EVALUATION OF DRUG REVOLVING FUND (DRF) IN GENERAL HOSPITAL, TORO, BAUCHI STATE

BY

DR YAKUBU, GIDA ABDULLAHI

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL IN PARTIAL FULFILLMENTS OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (MPH).

DEPARTMENT OF PUBLIC HEALTH AND PREVENTIVE MEDICINE
FACULTY OF MEDICINE
AHMADU BELLO UNIVERSITY
ZARIA
NIGERIA.

JULY 2006

DECLARATION

I hereby declare that the project entitled “Evaluation of Drug Revolving Fund (DRF) in General Hospital, Toro, Bauchi state” is a product of my personal research efforts and that it has not been presented previously by any person in any institution for an academic award. All sources of information have been specifically acknowledged by means of references in accordance with the rules of presentation of project.

Dr. Yakubu, Gida Abdullahi

Sign. ……

Date …….

CERTIFICATION

This is to certify that this project was successfully conducted by Dr Yakubu, Gida Abdullahi and submitted to the Department of community medicine, Faculty of Medicine, Ahmadu Bello University, Zaria in partial fulfillment of the award of a Master of Public Health.

_____ _____

DR C L Ejembi, (MBBS, DTM&H, FMCPH) Date
Department of Community Medicine
Ahmadu Bello University, Zaria.

_____ _____

Dr A U Shehu (MBBS, DTM &H, FWACP) Date
Head of Department
Department of Community Medicine
Ahmadu Bello University, Zaria.

_____ _____

External Examiner **Date**

_____ _____

Prof. J U Umoh [DVM (ABU), MSPH, PhD (Missouri)] **Date**
Dean Postgraduate School
Ahmadu Bello University, Zaria.

DEDICATION

This piece of work is dedicated to all those who stand to benefit from the outcome of this project.

ACKNOWLEDGEMENT

I thank Almighty God for the beautiful things He has done to my life and the Bauchi State Government for sponsoring this programme. I wish to thank my supervisor Dr C L Ejembi for her untiring efforts, guidance, criticism and encouragement throughout the conduct of this project. My profound gratitude goes to Professor P. W Ogala, Pediatric Department ABU, Zaria for his advice and guidance. I am greatly indebted to all the lecturers and staffs of the Department of Community Medicine, ABU Zaria for the knowledge they imparted on me. And to all my colleagues- it's been a wonderful year of togetherness.

I also wish to thank my wife, children (Aisha, Ahmed and Fatima) and friends for their patience and support throughout the duration of this course.

ABSTRACT

Context: The "out of stock syndrome" and irrational drug use with their associated consequences that characterized our health facilities informed the investigations of the operations and management of the drug revolving fund, drug availability and affordability and rational use of drug in General Hospital, Toro, Bauchi State.

Objectives: To evaluate the Drug Revolving Fund (DRF) operations in relation to drug procurement procedures, its management at the facility, drug availability, accessibility, affordability to patients and its rational use in General Hospital, Toro, Bauchi State.

Methods: An interview schedule was used to collect information from the Principal Medical Officer In charge, the Hospital Secretary and Pharmacist In-Charge on methods of drug procurement, its management and cost recovery. Furthermore, on-site inspection of storage facilities and drug stock using a storage facility checklist and a checklist of selected key drugs to collect data on method of storage and drug availability respectively was carried out..

In addition, a cross-sectional descriptive, study using structured interview-administered questionnaire was used to elicit information from 520 patients at the Outpatient Department of the same facility on drug availability of prescribed drugs, affordability and rational drug use in the facility.

Results: The result showed that the state government is responsible for drug procurement, which is by contract purchase. The operation and management is by cost recovery system. Of the 520 patients interviewed, 386 (74.2%) of them acknowledge that the hospital prices of drug were cheaper than other sources. Nevertheless, the result showed the non-availability of some essential drugs,

poor storage facilities and low financial accessibility of patients to most prescribed drugs.

The average number of drugs prescribed per patient was 5.2, (range between 2-8 drugs). About 228 (43.9%) received injection, 56.3% of patients were prescribed antibiotic. 84.6% and 37.4% of the prescribed drugs were from the essential drug list (EDL) and by generic prescribing respectively. However, only 60.1% of the prescribed drugs were actually dispensed and only 8.6% of the dispensed drugs were adequately labeled while 91.4% had only dose regimen but no names of the patient and drug name on the dispensing envelope.

Most patients interviewed had knowledge of how much drugs to take (480; 92.3%), at what times to take (456; 87.7%) and for how long to take (267; 51.3%). Only 148 (28.5%) had overall correct knowledge of how much to take, what times to take and for how long.

Conclusion: In conclusion, the Drug Revolving Fund in the facility is not optimal in terms of drug availability, storage facilities and rational drug use. Thus, measures have to be taken to improve drug availability, provision of adequate storage facilities and proper use of generic prescribing and proper dispensing procedures of drugs through educational intervention to improve drug use in our secondary health facilities. General improvement in purchasing powers of especially women through women empowerment programmes.

