

Drug Use Pattern in Upazilla Health Complexes of Bangladesh

A thesis report submitted to the department of pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy



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SUMMARY OF THE STUDY

In Bangladesh, inappropriate and irrational use of drug is widespread. The purpose of this study is to update the knowledge on disease management practices in government health facilities and to understand the reason for current behavior of drug prescribers and dispensers.

The study focused on determination of prescribing and health care practices of doctors and pharmacist in the Thana health complexes in Bangladesh. Drug use indicators developed by international network for rational use of drug (INRUD) were used in the study. The study used the indicators like prescribing, patient cares, and drug systems and captured the key information on prescribing pattern, patients care and health facility management. This was done through collecting prospective data.

To determine the pattern of drug prescription by consultants in Thana Health Complex of Bangladesh, 30 prescriptions were collected from Araihasar Thana Health complex. In total, 62 drugs were prescribed. The average number of drugs per encounter was 2%. This survey revealed that 60% drugs were prescribed by generic names and 71% drugs were prescribed from essential drug list. Poly-pharmacy was observed in 80% of all encounters. Information about the prescribing physician and the patient was

invariably deficient. Name of patient, age and gender were totally absent in all prescriptions. In addition, none of the prescriptions mentioned address, diagnosis, or allergy of the patient. The most commonly prescribed therapeutic classes of drugs of total cases were as follows: 40% antibiotics, 13.3% antidiarrhoeal and 26.6% antiulcer. Other drugs included vitamin supplements (17%), ferrous sulphate (6.7%) and Co-trimoxazole (40%) of total cases. Other agents prescribed in small proportions of encounters collectively amounted to 6% of total cases. No patients were given injection. The average consultation time was found to be 1.7 minutes and the dispensing time was only 20 seconds. The availability of key drugs was 58% and there was no essential drug list. The survey showed that 68% of the total prescribed drugs were actually dispensed and no dispensed drugs were adequately labeled. 77% patients had adequate knowledge on correct dose.

In many case the doctors were found to comply with the patients demand by prescribing unnecessary drugs. From the result of the Study it is understood that many drugs were prescribed irrationally or inappropriately.

Introduction

Bangladesh is a country where most of the people live under the poverty level. So huge expense for drug is not convenient for the people. For this reason Bangladesh introduces a policy named national drug policy. *The National Drug Policy (NDP), 1982, of Bangladesh was expected to make available essential, good quality drugs at affordable prices. Inadequate supply of essential drugs, substandard quality, uncontrolled drug prices and inappropriate uses of drugs are major problems in Bangladesh.* Unethical drug promotion and marketing of substandard and unnecessary drugs in Bangladesh were very common before 1982. Instead of producing essential drugs, most drug manufacturers manufactured non-essentials such as vitamins, tonics, enzymes, gripe waters and cough mixtures. To stop these practices, Bangladesh formulated a pioneering National Drug Policy (NDP) in 1982. The Drugs (Control) Ordinance, 1982, was promulgated subsequently to implement the NDP. The principal objectives of the NDP were to make available essential drugs; ensure good quality drugs; control drug prices; ensure rational use of drugs; develop an effective drug monitoring system; improve the standard of hospital and retail pharmacies; and ensure good

manufacturing practices. Before the NDP, eight multinational companies (out of 166 licensed companies) had about 75 to 80 per cent share of the drug market. Many of them abandoned their operations in Bangladesh after the NDP. Today, local pharmaceutical companies dominate the drug market with a share of more than 75 per cent. The NDP has had some success in regulating the drugs market of Bangladesh, but many of the goals of this initiative are yet to be achieved.

First of all we have to know that what rational use of drug is:

The 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 the community. **(WHO 1988)**

That means:

- Appropriate indication
- Appropriate drug
- Appropriate administration, dosage, and duration
- Appropriate patient
- Appropriate patient information

In the developing countries like Bangladesh the misuse or irrational drug use occurs frequently in Thana health complex.

Because of this irrational use of drug patients are suffering from both adverse clinical consequence and also loss of resources like money. The irrational drug use must be minimized to an affordable limit to save the limited resources and to get rid from the unwanted adverse effect of drug products.

The purpose of this study is to figure out the drug dispensing and use pattern in the government health centers in Bangladesh, to evaluate the problems in using the inappropriate drugs, and to know the different pressure and constraints comes on the prescribers and dispensers.

In short:

- Identify magnitude and nature of inappropriate drug utilization
- Understand the adverse impacts of inappropriate use of drugs
- Describe factors which influence the decision-making process
- Identify factors which influence the behavior of prescribers and patients
- Discuss specific medication use problems

BACKGROUND:

The irrational and inappropriate use of drug is now seems to be very common in the developing countries like Bangladesh. Inappropriate use of drug in many clinical conditions especially for infectious disease is very common in Bangladesh. Various forms of inappropriate prescribing are often remain unnoticed by the medical practitioners or delivery of health services. The rational use of drugs is an essential element in achieving quality of health and medical care for patients and the community, and this must be the important concern of practitioners .there are many problems in Bangladesh, one of them is poly pharmacy. Poly pharmacy is a challenging problem in Bangladesh. it is also discouraged by medical science though it may destroy human life. Use of antibiotic and antimicrobial without any valid reason is most common in Bangladesh. This is mostly practices in the Thana health complex. This is the reason why antibiotic resistance is growing up. To improve the quality of health care for the patients of our country, it is a crying need for rational use of drugs. Actions or intervention programs to promote the appropriate use of drugs should be continuously implemented and have to maintain it systematically. In the proposed study, the health care and prescribing behavior of

doctors and dispensing behavior of pharmacist will be monitored in Thana Health Complexes by using some key indicators developed by International Network for Rational Use of Drug (INRUD).

