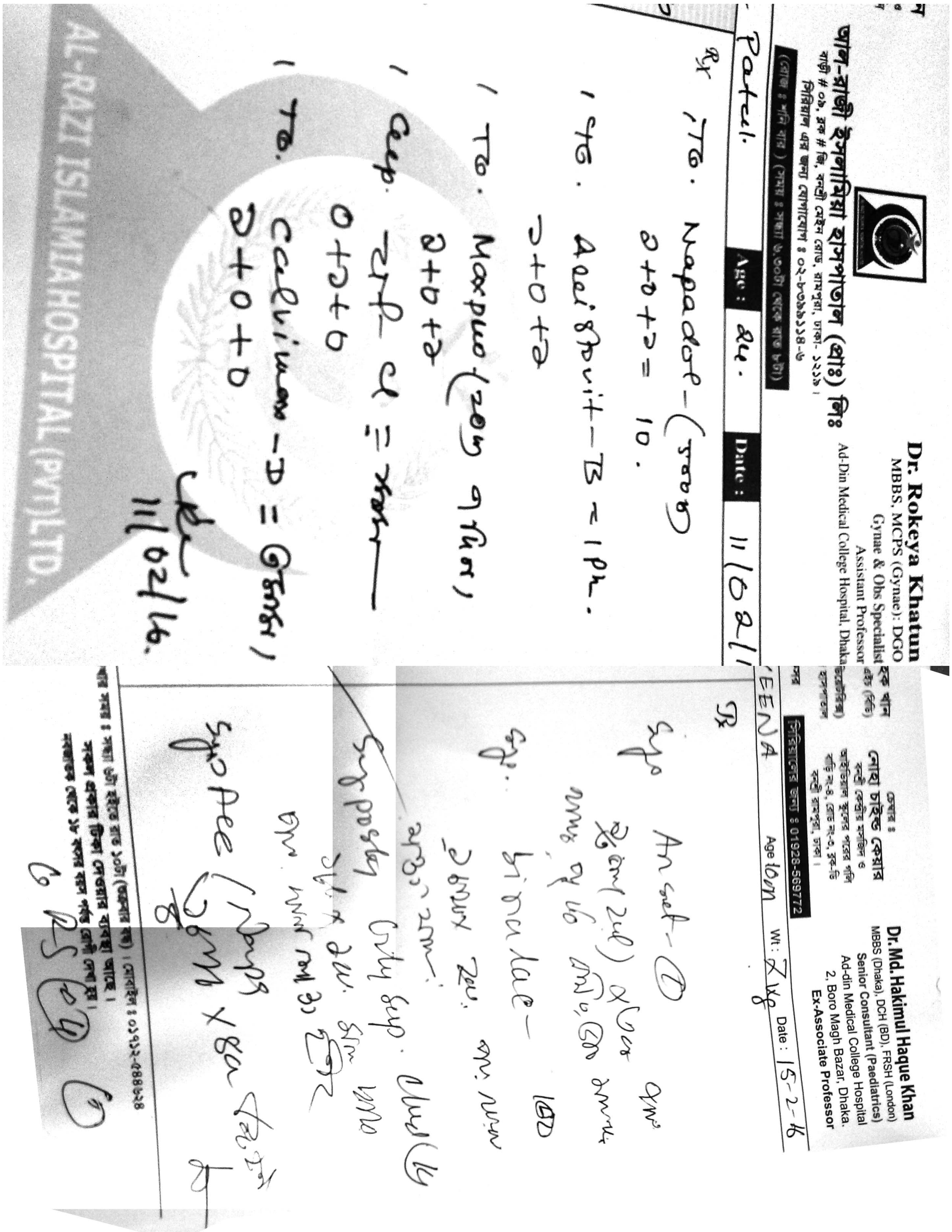
Syp. Ambrox
১ চামচ × ৩ বার — ৭দিন

Napa Suppo (125 mg)
১টি জ্বর ১০৫°F হলে

অবস্থার অবনতি হলে অথবা জরুরী প্রয়োজনে নিকটবর্তী হাসপাতালে যোগাযোগ করবেন

চেম্বার :

