Evaluation of Tuberculosis Treatment Pattern by Prescription Monitoring Tools in Public and Private Sectors in Dhaka Metropolis.

B. PHARM THESIS

A dissertation submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirements for the Bachelor of Pharmacy

Submitted by

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Dedicated To My Beloved Parents Without Whom I Could Be Here……

Endorsement by the Chairperson

This is to certify that the thesis submitted to the Department of Pharmacy, East West University, Dhaka-1212, in partial fulfilment of the requirement for the Degree of Bachelor in Pharmacy, was carried out by Israt Jahan Farha, ID: 2013-1-70-023.

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Certificate by the Supervisor

This is to certify that the thesis entitled **"Evaluation of Tuberculosis Treatment Pattern by Prescription Monitoring Tools in Public and Private Sectors in Dhaka Metropolis"** submitted to the Department of Pharmacy, East West University, in the partial fulfilment of the requirement for the degree of Bachelor of pharmacy was carried out by **Israt Jahan Farha, ID: 2013-1-70-023** in 2017, under the supervision and guidance of me. The thesis has not formed the basis for the award of any other degree/diploma/fellowship or other similar title to any candidate of any university.

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Declaration by the Candidate

I, **Israt Jahan Farha** hereby declare that the dissertation entitled **"Evaluation of Tuberculosis Treatment Pattern by Prescription Monitoring Tools in Public and Private Sectors in Dhaka Metropolis''** submitted by me to the Department of Pharmacy, East West University, in the partial fulfilment of the requirement for the award of the degree Bachelor of Pharmacy is a complete record of original research work carried out by me during 2017, under the supervision and guidance of**Mst. Marium Begum**, Senior Lecturer, Department of Pharmacy, East West University.The thesis has not formed the basis for the award of any other degree/diploma/fellowship or other similar title to any candidate of any university.

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Abstract

It drugs are not the only therapeutic interventions, which provide a desirable health level, rational use of them plays an important role in the efficacy and sufficiency of therapeutic interventions. Rational drug utilization means that each individual receives the right medicine, in an adequate dose for an adequate duration, with appropriate information and follow-up treatment, and at an affordable cost.

Some examples of irrational prescription are over- and under-prescribing, polypharmacy, no indicated drug prescription, unreasonable use of expensive medicines and inappropriate use of antibiotics. In addition to high cost of treatment, inappropriate prescribing causes ineffective, unsafe treatment, exacerbation or prolongation of illness, distress, and harm to the patient.

Like other countries, inappropriate use of drugs due to irrational prescription practices is a common problem in Iran, and requires being concisely controlled.

Due to the high cost of inappropriate use of drugs, developing countries face more problems because of the limited economic resources and lack of organized drug policy.

In order to improve the prescription quality and rational prescription pattern promotion there is an inevitable need to investigate the factors that affect doctors' prescription patterns. Studies have shown that there is a correlation between prescription patterns and gender, age, educational status, work experience, economic situation, and physician's specialty. Defining drug prescription and consumption pattern provides advantageous feedback to prescribers in order to improve their prescribing behavior. Prescription analyzing studies help the policymakers to set the priorities to promote the rational use of medicines nationwide.

This study aims to quantify the current situation of drug use pattern for the treatment of Tuberculosis in correlation with prescribing behavior of physicians based on their different specialties. The objective was to quantify the specialists' prescription pattern in ten different public and private sectors in Dhaka metropolis, Bangladesh and to point out the prescribing behavioral differences among several specialties.

A retrospective cross-sectional study was carried out on the claim data and 6000 prescription is collected from 10 different hospitals among which 5 are private and five are government owned. Outdoor prescription data were obtained on the basis of the claims that the pharmacies submitted to the insurers during 1 year period of the study. More than 6000 prescriptions were analyzed depending on various parameters that is designed and outcome has been justified.

After comparison study we have seen that average number of drug per prescription in case of public hospitals is 5 where as it is 7 for private hospitals. As Tuberculosis is a specialized disease to be cured and also an infectious diseases so it needs extensive diagnostic test and history study and we see that in both prescription collection from private and public sectors contain 100% disease diagnosis history. Near about 91% prescription contain more than 4 diagnostic test in case of public hospitals where as it is 97% for private hospitals.

As immunity break down in tuberculosis patients it is necessary to prescribe multivitamins and minerals to boost up the patients immunity system. This is why prescription collected from private sectors contains 87% multivitamins and prescriptions collected from private sectors

contain 100% multi vitamins. All the drugs need for tuberculosis treatment is supplied by WHO and UNDP finance and tuberculosis treatment is totally free but depending on patients conditions it needs others bronchodilators, multi vitamins, antihistamines, others drugs which cost near 293 BDT for public sectors and 523 for private sectors.

Age missing in both prescriptions was 4% and date missing was 1%. Tuberculosis is prone to patient's year less than 4 and greater than 35years. Tendency of Antibiotic use was 296% before intervention and after intervention 258% it is reduced by 38% in public sects. In private sectors before intervention it was 397% and after intervention 371% reduced by 26%. Patient satisfaction is also analyzed. Clinical check list is also analyzed.

There is an inevitable need to improve prescription habits among different specialties, especially among general practitioners. This causes the policymakers to put more emphasis on priorities such as continuous education.

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1.1. Prescription

A prescription is a written or computerized order from a healthcare provider (prescriber) directing the pharmacy to compound and dispense a drug or medication for a patient to use [1]. The central priority of health care system is providing the right medicine to the right people at the right time [2].

The word "prescription" is derived from the Latin term praescriptus which is made up of two Latin words - Prae - a prefix meaning 'before' and scribere- meaning 'to write' Putting it all together (Prae + scribere), prescription means 'to write before' which reflects the historical fact that a prescription traditionally had to be written before a drug could be compounded and administered to a patient.

Any drug prescription should contain, in legible form, elements required for appropriate dispensing of drugs, to ensure continuity of care and for legal purposes. Rational prescription means that patients receive appropriate medicine in proper dosage, at the lowest cost [3].Inappropriate prescription practices like polypharmacy[4], use of non-essential drugs[5], indiscriminate use of analgesics, antibiotics, and vitamins[3], ignoring important interactions, incomplete prescriptions [6] and poor legibility[7], are contributing to increasing antibiotic resistance [8], adverse drug reactions, serious medication errors8, loss of patient confidence [3] and high cost of treatment[3].

1.1.1. Different Parts of Prescription

Prescriptions are written in a blank of universally accepted format or may be made in pads. A typical prescription consists of the following parts.

1.1.1.1. Physician (Prescriber) Information

Information about physician is essential so that the doctor could be contacted in emergency to seek clarification and necessary instruction, missing words, confirmation etc. Following information is mentioned on the prescription:

i) Doctor's name, designation and Registration Number

ii) Address with phone number and e-mail.

iii) Date of issue of prescription.

iv)Prescription number, (required when calling the pharmacy for a refill or for insurance purposes).

1.1.1.2. Patient Information

The name, address, age and sex of the patient help in identifying the prescription. Date of prescribing and date(s) of presentation for filling are necessary for keeping accurate records and ascertaining the needs of the patient. Age and sex of the patient, if mentioned, help the pharmacist to check the prescribed dose (s) of the medication.

i) Name of Patient: The prescribed medication is only for the patient whose name is on the label. Medications should not be given to another patient even if the other patient has similar symptoms.

ii) Sex : Male / Female

iii) Age and weight : For calculation of dose, dose frequency and route of administration.

1.1.1.3. Superscription

The superscription which consists of the heading where the symbol Rx (an abbreviation for recipe, the Latin for 'take thou' or 'you take' is found. Rx symbol comes before the inscription. The sign at the foot of the letter R is believed to represent the sign of Jupiter, the God of Healing. Some historians believe that the symbol Rx originated from the sign of Jupiter.

1.1.1.4. Inscription

The inscription (body of prescription) comprises an important part of prescription containing-

i) Name(s) of drug(s) and their quantities,

ii) Other chief ingredients of the prescription with quantity,

iii) Instruction regarding dosage form like tablet, capsule, suspension, mixture, etc., and

iv) Dose and quantity of prescription

1.1.1.5. Subscription

The subscription gives specific directions for the pharmacist on how to compound the medication. Most of direction is usually expressed in contracted Latin or in the form of abbreviation. Instructions for preparation are also given such as: 'make a mixture', 'mix and make 10 tablets', or 'dispense 10 capsules'.

1.1.1.6. Transcription or Signatura

The signatura which gives instructions to the patient -

1. How, how much, When, and how long the drug is to be taken.

These instructions are preceded by abbreviation 'Sig.' from the Latin, meaning 'mark.' The signatura should always be written in English; however, physicians continue to insert Latin abbreviations, e.g.,' 1 cap t.i.d. pc' which the pharmacist translates into

English as 'take one capsule three times daily after meals'. It may also contain special instructions, warnings, followed by the signature of the prescriber.

1.1.1.7. Renewal

The number of times a prescription is to be repeated, is written by the physician under renewal instructions.

1.1.1.8. Signature

Finally the prescription must bear the signature of the prescriber to impart it the legal validity.

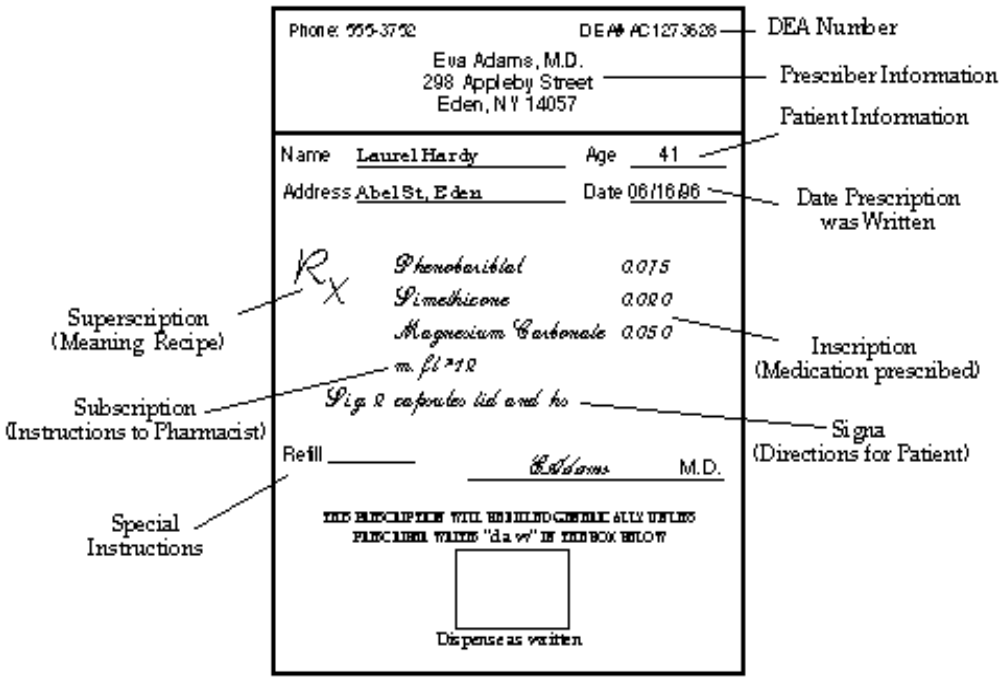


Figure 1a: Different parts of prescription

1.1.1.9. Other important instructions

(a) Refills - the label will show the number of refills permitted /no refills

(b) Qty : "quantity" or how much is in the package.

(c) Mfg. : "manufacturer" or who makes the medication.

(d) Expiry date : do not use the medication past this date. Do not save unused prescription. If same patient gets sick again, prescriber should be consulted.

(e) Take complete /full course : means that patient should finish taking the entire contents of the prescription even if feeling better especially patient taking antibiotics. This is to avoid recurrence of infection and development of resistance.

(f) Take with / without food: means whether the medication is to be taken after a meal or empty stomach. Some medications work better when the stomach is full while some medications work better when the stomach is empty.

(g) Take four times a day: means to take the medication four times in 24 hours with equal spacing of time. It is different than 'Take every four hours'. If any confusion occurs when to give the medications, one should consult doctor or pharmacist. Most medications do not have to be precisely timed to be effective, but some do.

(h) Take as needed as symptoms persist: means the medication can be taken when symptoms are present, without consulting the prescriber.

(i) The package may also have bright colored warning labels with additional information. The following are examples:

(i) Safe storage instructions, such as 'keep refrigerated'.

(ii) Instructions for use, such as 'shake well before use'.

(iii) Possible side effects, such as 'may cause drowsiness'.

1.1.2. Types of Prescription

1.1.2.1. Erroneous Prescriptions

- Where the brand name precedes the generic name
- Where the generic name is the one in parenthesis
- Where the brand name is not in parentheses
- Where more than one drug product is prescribed on one prescription form.

1.1.2.2.Violative Prescriptions

- Where generic name is not written
- Where the generic name is not legible and a brand name which is legible is written

- When the brand name is indicated and instructions added (such as the phrase “no substitution") which tend to obstruct, hinder or prevent proper generic dispensing.

1.1.2.3. Impossible Prescriptions

- When only the generic name is written but it is not legible.
- When the generic name does not correspond to the brand name
- When both the generic name and the brand name are not legible
- When the drug product prescribed is not registered with FDA

1.2. Polypharmacy

The term polypharmacy refers to the group of medications one person may be taking. It comes from two Greek root words: poly, meaning many, and pharmakeia meaning medicines or drugs. It is generally used when that one person is taking too many medications, or when the drugs have been prescribed by many doctors, and may not have been coordinated well. The definition of polypharmacy is still controversial [9, 10, 11].

Although the term polypharmacy has evolved over time and is often used to mean many different things in different situations, its basic definition is quite simple, more drugs are prescribed or taken than are clinically appropriate [12]. The specific number of drugs taken is not itself indicative of polypharmacy as all of the drugs may be clinically necessary and appropriate for the patient; however, as the number of prescribed drugs increases, so do the chances of Polypharmacy [13].

A 2002 US survey indicated that 25% of the overall population takes five or more medications per week [14]. When specifically considering the population 65 years of age and older, this percentage increases to about 50%, with 44% of men and 57% of women taking five or more medications per week and 12% of both sexes taking 10 or more prescriptions per week [15]. The most worrisome consequence of polypharmacy is the occurrence of adverse drug reactions (ADRs), but increased drug costs and patient quality of life are also significant issues [16, 17]. The elderly population, which often suffers from multiple chronic diseases requiring multiple medications, continues to increase. These patients are much more likely to experience Polypharmacy and its negative consequences, especially ADRs [18, 19, 20, 21,22].

ADRs are one of the most troubling issues surrounding medication use in the elderly, as this patient population is more likely to have poor outcomes than others [23]. ADRs affect approximately 10-20% of hospitalized patients and around 7% of the general population; this number increases when the population of interest is limited to the elderly [24, 25].

1.2.1. Reasons for Polypharmacy

Considering the large number of polypharmacy concepts, there is need of an agreement in relation to this definition to evaluate its frequency, control its occurrence and to identify the risk of adverse reactions associated with polypharmacy [26]. There are several reasons for polypharmacy:

- ➢ As the population ages, polypharmacy increases. The elderly often required multiple medications to treat multiple health-related conditions [27].
- ➢ Patient with multiple comorbid medical conditions also required numerous medications to treat each condition. It is not unreasonable for patient with multiple comorbid medical conditions to be on 6-9 medications to reduce his or her long-term risk for those conditions, i.e, diabetes conditions and coronary events [28].
- ➢ A recent hospitalization also puts patients at risk of polypharmacy. Medicines are started and stopped quite frequently during patient hospital stay.
- ➢ Multiple doctors are prescribing medications for the same patient. Once a patient starts a medication, it is never discontinued.
- ➢ Lack of patient education is the most common reason. Doctors do not inform patients or patients do not ask questions.

Polypharmacy may occur when additional drugs are prescribed to treat the adverse effects of other drugs. This is known as the 'prescribing cascade' [29,30]. Other suboptimal prescribing associated with polypharmacy includes prescription of more than one drug in the same class or prescription of a drug that interacts with or is contraindicated in combination with another of the patient's medicines [31].

Polypharmacy in of itself is not problematic.Polypharmacy can, however, become problematic when negative outcomes occur. Polypharmacy has been shown to result in:

- ➢ Unnecessary and/or inappropriate medication prescribing.
- ➢ Increased risk for drug interactions and ADRs [32].
- ➢ Nonadherence.
- ➢ Increased overall drug expenditures.

1.3. Rational and Irrational Use of Drugs

1.3.1. Rational Use of Drugs

The terms "appropriate" and "rational" use of drugs will be used interchangeably throughout the session. The Conference of Experts on the Rational Use of Drugs, convened by the World Health Organization in Nairobi in 1985, defined rational use as follows:

Rational use of drugs requires that patients receive medicines 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 [33].

This definition clarifies that there should be a process of prescription, which includes-

- Correctly in defining a patient's problems (or diagnosis)
- Correctly in defining effective and safe treatments (drugs and nondrugs)
- Correctly in selecting appropriate drugs, dosage, and duration
- Proper writing a prescription
- Proper giving patients adequate information and
- Proper planning to evaluate treatment responses.

The definition implies that rational use of drugs, especially rational prescribing, should meet certain criteria as follows:

i. Appropriate indication. The decision to prescribe drug(s) is entirely based on medical rationale and the drug therapy is an effective and safe treatment.
ii. Appropriate drug. The selection of drugs is based on efficacy, safety, suitability, and cost considerations.
iii. Appropriate patient. No contraindications exist, the likelihood of adverse reactions is minimal, and the drug is acceptable to the patient.
iv. Appropriate patient information. Patients are provided with relevant, accurate, important and clear information regarding their conditions and the medication(s) that are prescribed.
v. Appropriate evaluation. The anticipated and unexpected effects of medications are appropriately monitored and interpreted [34].

1.3.2. Irrational Use of Drugs

Irrational prescribing may be regarded as "pathological" prescribing when the above-mentioned criteria are not fulfilled. Common patterns of irrational prescribing may, therefore, be manifested in the following forms: [35,36,37]

- ➢ The use of drugs when no drug therapy is indicated, e.g., antibiotics for viral upper respiratory infections
- ➢ The use of the wrong drug for a specific condition requiring drug therapy, e.g., tetracycline in childhood diarrhea requiring ORS
- ➢ The use of drugs with doubtful or unproven efficacy, e.g., the use of antimotility agents in acute diarrhea
- ➢ The use of drugs of uncertain safety status, e.g., use of dipyrone (Baralgan, etc.) Failure to provide available, safe, and effective drugs, e.g., failure to vaccinate against measles or tetanus, or failure to prescribe ORS for acute diarrhea
- ➢ The use of correct drugs with incorrect administration, dosages, and duration, e.g., the use of IV metronidazole when suppositories or oral formulations would be appropriate
- ➢ The use of unnecessarily expensive drugs, e.g. the use of a third generation, broadspectrum antimicrobial when a first-line, narrow spectrum agent is indicated

Some examples of commonly encountered inappropriate prescribing practices in many health care settings include— [35, 36, 37]

- ➢ Overuse of antibiotics and antidiarrheals for nonspecific childhood diarrhea
- ➢ Indiscriminate use of injections, e.g., in malaria treatment
- ➢ Multiple or over-prescription
- ➢ Excessive use of antibiotics for treating minor TB
- ➢ Multivitamins and tonics for malnutrition
- ➢ Unnecessary use of expensive antihypertensives

1.3.3. 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 [35,36,37]. 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	

All of these factors are affected by changes in national and global practices. For example, the frequent use of injections is declining in many African countries because of the fear of AIDS. In some countries, however, the use of injectibles remains high due to false assumption of prescribers that injections will improve patient satisfaction and that they are always expected by the patients.

1.3.4. Types of Irrational Use of Drugs

1) Under-prescribing

Occurs when:
● Needed medications are not prescribed ● The dosage prescribed is inadequate

2) Over-prescribing:

Occurs when:

- The prescribed drug is not needed by the patient
- The quantity of drug dispensed is too much for current course of treatment

3) Incorrect prescribing or dispensing:

Occurs when:
The ● Prescribing the wrong drug. ● Dispensing the wrong drug due to the prescription being prepared improperly ● Adjustments are not made for existing medical, genetic, environmental or other conditions

4) Extravagant prescribing:

Occurs when:
● Prescribing a more expensive branded drug when there is a less expensive generic drug of good quality available. ● Treating the patient symptomatically instead of treating the serious illness, hence making the patient use a lot of his funds.

5) Multiple prescribing:

Occurs when:
● Two or more medications are prescribed when fewer would achieve the same effect

Figure 1b: The vicious cycle that leads to overuse of medicines. Source: WHO, 1997, managing drug supply

1.3.5. Factors That Influence Irrational Drug Use

Many interrelated factors influence drug use and can all contribute to irrational use. The health system, prescriber, dispenser, patient, and community are all involved in the therapeutic process. Let us look at the factors affecting each of these players.

1.3.5.1. Health System

Factors affecting the health system include unreliable supply, drug shortages, expired drugs, and availability of inappropriate drugs. Such inefficiencies in the system lead to a lack of confidence in the system by the prescriber and the patient. The patient demands treatment and the prescriber feels obliged to give what is available, even if the drug is not the correct one to treat the condition.