Problems of irrational drug use

► Serious public health problems:

Quality & access of health services

► Adverse impacts:

Quality,

Cost,

Adverse reaction,

Psycho-social



Which include the followings:

- The overuse of antibiotics and antidiarrheals for nonspecific childhood diarrhea
- Indiscriminate use of injections for malaria
- Multiple or over-prescription
- Use of antibiotics for mild, non-bacterial infection, e.g., URI
- Tonics and multivitamins for malnutrition

- Unnecessary use of expensive antihypertensives
- Use of drugs when no drug therapy is needed
- Use of wrong drugs
- Use of drugs with doubtful efficacy
- Use of drugs with uncertain safety status
- Failure to prescribe safe, & effective drugs
- Incorrect administration, dosages, or duration

Research objectives

1. To identify magnitude and nature of inappropriate drug utilization
2. To understand the adverse impacts of inappropriate use of drugs
3. To describe factors which influence the decision-making process
4. To identify factors which influence the behavior of prescribers and patients
5. To discuss specific medication use problems

Hypothesis

Irrational prescribing and dispensing practices and inappropriate, ineffective and economically ineffective use of drug is widespread in public sector like Thana health complexes. After the investigation of the drug use pattern in Thana health complex, this will improve rational prescribing and drug use for the disease under consideration.

Conceptual model

There are many factors which underlines the irrational drug use.

These are as below:

A) Patients

- Drug misinformation
- Misleading beliefs
- Inability to communicate problems

b) Prescribers

- lack of education and training
- lack of drug information
- heavy patient load

- pressure to prescribe
- generalization of limited beliefs
- misleading beliefs about efficacy

c) Industry

- promotion
- misleading claims

D) Drug Supply

- inefficient management
- non-availability of required drugs

E) Drug Regulation

- availability of unsafe drugs
- informal prescribers

Study sites and sampling

A study was carried out on 13th June, 2009 at Araihasar Thana Health Complex. 30 prescriptions were collected, audit and analyzed using WHO/INRUD indicators on drug use. Prospective data were collected to assess the prescribing practices of doctors. The prospective data were sampled by intercepting the patients of the Thana Health Complex, as they exited. The quality of

dispensing and each patient's understanding about the dosage were assessed prospectively by observation and exit interviews of 30 patients. Facility's main store was visited to assess the availability of essential drugs. The field work was done by five students and supervision given by the department of Pharmacy of East West University. During this training the Thana Health Complex to be surveyed was randomly selected.

The selected health complexes:

- ▶ Savar
- ▶ Sreepur
- ▶ Sonargaon
- ▶ Keranigong
- ▶ Araihasar



Core drug use indicators

Three indicators are there

a) Prescribing indicators

- Average number of drugs per encounter
- %of drugs prescribed by generic name
- % of encounters with antibiotic prescribed
- % of encounters with injection prescribed
- %of drugs prescribed from essential drug list

b) Patient care indicators

- Average consulting time
- Average dispensing time
- %of drugs actually dispensed
- %of drugs adequately labeled
- Patient's knowledge of correct dose

c) Health facility indicators

- Availability of copy of essential drug list
- Availability of key drugs

Common diseases

- Fever
- Diarrhea
- Malaria
- ARTI
- Scabies
- Fungal skin infection
- Anemia
- Worm infection
- Conjunctivitis

Data collection procedures

The procedure was done in Araihasar Thana Health Complex .The observation was started in the middle of the clinical day. Based on an understanding of the patient flow at health facilities the procedure to record the times of clinical consultation and dispensing was specified in advance. Five students of Pharmacy department were trained by the research instructor. It was necessary to get permission letter from the officer of Thana Health Complex. The data were collected about both the clinical examination and drug dispensing procedures The procedure was to record beginning and ending times for individual consultation. A similar procedure was used in the dispensing area where the beginning and ending times of the patient interactions with dispenser was recorded. It was evaluated on the patient's knowledge of when and in what quantity each drug should be taken. It was also monitored the number of drugs received by patient from the dispensing store of the Health complex. The data for the health facility indicator were recorded on the facility summery form.

Source of Data in Summary

1) The prospective data were collected by observing the prescribing pattern in a sample of clinical encounters taking place at outpatient health facility

The detail prescribing indicator form required the following:

- Name, age and sex of the patient
- Health problems of the patient
- Name, strength and quantity of the prescribed drugs.

Prospective data on the quality of patient care were collected by observing the consultation and examination of 30 cases. Observations were made in the consultation room without interrupting normal activities. .

The facility's main store was visited to assess the availability of essential drugs.

Data were consolidated using a summary form time of exchange between the patient and the doctor.