ড্রাগ হাউজ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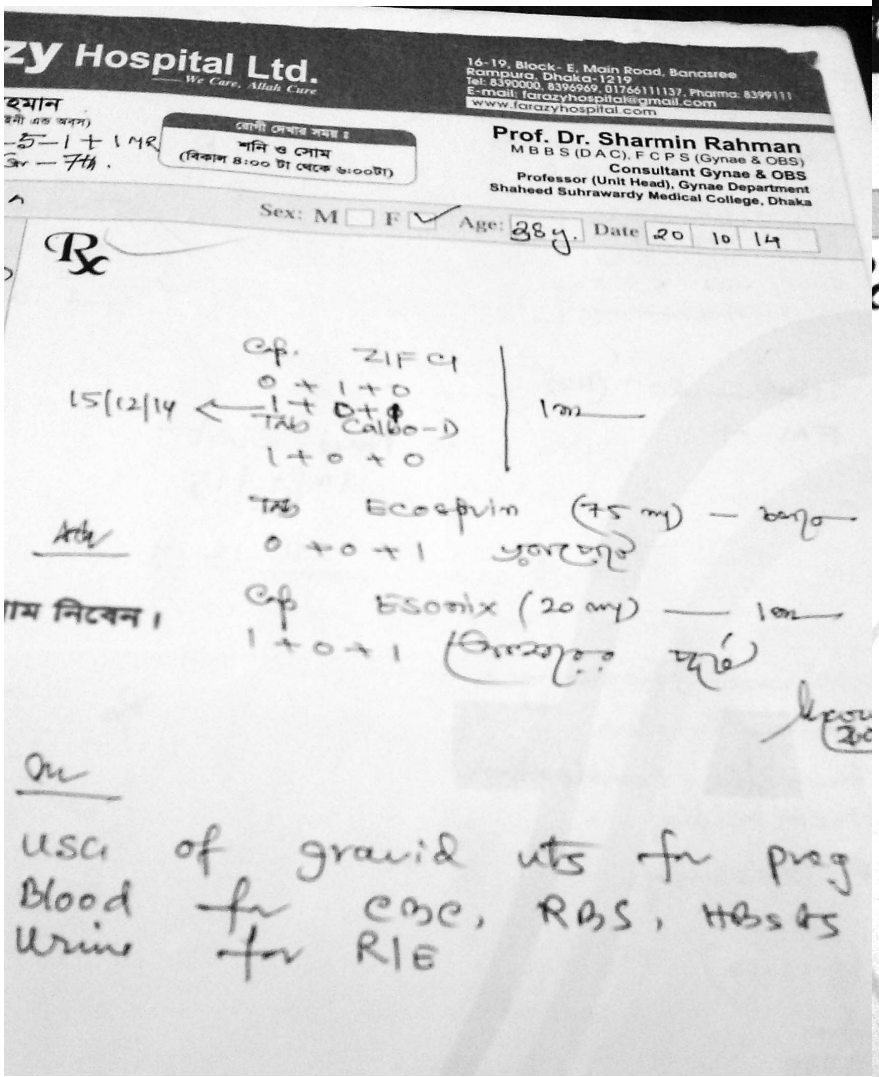