1.3.5.2. Prescriber

The prescriber can be affected by internal and external factors. He or she may have received inadequate training, or may be using outdated prescribing practices due to a lack of continuing education. There may be a lack of objective drug information, and the information provided by drug representatives may be unreliable. The prescriber may be tempted to generalize inappropriately about the effectiveness or side effects of drugs on the basis of limited personal experience. Externally, a heavy patient load and pressure to prescribe from peers, patients, and drug company representatives all complicate prescribing decisions. Finally, profit may affect a prescriber's choice if the prescriber's income is dependent on drug sales.

1.3.5.3. Dispenser

The dispenser plays a crucial role in the therapeutic process. The quality of dispensing may be affected by the training and supervision the dispenser has received and the drug information available to the dispenser. A shortage of dispensing materials and short dispensing time due to heavy patient load may also have an adverse impact on dispensing. Finally, the low status of dispensers affects the quality of dispensing.

1.3.5.4. Patient and Community

The individual's adherence to treatment is influenced by many factors, including:

- cultural beliefs,
- the communication skills and attitudes of the prescriber and dispenser,
- the limited time available for consulting,
- the shortage of printed information, and
- community beliefs about the efficacy of certain drugs or routes of administration.

For example, there may be a belief that injections are more powerful than capsules, or that capsules are more effective than tablets.

It is clear that although the knowledge and experience of the prescriber are important aspects of the interaction between prescriber and patient, they are not the only factors. As discussed above, there are many causes for irrational drug use and many factors are involved in the decision making process.

These factors vary for each person and situation. This means that specific interventions to improve prescribing may work under some circumstances but not others. Due to the complexity of factors, involved, it is unlikely that any single intervention will work in every situation.

1.4. Prescription pattern and monitoring

Prescription pattern monitoring studies (PPMS) are a tool for assessing the prescribing, dispensing and distribution of medicines. Medicines are an integral part of the health care, and modern health care is impossible without the availability of necessary medicines. They not only save lives and promote health, but prevent epidemics and diseases too. Accessibility to medicines is the fundamental right of every person.[39]

Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harn1 to the patient and higher costs. They also make prescriber vulnerable to influences which can cause irrational prescribing [40]. Irrational prescription of drugs is of common occurrence in clinical practice [41]. Important reasons are being lack of knowledge about drugs, unethical drug promotions and irrational prescribing habits of clinicians. Monitoring

of prescriptions and drug utilization studies can identify the problems and provide feedback to prescribers so as to create awareness about irrational use of drugs [42].

Drug utilization research was defined by World Health Organization (WHO) in 1977 as a marketing, distribution, prescription, and use of drugs in society, with special emphasis on the resulting medical, social and economic consequences. Pharmacoepidemiology is the study of the use and effects/side-effects of drugs in large numbers of people with the purpose of supporting the rational and cost-effective use of drugs in the population thereby improving health outcomes. Drug utilization research is thus an essential part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. Together, drug utilization research and pharmacoepidemiology may provide insights into many aspects of drug use and drug-prescribing. They provide much useful information on indirect data on morbidity, treatment cost of illness, therapeutic compliance, incidence of adverse reactions, effectiveness of drug consumption and choice of comparators.[43]

Prescription pattern monitoring studies (PPMS) are drug utilization studies with the main focus on prescribing, dispensing and administering of drugs. They promote appropriate use of monitored drugs and reduction of abuse or misuse of monitored drugs. PPMS also guide and support prescribers, dispensers and the general public on appropriate use of drugs, collaborate and develop working relationship with other key organizations to achieve a rational use of drugs.[44]

Prescription Patterns explain the extent and profile of drug use, trends, quality of drugs, and compliance with regional, state or national guidelines like standard treatment guidelines, usage of drugs from essential medicine list and use of generic drugs. There is increasing importance of PPMS because of a boost in marketing of new drugs, variations in pattern of prescribing and consumption of drugs, growing concern about delayed adverse effects, cost of drugs and volume of prescription.[44]

The aim of PPMS is to facilitate the rational use of drugs in a population. 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 half of all patients fail to take them correctly. The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards. The rational use of medicines (RUM) is defined as “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.[43]

Prescription patterns have been studied in a variety of settings. The experience accumulated over time has originated a standard assessment methodology, well-known and applied worldwide (WHO, 1993). Prescription patterns depend on the professional qualifications of the prescribers, the quality of their training, in-service training and supervision activities, ingrained traditions,

market incentives, patient preferences, regulatory provisions, drug supply constraints, the availability of treatment guidelines.

These factors evolve during a protracted crisis, not all in the same direction, nor uniformly. A patchwork of findings is common. The contraction of commercial outlets outside large towns may reduce the availability of unneeded drugs. Their replacement by standard kits induces a measure of rationing. An ensuing drop in the misuse of antibiotics and injections, although negatively perceived by prescribers and patients alike, represents a tangible improvement. On the other hand, the communization of health care encourages the prescription of unneeded, even harmful drugs. Against the general decline of standards, health services supported or directly provided by some capable NGOs may receive a boost in terms of in-service training, supply and supervision, which translates into improved prescription practice.. Standard treatment guidelines may have been formulated and taken roots in daily practice before the crisis. When this is the case, collaborative NGOs may adopt them. Other health service providers, bound to their own international standards, prefer to ignore national guidelines. Over time, health care fragments.

Not many battered health sectors have invested in formulating standard treatment guidelines, or in updating old ones, during a crisis. Precious opportunities to disseminate sound professional practice are wasted. Disease-control programmes and international agencies are left in charge of filling this gap. As they are unlikely to reach a measure of consensus, guidelines multiply.

Diverging views, with government officials extolling the merits of existing guidelines, despite their unavailability, alongside NGO managers downplaying their value, without even having examined them, are commonplace. Higher-level cadres are likely to be dismissive of guidelines perceived as constraints to their medical practice. The true users of treatment guidelines, frontline health care providers, may remain unheard in these futile discussions.

Drugs play an important role in protecting, maintaining and restoring health. Prescription writing is a science and an art, as it conveys the message from the prescriber to the patient. The treatment of diseases by the use of essential drugs, prescribed by their generic names, has been emphasized by the WHO and the National Health Policy of India.

The cost of drug prescription poses problems in developing countries such as India, which allocates only 0.9% of its Gross Domestic Product (GDP), i.e. Rs. 200 per capita,to health. The allocation for meeting the cost of the drugs is even meager. Moreover, the production of pharmaceutical preparations in India is grossly imbalanced and there is cut throat competition among drug companies, which breeds malpractice. Indian markets are flooded with over 70,000 formulations, as compared to about 350 listed in the WHO essential drug list, and pharmaceutical companies encourage doctors to prescribe branded medicines, often in exchange for favors. This study was, therefore, undertaken with the aim to find out the prescription pattern and cost per prescription at different levels of health facilities in the public health facilities of Lucknow - the capital city of Uttar Pradesh, a state in north India.

Prescription Guideline

This manual focuses on the process of prescribing. It gives you the tools to think for yourself and not blindly follow what other people think and do. It also enables you to understand why certain national or departmental standard treatment guidelines have been chosen, and teaches you how to make the best use of such guidelines. The manual can be used for self-study, following the systematic approach outlined below, or as part of a formal training course.

Part 1: The process of rational treatment

This overview takes you step by step from problem to solution. Rational treatment requires a logical approach and common sense. After reading this chapter you will know that prescribing a drug is part of a process that includes many other components, such as specifying your therapeutic objective, and informing the patient.

Part 2: Selecting your P-drugs

This section explains the principles of drug selection and how to use them in practice. It teaches you how to choose the drugs that you are going to prescribe regularly and with which you will become familiar, called P(ersonal)-drugs. In this selection process you will have to consult your pharmacology textbook, national formulary, and available national and international treatment guidelines. After you have worked your way through this section you will know how to select a drug for a particular disease or complaint.

Part 3: Treating your patients

This part of the book shows you how to treat a patient. Each step of the process is described in separate chapters. Practical examples illustrate how to select, prescribe and monitor the treatment, and how to communicate effectively with your patients. When you have gone through this material you are ready to put into practice what you have learned.

Part 4: Keeping up-to-date

To become a good doctor, and remain one, you also need to know how to acquire and deal with new information about drugs. This section describes the advantages and disadvantages of different sources of information.

Annexes

The annexes contain a brief refresher course on the basic principles of pharmacology in daily practice, a list of essential references, a set of patient information sheets and a checklist for giving injections.

Drug names

In view of the importance that medical students be taught to use generic names, the International Nonproprietary Names (INNs) of drugs are used throughout the manual.

1.5. Pharmacy practice

Pharmacy practice is the discipline of pharmacy which involves developing the professional roles of pharmacists.

Over the past four decades there has been a trend for pharmacy practice to move away from its original focus on medicine supply towards a more inclusive focus on patient care. The role of the pharmacist has evolved from that of a compounder and supplier of pharmaceutical products towards that of a provider of services and information and ultimately that of a provider of patient care. Increasingly, the pharmacist's task is to ensure that a patient's drug therapy is appropriately indicated, the most effective available, the safest possible, and convenient for the patient. By taking direct responsibility for individual patient's medicine-related needs, pharmacists can make a unique contribution to the outcome of drug therapy and to their patients' quality of life. The new approach has been given the name pharmaceutical care. The most generally accepted definition of this new approach is: "**Pharmaceutical care** is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life".[45]

In adopting this definition in 1998, the International Pharmaceutical Federation (FIP) added one significant amendment: "achieving definite outcomes that improve or maintain a patient's quality of life". The practice of pharmaceutical care is new, in contrast to what pharmacists have been doing for years. Because pharmacists often fail to assume responsibility for this care, they may not adequately document, monitor and review the care given. Accepting such responsibility is essential to the practice of pharmaceutical care. In order to fulfill this obligation, the pharmacist needs to be able to assume many different functions. The concept of the seven-star pharmacist, introduced by WHO and taken up by FIP in 2000 in its policy statement on Good Pharmacy Education Practice, sees the pharmacist as a caregiver, communicator, decision-maker, teacher, life-long learner, leader and manager. [46]

1.5.1. New dimensions of pharmacy practice

- Pharmaceutical care
- Evidence-based pharmacy
- Meeting patients' needs
- Chronic patient care – HIV/AIDS
- Self-medication
- Quality assurance of pharmaceutical care services
- Clinical pharmacy

- Pharmacovigilance. [45-47]

1.6. Antibiotic Resistance

Antibiotic resistance in respiratory bacteria now poses a serious threat to the mortality gains of recent decades. As in developed countries, widespread use of antibiotics in developing countries has resulted in many bacteria becoming partially or completely resistant to some antibiotics. In developed countries, 75% of antibiotic prescriptions are useful but most prescriptions are unnecessary. The unnecessary use of antibiotic is expensive and it hastens the development of antibiotic resistance.[48]

1.7. Tuberculosis (TB)

Tuberculosis (TB) has deep social and economic roots;[49] it is widespread; currently one-third of the global population is infected;[50] and although treatment of TB is feasible and effective, active TB is lethal in more than 50% of cases when left untreated.[51] In 2004, TB mortality accounted for 1.6 million deaths, mostly in developing countries.[50] Although the disease appeared to have been controlled by the 1980s, TB incidence started to increase again in industrialized countries around 1985.[52] Several interrelated forces drove this resurgence, including increases in prison populations, homelessness, intravenous drug use, and immigration from countries where TB continued to be endemic. Above all, the decline in TB control activities and the human immunodeficiency virus (HIV) epidemic were two major factors that worked together to fuel the re-emergence of TB.[53]

Increasing TB incidence rates in the 1990s were reported in the former Soviet Union, former Yugoslavia, and some other countries in Eastern Europe. The lowest incidence in Europe is found in Southern countries and Scandinavia.[54] Increased unemployment, homelessness, alcoholism, HIV transmission, and drug resistance, boost the incidence of TB.[55,56]

1.7.1. Causes of Tuberculosis

The *Mycobacterium tuberculosis* bacterium causes TB. It is spread through the air when a person with TB (whose lungs are affected) coughs, sneezes, spits, laughs, or talks.

TB is contagious, but it is not easy to catch. The chances of catching TB from someone you live or work with are much higher than from a stranger. Most people with active TB who have received appropriate treatment for at least 2 weeks are no longer contagious.

Since antibiotics began to be used to fight TB, some strains have become resistant to drugs. Multidrug-resistant TB (MDR-TB) arises when an antibiotic fails to kill all of the bacteria, with the surviving bacteria developing resistance to that antibiotic and often others at the same time.

MDR-TB is treatable and curable only with the use of very specific anti-TB drugs, which are often limited or not readily available. In 2012, around 450,000 people developed MDR-TB. [57]

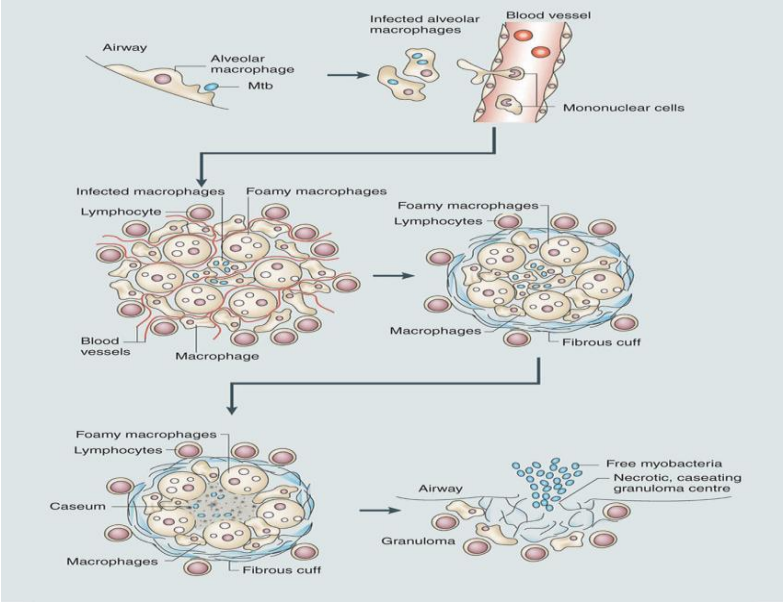


Figure 1c: The progression of human Tuberculosis

1.7.2. Symptoms of TB

While latent TB is symptomless, the symptoms of active TB include the following:

- ➢ Coughing, sometimes with mucus or blood
- ➢ Chills
- ➢ Fatigue
- ➢ Fever
- ➢ Loss of weight
- ➢ Loss of appetite
- ➢ Night sweats

Tuberculosis usually affects the lungs, but can also affect other parts of the body. When TB occurs outside of the lungs, the symptoms vary accordingly. Without treatment, TB can spread to other parts of the body through the bloodstream:

- ➢ TB infecting the bones can lead to spinal pain and joint destruction
- ➢ TB infecting the brain can cause meningitis
- ➢ TB infecting the liver and kidneys can impair their waste filtration functions and lead to blood in the urine
- ➢ TB infecting the heart can impair the heart's ability to pump blood, resulting in a condition called cardiac tamponade that can be fatal.[57]

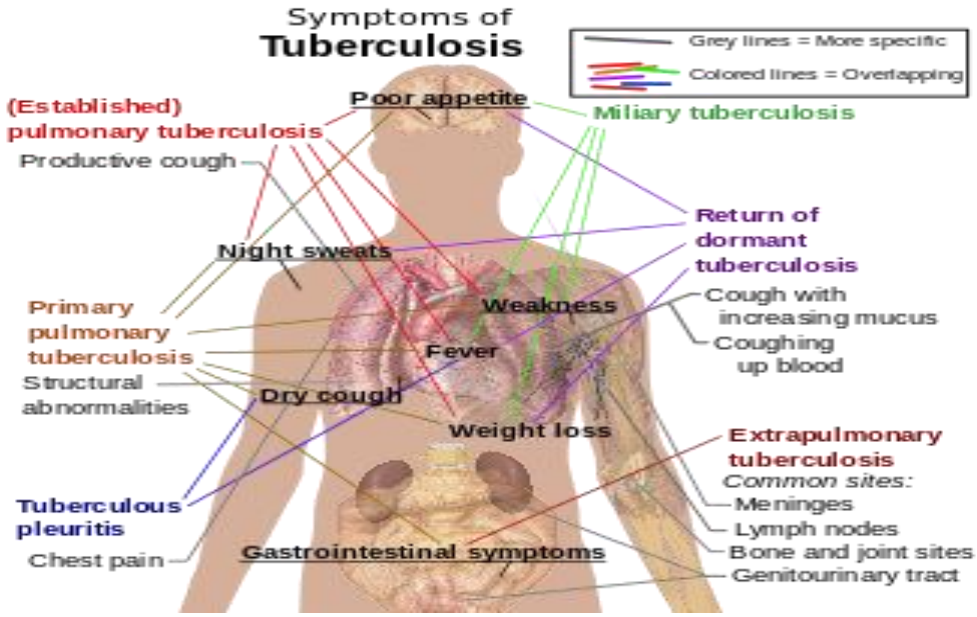


Figure 1d: The symptoms of Tuberculosis

1.7.3. Diagnosis of TB

To check for TB, a doctor will use a stethoscope to listen to the lungs and check for swelling in the lymph nodes. They will also ask about symptoms and medical history as well as assessing the individual's risk of exposure to TB.

The most common diagnostic test for TB is a skin test where a small injection of PPD tuberculin, an extract of the TB bacterium, is made just below the inside forearm.

The injection site should be checked after 2-3 days, and, if a hard, red bump has swollen up to a specific size, then it is likely that TB is present.

Unfortunately, the skin test is not 100 percent accurate and has been known to give incorrect positive and negative readings.

However, there are other tests that are available to diagnose TB. Blood tests, chest X-rays, and sputum tests can all be used to test for the presence of TB bacteria and may be used alongside a skin test.

MDR-TB is more difficult to diagnose than regular TB. It is also difficult to diagnose regular TB in children. [57]

1.7.4. Countries with higher tuberculosis rates

The following countries have the highest TB rates, globally:

- ➢ Africa - particularly West African and sub-Saharan Africa
- ➢ Afghanistan
- ➢ Southeast Asia - including Pakistan, India, Bangladesh, and Indonesia
- ➢ China
- ➢ Russia
- ➢ South America
- ➢ Western Pacific region - including the Philippines, Cambodia, and Vietnam [57]

1.7.5. Drugs Use for TB

- Standard TB treatment regimens including INH, rifampin and pyrazinamide [58,59,60]
- Combinations of (Isoniazid + Rifampicin + Ethambutol + Pyrazinamide) daily for 2 months.
- Combinations of (Isoniazid + Rifampicin) three times a week for next 4 months.[61]

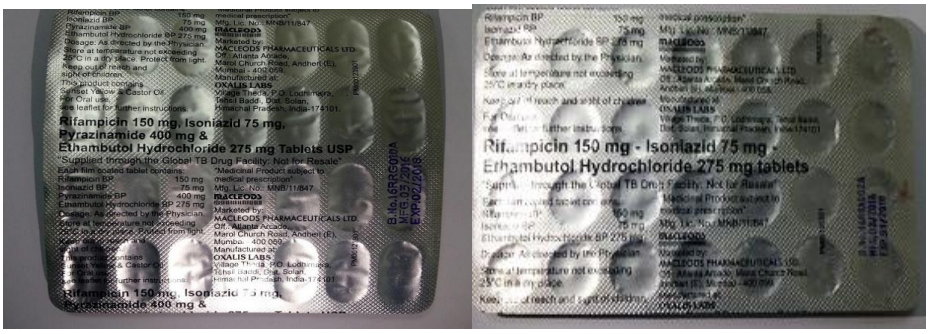


Figure 1e: WHO prescribing anti tuberculosis drugs

2.1. Mechanism of TB in body

2.1.1. Transmission

When people with active pulmonary TB cough, sneeze, speak, sing, or spit, they expel infectious aerosol droplets 0.5 to 5.0 μm in diameter. A single sneeze can release up to 40,000 droplets. Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very small, the inhalation of fewer than 10 bacteria may cause an infection.[5] Transmission should only occur from people with active TB - those with latent infection are not thought to be contagious.

2.1.2. Pathogenesis

Tubercle bacilli that reach the alveoli are ingested by alveolar macrophages. Infection follows if the inoculum escapes alveolar macrophage microbicidal activity.Once infection is established, lymphatic and hematogenous dissemination of tuberculosis typically occurs before the development of an effective immune response. This stage of infection, primary tuberculosis is usually clinically and radiologically silent.

In most persons with intact cell – mediated immunty, T cells and macrophages surround the organisms in granulomas that limit their multiplication and spread. The granuloma prevents dissemination of the mycobacteria and provides a local environment for interaction of cells of the immune system. Bacteria inside the granuloma can become dormant, resulting in latent infection. The infection is contained but not eradicated, since viable organisms may lie dormant within granulomas for years to decades. Individuals with this latent tuberculosis infection do not have active disease and cannot transmit the organism to others. However, reactivation of disease may occur if the host's immune defenses are impaired.

If TB bacteria gain entry to the bloodstream from an area of damaged tissue, they can spread throughout the body and set up many foci of infection, all appearing as tiny, white tubercles in the tissues. This severe form of TB disease, most common in young children and those with HIV, is called military tuberculosis.

2.2. Prevention

Tuberculosis prevention and control efforts primarily rely on the vaccination of infants and the detection and appropriate treatment of active case. The World Health Organization has achieved some success with improved treatment regimens, and a small decrease in case numbers.

2.3. Vaccines

The only currently available vaccine as of 2011 is bacillus Calmette–Guérin (BCG) which, while it is effective against disseminated disease in childhood, confers inconsistent protection against contracting pulmonary TB.Nevertheless, it is the most widely used vaccine worldwide, with more than 90% of all children being vaccinated.