Enumerators are with patient



Enumerator with a staff



Enumerators waiting for patient care interview



Enumerators are inside the health complex



Pattern of prescription writing at Upazilla Health Complex

PRESCRIBING INDICATOR FORM

LOCATION: ARAHAZAR THANA HEALTH COMPLEX

Sequence	Drugs	Generics	Antibiotics(0/1)	Injection(0/1)0	On EDL
1	1	1	0	0	1
2	2	2	1	0	2
3	2	2	1	0	2
4	3	1	1	0	2
5	2	2	0	0	2
6	2	1	1	0	1
7	2	1	1	0	1
8	2	1	0	0	1
9	1	1	0	0	1
10	2	1	1	0	1
11	2	1	0	0	1
12	2	2	1	0	2
13	4	2	1	0	2
14	2	1	0	0	2
15	2	1	0	0	1
16	3	1	0	0	1
17	2	2	1	0	1
18	3	1	1	0	1
19	1	1	0	0	1
20	3	1	1	0	1
21	1	1	0	0	1
22	2	1	0	0	2
23	2	1	0	0	2
24	1	1	0	0	1
25	2	1	0	0	2
26	4	2	1	0	2
27	2	1	0	0	2
28	2	1	0	0	2
29	2	1	0	0	2
30	1	1	0	0	2
Total	62	37	12	0	44
Average percentage	2%	60%	40%	0%	71%

PATIENT CARE FORM
LOCATION: ARAHAZAR THANA HEALTH COMPLEX

Sequence	Consulting time(min)	Dispensing time(sec19)	Drugs prescribed	Drugs dispensed	Adequately labeled	Knows dosage(0/)
1	1.8	19	1	1	0	1
2	1.3	25	2	2	0	1
3	3.4	12	2	1	0	0
4	2.3	15	3	1	0	0
5	2.1	28	2	2	0	1
6	1.2	16	2	1	0	0
7	2.3	14	2	1	0	1
8	1.5	23	2	2	0	1
9	1.0	19	1	1	0	1
10	1.9	27	2	2	0	1
11	2.3	21	2	2	0	1
12	1.0	13	2	1	0	1
13	1.2	25	4	2	0	0
14	2.2	23	2	2	0	1
15	1.1	29	2	2	0	1
16	1.3	24	3	2	0	0
17	1.5	27	2	2	0	1
18	2.3	30	3	2	0	1
19	0.9	17	1	1	0	1
20	1.8	19	3	1	0	0
21	0.8	11	1	1	0	1
22	1.6	18	2	1	0	1
23	1.0	15	2	1	0	1
24	0.9	19	1	1	0	1
25	2.2	20	2	1	0	1
26	3.1	28	4	2	0	0
27	2.4	14	2	1	0	1
28	1.5	16	2	1	0	1
29	1.2	13	2	1	0	1
30	0.9	18	1	1	0	1
Total	50.0		62	42	0	23
Average	1.7	20				
Percentage				68% of prescribed	0% of dispensed	77% of cases asked

KEY DRUGS IN STOCK TO TREAT IMPORTANT CONDITION

Disease	drug	In stock(0/1)
Diarrhea	ORS	1
	Cotrimoxazole tablet	1
Fever	Paracetamol tablet	1
ARTI	Penicillin tablet	1
Malaria	Chloroquine tablet	0
Scabies	Benzyl benzoate ointment	0
Fungal skin infection	Whitefield ointment	1
Anemia	Ferrous salt + Folic acid tablet	1
Worm infection	Mebendazole tablet	0
Conjunctivitis	Chloramphenicol eye drops	0
NSAID	Aspirin	0
Other antibiotics	Ampicillin	1

% in stock this facility =58%

Here,

1=yes

0=no

Result and discussion

Prescribing Indicator

Polypharmacy means "many drugs" and refers to problems that can occur when a patient is taking more medications than are actually needed. It is a particular concern for older adults, who make up 13% of the population but account for almost 30% of all prescribed drugs.

The typical older adult takes one or more prescription drugs plus several OTC remedies, such as antacids, laxatives or pain-killers, often used without informing their physician. Some people have no problems at all, but others suffer because of the combination of drugs they take. Indeed, research has found that higher rates of depression and lower quality of life were results of a person's perception that they were taking too many drugs.

In our point of study at Araihasar Thana health complex the average number of drugs was 2. The number of drugs per encounter indicates the pattern of poly-pharmacy. The ideal figure should be one drug for one condition. 30 prescriptions were analyzed and we found that there are many scopes to improve that

result by avoiding unnecessary drugs from the prescription. as for example a 65 years old patient do not need 2 medicines (allatrol and paracetamol) only for normal cold. This is not a good practice. Another 60 years old patient was given 5 drugs in case of chest pain. Those were Omeprazole, Clognil plus, Vitamin B complex, Diclofenac, Antacid plus. Here we can see that two Antiulcer drugs is given which is of same action, and also Vitamin B complex paracetamol and diclofenac is given, which have the same activity. This indicates the irrational use of drugs. Vitamin B complex can be easily obtained from vegetable and fruit contents. Vitamin B complex could be avoided in this case. Excess uses of vitamins leads to hypervitaminogenesis. Which have the symptom of vitamin deficiency. Vitamin and antioxidant increase the risk of death. In many prescriptions we have seen that the doctors prescribed vitamin in case of malnutrition, simple cold. By avoiding the use of unnecessary drug it is possible to maintain rational drug use. The average number of drugs prescribed in public sector facilities in most the countries range from 1.3 to 2 drugs. The study shows that the result comply with this range.