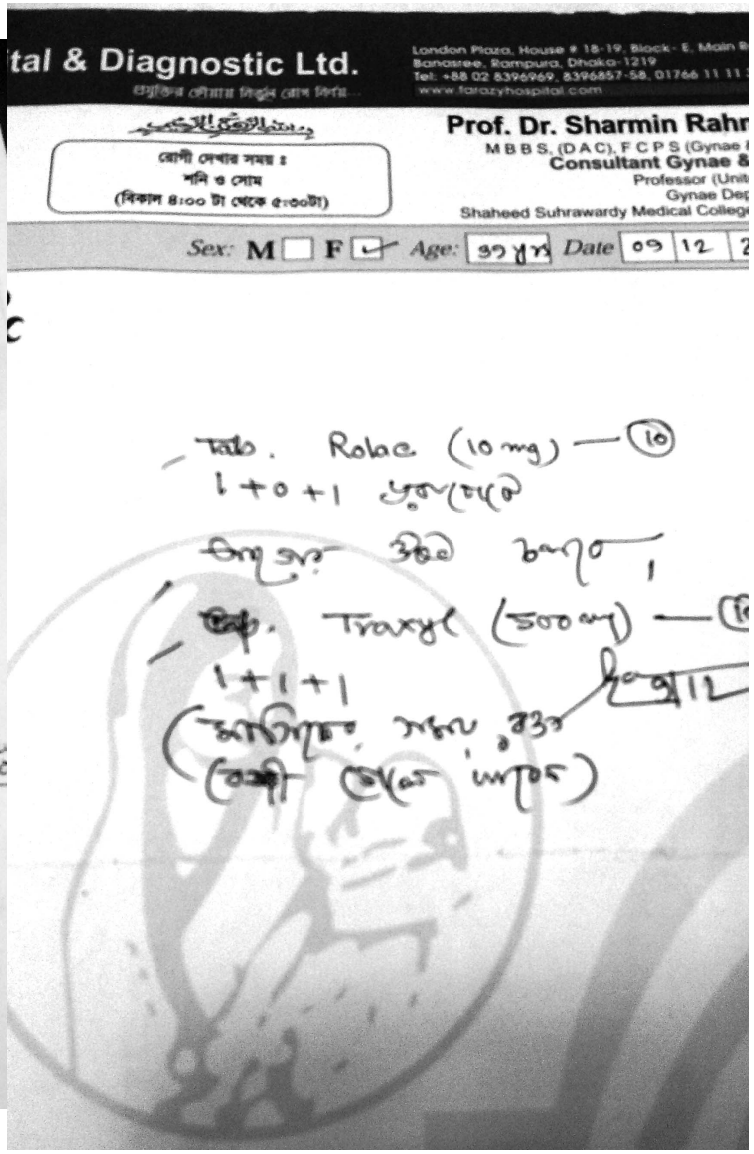
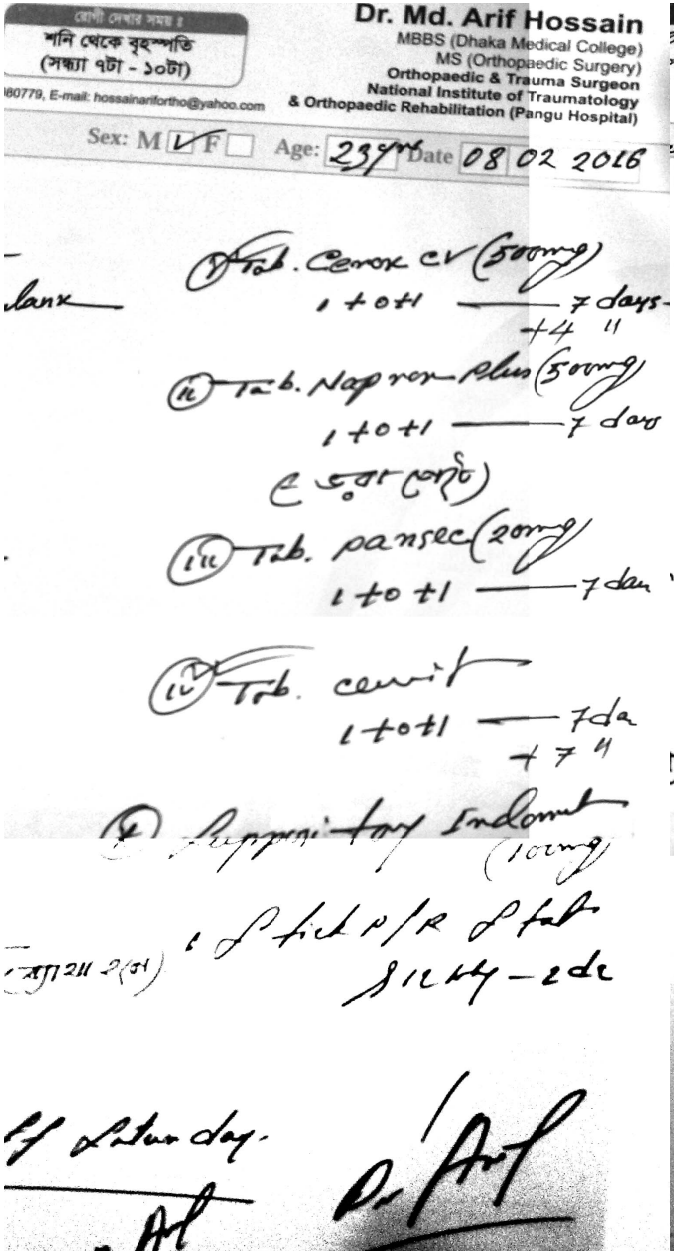