2.4. Management

There are also measures one can take and help protect ourselves and others**:**

* Keeping the immune system healthy. Eat plenty of healthy foods including fruits and vegetables; get enough sleep, and exercise at least 30 minutes a day most days of the week to keep your immune system in top form.

*Get tested regularly. Experts advise people who have a high risk of TB to get a skin test once a year. This includes people with HIV or other conditions that weaken the immune system, people who live or work in a prison or nursing home, healthcare workers, people from countries with high rate of TB and others in high risks group.

* Consider preventive therapy. If you test positive for latent TB infection, your doctor will likely advise you to take medications to reduce your risk of developing active TB.

* Vaccination: This is one major preventive measure against TB. A vaccine called BCG does help strengthen the immune system. BCG is particularly effective in children. Discuss BCG vaccination with a doctor and ensure to be vaccinated if there is a need for it.

* Finish your entire course of medication. This is the most important step you can take to protect yourself and others from TB. When you stop treatment early or skip doses, TB bacteria have a chance to develop mutations that allow them to survive the most potent TB drugs. The resulting drug-resistant strains are much more deadly and difficult to treat.

* Report to hospital: If a member of the family or somebody close to you is diagnosed as having active TB, then it is very important to get your family and yourself tested. The earlier it is detected, the better and faster the treatment. The dangerous contact time is before treatment. However, once treatment with drugs starts, the sick person is non-contagious within a few weeks.

To help keep your family and friends from getting ill if you have active TB

* Stay at home. Avoid going to work or school or sleep in a room with other people during the first few weeks of treatment for active TB. Doctors should be able to issue a sick leave for a certain duration if you work (these are the periods that TB is contagious).

* Ensure adequate ventilation. Open the windows whenever possible to let in fresh air. Avoid going in crowded places. Let there be enough ventilation.

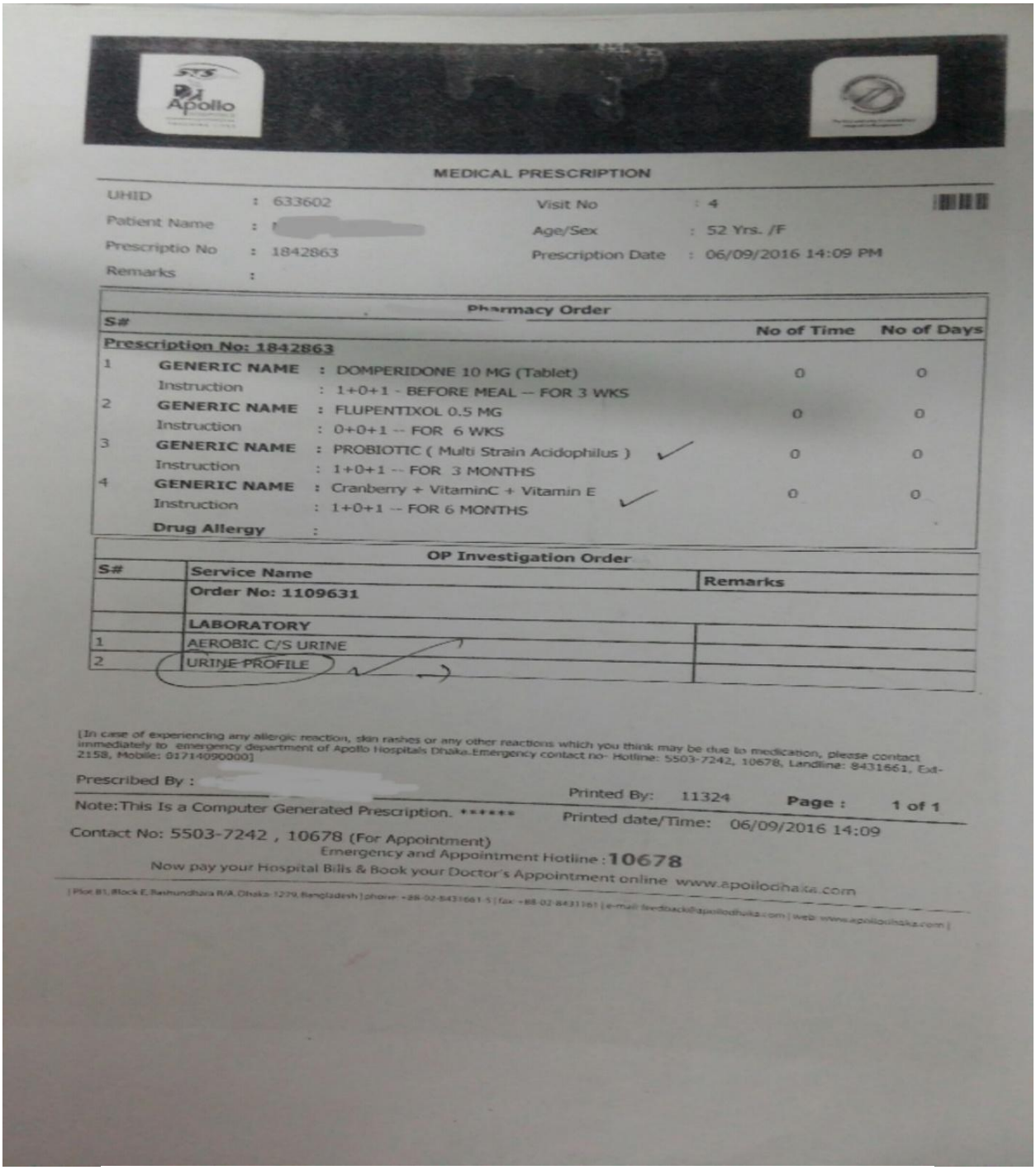
* Practice good hygiene: Wash your body regularly, brush your teeth, wear clean clothes and keep your environment tidy and clean.

* Cover your mouth. It takes two to three weeks of treatment before you're no longer contagious. During that time, be sure to cover your mouth with a tissue any time you laugh, sneeze or cough. Put the dirty tissue in a bag, seal it and throw it away. Also, take adequate measures during the first three weeks of diagnosis and treatment as this will help lessen the risk of transmission, remember it is only you that specifically knows you have TB. After the active phase of TB, you can expect to keep your job, to go to school, to stay with your family, and to lead a normal life.

2.5. Treatment for TB

Treatment of TB uses antibiotics to kill the bacteria. Effective TB treatment is difficult, due to the unusual structure and chemical composition of the mycobacterial cell wall, which hinders the entry of drugs and makes many antibiotics ineffective. The two antibiotics most commonly used are isoniazid and rifampicin, and treatments can be prolonged, taking several months. Latent TB treatment usually employs a single antibiotic, while active TB disease is best treated with combinations of several antibiotics to reduce the risk of the bacteria developing antibiotic resistance People with latent infections are also treated to prevent them from progressing to active TB disease later in life. Directly observed therapy, i.e. having a health care provider watch the person take their medications, is recommended by the WHO in an effort to reduce the number of people not appropriately taking antibiotics. The evidence to support this practice over

people simply taking their medications independently is poor.Methods to remind people of the importance of treatment do, however, appear effective.



MEDICAL PRESCRIPTION

UHID : 633602 Visit No : 4

Patient Name : [redacted] Age/Sex : 52 Yrs. /F

Prescriptio No : 1842863 Prescription Date : 06/09/2016 14:09 PM

Remarks :

Pharmacy Order

S#			No of Time	No of Days
Prescription No: 1842863				
1	**GENERIC NAME**	: DOMPERIDONE 10 MG (Tablet)	0	0
	Instruction	: 1+0+1 - BEFORE MEAL -- FOR 3 WKS		
2	**GENERIC NAME**	: FLUPENTIXOL 0.5 MG	0	0
	Instruction	: 0+0+1 -- FOR 6 WKS		
3	**GENERIC NAME**	: PROBIOTIC (Multi Strain Acidophilus)	0	0
	Instruction	: 1+0+1 -- FOR 3 MONTHS		
4	**GENERIC NAME**	: Cranberry + VitaminC + Vitamin E	0	0
	Instruction	: 1+0+1 -- FOR 6 MONTHS		
	Drug Allergy	:		

OP Investigation Order

S#	Service Name	Remarks
	Order No: 1109631	
	LABORATORY	
1	AEROBIC C/S URINE	
2	URINE PROFILE	

[In case of experiencing any allergic reaction, skin rashes or any other reactions which you think may be due to medication, please contact immediately to emergency department of Apollo Hospitals Dhaka.Emergency contact no- Hotline: 5503-7242, 10678, Landline: 8431661, Ext-2158, Mobile: 01714090000]

Prescribed By : [redacted] Printed By: 11324 **Page :** 1 of 1

Note:This Is a Computer Generated Prescription. ****** Printed date/Time: 06/09/2016 14:09

Contact No: 5503-7242 , 10678 (For Appointment)

Emergency and Appointment Hotline : **10678**

Now pay your Hospital Bills & Book your Doctor's Appointment online www.apollodhaka.com

Figure 2a: Sample of a prescription of Apollo Hospital prescribed with generic name

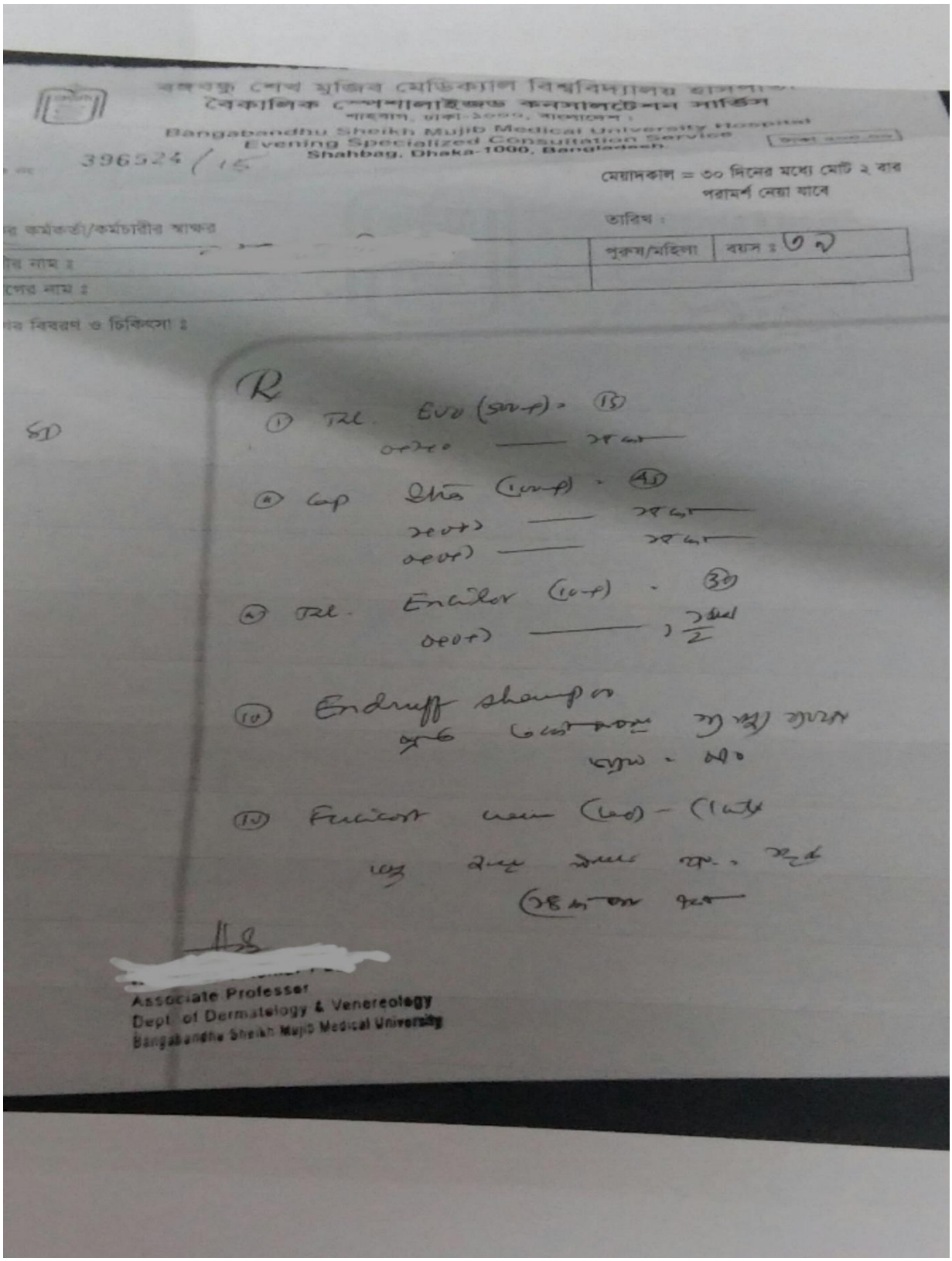
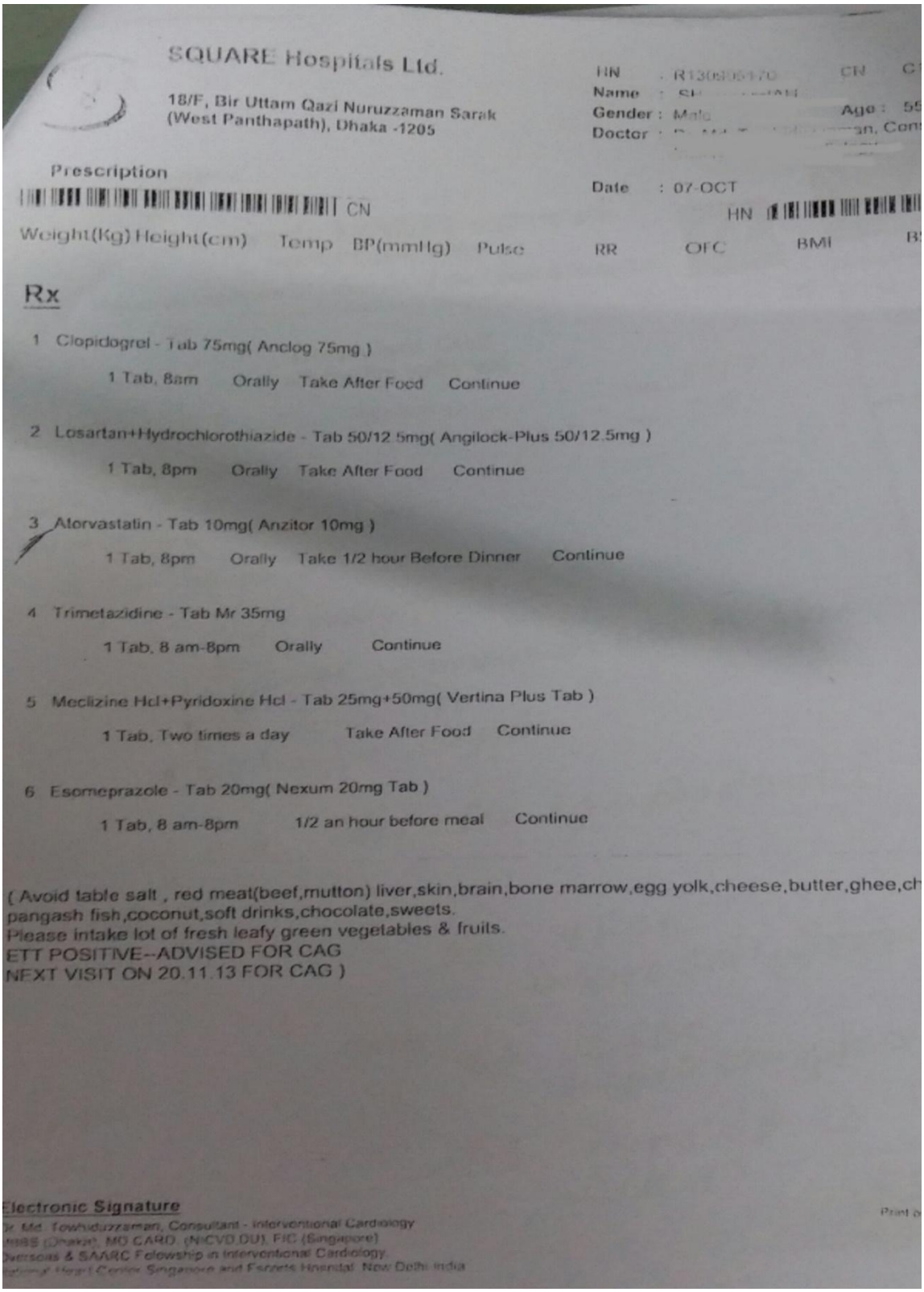


Figure 2b: Sample prescription without having any disease diagnosis history



SQUARE Hospitals Ltd.

18/F, Bir Uttam Qazi Nuruzzaman Sarak
(West Panthapath), Dhaka -1205

HN : R13060[illegible] CN C
Name : SH[illegible]AN
Gender : Male Age : 55
Doctor : [illegible]sn, Cons

Prescription

Date : 07-OCT

CN HN

Weight(Kg) Height(cm) Temp BP(mmHg) Pulse RR OFC BMI B

Rx

1 Clopidogrel - Tab 75mg(Anclog 75mg)

1 Tab, 8am Orally Take After Food Continue

2 Losartan+Hydrochlorothiazide - Tab 50/12.5mg(Angilock-Plus 50/12.5mg)

1 Tab, 8pm Orally Take After Food Continue

3 Atorvastatin - Tab 10mg(Anzitor 10mg)

1 Tab, 8pm Orally Take 1/2 hour Before Dinner Continue

4 Trimetazidine - Tab Mr 35mg

1 Tab, 8 am-8pm Orally Continue

5 Meclizine Hcl+Pyridoxine Hcl - Tab 25mg+50mg(Vertina Plus Tab)

1 Tab, Two times a day Take After Food Continue

6 Esomeprazole - Tab 20mg(Nexum 20mg Tab)

1 Tab, 8 am-8pm 1/2 an hour before meal Continue

(Avoid table salt , red meat(beef,mutton) liver,skin,brain,bone marrow,egg yolk,cheese,butter,ghee,ch
pangash fish,coconut,soft drinks,chocolate,sweets.
Please intake lot of fresh leafy green vegetables & fruits.
ETT POSITIVE--ADVISED FOR CAG
NEXT VISIT ON 20.11.13 FOR CAG)

Electronic Signature

[illegible] Md. Towhiduzzaman, Consultant - Interventional Cardiology
[illegible] (Dhaka), MD CARD. (NICVD,DU), FIC (Singapore)
Overseas & SAARC Fellowship in Interventional Cardiology
[illegible] Heart Centre Singapore and Escorts Hospital, New Delhi India

Print d

Figure 2c: A sample from a private hospital without having any generic name

2.5.1. Medication or standard treatment guidelines

2.5.1.1. For normal TB patient

The recommended treatment of new-onset pulmonary tuberculosis, as of 2010, is six months of a combination of antibiotics containing rifampicin, isoniazid, pyrazinamide and ethambutol for the first two months, and only rifampicin and isoniazid for the last four months. Where resistance to isoniazid is high, ethambutol may be added for the last four months as an alternative.

Table 2.5.A: First line Antituberculosis drugs

Recommended Doses of First Line Antituberculosis Drugs for Adults

	Daily	Recommended dose 3 times per week		
	Dose and range (mg/kg body Drug weight)	Maximum (mg)	Dose and range (mg/kg body weight)	Daily maximum (mg)
Isoniazid (H)	5 (4-6)	300	10 (8-12)	900
Rifampicin (R)	10 (8-12)	600	10 (8-12)	600
Pyrazinamide (Z)	25 (20-30)	-	35 (30-40)	-
Ethambutol (E)	15 (15-20)	-	30 (25-35)	-
Streptomycin[2] (S)	15 (12-18)		15 (12-18)	1000

Regimen for Treatment of TB

Category of cases	Intensive phase	Continuation phase
New cases	2 month of HRZE	4 month of HR
Previously treated cases		
Failure cases	Emperical MDR-regimen 6-9 months	18-24 months
(High likelyhood of MDR-TB)	Regimen to be modified after DST result.	
Relapse/Default cases	2 HRZES/1 HRZE/5 HRE	
(Medium/low likelyhood of MDR-TB)	Regimen to be modified after DST result.	

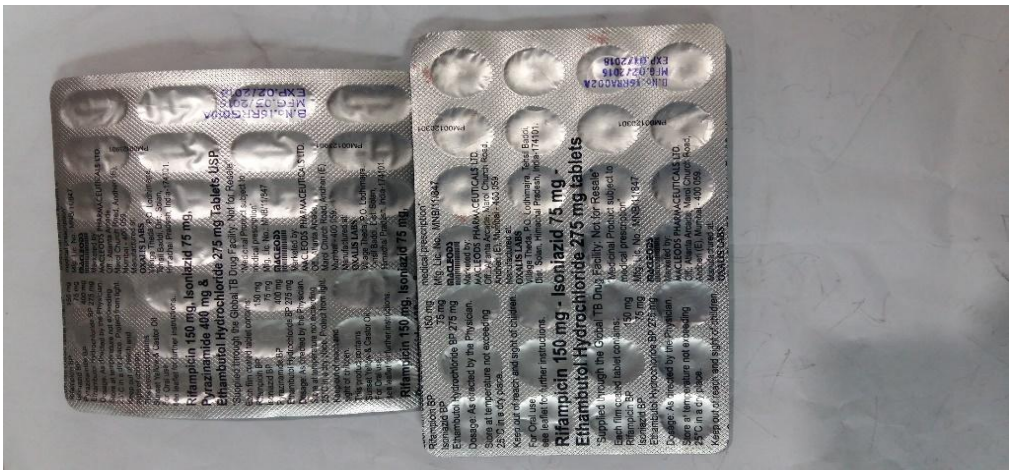


Figure 2d: WHO approved 3FDC drugs sample (Rif 150mg+Iso 75mg+Etha 275mg), 4FDC drugs sample (Rif 150mg+Iso

2.5.1.2. For MDR patient

There are 5 groups of drugs to treat MDR-TB. Include atleast 4 drug certain to be effective by taking one drug from each group from 1-5 in a heriarchial order.