#Drugs often have several names. When a drug is first discovered, it is given a chemical name, which describes the atomic or molecular structure of the drug. The chemical name is thus usually too complex and cumbersome for general use. Next, a shorthand version of the chemical name or a code name (such as RU 486) is developed for easy reference among researchers. When a drug is approved by the Food and Drug Administration (FDA) it is given a generic (official) name and a trade (proprietary or brand) name. The trade name is developed by the company requesting approval for the drug and identifies it as the exclusive property of that company. For example, Phenytoin, some Trade Names DILANTIN is the generic name and Dilantin is a trade name for the same drug. When a drug is under patent protection, the company markets it under its trade name. When the drug is off-patent the company may market its product under either the generic name or trade name. Other companies that file for approval to market the off-patent drug must use the same generic name but can create their own trade name. As a result, the same generic drug may be sold under either the generic name or one of many trade names.

There are many reasons that doctors use brand name over the generic one:

- Generic names are usually more complicated and harder to remember than trade names. Many generic names are a shorthand version of the drug's chemical name, structure, or formula. In contrast, trade names are usually catchy, often related to the drug's intended use, and relatively easy to remember, so that doctors will prescribe the drug and consumers will look for it by name.
- Trade names often suggest a characteristic of the drug. For example, Lopressor lowers blood pressure, Vivactil is an antidepressant that might make a person more vivacious, Glucotrol controls high blood sugar (glucose) levels, and Skelaxin relaxes skeletal muscles. So it is easy to remember.
- The term generic, when applied to such items as foods and household products, is used to describe a less expensive, sometimes less effective or lower-quality copycat version of a trade-name product.

- most generic drugs, although less expensive than the comparable trade-name drug, are as effective and of the same quality as the trade-name drug.

- promotional strategy of the pharmaceuticals

In this study the average 60% of the drugs were prescribed in generic name. It shows very low percentage but we expected the 100% drugs should be prescribed by the generic name in public health complexes. Due to the promotional strategy of the pharmaceuticals company, they try to satisfy the doctors at any cost. So the doctors have the tendency to prescribe more drugs in brand name. Their prescribing behavior is irrational. We observed that Omeprazole tablet was given by the name of Losectil, which is its brand name. Also ranitidine was prescribed by its brand name of Neotack. Metronidazole was prescribed by its brand name of Flazil.

The patients had to buy that drugs which were given in brand name from the local drug Store. These are nothing but a marketing policy. Due to this policy the poor patients are deprived of getting the drugs form Thana Health complex.

#Antibiotic is commonly used in developing country due to high occurrence of infectious disease. Incorrect use of antibiotics increases resistance. Our next concern was to study percentage of encounter with antibiotics. The result was 40% of total cases. In Bangladesh the use of incorrect antibiotics is creating a serious problem like antibiotic resistance. The high rate of antibiotic resistance in this country appears to be due to a combination of heavy burden of bacterial infectious disease, inappropriate use of the available drugs. For example only for normal fever it is not a good practice to give an antibiotic course. The study was undertaken in Araihasar Thana health complex to better define the use of antibiotics with appropriate dosage for a given period of time in the community.

#Injection is another dose of drug. Injection is not convenient to the patient's but some people think that injection will work better and at a short time. Also doctors think that patients will satisfy to have an injection dose. In our study in Araihasar Thana Health complex the percentage of injection was totally absent. This treatment is very appreciable and encouraging. This may be due to various reasons. One may be due to unavailability of injection in drug store of Thana Health Complex. And another may be due to the implementation of

National Drug Policy in which production of injection has been limited to a great extent.

Essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford. The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations; exactly which medicines are regarded as essential remains a national responsibility.

Our next concern was on the percentage of drug use following essential drug list. We have a result of 71%. The result is satisfactory. The behavior of prescribing drugs from Essential Drug List is due to procurement and supply of most of the drugs for health complexes from Essential Drug Company Limited owned by the government

Patient Care Indicator

The quality of care provided to patients was assessed by examining the consultation practices of doctors in Araihaazar Thana Health Complex. The average consultation time per patient was 1.7 minutes. This result is not satisfactory. Because a patient have to know all possible information about the disease and the medication. Also the doctor need more time to know about the clinical condition and the appropriate diagnosis of that clinical condition. To know about the clinical condition the doctors have to question the patient. But in this short time session it can not be possible. This short time is not enough to provide adequate clinical interaction. Proper diagnosis can be done by knowing the prehistory of the patient's condition. But the doctors do not want to know the prehistory. They just consider the patient's present condition and prescribe drugs without any physical examination. This is the reason why the consulting time is so low. This condition can be life threading for some clinical condition as heart disease, during pregnancy. In the developing country this problem is more prominent.

#The quality of care was assessed by examining the dispensing practices. The average time taken to dispense the drugs was 20 seconds for each patient. This really a short time for properly dispense a drug. In this short time period the pharmacist can not give full information about the dosing of the drug .Another problem is that the pharmacists are illiterate. They have no ideas about the drugs and its uses. So the pharmacist should give the clear information about the drugs and its uses to the patients, which might be dangerous for patient's health. Also storage condition is a big factor. If a drug is not properly stored then it may loose it's efficacy and an ineffective drug may create poison in the body. Finally we can say that the drugs are poorly dispensed in the Thana Health Complex.

The percentage of drugs prescribe in the Araihasar Thana Health Complex was about on average 62%, given to the patients. Medicines are often prescribed according to the supplies available at the health center on the day concerned and not necessarily according to what the patient needs .This result was not satisfactory. This is because the doctors write only the brand name not the generic name.

So the patient can't get medicines from the Thana health complex store.