রোগী দেখার সময় ঃ
শনি থেকে বৃহস্পতি
(সন্ধ্যা ৭টা - ১০টা)

Dr. Md. Arif Hossain
MBBS (Dhaka Medical College)
MS (Orthopaedic Surgery)
Orthopaedic & Trauma Surgeon
National Institute of Traumatology
& Orthopaedic Rehabilitation (Pangu Hospital)

80779, E-mail: hossainarifortho@yahoo.com

Sex: M ☑ F ☐ Age: 23/M Date 08 02 2016

Tab. Cenox CV (500mg)
1+0+1 —— 7 days
+4 11

(ii) Tab. Naproxen Plus (500mg)
1+0+1 —— 7 day

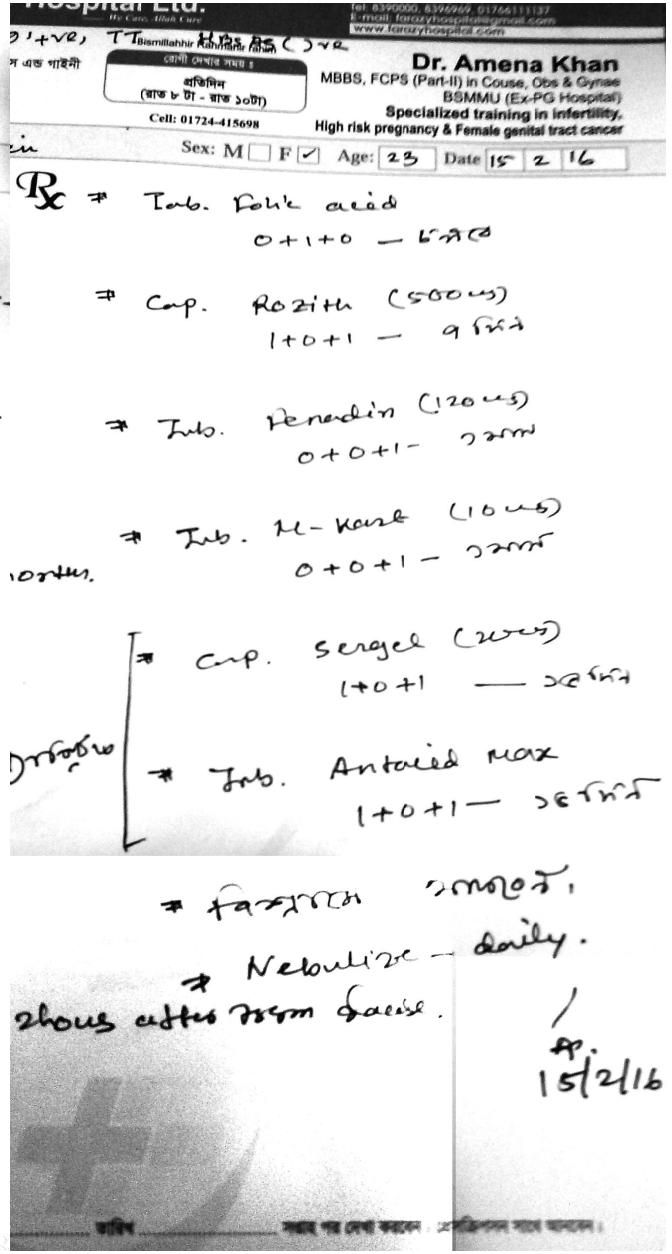
(iii) Tab. pansec (20mg)
1+0+1 —— 7 day

(iv) Tab. cervit
1+0+1 —— 7da
+7 4

(v) Suppository Endomet (100mg)

Stitch P/R Stab
Sicky — 2da

Dr. Arif



Hospital Ltd.
We Care, Walk Care
Tel: 8390090, 8396969, 01766111137
E-mail: farazyhospital@ymail.com
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Bismillahhir Rahmanir Rahim

রোগী দেখার সময় ঃ
প্রতিদিন
(রাত ৮ টা - রাত ১০টা)

Cell: 01724-415698

Dr. Amena Khan
MBBS, FCPS (Part-II) in Couse, Obs & Gynae
BSMMU (Ex-PG Hospital)
Specialized training in infertility,
High risk pregnancy & Female genital tract cancer

Sex: M ☐ F ☑ Age: 23 Date 15 2 16

℞
- Tab. Folic acid 0+1+0 — ৮দিন
- Cap. Rozith (500mg) 1+0+1 — ৭দিন
- Tab. Peradin (120mg) 0+0+1 — ১৫দিন
- Tab. M-Kast (10mg) 0+0+1 — ১৫দিন
- Cap. Sergel (20mg) 1+0+1 — ১৫দিন
- Tab. Antacid max 1+0+1 — ১৫দিন

- ফারমাসে ১৫দিন।
- Nebulize — daily.

2hours after food.

15/2/16