Group 1: - pyrazinamide (Z)

First-line oral agents - ethambutol (E), rifabutin (Rfb)

Group 2: - kanamycin (Km)

Injectable agents - amikacin (Am), capreomycin (Cm), streptomycin (S)

Group 3: - levofloxacin (Lfx), moxifloxacin (Mfx), ofloxacin (Ofx)

Group 4: - para-aminosalicylic acid (PAS)

Oral bacteriostatic - cycloserine (Cs)

second-line agents - terizidone (Trd), ethionamide (Eto), protionamide (Pto)

Group 5 (3^{rd} line agents) - clofazimine (Cfz),thioridazine, Agents with unclear - linezolid (Lzd)

role in treatment of - amoxicillin/clavulanate (Amx/Clv)

drug resistant-TB - thioacetazone (Thz), imipenem/cilastatin (lpm/Cln), clarithromycin (Clr)

(one oral agent from Gr.1 + one injectable aminoglycoside or polypeptide from Gr.2 + one fluroquinolone (Gr.3) + remaining drug from Gr.4 to complete the regimen. For regimens with fewer than 4 effective drugs consider adding group 5 drugs. Regimen often contain 5 to 7 drug. In India 6 drugs (Pyrazinamide + Ethambutol + Kanamycin + Levofloxacillin/ Ofloxacillin + Cycloserine + Ethionamide) are given in intensive phase and 4 drugs (Ethambutol + Levofloxacillin/Ofloxacillin + Ethionamide + Cycloserine)

given during continuation phase.

Intensive phase is defined by the duration of treatment with injectable agent. It should be minimum for 6 months and for atleast 4 months after the patient first becomes and remains smear and culture negative. The continuation phase should continue for minimum of 18 months to 24 months after culture conversion.

Figure 2e: MDR drugs sample (Rif 150mg+Iso 300mg+Etha 400mg+Pyra 400mg+Moxi 400mg)

3.1. Methodology

Ten different hospitals have been selected for data collection among them five are private and five are public hospitals. These ten hospitals are the major hospitals of our country and a good number of patients come to these health facilities daily. Patient with tuberculosis suffers from immune depression we confounded our research on all the people aged between 0 to 90 years.
We selected ten teaching hospitals namely as:

Public Hospitals:

1. Dhaka Medical College Hospital (DMCH) ,
2. Sir Solimullah medical college (SSMC),
3. Bangladesh Sheikh Mujib Medical university (BSMMU),
4. Shoheed Suhoawardy medical college hospital (SSMCH)and
5. National Institute of diseases of the Chest and hospital (NICDH)

In public sector all are teaching hospitals. A teaching hospital is a hospital that partners with medical and nursing college, education programs and research centers to improve health care through learning and research. In teaching hospitals have many advantages like improved new treatments and cures, state-of-the-art technologies, shorter hospitalizations for major illnesses and procedures, better outcomes and survival rates, specialized surgeries and experimental medical procedures. Highly trained physicians and surgeons are available 24-hours a day in those hospitals..

In Private Hospitals:

1. Square Hospital Ltd (SH),
2. Popular Hospitals (PH),
3. Apollo Hospitals (AH),
4. United Hospitals (UH) and
5. Labaid Specialized Hospitals (LSH)

In private sector all are professional patients care hospitals. A private hospital is mainly owned and managed by private organizations. They include day hospitals that give services on a day-

only basis, and hospitals that offer overnight care by highly trained physicians and surgeons, available 24-hours a day.

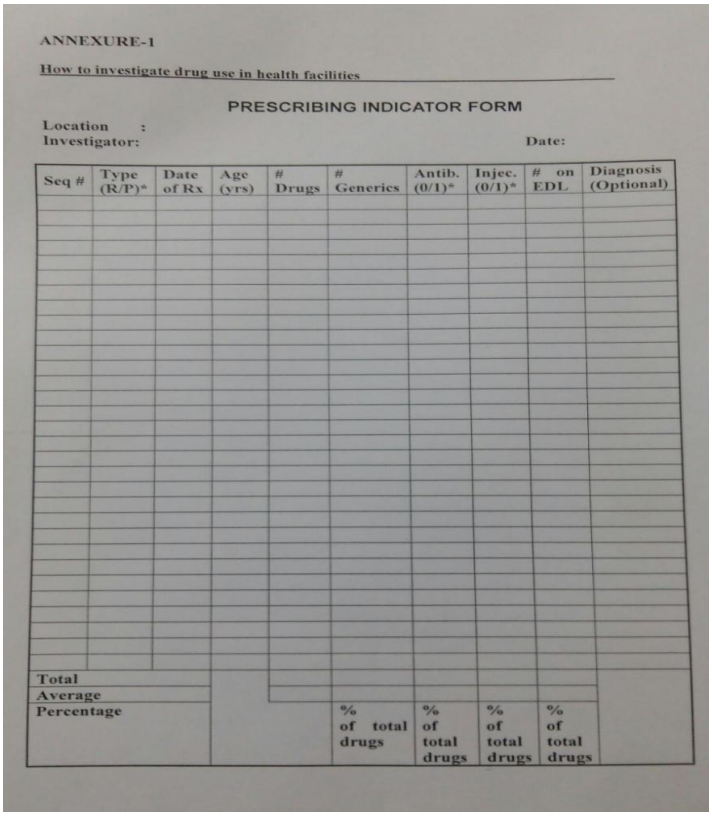
Table 3A: Diagram for Sources of data collection from Public and Private Hospital

Source of prescriptions

No. of Hospital	Before Intervention	After Intervention
DMCH	300	300
SSMC	300	300
BSMMU	300	300
SSMCH	300	300
NICDH	300	300

No. of Hospital	Before Intervention	After Intervention
SH	300	300
PH	300	300
AH	300	300
UH	300	300
LSH	300	300

We decided to take 6000 prescriber-patient encounter data (retrospective) each from the ten hospitals on the basis of a prepared format **(Annex.-1: Prescribing indicator form)**. This format contained the date of prescription, age distribution of the child, number of drugs prescribed, how many of them are generics, number of encounters receiving antibiotics, number of encounters receiving injections, number drugs from the essential drug list and the diagnosis history etc.



ANNEXURE-1

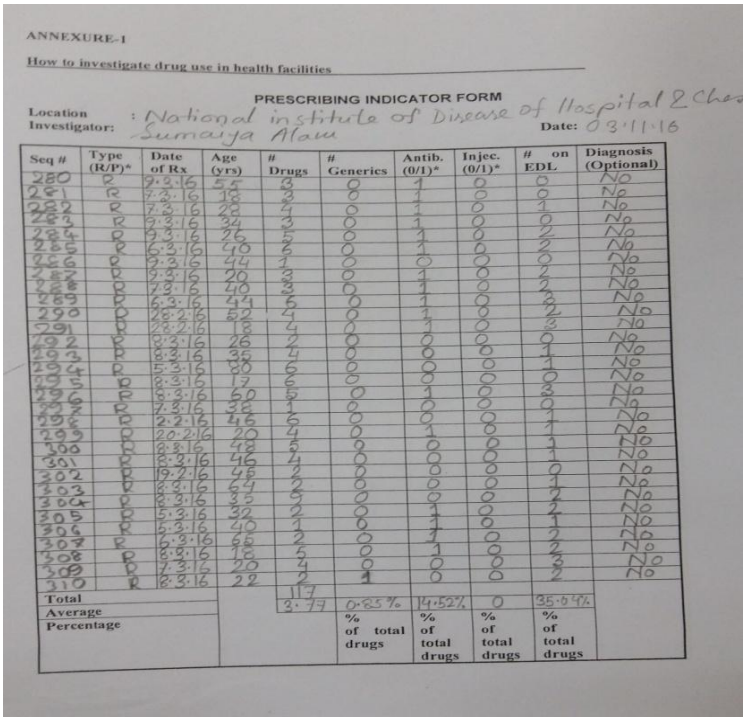
How to investigate drug use in health facilities

PRESCRIBING INDICATOR FORM

Location :
Investigator: Date:

Seq #	Type (R/P)*	Date of Rx	Age (yrs)	# Drugs	# Generics	Antib. (0/1)*	Injec. (0/1)*	# on EDL	Diagnosis (Optional)
Total									
Average									
Percentage					% of total drugs	% of total drugs	% of total drugs	% of total drugs	

Figure 3a: Image of a blank sample of Annexeure 1



ANNEXURE-1

How to investigate drug use in health facilities

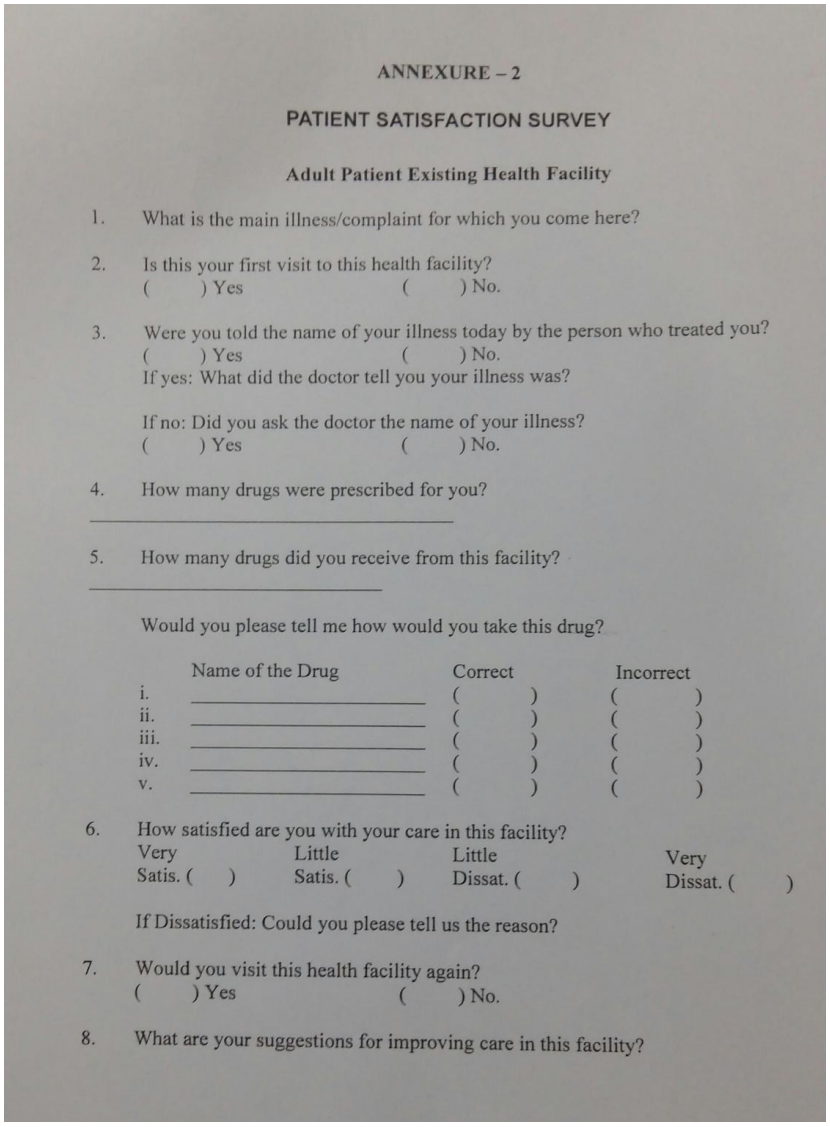
PRESCRIBING INDICATOR FORM

Location : National institute of Disease of Hospital & Che
Investigator: Sumaiya Alam Date: 03.11.16

Seq #	Type (R/P)*	Date of Rx	Age (yrs)	# Drugs	# Generics	Antib. (0/1)*	Injec. (0/1)*	# on EDL	Diagnosis (Optional)
280	R	9.3.16	55	3	0	1	0	0	No
281	R	7.3.16	18	3	0	1	0	0	No
282	R	7.3.16	28	4	0	1	0	1	No
283	R	9.3.16	34	3	0	1	0	0	No
284	R	9.3.16	25	5	0	1	0	2	No
285	R	6.3.16	40	5	0	1	0	2	No
286	R	9.3.16	44	1	0	0	0	0	No
287	R	9.3.16	20	3	0	1	0	2	No
288	R	7.3.16	40	3	0	1	0	2	No
289	R	6.3.16	41	5	0	1	0	3	No
290	R	28.2.16	52	4	0	1	0	2	No
291	R	28.2.16	18	4	0	1	0	2	No
292	R	9.3.16	26	2	0	0	0	0	No
293	R	8.3.16	35	4	0	0	0	1	No
294	R	5.3.16	80	6	0	0	0	1	No
295	R	8.3.16	17	6	0	0	0	0	No
296	R	9.3.16	60	5	0	1	0	3	No
297	R	7.3.16	38	1	0	0	0	0	No
298	R	2.2.16	46	6	0	0	0	1	No
299	R	20.2.16	20	4	0	1	0	1	No
300	R	8.3.16	48	2	0	0	0	1	No
301	R	8.3.16	46	4	0	0	0	0	No
302	R	19.2.16	48	2	0	0	0	1	No
303	R	8.3.16	64	2	0	0	0	1	No
304	R	8.3.16	32	5	0	0	0	2	No
305	R	5.3.16	32	2	0	1	0	2	No
306	R	5.3.16	40	1	0	1	0	1	No
307	R	5.3.16	65	2	0	1	0	2	No
308	R	9.3.16	18	5	0	1	0	3	No
309	R	7.3.16	20	4	0	0	0	3	No
310	R	8.3.16	22	2	1	0	0	2	No
Total				117					
Average				3.77	0.85%	14.52%	0	35.64%	
Percentage					% of total drugs	% of total drugs	% of total drugs	% of total drugs	

Figure 3b: Image of a fill up sample of Annexure 1

We also took 1500 prescriber-patient and 1500 pharmacist/health care provider-patient encounter date (prospective) each from the ten hospitals on the basis of different questionnaire **(Annex.-2: Patient Satisfaction Survey)** to determine the different aspects of consulting time, dispensing time, number of drugs dispensed, extent of adequate labeling and patients knowledge about correct dosing.



ANNEXURE – 2

PATIENT SATISFACTION SURVEY

Adult Patient Existing Health Facility

1. What is the main illness/complaint for which you come here?

2. Is this your first visit to this health facility?
( ) Yes ( ) No.

3. Were you told the name of your illness today by the person who treated you?
( ) Yes ( ) No.
If yes: What did the doctor tell you your illness was?

If no: Did you ask the doctor the name of your illness?
( ) Yes ( ) No.

4. How many drugs were prescribed for you?
_____

5. How many drugs did you receive from this facility?
_____

Would you please tell me how would you take this drug?

	Name of the Drug	Correct	Incorrect
i.	_____	( )	( )
ii.	_____	( )	( )
iii.	_____	( )	( )
iv.	_____	( )	( )
v.	_____	( )	( )

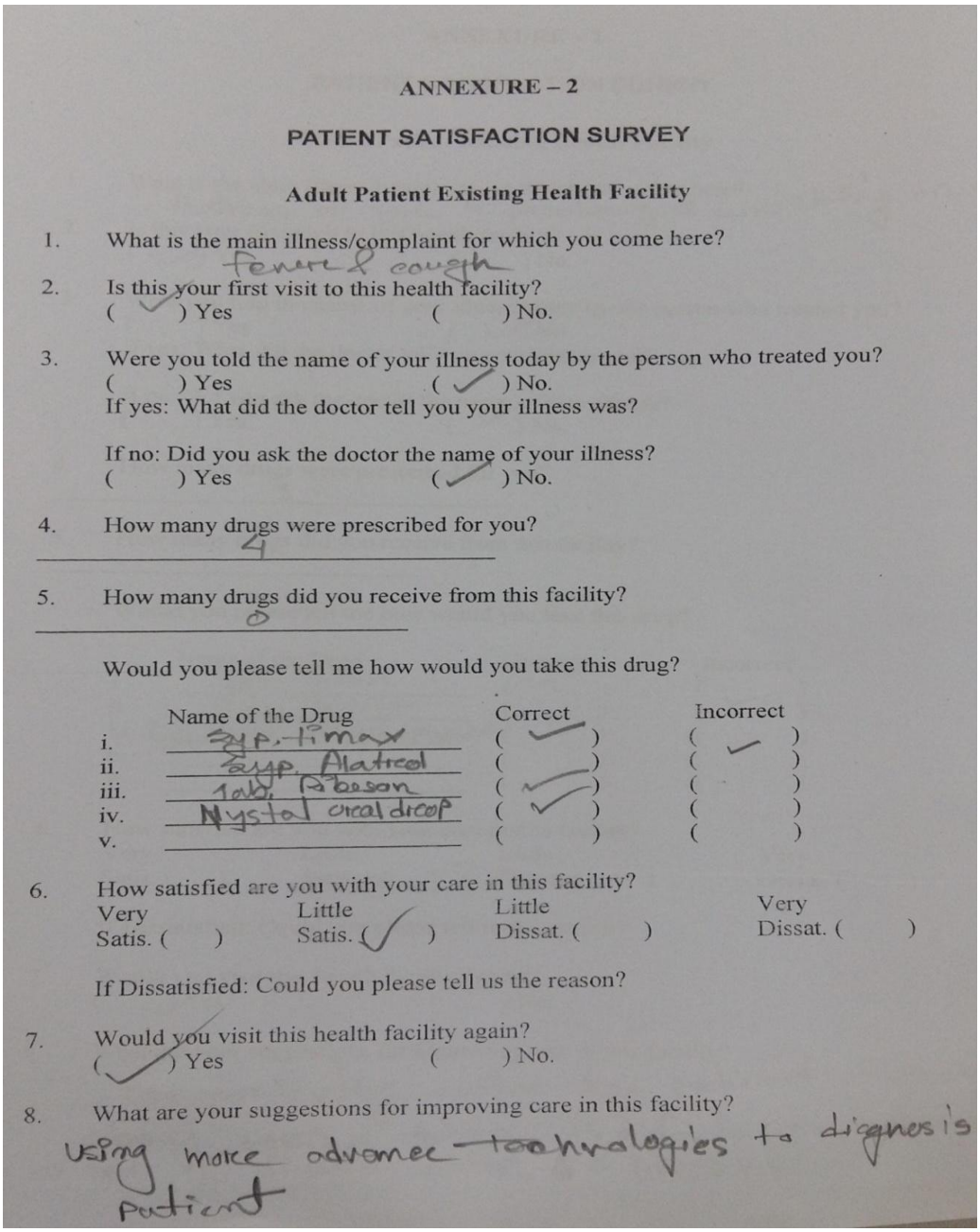
6. How satisfied are you with your care in this facility?
Very Satis. ( ) Little Satis. ( ) Little Dissat. ( ) Very Dissat. ( )

If Dissatisfied: Could you please tell us the reason?

7. Would you visit this health facility again?
( ) Yes ( ) No.

8. What are your suggestions for improving care in this facility?

Figure 3c: Image of a blank sample of Annexure 2



ANNEXURE – 2

PATIENT SATISFACTION SURVEY

Adult Patient Existing Health Facility

1. What is the main illness/complaint for which you come here?
fever & cough

2. Is this your first visit to this health facility?
(✓) Yes ( ) No.

3. Were you told the name of your illness today by the person who treated you?
( ) Yes (✓) No.
If yes: What did the doctor tell you your illness was?

If no: Did you ask the doctor the name of your illness?
( ) Yes (✓) No.

4. How many drugs were prescribed for you?
4

5. How many drugs did you receive from this facility?
0

Would you please tell me how would you take this drug?