#Labeling on the drug container was totally absent in Araihaazar Thana Health Complex. Adequately labeling as drug packages containing at least patient name, drug name, dosing pattern and the time when the drug should be taken.

#The patient knowing about the drug and dosing pattern was about 77%.without adequately knowing about the dosage form the patient can't make the best use of it. This may cause the misuse of drug.

Facility indicator

There were 7 drugs in the stock. And the average was 58%. This was not satisfactory. But unfortunately there was no essential drug list. The low or unavailability of essential drugs affects the prescribing patterns. Bangladesh has a limited economy, and because of this drug supply in this type of governmental health complexes. This is the reason why the poor peoples are not getting drugs from the health complex. Also they are not careful to take medicine after they get some benefit some days later of taking medicine. So it is a great problem. Specific improvement in the management of drugs could reduce wastage and irrational use. Improved drug management improves the availability of drugs within the health system without increasing expenses.

Impact of Inappropriate Use of Drugs

The impact of this irrational use of drugs can be seen in many ways:

- Reduction in the quality of drug therapy leading to increased morbidity and mortality,
- Waste of resources leading to reduced availability of other vital drugs and increased costs,
- Increased risk of unwanted effects such as adverse drug reactions and the emergence of drug resistance, e.g., malaria or multiple drug resistant tuberculosis,
- Psychosocial impacts, such as when patients come to believe that there is "a pill for every ill". This may cause an apparent increased demand for drugs.



Some examples of inappropriate prescribing:

- Overuse of antibiotics and antidiarrheals for non-specific childhood diarrhea
- Indiscriminate use of injections, e.g., in malaria treatment,
- Multiple drug prescriptions,
- Excessive use of antibiotics for treating minor ARI.

Factors Underlying Irrational Use of Drugs

There are many different factors which affect the irrational use of drugs way. The major forces can be categorized as those deriving from patients, prescribers, 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 - non- essential drugs available	non-formal prescribers lack of regulation enforcement
Industry - promotional activities	misleading claims

Limitation

Data collection from Thana Health Complex was found to be a difficult task to perform. The principle limitation of this study was that there was no information regarding the patient's diagnosis in the prescription

Another limitation was the doctors tried to change their previous prescribing behavior, because they were careful in their prescribing after they knew about us.

Conclusion:

From the present study we have identify some problems as the followings:

- Drugs are prescribed unnecessarily where no drug is required.
- Short dispensing and consulting time provide inadequate clinical interactions and little patient care.
- Labeling and dispensing is totally absent.
- Inadequate drug supply hampers prescribing and patient care.
- Unnecessary use of antibiotic cause the resistance of antibiotic.
- Unnecessary cost is happening due to the irrational drug use.

Recommendations

The following recommendations are made towards the improvement of the utilization and rational prescribing of drugs at this secondary healthcare level.

1. Standard treatment protocol for common disease such as typhoid fever, diarrhea, dysentery, gastric ulcers and respiratory tract infections should be developed.
2. Refresher training course should be provided in the most common illness and therapy.
3. Short course in rational prescribing, in particular for the use of antibiotics, NSAID and antidiarrhoeal should be organized for the prescribers.
4. In particular, studies need to be conducted to investigate the drug use pattern in the medical colleges and teaching hospitals, where medical students first learn and practice prescribing.

Irrational prescribing is a habit that is difficult to cure. However, prevention is possible. There is some evidence that interventions such as short problem-based training course in pharmacotherapy and rational use focused workshops can improve prescription behavior.

Regulatory methods are related to government policy or laws. These include banning unnecessary and harmful drugs, limiting the number of drugs available to lower level of health facilities, and limiting the number of drugs.

Managerial methods are related to health system administration. These include altering prescribing and dispensing patterns by encouraging the standard prescription forms, limiting drug availability, restricting the prescribing of certain drugs to doctors with special training, printing clear instructions on drug counter labels, diagnostic and treatment guidelines

Finally public health care campaigns should be introduced to address the use and misuse of drugs.



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ANNEX



Annex-1

Upazilla Health Complexes of Dhaka Division

Districts	Postal Code	Thanas	Serial No.	
Sariatpur	220	Goshairpur	1	
	221	Damuddya	2	
	222	Palong	3	
	223	Bhederganj	4	
	224	Naria	5	
	225	Zazira	6	
Madaripur	226	Sibehar	7	
	227	Rajoir	8	
	228	Madaripur	9	
	229	Kalkini	10	
Gopalganj	230	Kotoalipara	11	
	231	Tongipara	12	
	232	Gopalganj	13	
	233	Kassiani	14	
	234	Muksudpur	15	
Faridpur	235	Bhanga	16	
	236	Shadapur	17	
	237	Charbhadrason	18	
	238	Faridpur	19	
	239	Nagarkandha	20	
	240	Alfadanga	21	
	241	Boalmari	22	
	242	Modhukhali	23	
	Rajbari	243	Baliakandi	24
		244	Pangsha	25
245		Rajbari	26	
246		Goalandaghat	27	
Manikganj	247	Harirampur	28	
	248	Shibalaya	29	
	249	Dawlatpur	30	
	250	Ghior	31	
	251	Manikganj	32	
	252	Singair	33	
	253	Saturia	34	
Dhaka	254	Dhamrail	35	
	255	Savar	36	
	256	Keraniganj	37	
	257	Nawabganj	38	
	258	Dohar	39	
Munshiganj	259	Sreenagar	40	
	260	Louhajang	41	
	261	Serajdikhan	42	
	262	Tongibari	43	
	263	Munshiganj	44	
	264	Gazaria	45	
Narayanganj	265	Narayanganj	46	