	Name of the Drug	Correct	Incorrect
i.	Syp. Timax	(✓)	(✓)
ii.	Syp. Alatrol	( )	( )
iii.	Tab. Disaron	(✓)	( )
iv.	Nystat oral drop	(✓)	( )
v.		( )	( )

6. How satisfied are you with your care in this facility?
Very Satis. ( ) Little Satis. (✓) Little Dissat. ( ) Very Dissat. ( )

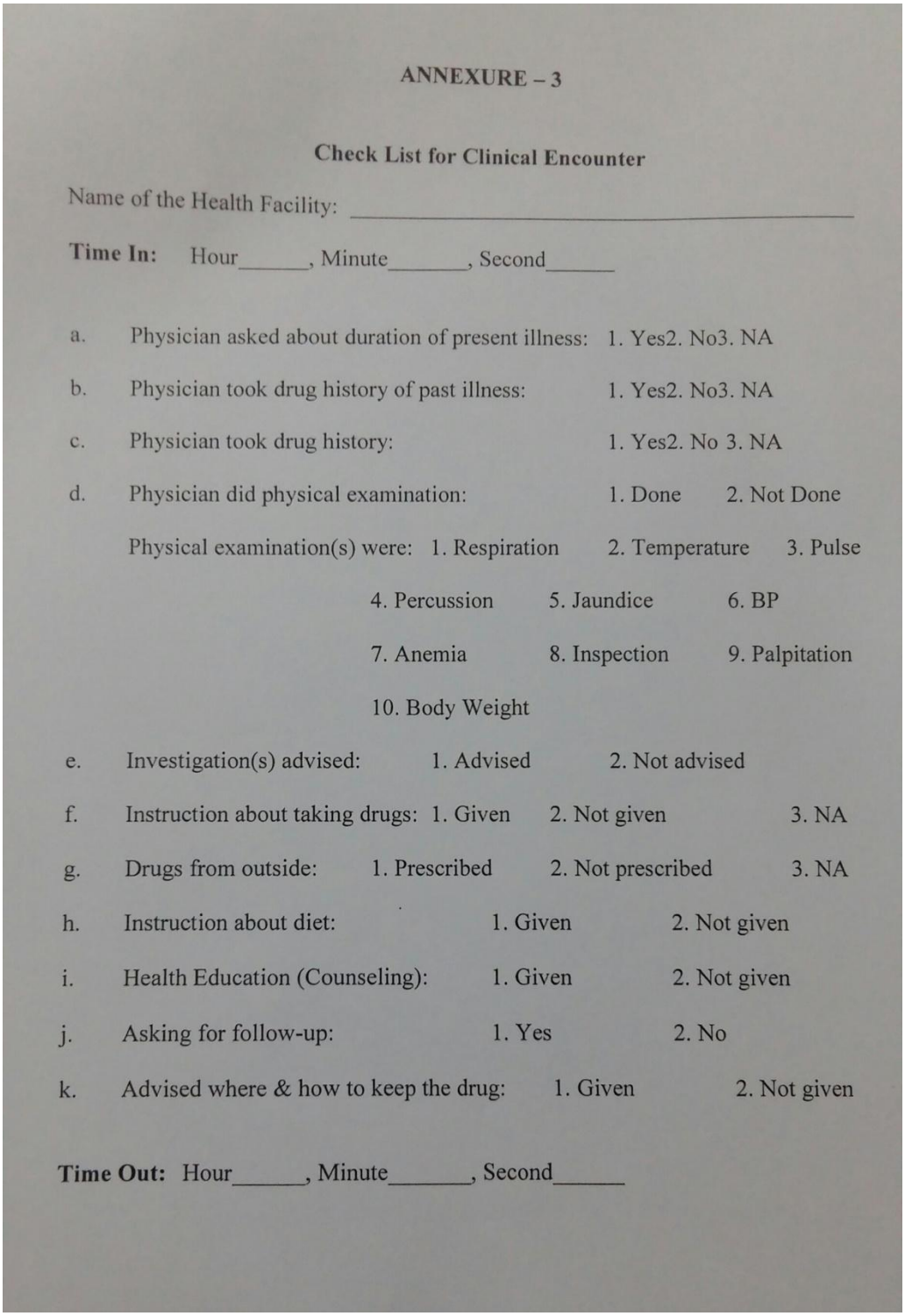
If Dissatisfied: Could you please tell us the reason?

7. Would you visit this health facility again?
(✓) Yes ( ) No.

8. What are your suggestions for improving care in this facility?
using more advance technologies to diagnosis patient

Figure 3d: Image of a fill up sample of Annexure 2

We also checked a list (prospective) was used **(Annex.-3: Check List for Clinical Encounter)** for a total of 3000 patients to determine the pattern of encounters they had with their prescribers.



ANNEXURE – 3

Check List for Clinical Encounter

Name of the Health Facility: _____

Time In: Hour_____, Minute_____, Second_____

a. Physician asked about duration of present illness: 1. Yes2. No3. NA

b. Physician took drug history of past illness: 1. Yes2. No3. NA

c. Physician took drug history: 1. Yes2. No 3. NA

d. Physician did physical examination: 1. Done 2. Not Done

Physical examination(s) were: 1. Respiration 2. Temperature 3. Pulse
4. Percussion 5. Jaundice 6. BP
7. Anemia 8. Inspection 9. Palpitation
10. Body Weight

e. Investigation(s) advised: 1. Advised 2. Not advised

f. Instruction about taking drugs: 1. Given 2. Not given 3. NA

g. Drugs from outside: 1. Prescribed 2. Not prescribed 3. NA

h. Instruction about diet: 1. Given 2. Not given

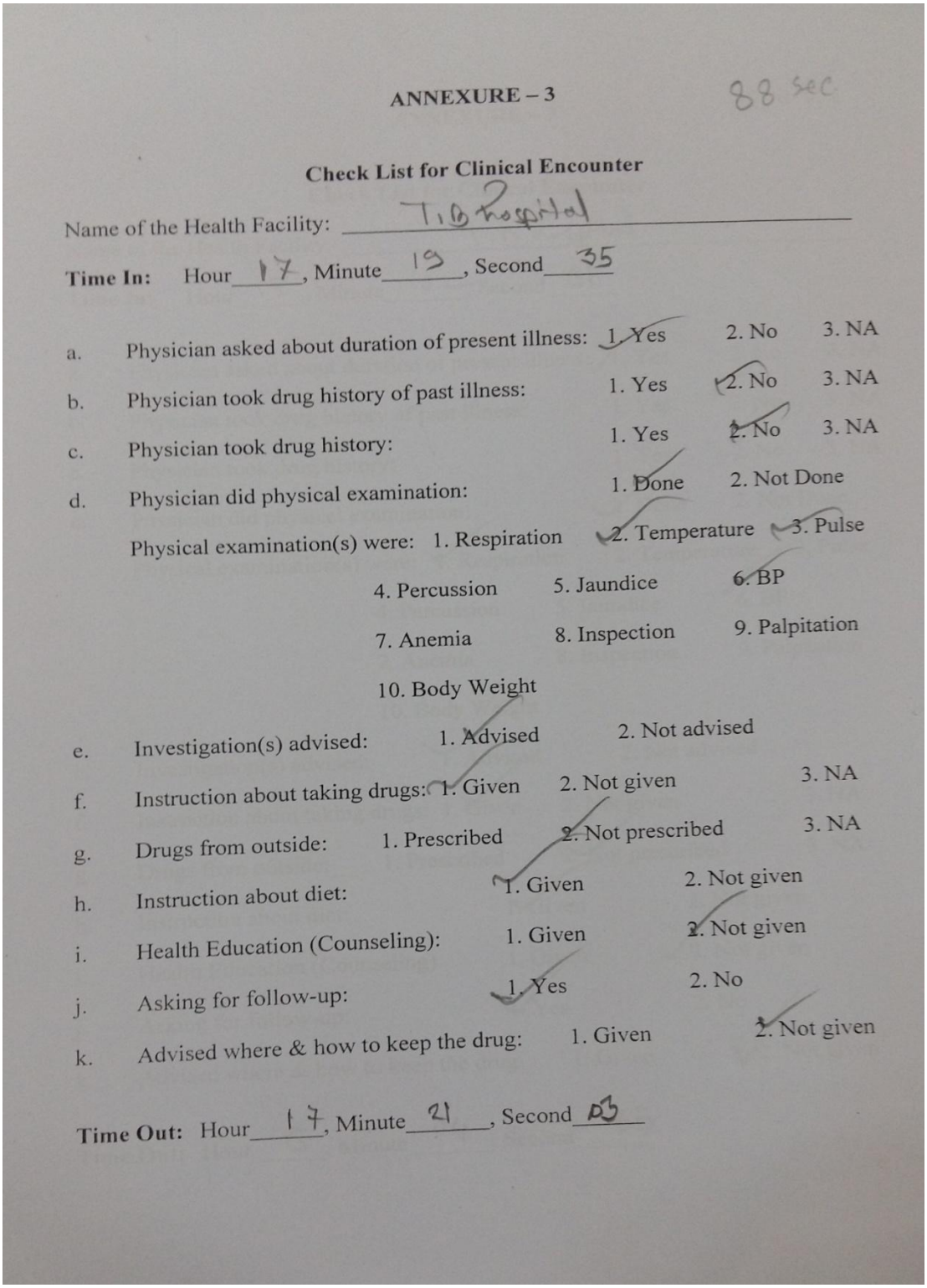
i. Health Education (Counseling): 1. Given 2. Not given

j. Asking for follow-up: 1. Yes 2. No

k. Advised where & how to keep the drug: 1. Given 2. Not given

Time Out: Hour_____, Minute_____, Second_____

Figure 3e: Image of a blank sample of Annexure 3



ANNEXURE – 3

88 sec

Check List for Clinical Encounter

Name of the Health Facility: T.B Hospital

Time In: Hour 17, Minute 19, Second 35

a. Physician asked about duration of present illness: 1. Yes 2. No 3. NA

b. Physician took drug history of past illness: 1. Yes 2. No 3. NA

c. Physician took drug history: 1. Yes 2. No 3. NA

d. Physician did physical examination: 1. Done 2. Not Done

Physical examination(s) were: 1. Respiration 2. Temperature 3. Pulse
4. Percussion 5. Jaundice 6. BP
7. Anemia 8. Inspection 9. Palpitation
10. Body Weight

e. Investigation(s) advised: 1. Advised 2. Not advised

f. Instruction about taking drugs: 1. Given 2. Not given 3. NA

g. Drugs from outside: 1. Prescribed 2. Not prescribed 3. NA

h. Instruction about diet: 1. Given 2. Not given

i. Health Education (Counseling): 1. Given 2. Not given

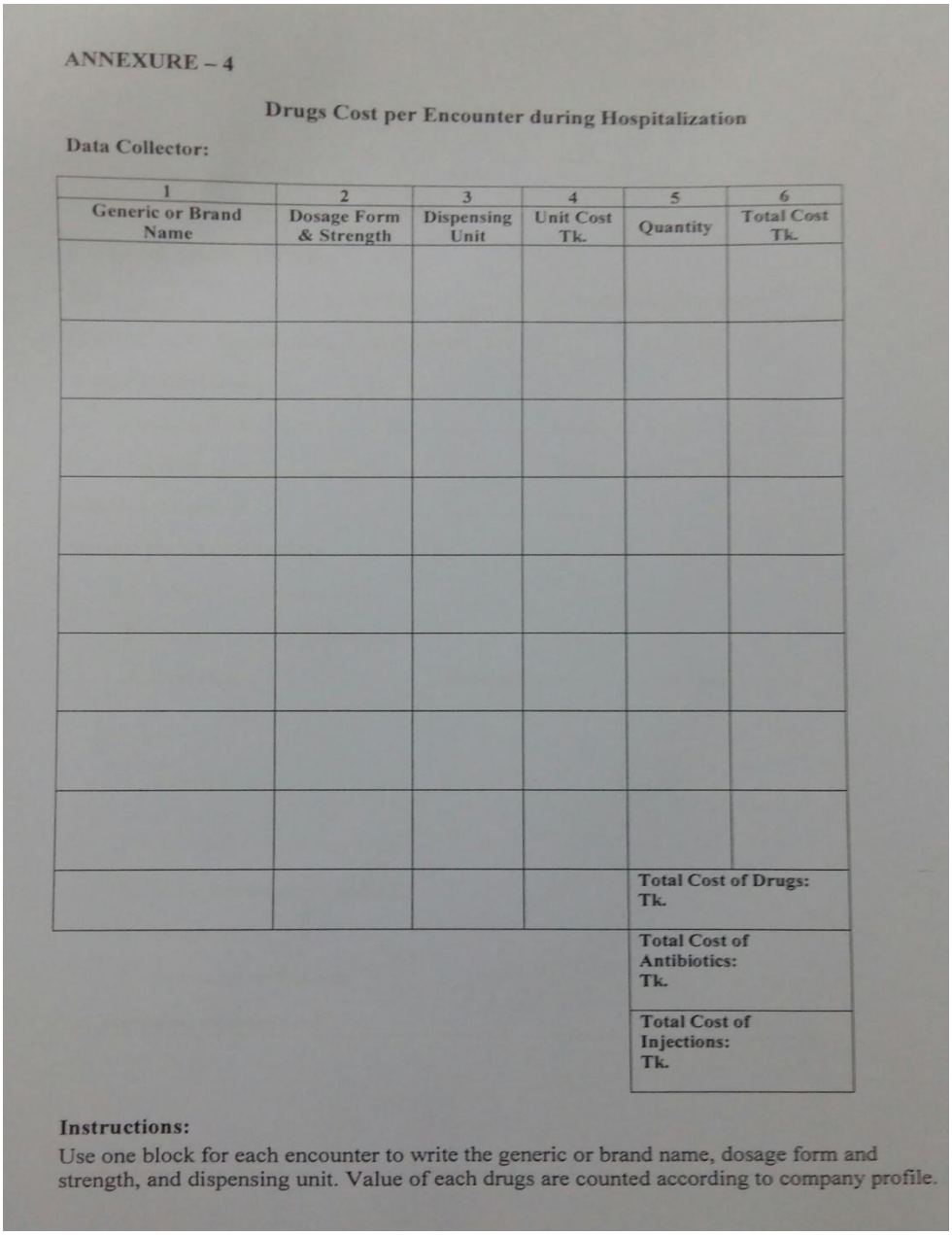
j. Asking for follow-up: 1. Yes 2. No

k. Advised where & how to keep the drug: 1. Given 2. Not given

Time Out: Hour 17, Minute 21, Second 03

Figure 3f: Image of a fill up sample of Annexure 3

Moreover, drugs cost were also counted **(Annex.-4: Drugs Cost per Encounter during Hospitalization)** for a total 3000 patients to determine the pattern of cost they had with their prescribers.



ANNEXURE – 4

Drugs Cost per Encounter during Hospitalization

Data Collector:

1	2	3	4	5	6
Generic or Brand Name	Dosage Form & Strength	Dispensing Unit	Unit Cost Tk.	Quantity	Total Cost Tk.
				Total Cost of Drugs: Tk.	
				Total Cost of Antibiotics: Tk.	
				Total Cost of Injections: Tk.	

Instructions:

Use one block for each encounter to write the generic or brand name, dosage form and strength, and dispensing unit. Value of each drugs are counted according to company profile.

Figure 3g: Image of a balnk sample of Annexure 4

ANNEXURE – 4

Drugs Cost per Encounter during Hospitalization

Data Collector: Wahida Binte Zahir

1 Generic or Brand Name	2 Dosage Form & Strength	3 Dispensing Unit	4 Unit Cost Tk.	5 Quantity	6 Total Cost Tk.
Ricofast	Tablet 250mg	1000mg	25	20	500
Ema	Tablet 20mg	40mg	5	60	300
Cef 3-DS	Tablet 200mg	400mg	50	10	500
Spirocard	Tablet 25mg	100mg	5	120	600
Disys	Tablet 80 mg	40mg	10	15	150
Telukast	Tablet 10mg	10mg	4	30	120
Clogril plus	Tablet		11	30	330
Lipicon	Tablet 20mg	20mg	18	30	540
				Total Cost of Drugs: Tk. 3040	
				Total Cost of Antibiotics: Tk. 500	
				Total Cost of Injections: Tk. 0	

Instructions:

Use one block for each encounter to write the generic or brand name, dosage form and strength, and dispensing unit. Value of each drugs are counted according to company pr

Figure 3h: Image of a fill up sample of Annexure 4

We decided to take another sets of data with same number of samples after an intervention using the same formats and questionnaires.

We took the program as a pilot project, and after analyzing the situation and the success of intervention the program can be expanded gradually from district hospitals to thana health complexes which will create a nationwide effective TB management system.

3.1.1. Data Collection

On the basis of prepared questionnaires we collected data from the outdoor patients. Our points of interest were:

- age of the patients,
- number of drugs per prescription,
- number of drugs prescribed by generic name,
- presence of antibiotics,
- presence of injections,
- number of drugs from EDL(Essential Drug List)
- diagnosis,
- consulting time per patient,
- dispensing time per patient,
- number of drugs dispensed per prescription,
- number of labeled drugs per dispensed drugs,
- number of patients having correct knowledge of dose,
- number of patients having diet education,
- number of patients having health education,
- number of patients asking for follow-up
- number of patients asked for duration of illness, past history or drugs history,
- number of patients undergoing physical examination,
- number of patients satisfied or dissatisfied with the health facility,
- number of patients getting dosing instruction,
- number of patients advised for investigation,
- about patient hearing, was it adequate or fair or little.

3.1.2. Data Entry and data analyzing

After entering the data into the computer and then by using MS OFFICE 10 which is recent version including MS Word and Excel, all the data were analyzed.

3.1.3. Data Presentation

Results are presented in different approaches using pie chart, bar diagram, line diagram, area diagram, cylinder chart, columns and different tables.

3.1.4. Decision Making For Intervention

We collected 3000 prescriptions from Public Medical Hospitals and 3000 prescriptions from Private Hospitals. In these 6000 Prescriptions are collected data have two parts. Those are before intervention and after intervention. In this way we collected before intervention 1500 prescription and after intervention 1500 prescription from Public Hospitals. Another 3000 prescription collected in the same way from Private Hospitals.

The prescribers from out-door geriatric departments of the ten hospitals were selected for possible interventions. Considering the merits and demerits of the educational, managerial and regulatory strategies of intervention, a combination of these three were planned, as per the design of the earlier international researchers.

Standard treatment guidelines for TB were available with both the prescriber groups. Their education and training also were sufficient to deal with the TB problems. Thus the target group was homogenous. Both the setting was urban and the same city.

After examining all the factors an Informal Group Discussion (IGD) was selected as the intervention programme. It was expected that this the prescribers and pharmacists (separately as two target groups) behave in the manner as they did previously. Once the items were identified, remedial interactions became easier. Moreover, the Informal Group Discussion (IGD) is quick, inexpensive and prescribers and pharmacists have been enjoying.

The Informal Group Discussion was designed in such a way that a group of senior physicians and pharmacists, who are teachers, would meet their corresponding colleagues to exchange ideas about the scientific approaches, feelings and beliefs.

3.2. Methodology II

3.2.1. Physician-Physician IGD

Senior medical teachers initiated a moderated informal discussion about TB treatment and updated information about the topic was provided. 6-8 geriatric prescribers in 2 groups separately in ten hospitals attend this.

This was done during the mid-day break and each lasted for about 2 hours. The conversation was no recorded and no other personnel other than the selected teachers and prescribers were allowed to attend. The points for discussion were pre-distributed amongst the teachers.

Measures were taken so that there was one moderator amongst the teachers and everyone participated in the discussion focused and in-depth lively discussion was held. In both the hospitals, the venue was one of the senior physician's office rooms.

Thus a mixed educational, managerial and regulatory strategy was follow for this intervention.

3.2.2. Pharmacist-Pharmacist IGD

The pharmacist in charge of the hospital dispensaries were likewise invited to attend the other sessions of Informal Group Discussion in the same premise after the working hours. Senior pharmacy teachers were present in the session as moderates and in each session 4-5 diploma pharmacists attending the dispensaries were present. The session 4-5 diploma lasted for 2 hours each.

These informal sessions discussed the situation the situation of drug supply and stocks. The need for dispensing with separate packaging, separate labeling, making the patient understand the right dose, timing schedule and safe keeping in the household.

The conversations were not recorded and any other personnel were not allowed. Every participant shared the informal discussion and discussion points were pre-distributed amongst the teachers.

Thus the pharmacist-pharmacist Informal Group Discussion was mixed educational, managerial and regulatory strategy for this homogeneous group.

Both the type of IGDs was all participated and the moderators skillfully conducted the sessions. None distorted or exaggerated the feelings of the participants and no one dominated the discussions also.

Thus the methodology for intervention reflected and accommodated the scopes strengths and weakness of the intervention strategy.

3.3. Post-Intervention Study

3.3.1. Preparation

After an informal intervention with the prescribers and pharmacists, there was another survey two weeks later. Another set of data with the same number of samples after the intervention using the same formats and questionnaires were collected.

3.3.2. Methodology

The methodology used for post-intervention study was the same as used for the pre-intervention study as stated in the section 3.1.2. The factors considered and the sample sizes were also the same.

3.3.3. Data Collection

Data were collected using the same framework and questionnaires on the same points previously stated on section 3.1.3.

3.3.4. Data Entry and Data Analyzing

Data were entered in computer and analyzed the data using the same MS OFFICE 10 Programme.

3.3.5. Data Presentation

Different types of charts (pie, line, column, bar, area etc) and tables were used to present the post post-intervention findings.

3.3.6. Duration of Data Collection

Data has been collected over a period of 12 months. Six months for collection of data before interventions and remaining six months is for after intervention data collection.

3.3.7. Volunteers involvement

A number of 10 paid ten volunteers had been involved in data collection. All volunteers are registered graduate pharmacist.

3.3.8. Source of Finance

Whole financed has been carried out by Social science Research Division, Planning Division, Ministry of Planning, The People Republic of Bangladesh.

4. Results and Discussion

Various major finding and parameters regarding prescription patterns are demonstrated in tables and respective graphs below:

4.1. Age Distribution of TB Patients

It was seen that all patients regardless the age limit are the most common victims of TB. However, all age groups are at risk. But In both Public and Private sectors 32% and 33% of the total patients less than 4 years of age, and the percentage of the patients greater than of age range of 35 years are most prone to TB. Age from 4 to 18 years in both public hospitals and private hospitals are quite low that is 18% and 22% respectively. Similarly age from 18 to 35 years in public sector who is suffering from TB is 15% which is low than the private sectors having 22% TB patients. This is shown in the following Table 4.1A and Figure 4.1a.