	266	Bandar	47
	267	Sonargaon	48
	268	Araihazar	49
	269	Rupganj	50
Narsingdi		Palash	51
	270	Narsingdi	52
	271	Raipur	53
	272	Belaboo	54
	273	Shibpur	55
	274	Manohardi	56
	275	Kapasia	57
Gazipur	276	Kaliganj	58
	277	Gazipur	59
	278	Sripur	60
	279	kaliakair	61
	280	Mirzapur	62
Tangail	281	Nagarpur	63
	282	Debduar	64
	283	Tangail	65
	284	Basail	66
	285	Sakhipur	67
	286	Kalihati	68
	287	Bhuapur	69
	288	Ghatail	70
	289	Gopalpur	71
	290	Modhupur	72
	291	Sarisabari	73
Jamalpur	292	Jamalpur	74
	293	Madarganj	75
	294	Malandaha	76
	295	Islampur	77
	296	Dewanganj	78
	297	Bakshiganj	79
	298	Sribordi	80
Sherpur	299	Jhenaigati	81
	300	Sherpur	82
	301	Nakhla	83
	302	Nalitabari	84
	303	Haluaghat	85
Mymansing	304	Dhubeura	86
	305	Phulpur	87
	306	gouripur	88
	307	Iswarganj	89
	308	Mymansing	90
	309	Muktagacha	91
	310	Phulbaria	92
	311	Bhaluka	93
	312	Gafargaon	94
	313	Trisal	95
	314	Nandail	96
	315	Hossenpur	97
Kishorganj	316	Kishorganj	98
	317	Pakundia	99

	318	Kotiadi	100
	319	Kuliarchar	101
	320	Bkairab	102
	321	Bjitpur	103
	312	Astagram	104
	313	Nikhli	105
	324	Mitamain	106
	325	Karimganj	107
	326	Tarail	108
	327	Itna	109
	328	Khaliajhuir	110
Netrokona	329	Modon	111
	330	Kendua	112
	331	Atpara	113
	332	Mohonganj	114
	333	Barhatta	115
	334	Nentrokona	116
	335	Purbodhala	117
	336	Durgapur	118
	337	Kalmakanda	119

PRESCRIBING INDICATOR FORM

Location: _____ Investigator: _____

Type: _____ Date: _____

Seq. #	Age (yrs)	# Drugs	# Generics	Antib. (0/1)*	Injec. (0/1)*	# on EDL	Diagnosis (Optional)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
Total							
Average							
Percentage							

* 0 = No 1 = Yes

PATIENT CARE FORM

Location: _____

Investigator: _____ Date: _____

Seq. #	Patient Identifier (if needed)	Consulting Time (min)	Dispensing Time (sec)	# Drug Prescribed	# Drug Dispensed	# Adequately Labelled	Knows Dosage (0/1)*
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
Count							
Total							
Average							
Percentage							

* 0 = No 1 = Yes

Annex-2

FACILITY SUMMARY FORM

Location: _____

Investigator: _____ Date: _____

Problems or Comments:

Essential Drug List/ Formulary available at facility? (0/1)*	
Key Drugs in Stock to Treat Important Conditions	In Stock (0/1)*
* 0 = No 1 = Yes ORS	
Vitamin A	
Cotrimoxazole tab.	
Paracetamol tab.	
Paracetamol pediatric syrup	
Benzybenzoate ointment	
Whitfield ointment	
Penicillin tab.	
Gentian violet powder/ iodine	
Mebendazole	
Ferrous sulphate + Folic acid tab.	
Chloamphenicol eye drop	
Ampicillin tab.	
% in stock this facility	

DETAILED PRESCRIBING ENCOUNTER FORM

Location: _____

Investigator: _____ Date: _____

ID#	Date	Name	Age	Sex	Prescriber
Health Problems	Health Problem Description		Code		
	1.				
	2.				
	3.				
Drugs	Name and Strength		Code		Quantity
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
9.					

ID#	Date	Name	Age	Sex	Prescriber
Health Problems	Health Problem Description		Code		
	1.				
	2.				
	3.				
Drugs	Name and Strength		Code		Quantity
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
9.					

Patient Exit Intercept Interview

- 1) What is the main complaint/ ailment for which you have come here to seek treatment?

- 2) Is this your first visit to facility for this ailment?
- 3) How long ago was your first visit?
- 4) Did you consult any practitioner for this episode of illness before coming here?
- 5) Whom did you consult? (Probe to specify type of practitioner)

- 6) Has the doctor of this facility told you about the name of the disease? (Skip to Q. 9)
(1) Yes (2) No
- 7) What is the diagnosis? (Skip to Q. 9)
- 8) Did you ask the doctor the name of your disease?
- 9) Did the doctor physically examine your child?
(1) Yes (2) No
- 10) Did you have the chance to fully tell the doctor about your illness?
- 11) Did the doctor advise any laboratory test?
- 12) How many drugs did you receive from this facility?
- 13) Did the doctor here give you a prescription for a drug that you must buy of this facility?
- 14) Did your doctor ask you to visit his private chamber for further treatment?
(1) Yes (2) No
- 15) Did the pharmacist explain to you how to take the drug?
(1) Yes (2) No