Table 4.1.A: Age distribution of TB patients

	Less than 4 years	4-18 years	18-35 years	35 years above
Public Sector	32%	18%	15%	36%
Private Sector	33%	22%	22%	25%

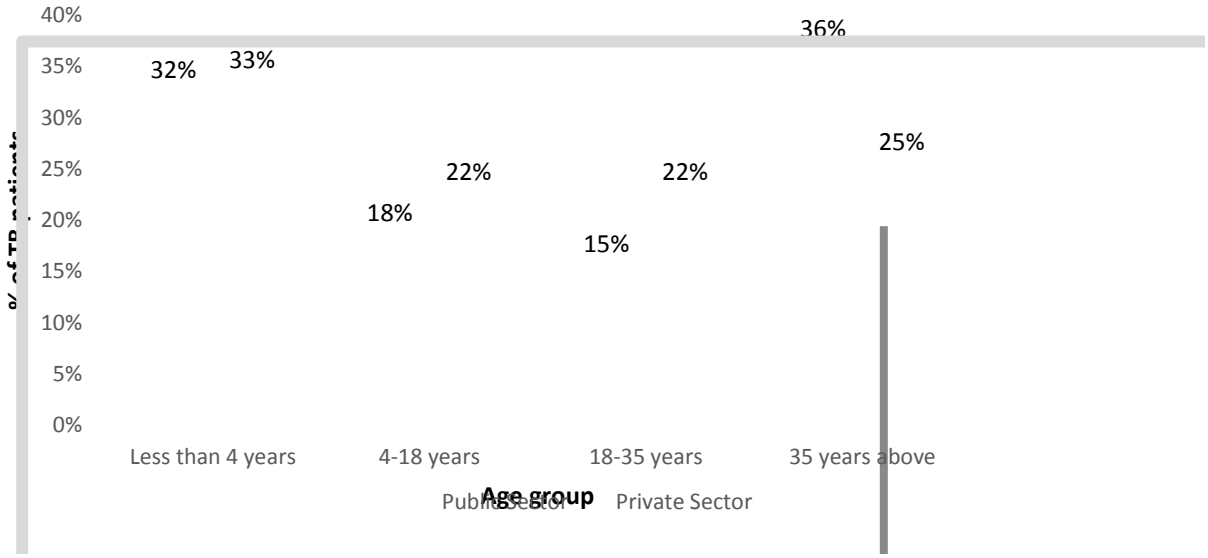


Figure 4.1.a: % Age distribution of TB patient

4.2. TB Treatment Pattern by Age Group

Different groups of drugs are prescribed for TB Patients. WHO and UNDP financed recommended drug regimen* is used as well as some other antibiotics, analgesics & antipyretic and bronchodilators are also used depending on patients disease condition. Beside this some sorts of antihistamines, vitamins and minerals are also prescribed. In Public sector patient less than 4 years having a number of 1526 antibiotics prescribed which is lower than private sector 9drug number 1780) because high number of antibiotic prescribed in private sector before intervention. After intervention antibiotics prescribed become lower than before intervention. Among other drugs bronchodilators and Vitamins and Minerals occupy the second and third highest position respectively for prescribing. The treatment pattern of different age groups regarding before and after intervention and number of total drugs are for both public and private sectors are showed in Table 4.2A, 4.2B, 4.2C, 4.2D and in Figure 4.2a, 4.2b, 4.2c, 4.2d. It was seen that after intervention total number of drugs is slightly decreased both in public and private sectors.

Table 4.2.A: TB treatment pattern by age group in public Sector (Before Intervention) (n=1500)

	Less than 4 years	4-18 years	18-35 years	More than 35 years	Total
Antibiotics	1526	850	756	1304	4436
Antipyretics& Analgesics	457	106	117	226	906
Bronchodilators	497	200	150	301	1148
Vitamins& Minerals	377	198	158	250	983
Others	256	157	112	198	723

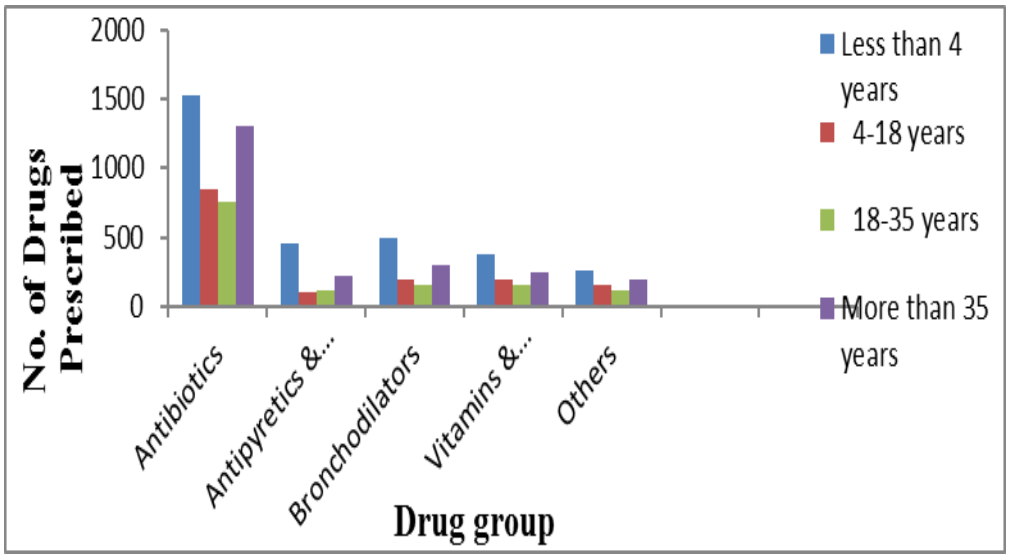


Figure 4.2.a: Tuberculosis treatment pattern by age group in public sector before intervention (n=1500)

* 3FDC drugs sample (Rif 150mg+Iso 75mg+Etha 275mg), 4FDC drugs sample (Rif 150mg+Iso 75mg+Etha 275mg+Pyra 400mg), MDR drugs sample (Rif 150mg+Iso 300mg+Etha 400mg+Pyra 400mg+Moxi 400mg).

Table 4.2.B: Tuberculosis treatment pattern by age group in public Sector after Intervention (n=1500)

	Less than 4 years	4-18 years	18-35 years	More than 35 years	Total
Antibiotics	1303	733	668	1180	3884
Antipyretics& Analgesics	301	180	160	300	941
Bronchodilators	172	177	120	207	676
Vitamins& Minerals	209	179	139	198	725
Others	111	115	91	110	427

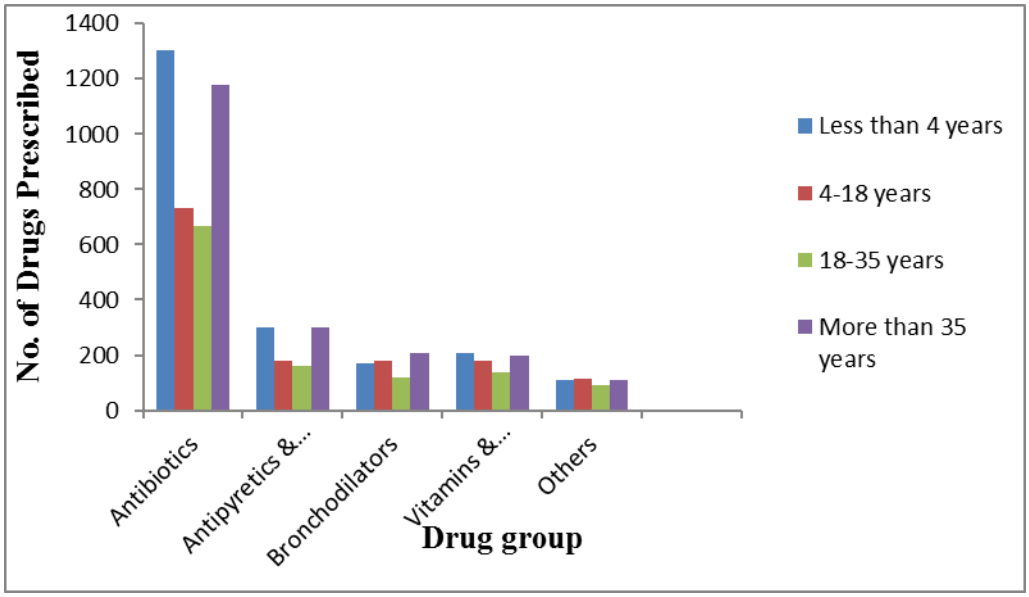


Figure 4.2.b: Tuberculosis treatment pattern by age group in public sector after intervention (n=1500)

Table 4.2.C: Tuberculosis treatment pattern by age group in private sector before intervention (n=1500)

	Less than 4 years	4-18 years	18-35 years	More than 35 years	Total
Antibiotics	1780	1204	1368	1598	5950
Antipyretics& Analgesics	577	283	290	370	1520
Bronchodilators	505	256	209	322	1292
Vitamins& Minerals	411	268	258	359	1296
Others	288	211	270	199	968

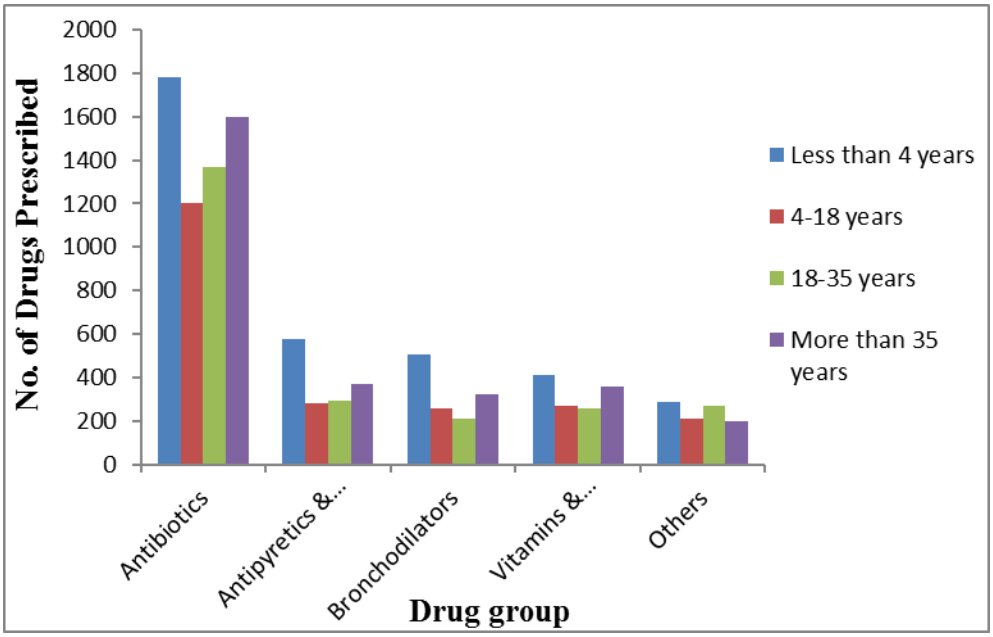


Figure 4.2.c: Tuberculosis treatment pattern by age group in private sector before intervention (n=1500)

Table 4.2.D: Tuberculosis Treatment Pattern by Age Group in Private Sector after Intervention (n=1500)

	Less than 4 years	4-18 years	18-35 years	More than 35 years	Total
Antibiotics	1688	1103	1298	1478	5567
Antipyretics& Analgesics	412	280	331	370	1393
Bronchodilators	459	379	251	273	1368
Vitamins& Minerals	398	259	281	258	1187
Others	273	201	228	201	983

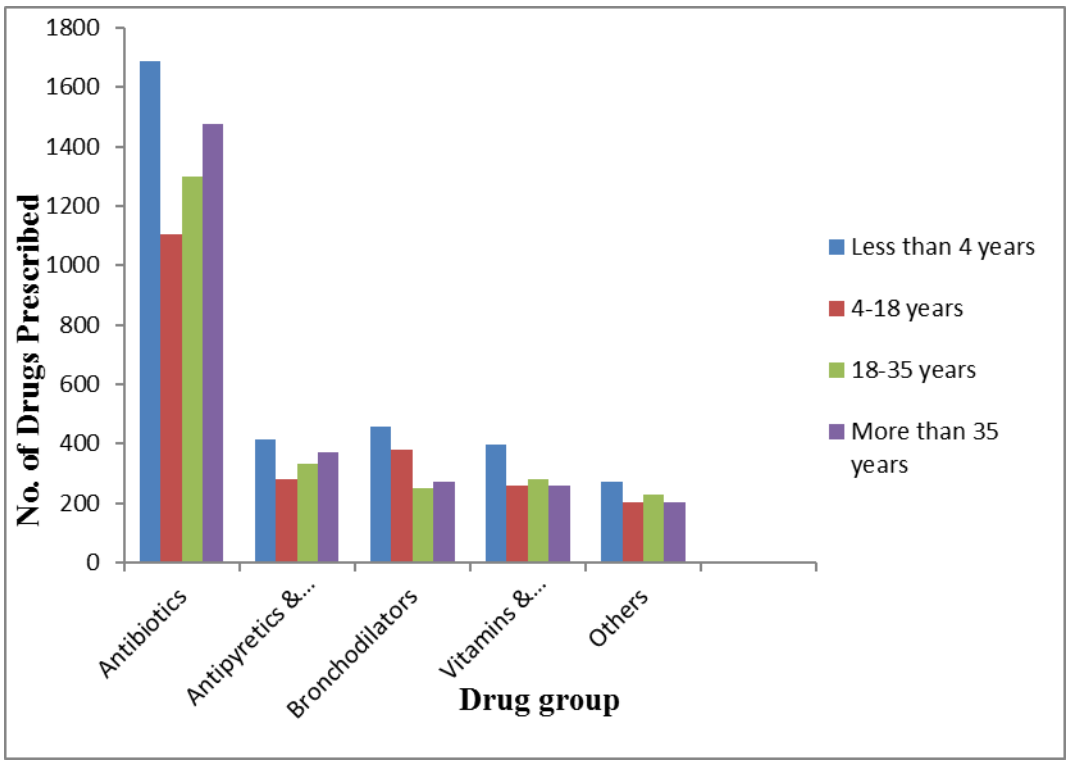


Figure 4.2.d:

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4.3. Number of Drugs per Case of TB by Age Groups

The total number of patients of less than age of 4 years, 4 to 18 years, 18 to 35 years and more than 35 years was 0% for using of 'no drug, 'one drug' 'two drugs' ' three drugs' are zero percentage for TB treatment for before and after intervention.

All data have been indicated both in tables and graphs showed Tables 4.3.1A, 4.3.2A, 4.3.3A, 4.3.4A, 4.3.5A, 4.3.6A, 4.3.7A, 4.3.8A and Figures 4.3.1a(i), 4.3.1a(ii), 4.3.2a(i), 4.3.2a(ii), 4.3.3a(i),4.3.3a(ii), 4.3.4a(i), 4.3.4a(ii), 4.3.5a(i), 4.3.5a(ii), 4.3.6a(i), 4.3.6a(ii), 4.3.7a(i), 4.3.7a(ii), 4.3.8a(i), 4.3.8a(ii).

4.3.1. Less than 4 years of age in public sector

In public sectors only 5% patients having less than 4 years received "4 drugs" and 94% patient received "5 or more than 5 drugs" before intervention. After intervention, it is decreased to 4% and 93% respectively which is shown in **Table 4.3.1A.** And **Figure 4.3.1a.**

Table 4.3.1A: Number of drugs per case of Tuberculosis by age group less than 4 years in public sector

	Before intervention		After intervention	
	No. of case	Percentage %	No. of case	Percentage
No drugs	0	0	0	0
One drugs	0	0	0	0
Two drugs	0	0	0	0
Three drugs	0	0	0	0
Four drugs	27	5.44	21	4.61
More than five drugs	469	94.56	435	95.39

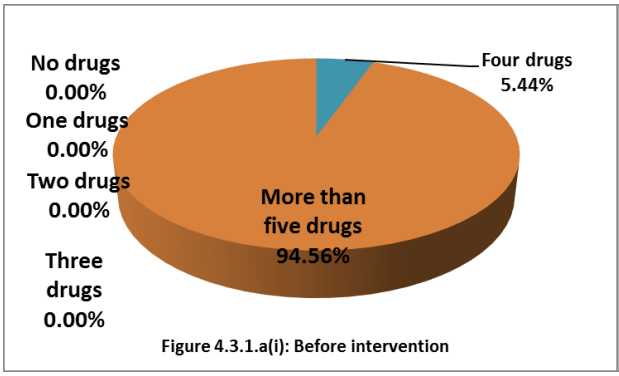


Figure 4.3.1.a(i): Before intervention

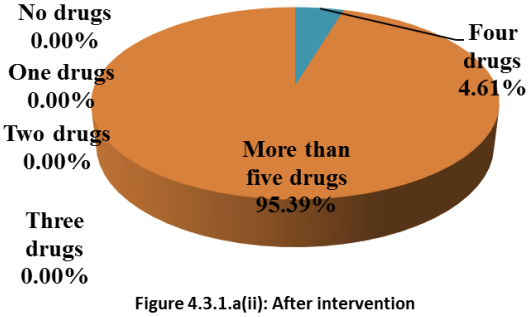


Figure 4.3.1.a(ii): After intervention

4.3.2. Less than 18 years of age public sector

In public health care sectors the tendencies of receiving multiple numbers of drugs in patients having less than 18 years are shown In **Table 4.3.2A:** and **Figure 4.3.2a**. It was seen that before intervention and after intervention patient having "4 drugs" is 7%. Surprisingly there is no change after intervention of those patients received "5 or more than 5 drugs" and it was 92%.

Table 4.3.2A: Number of drugs per case of Tuberculosis by age group less than 18 years in public sector

	Before intervention		After intervention	
	No. of case	Percentage %	No. of case	Percentage
No drugs	0	0	0	0
One drugs	0	0	0	0
Two drugs	0	0	0	0
Three drugs	0	0	0	0
Four drugs	19	7.63	21	7.42
More than five drugs	230	92.37	262	92.58

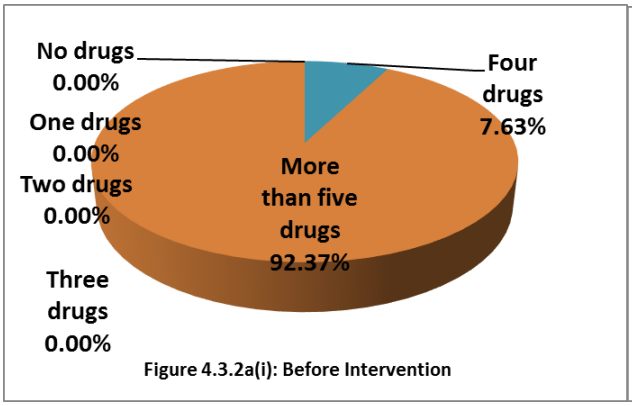


Figure 4.3.2a(i): Before Intervention

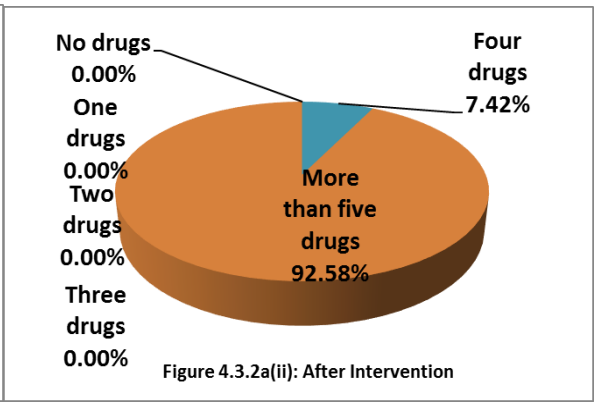


Figure 4.3.2a(ii): After Intervention

4.3.3. Less than 35 years of age public sector

There is no significant change in prescribing of number of drugs per prescription in public sectors before and after intervention. It has been assessed that patients receiving" 4 drugs" after intervention is 5% and before intervention it was 7%. Patents consumed "5 or more than five drug" is 95% before intervention and 92% after intervention.

Table 4.3.3A: Number of drugs per case of TB by age group less than 35 years in public sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0	0%	0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	13	5.86%	17	7.52%
More than five drugs	209	94.14%	209	92.48%

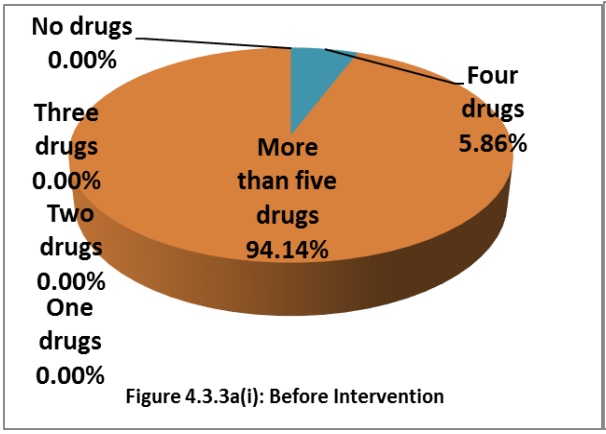


Figure 4.3.3a(i): Before Intervention

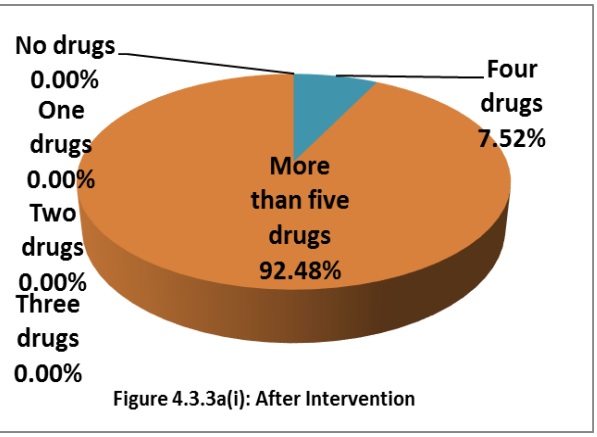


Figure 4.3.3a(i): After Intervention

4.3.4. More than 35 years of age public sector

Patients having TB age more than 35 years intake "4 drugs" before intervention is 2% which showed slight increase and it was 3% after intervention. In case of "5 or more than 5 drugs" it was 90% and 97% before and after intervention respectively.