LIST OF 150 ESSENTIAL DRUGS

A. List of 12 essential drugs for use by the village level health workers:

1. Aspirin Tablet.
2. Chloroquine Phosphate Tablet/Syrup.
3. Aluminium Hydroxide Gel Tablet/Suspension.
4. Piperazine Tablet/Elixir.
5. Glucose Electrolyte Powder (ORS).
6. Phenoxymethyl Penicillin (Penicillin V) Tablet/Syrup.
7. Ampicillin Capsule/Syrup/Injection.
8. Ergometrine/Methylergometrine Maleate Tablet/Injection.
9. Ferrous Sulphate Tablet/Syrup.
10. Ephedrine.
11. Vitamin A 200,000 Units Capsule/100,000 Units Injection.
12. Chloramphenicol Eye/Ear/Ointment/Drop.

B. List of additional 33 essential Health Care for Primary Health Care up to the Upazilla Health Complex level:

13. Paracetamol Tablet/Elixir.
14. Pethidine Hydrochloride Injection.
15. Sulphadoxin with Pyrimethamine.
16. Levamisole Tablet/Elixir.
17. Chloramphenicol Tablet/Elixir/Injection.
18. Lidocaine 1%
19. Isoniazid with Thiacetazone Tablet.
20. Streptomycin Sulphate Injection.
21. Metronidazole Tablet/Elixir/Injection.
22. Atropine Sulphate Injection.
23. Hyoscine-N-Butyl Bromide Tablet/Injection.
24. Chlorohexidine/ Chloroxylenol Solution/Cream.
25. Procaine penicillin Injection.
26. Tetracycline / Oxytetracycline Capsule/Injection/ointment.
27. Phenobarbitone Tablet/Injection.
28. Diazepam Tablet/Injection.
29. Chlorpromazine Tablet/Injection/Syrup.
30. Dextrose in water (5%, 25%, 50%).
31. Redistilled water (Pyrogen free) amps.
32. Cholera Fluid.
33. Oxytocin.
34. Furosemide Tablet/Injection.
35. Prednisolone Tablet.
36. Propranolol Tablet/Injection.
37. Aminophylline Tablet/Injection.
38. Co-trimoxazole tablet/Suspension.

39. Homatropne.
40. DT/SPT/POLIO/Tetanol.
41. Diphtheria Anti-Toxin.
42. Tablet Vitamin B-Complex/Multi Vitamin drops 15ml.
43. Ung. Salicylic Acid and Benzoic Acid.
44. Benzyl Benzoate Saponated.
45. I.V. Saline of various strengths (0.9%, 0.25%, 0.18%) with 4% Dextrose/ 0.9% Saline without Dextrose.

C. List of additional 105 Essential Drugs for use up to Tertiary level:

46. Indomethacin Capsule/suppository.
47. Morphine Sulphate Injection.
48. Allopurinol.
49. Quinine Tablet/Injection/Powder.
50. Corticosteriod Eye Drop/Ointment.
51. Diethyl Carbamazine Tablet/Suspension.
52. Chloramphenicol Skin Ointment.
53. Mebendazole tablet.
54. Promethazine Tablet/Injection/Syrup.
55. Ether Anesthetic.
56. Procaine Hydrochloride.
57. Susamethonium.
58. Thiopental Sodium.
59. Gallaminetriethiedide.
60. Tubocurarine
61. Halothane.
62. Isoniazid Tablet.
63. Ethambutol Tablet.
64. Rifampicin.
65. Dapsone tablet.
66. Glibenclamide.
67. Insulin Preparation.
68. Pilocarpine Drop 1%, 2%, 4%.
69. Emethine Hydrochloride Injection.
70. Naloxone Hydrochloride.
71. Sodium Thiosulphate Injection.
72. Trifluperazine.
73. Pralidoxime Tablet/Injection.
74. Sodium antimony Gluconate Injection.
75. Tincture Iodine.
76. Lysol/Cresol/Soap Solution (Surgical).
77. Benzyl Penicillin Injection.
78. Benzathine Penicillin Injection.
79. Erythromycin Suspension/ Tablet.
80. Gentamycin Injection/Drops/Ointment.
81. Cloxacillin Syrup/Capsule/Injection.



82. Ethosuximide Capsule.
83. Phenytoin Tablet/Capsule/Elixir.
84. Amitriptyline/Nortriptyline Tablet.
85. Haloperidol Tablet/Capsule.
86. Prochlorperazine Tablet/Injection.
87. Potassium Chloride Tablet/Injection/Syrup.
88. Mannitol Solution.
89. Dialysis Fluid.
90. Plasma Substitute.
91. Sodium-Bi-Carbonate Infusion 7.5% or 8.4%.
92. Bendrofluazide.
93. Acetazolamide.
94. Spironolactone.
95. Barium Sulphate (X-ray grade)
96. Iodipamide 30%, 50%.
97. Iopanic acid/ Iobenzamic acid tablet.
98. Acetrizoic Acid/Iodized Oil Injection.
99. Sodium diatrizoate.
100. Iron-Dextran Complex Injection.
101. Folic Acid Tablet.
102. Hydrocortisone Injection/Ointment/Cream.
103. Dexamethasone Tablet/Injection.
104. Stibaestrol/Diethylstiboestrol.
105. Levo-thyroxine.
106. Progesterone Preparatious.
107. Neomarcazole.
108. Digoxin Tablet/Injection.
109. Diazoxide Injection.
110. Methyl-Dopa Tablet.
111. Glyceryl Trinitrate Sublingual Tablet/Ointment.
112. Procainamide Injection/Capsule.
113. Heparin Injection.
114. Warfarin-Sodium.
115. Tetracaine/Novosine.
116. Metaraminol Injection.
117. Senna Tablet.
118. Glycerin Suppository.
119. Sulphadimidin Tablet.
120. Ibuprofen.
121. Sulphanilamide Powder.
122. Sulphadiazine Injection.
123. Adrenaline/Epinephrine Injection.
124. Neo-stigmine Tablet/Injection.
125. Sulbutamol Tablet/Injection/Elixir/Inhalar.
126. ACD Blood Pack/Double Bag/Triple Bag.
127. TABC.
128. Anti-Rabies Vaccine.

129. Polyvalent Anti-Venom.
130. Tetanus Anti-toxin (minimum 100,000 Unit Dose)
131. Diphtheria Anti-Toxin.
132. Vitamin B₁ Injection/Tablet.
133. Vitamin C Tablet.
134. Vitamin B₁₂ Injection.
135. Vitamin K Tablet/Injection/Vitamin K₁ Injection.
136. Cyclophosphamide Tablet/Injection.
137. 5 Fluro-uracil Injection/Capsule/Ointment.
138. Methotrexate Tablet/Injection.
139. Busulphan Tablet.
140. Vincristine Injection.
141. Nitrogen Mustard Injection.
142. Dosurubicin.
143. Chlorambucil.
144. Fluorescien Eye Drop 1%.
145. Clofazimine Tablet.
146. Calciferol.
147. Griseofulvin.
148. Pyrazinamide.
149. Plaster of Paris.
150. Zinc Oxide Adhesive Bandage.

Data on International Indicator Studies (1990- 1993)

1. Average Number of Drugs per Encounter

High: 5.2 (Nigeria), 4.3 (Ghana)
Low: 1.3 (Zimbabwe), 1.3 (Ecuador)

2. % Prescribed as Generics

High: 97 (Zimbabwe)
Low: 37 (Ecuador)

3. % Received Antibiotics

High: 63 (Sudan)
Low: 12 (Guatemala)

4. % Receiving injection

High: 56 (Ghana)
Low: 0 (Bangladesh)

5. Average Consultation Time (Min)

High: 6.3 (Nigeria)
Low: 2.3 (Malawi)

6. Average Dispensing Time (Sec)

High: 198 (Uganda)
Low: 13 (Nigeria)

7. % Patient Knowing Dose

High: 82 (Indonesia)
Low: 27 (Malawi)

8. % Drug Dispensed

High: 99 (Swaziland)
Low: 70 (Nigeria)

9. % Adequately Labeled

High: 86 (Mozambique)
Low: 0 (Nigeria)

10. Key Drugs In Stock

High: 100 (Jamaica)
Low: 38 (Ecuador)

NOTE References can be found on the next page

Continent	No.	Country	Date	PRESCRIBING INDICATORS						PATIENT CARE					FACILITY	
				# Facilities	# Drugs	% Antibiotic	% Injections	% Generics	% on EDL	Consult Time (m)	Dispense Time (sec)	% Know Dosing	% Drug Dispensed	% Adeq Labeled	% Drugs in Stock	
Africa	2	Uganda	1990	42	1.9	56%	48%									
	3	Sudan	1991	37	1.4	63%	36%	63%								
	4	Malawi	1991	72	1.8	34%	19%			2.3		27%				67%
	7	Zimbabwe	1991	56	1.3	29%	11%	94%								
	8	Tanzania	1992	20	2.2	39%	29%	82%		3.0	78	75%				72%
	9	Nigeria	1992	20	3.8	48%	37%	58%		6.3	13	81%	70%			62%
	17	Cameroon	1992	20	3.0	51%	41%	58%								
	12	Ghana	1993	20	4.3	47%	56%	59%								
	18	Uganda	1993	127	2.4	53%	36%	86%		4.6	198	29%	91%	37%		
	19	Mozambique	1993	26	2.2	43%	18%	99%		3.7	37	82%	85%	86%		87%
	20	Swaziland	1994	20	3.0	54%	38%	63%		6.1	18	87%	99%	56%		92%
21	Nigeria	1994	11	5.2	58%	63%	62%		5.0	18	89%	94%	0%			
Asia	1	Yemen	1989	19	1.5	46%	25%									
	5	Indonesia	1991	20	3.3	43%	17%	59%		3.0		82%				
	6	Bangladesh	1991	20	1.4	31%	0%					63%				
	10	Nepal	1992	20	2.1	43%	5%	44%		3.5	86	56%	83%			90% 40%
America	11	Ecuador	1992	19	1.3	27%	17%	37%								38%
	14	Guatemala	1992	20	1.4	27%	13%	72%								
	13	El Salvador	1993	20	2.2	32%	7%	72%								
	15	Jamaica	1993	20	2.4	30%	4%	40%								
	16	East Carib	1993	20	1.9	39%	1%	49%			184					
		AVERAGE		31	2.4	43%	25%	65%		4.2	79	67%	87%		73%	40%
		MAXIMUM		127	5.2	63%	63%	99%		6.3	198	89%	99%		92%	40%
		MINIMUM		11	1.3	27%	0%	37%		2.3	13	27%	70%		38%	40%

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