Table 4.3.4A: Number of drugs per case of TB by age group more than 35 years in public Sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0		0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	10	1.88%	17	3.18%
More than five drugs	523	98.12%	518	96.82%

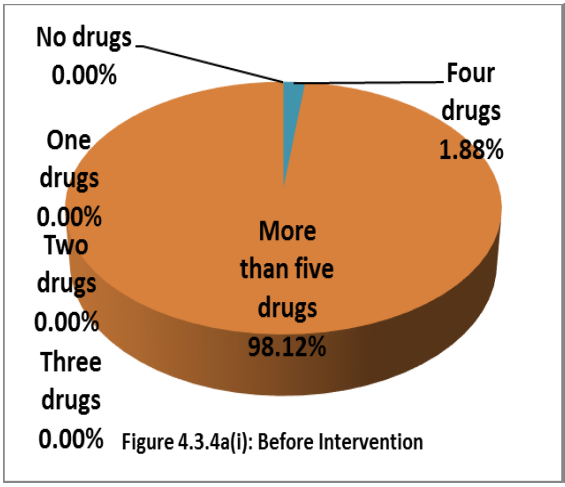


Figure 4.3.4a(i): Before Intervention

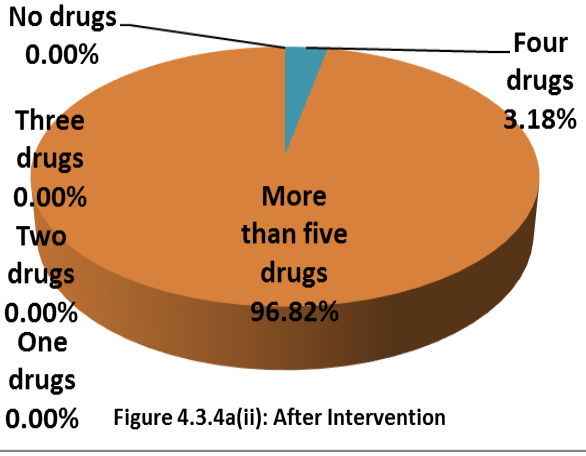


Figure 4.3.4a(ii): After Intervention

4.3.5. Less Than 4 years in Private Sector

Patients having less than 4 years received 5% of "4 drugs" regimen before intervention and it decreased by 1% after intervention. But In case of "5 or more drugs" majority drugs has been consumed by patients that is 95% and after intervention it showed the same manner as it occurred in case of "4 drugs".

Table 4.3.5A: Number of drugs per case of TB by age group less than 4 years in private sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0	0%	0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	21	4.19%	17	3.46
More than five drugs	480	95.81%	475	96.54%

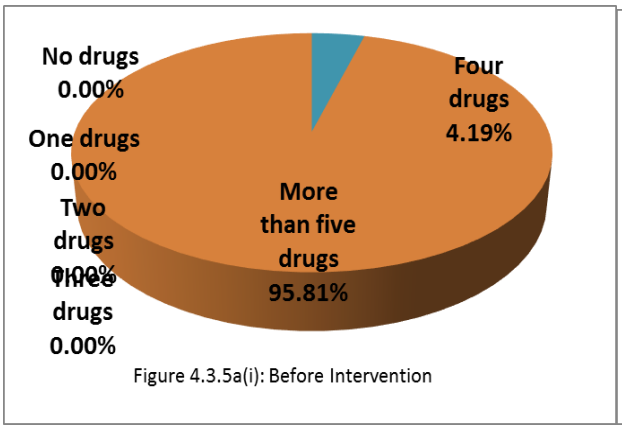


Figure 4.3.5a(i): Before Intervention

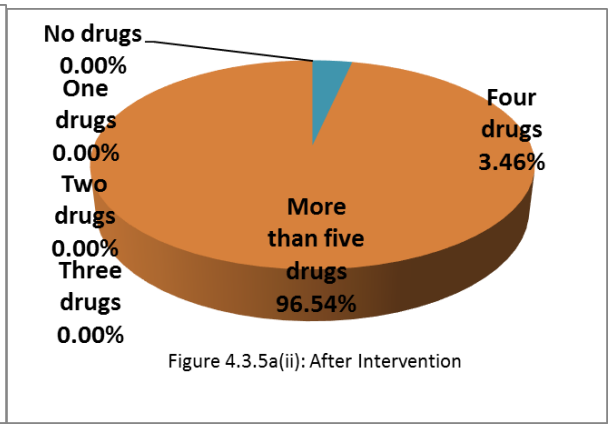


Figure 4.3.5a(ii): After Intervention

4.3.6. Less than 18 years of age private sector

In case of less than 18 years a bit increase occurred. 4% drugs are prescribed in case of "4 drugs" and after intervention there is a jump of 2%. In case of "5 or more than five drugs" there are dissimilarities. Here before intervention the percentage of drugs prescribes is 96 which after intervention not improved rather it exhibit a reduction by 2%.

Table 4.3.6A: Number of drugs per case of TB by age group less than 18 years in private sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0	0%	0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	12	3.85%	19	5.92%
More than five drugs	300	96.15%	302	94.08%

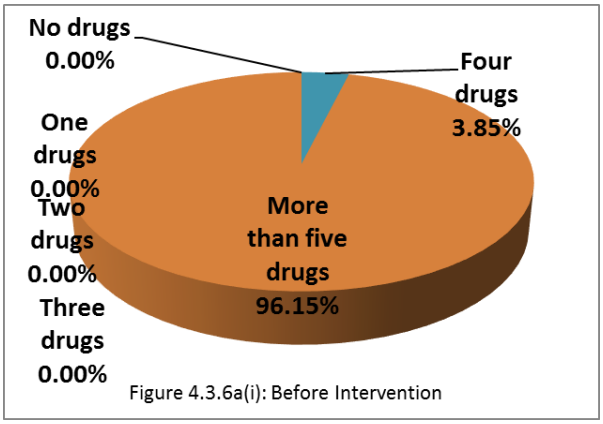


Figure 4.3.6a(i): Before Intervention

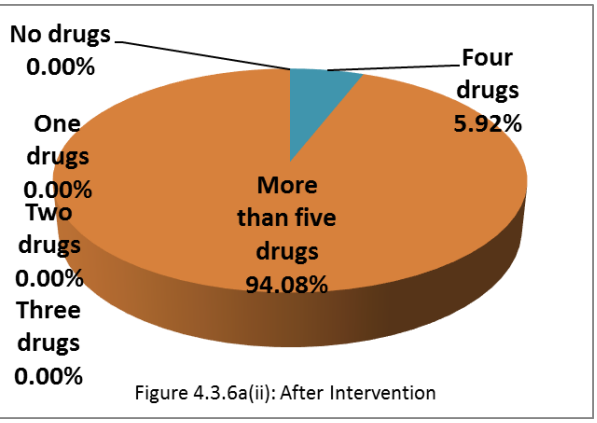


Figure 4.3.6a(ii): After Intervention

4.3.7. Less than 35 years of age Private sector

Both in two cases that is “4 drugs” and “5 or more drugs” exhibited the same percentage of growth after intervention and it was 1%.

Table 4.3.7A: Number of drugs per case of TB by age group less than 35 years in private sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0	0%	0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	18	5.68%	21	6.36%
More than five drugs	299	94.32%	309	93.64%

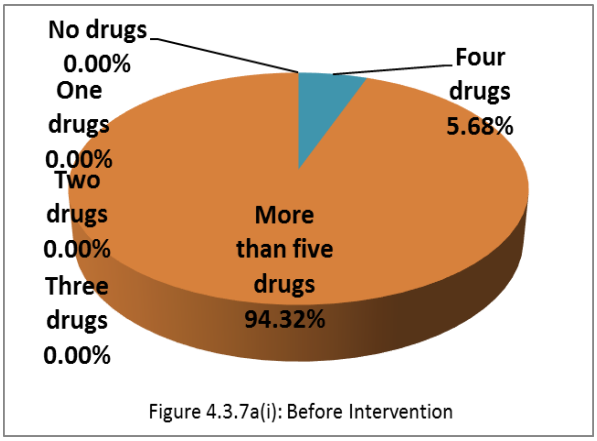


Figure 4.3.7a(i): Before Intervention

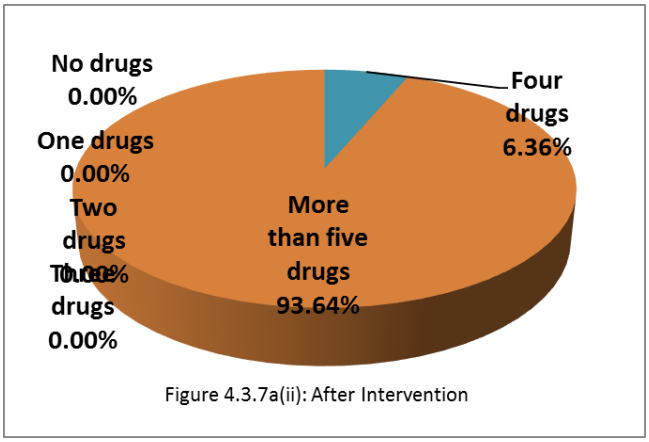


Figure 4.3.7a(ii): After Intervention

4.3.8. More than 35 years of age Private sector

In private sectors, the patients having age greater than 35 receiving “4 drugs” before intervention the percentage of number of drugs is 3% and after intervention it showed a leap of 3%. But patients receiving “5 or more than 5 drugs” showed a percentage of 97% but after intervention the percentage is 94.

Table 4.3.8A: Number of drugs per case of TB by age group more than 35 years in private sector

	Before intervention		After intervention	
	No. of case	Percentage	No. of case	Percentage
No drugs	0	0%	0	0%
One drugs	0	0%	0	0%
Two drugs	0	0%	0	0%
Three drugs	0	0%	0	0%
Four drugs	11	2.97%	18	4.32%
More than five drugs	359	97.03%	399	95.68%

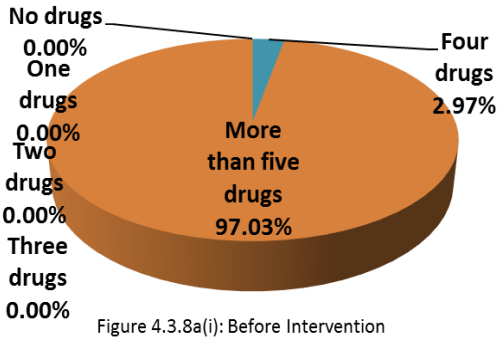


Figure 4.3.8a(i): Before Intervention

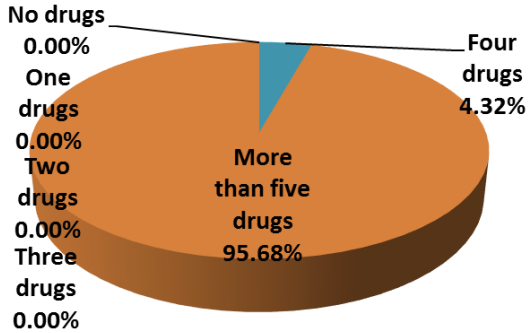


Figure 4.3.8a(ii): After Intervention

4.4. Average number of Antibiotics received by Age Group of patients in public sectors

Before intervention, average number of antibiotics consumed by children in public sectors under 4 years and >35 years was 3.7 and 2.4 respectively. Similarly patients with age range 4-<18years and 18-35years intake same average number of drugs and it is 3.4 before intervention. This value decreased to an average number of 2.85 and 2.2 after the intervention for less than 4 years and greater than 35 years of patients. For children less than 4 years of age the average number of drugs per prescription is high. This is shown in Table 4.4A, 4.4B and Figure 4.4a and 4.4b

Table 4.4.A: Average number of antibiotics received by Age Group of patients in public sectors

	Less than 4 years		4-18 years		18-35 years		35 years above	
	Total Cases	Antibiotics	Total cases	Antibiotics	Total Cases	Antibiotics	Total Cases	Antibiotics
Before Intervention	496	1526	249	850	2.22	756	533	1304
Average Number of antibiotic per prescription		3.7		3.41		3.4		2.44
After Intervention	456	1303	283	733	226	668	535	1180
Average Number of antibiotic per prescription		2.85		2.56		2.95		2.20

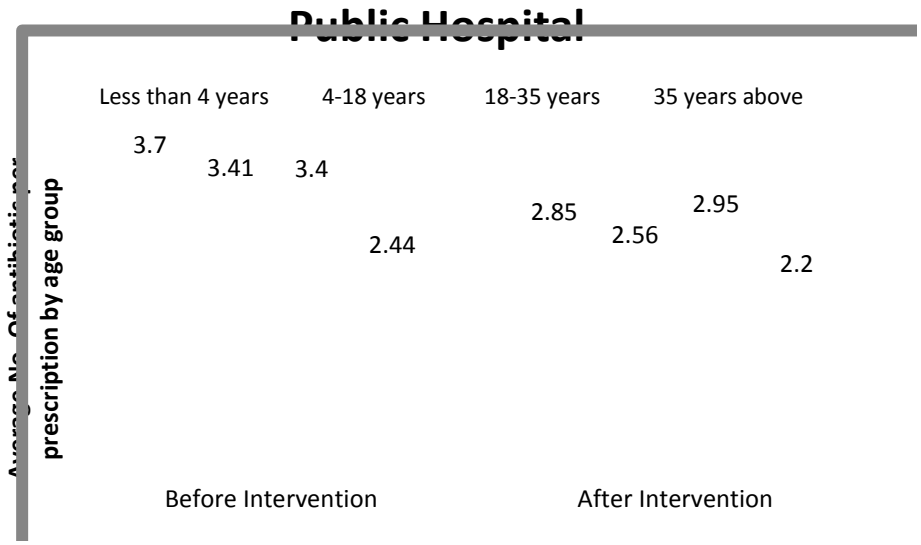


Figure 4.4a: Average Number of antibiotic per prescription before and after intervention in public sectors by age group

Table 4.4B: Average number of antibiotics received by Age Group of various patients in private sectors

	Less than 4 years		4-18 years		18-35 years		35 years above	
	Total Cases	Antibiotics	Total cases	Antibiotics	Total Cases	Antibiotics	Total Cases	Antibiotics
Before Intervention	501	1780	312	1204	317	1368	370	1598
Number of drugs per prescription		3.55		3.85		4.31		4.31
After Intervention	492	1688	321	1103	330	1298	357	1478
Number of drugs per prescription		3.43		3.43		3.93		4.14

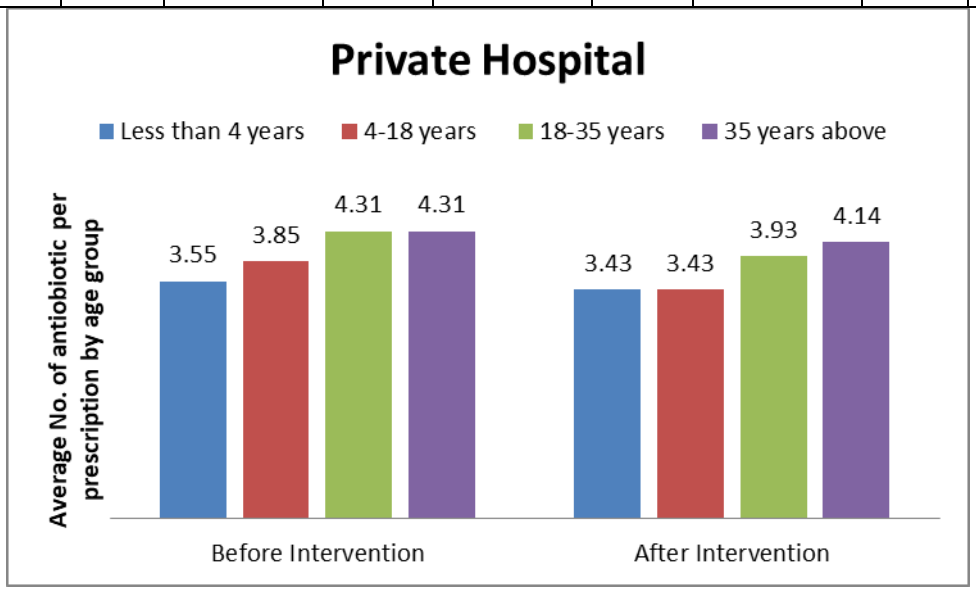


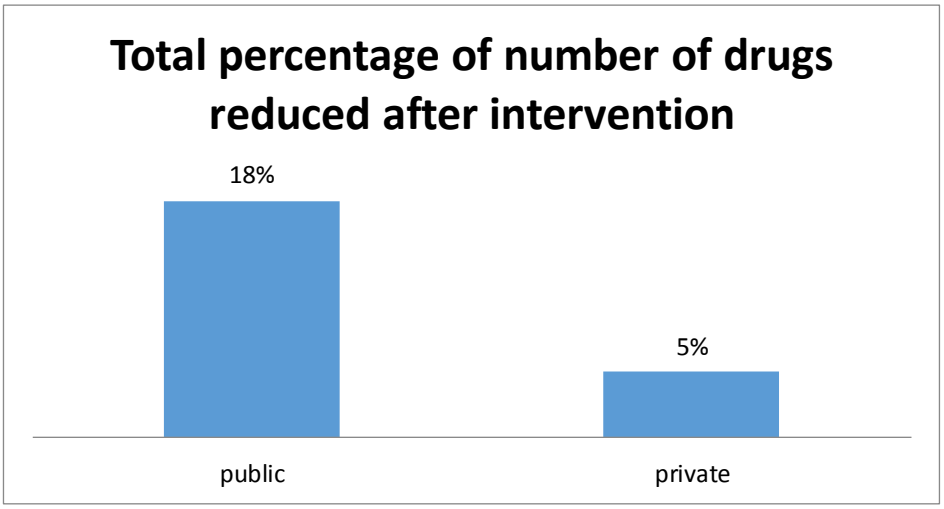
Figure 4.4b: **Average Number of antibiotic per prescription before and after intervention in private sectors** by age group

4.5. Improvement of average number of drugs after encounter in TB treatment both in Public and Private Sectors

In Public sector, total number of drugs prescribe before intervention is 8196 and after intervention 6653. In Private sector total number of drugs written on prescription before intervention is 11026 and after intervention 10498. Here it is shown that more number of drugs prescribed in private sector rather than public sector. But after intervention the number of drug is reduced by 18 % in public sectors and 5% in private sectors.

Table 4.5.A: Improvement of average number of drugs after encounter in TB treatment both in public and private sectors

Public Sector		Private Sector	
Total Number of Drugs Before Intervention	Total Number of Drugs After Intervention	Total Number of Drugs Before Intervention	Total Number of Drugs After Intervention
8196	6653	11026	10498
Total reduced	18%		5%



4.5.a: Total % of number of drugs reduced after intervention

4.6. Average number of antibiotic per prescription before and after intervention both in public and private sectors

The table shows that percentage of use of antibiotics in Public sectors was less than in Private sector. It was 2.95 in Public whereas in Private sector it was 3.97 before intervention. After intervention, average number of antibiotic reduction both in public and private sectors are 2.58 and 3.71 respectively. It is reflected in Table 4.6A and Figure 4.6a.

Table 4.6.A: Average number of antibiotic per prescription before and after intervention both in public and private sectors

Public Sector		Private Sector	
Antibiotic Before Intervention	2.95	Antibiotic Before Intervention	3.97
Antibiotic After Intervention	2.58	Antibiotic After Intervention	3.71

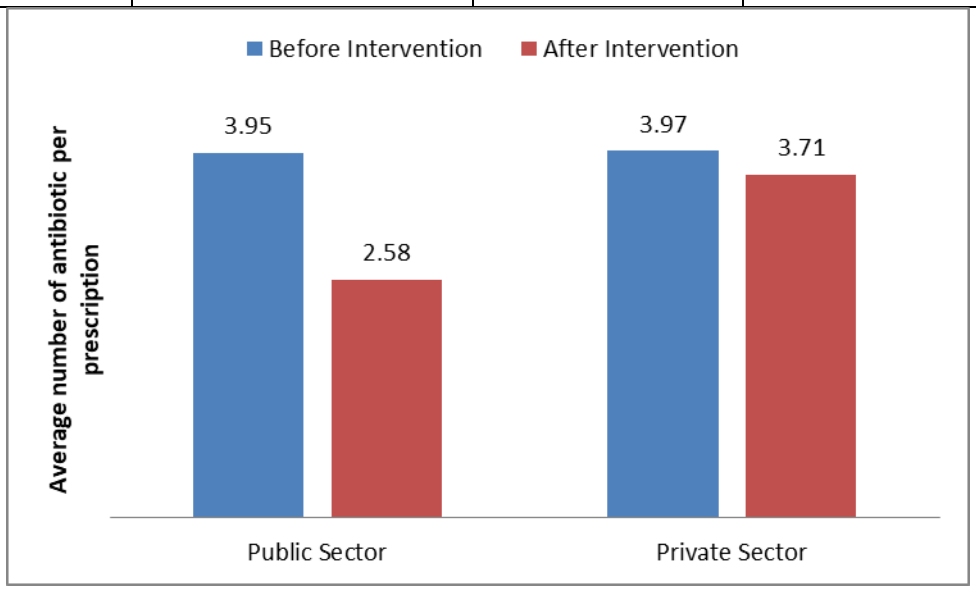


Figure 4.6a: Average number of antibiotic received by patient before and after intervention both in public and private sectors.

4.7. Check List for Clinical Encounter both in Public and Private Sector in the Treatment of TB

In public sector more than 69% do not ask about duration of present illness where as it is bit less here in private sectors and it was 62%.

Physicians do not take any history of 82% patients' past illness in private sectors but in private sectors it is not so improved and it was 70 %.

Only 2% patient got the opportunity to tell their previously taken drug history in public sectors where as in private sectors it is only 4%.

Only 4% patient got investigation advice in public sectors and this situation is comparative good in private sectors, where 33% patients get advice.

64% patients do not get any instruction regarding taking the drugs in public sectors, where as in private sectors 52% patients get instruction.

Comparatively private sector is more careful to the patients than public sector.

Table 4.7.A: Check list for clinical encounter both in public and private sector in the treatment of TB

Indication	Public Sector			Private Sector		
	Yes	No	Not Applicable	Yes	No	Not Applicable
Asking about duration of present illness	36%	69%	2%	41%	62%	0%
Taking history of past illness	3%	82%	15%	21%	70%	9%
Taking previous drug history	2%	92%	6%	4%	90%	6%
Investigation advised	4%	96%		33%	67%	
Instruction about taking drugs	36%	64%		52%	20%	26%
Instruction about diet	3%	97%		46%	3%	49%

4.8. Patient satisfaction and percentage of patients' satisfaction inquiry of TB treatment

In private sector 33% patients showed very satisfaction to the treatment pattern where as in public very high satisfied patient is only 10%. is higher than public sector 10%. Dissatisfaction is also very less (only 5%) in private than public sector where it is 12%. 73% patient is little satisfied in public sectors on the other hand 55% patient of private sectors shows the same tendency. But private sectors serve the patient better than public sectors.

Table 4.8.A: Percentage of patient satisfaction data TB treatment

Patient Satisfaction Percentage	Public Sector				Private Sector			
	Very Satisfied (vl)	Little Stisfied (I)	Little Dissatisfied (Id)	Very Dissatisfied (vd)	Very Satisfied (vl)	Little Stisfied (l)	Little Dissatisfied (ld)	Very Dissatisfied (vd)
	10%	73%	5%	12%	33%	50%	12%	5%

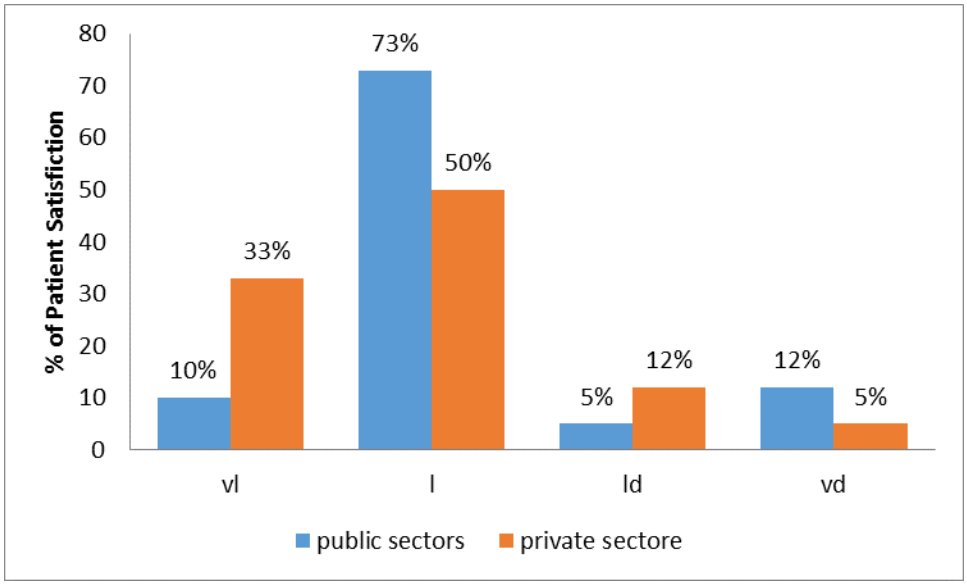


Figure 4.8a: % of patient satisfaction in Public and Private sector

4.9. Percentage of patients' hearing during TB treatment

Physicians in public sectors are not so much attentive to patient's objections, diseases condition hearing. Nearly 60% physicians are not hear anything from patients at all in public sectors but in private sectors the hear 36%. Adequete hearing occure in private sectors which is 27% in private sectors but in public it was only below one fourth of total**.**

Table:4.9.A: Percentage of patients' hearing during TB treatment

Patient hearing public					**Patient hearing private**			
Patient Hearing	Not hearing	Adequate	Fair	Little Hearing	Not Hearing	Adequate	Fair	Little Hearing
	59%	10%	19%	12%	36%	27%	13%	24%

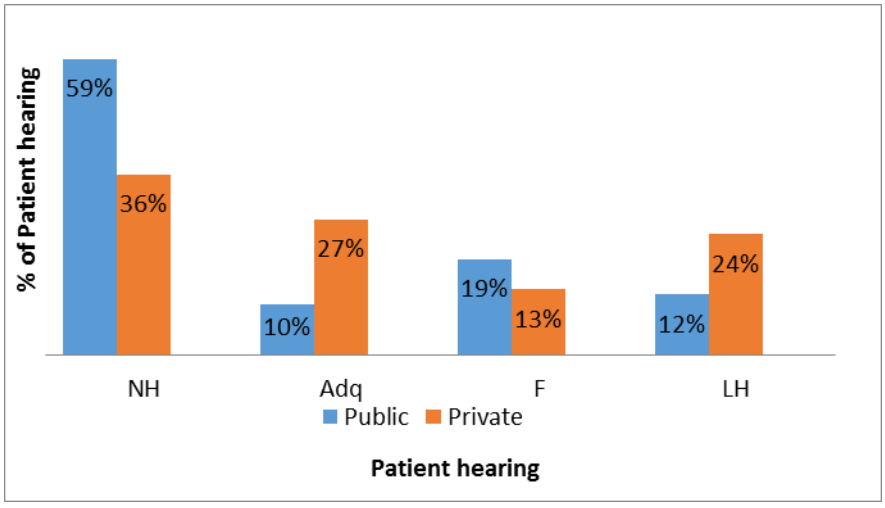


Figure 4.9a: % of patient hearing in Public and Private sector

4.10. Percentage of drugs dispensed from hospitals and outside of hospitals

In public health care provider system 65% drugs has been dispensed whereas in private hospitals no drugs dispensed. Moreover 100% had to buy from outside pharmacy in private hospitals which is only 37% in case of public hospitals.

Table: 4.10A: Percentage of drugs dispensed from hospitals and outside of hospitals

	Public sectors		Private Sectors	
	Yes	No	Yes	No
Drugs from Hospitals	63%	37%	0%	100%

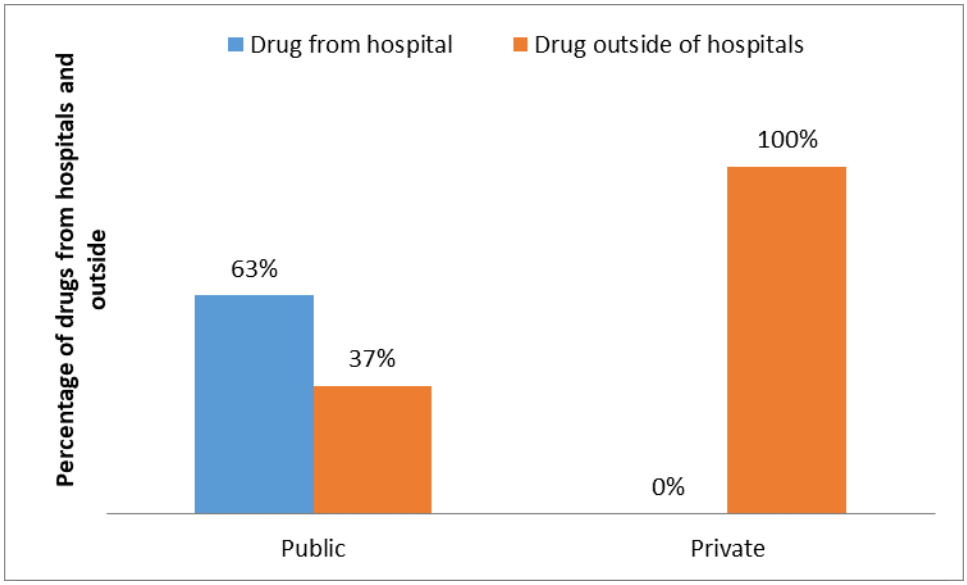


Figure: 4.10a Percentage of drugs dispensed from hospitals and outside of hospitals

4.11. Percentage of patient for asking of follow up

Private sector emphasized for follow up of the patients, where 90% were asked to for follow up checking where in public sectors it is only 11%.

Table 4.11.A: Percentage of patient for asking of follow up

	Public Sectors		Private Sectors	
	Yes	No	Yes	No
Asking for follow up	11%	89%	90%	10%

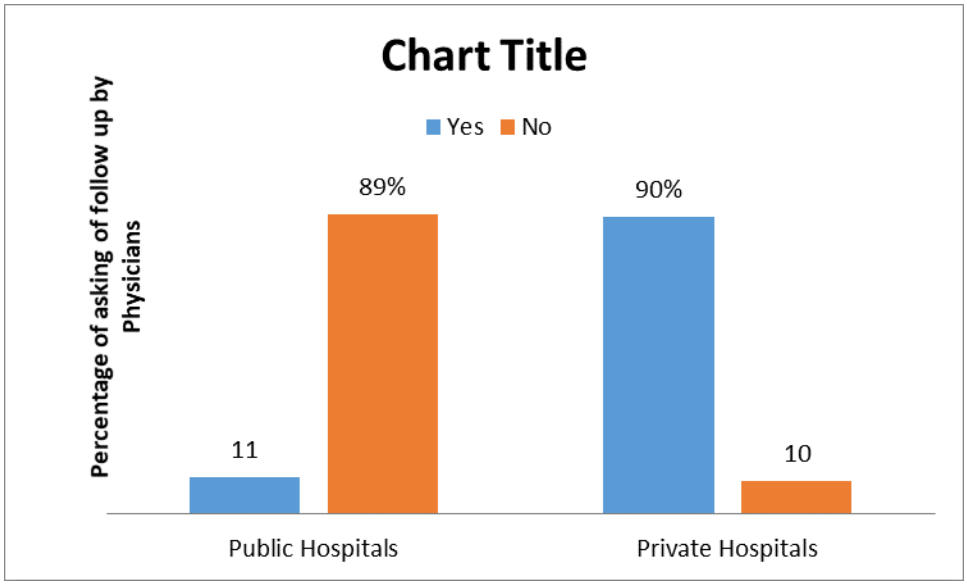


Figure 4.11a: Percentage of patient for asking of follow up

4.12 Percentage of physical examination done in private and public hospitals

Near about 90% experiences physical examination when they go for consultation with doctors in private hospitals but it is significantly less in public hospitals and it is only 63%.

Table 4.12.A: Percentage of physical examination done in private and public hospitals

	Public Hospitals		Private Hospitals	
Physical examination	Done	Not Done	Done	Not Done
	69%	31%	89%	11%

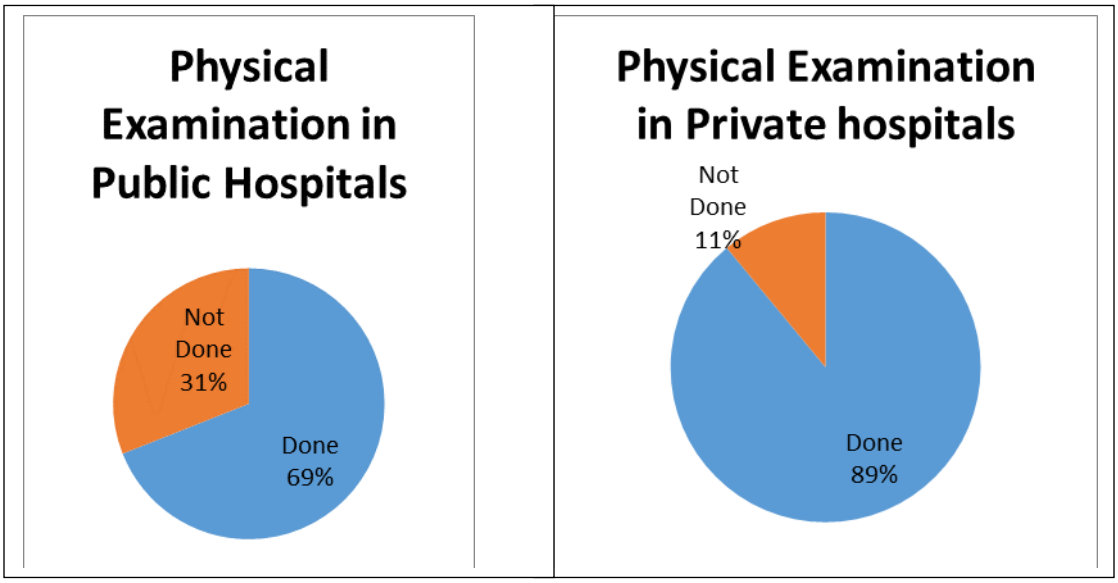


Figure 4.12a: Percentage of physical examination done in private and public hospitals

4.13. Percentage of physical examination done in private and public hospitals

For TB patients mostly respiration rate is monitored. There is no definite pattern of percentage of physical test. It shows an unpredicted pattern depended on diseases conditions.

Table 4.13.A: Percentage of physical examination done in private and public hospitals

Physical examination	Done In public Hospitals	Done In Private Hospitals
Respiration	89%	70%
Percussion	14%	56%
Temperature	30%	40%
Inspection	39%	52%
Weight	18%	51%

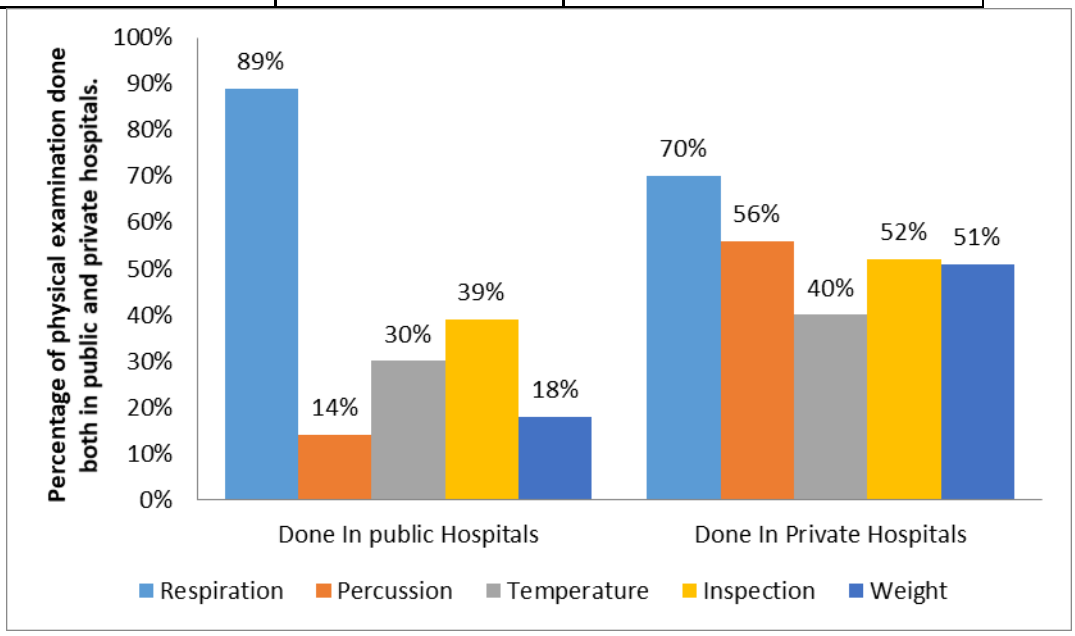


Figure 4.13.a: Percentage of physical examination done in private and public hospitals

4.14. Summary of the effects of intervention on different aspects in public and private sectors in TB Treatment Dhaka Metropolitan

In public sector 91% of drug prescribed is listed on EDL which is higher than private sector (87%) before intervention. After intervention 97% prescribed in public sectors could be listed on EDL but only 86% prescribed in private sector can be listed on EDL.

In private hospitals average consulting time around 236 seconds but 125 seconds in public before intervention. After intervention private health care sector showed an increase manner in consulting time which is 249 seconds which and higher than public health care sector (136 seconds). Only 12% of patients have correct dosing knowledge in private sectors. Both sectors have very poor dosing knowledge before and after intervention. Adequate labeling is only obtained in public sector.

Table 4.14A: Summary of the effects of intervention on different aspects in public and private sectors in TB treatment Dhaka Metropolitan

Indicators	Public sector		Private sector	
	Before int.	After int.	Before int.	After int.
% of drug from EDL	91	97	82	86
Avg. consulting time (sec)	125	136	236	249
% of patient knowing correct dosing	3	9	11	12
% of drug adequately labelled	69	78	0 (N.A)	0 (N.A)

4.15. Comparative study of basic information of prescription in case of TB treatment both for public and private sectors

In public sectors a total of 14849 drugs is prescribe in 3000 prescription before and after intervention which is in an average 4 drugs per prescription. On the other hand a total of 21524 drugs are prescribed in private sectors before and after intervention and the average number of drugs per prescription is 7. Both sectors contain 100% diagnostic test within prescription.

In public sectors 91% prescription contain more than four diagnostic tests which is 2730 of a total case 3000. In private sectors it is 97%.

In public sectors 93% prescription contain multivitamins on the other hand in private sectors it is 100%.

A prescription in public sectors for the treatment of TB cost for 293BDT per prescription. But the expenditure in private sectors is 529BDT which is much higher than public sectors.

Table 4.15.A: Comparative study of basic information of prescription in case of TB treatment both for public and private sectors

Category of hospitals	Average Numbers of drug per prescription	Prescription contains diagnostic history	Prescription contains more than 4 diagnostic test	Presence of multivitamins	Expenditure of per prescription Excluding diagnostic test)
Govt. Hospitals	5 Total prescribed drugs= 14849 Total prescriptions = 3000	100% Total case 3000	91% Total case 2730 of 3000	93% Total case 2790 of 3000	293 Tk.
Private Hospitals	7.17 Total prescribe drugs =21524 Total prescrioptions= 3000	100% Total case=3000	97% Total case 2910 of 3000	100% Total case3000 of 3000	529Tk.

4.16. Percentage of patient date missing in Public and Private sector

In prescription assessment we observed that in total 6000 prescription age missing is very less only 1% and age missing is only 4%.

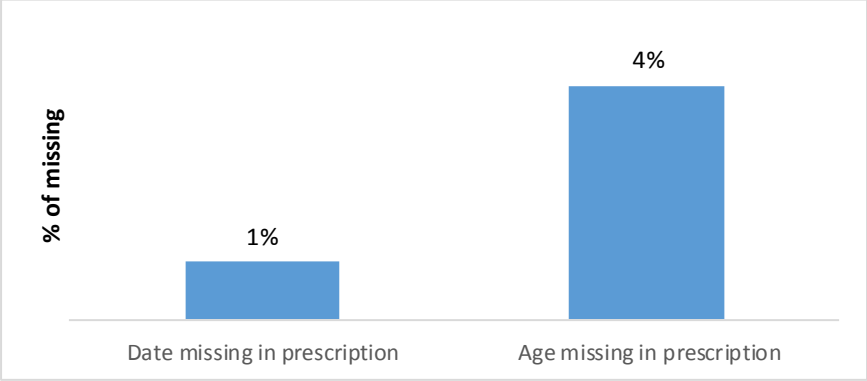


Figure 4.16.a: % of patient date missing in Public and Private sector

Conclusion

Irrational prescribing pattern is a habit which cure is troublesome. For any kind of error of a physician the patients suffer badly. Though TB is very prone in Bangladesh basically childs less than 4 and adults more than 35 years old are very affected by this disease, so physician should more concern. Public hospitals have to increase their facilities, consulting time and all other services that general people expect. Besides private hospitals should more reduce prescribing more drugs, tests etc. TB treatment is comparatively economical since its maximum time occurred by bacterial attack and for these reason physician prescribed a lots of antibiotics but government give it free. Physicians need to be clarified in their conception about rational prescription pattern, clinical pharmacology, and pharmacotherapy to improve prescription practice rather. Doctors, pharmacists and nurses all together should need to build triangle health care committee to minimize health problem. Though this trend is not turned on in our country yet but it's highly expected. Governing bodies have to be more concerned and should take necessary steps for irrational prescribing pattern. No interruption is desirable in our public health care system. Patients will get their proper consultancy and be happy

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