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CHAPTER ONE

INTRODUCTION

Drugs has been defined by WHO as "Any substance that, when taken into the living organism, may modify one or more of its function"[1]. Essential drugs have been defined by WHO as "those that satisfy the health care needs of the majority of the population"[2]. Therefore government of all nations is expected to provide through its existing public health facilities adequate, safe, efficacious and affordable drugs to its populace at all times[2].

The problem of drug management has been lingering in Africa since early 70's. The supply, distribution and availability of drugs in most public health facilities started dwindling as a result of growing population, coupled with poor resources management and poor political will. This resulted in concentration of the little available drugs in urban centres while the rural areas where over 70% of the population live were deprived of essential drugs. This resulted in the call of 28th World Assembly in 1975 to address the problem. It was at this forum that the Director-General suggested the need for an Essential Drug List (EDL) [3].

The World Health Organisation introduced the Essential Drug Programme (EDP) in 1975 to increase access to drugs that treat the most prevalent diseases. This programme had an objective of making available

essential drugs that satisfy the health needs of the majority of the population at all times, in adequate amounts and in the appropriate dosage forms[4].

In 1978, an International Conference at Alma - Ata (USSR), gave birth to "Primary Health Care". The Alma Ata Conference defined Primary Health Care as "Essential care based on practical scientifically sound and socially acceptable method and technology made universally accessible to individuals and families in the community and through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self reliance and self determination"[2]. One of the essential elements of primary health care is the provision of **essential drugs**. Drugs occupy a unique position in health care provision, making the health care credible because they can cure disease, relieve symptoms and alleviate sufferings. It was obvious, therefore that the then situation in which regular availability of the most needed drugs could not be ensured to the attainment of the health for all[5].

Having accepted the Alma - Ata declaration of health for all by the year 2000, making health accessible to majority population became a major concern of the government, and primary health care system was designed to make the attainment of the goal of the health for all possible[4]. The concept of Essential Drug List (EDL) in essence was borne out of the principle that

notwithstanding the limited resources of the African countries, they can extend the accessibility of most needed drugs to their health care programmes with a selected list of essential drug [4].

In 1977, WHO formulated a list of 200 essential drugs to be used as a guideline by governments. The WHO Action programme on Essential Drug and Vaccines (APED) was formed in 1981 to provide training and to lend technical assistance and some financial support to countries implementing policies designed to ensure the widespread availability and affordability of Essential Drugs[3]. In Nigeria, the Essential Drug Programme (EDP) came on stream in 1988 and received legal backing when in 1989 decree 43 was promulgated. The national Drug Formulary/Essential Drug Committee was inaugurated and in 1989 the first National Essential Drug List containing 409 items was produced. The selection was based on the pattern of disease prevalence in the country, drugs to be in generic name rather than branded names, sufficient evidence of efficacy and safety and was to cover all the levels of the health care delivery system. The List has been revised three (3) times—second revision 1991 (484 items), third revision 1996 (486 items) and recently the fourth revision 2003 (393 items) to take care of the current concerns in the management of HIV/AIDS, Tuberculosis, Integrated Management of Childhood Illnesses (IMCI) and Malaria. The adoption of an Essential Drug List is a key strategy for

achieving one of the goals of the National Drug Policy which is to make available at all times, in adequate dosage form, drugs that satisfy the health care need of majority of the people. This meant that both the public and the private sectors are to adhere strictly to the concept of the programme. It therefore became an offence to manufacture or import into the country any drug outside the essential drug list.[6]

Following acute health crisis in Sub-Saharan Africa at the beginning of 1980s as a result of many factors including global economic recession, phenomenal rate of population growth and poor economic management, the WHO African Region in collaboration with UNICEF proposed measures at its annual meeting of African Ministers of Health in Bamako, Mali in September, 1987 to deal decisively with the problem of health care delivery system in African [7].

The Bamako Initiative aimed to:

a) Encourage social mobilization initiative to promote community participation in policies on essential drugs, maternal and child health at district (LGA) level

b) Ensure regular supply of essential drugs of good quality and at lowest cost to support the implementation of Primary Health Care.

c) Define and implement a primary care self-funding mechanism at district (LGA) level, especially by setting up a revolving fund for essential drugs

The objectives of the Bamako Initiative was as a strategy for revitalising and strengthening the Primary Health Care (PHC) system and extending PHC services to the periphery, with emphasis on children and women. The enabling mechanism in this strategy is the initial provision of the basic essential drugs and supplies in order to build a system of cost-sharing and to establish a Revolving Fund under community co-management which, together with support from state and Federal government will ensure sustained health care system.

In Nigeria, the implementation of the Bamako Initiative (BI) programme started in 1988 and was spearheaded by the National Primary Health Care Development Agency (NPHCDA) in 1988. With BI appreciable progress was made in terms of overall impact on the health care delivery system. It was estimated that by 1990, population access to health services would increase to about 67% from less than 30% [8]. However, only about 49 of the then country's 593 LGAs implemented the Bamako Initiative, covering a population of 8.8 million, which represents about 10% of the country's population. Thus, the achievements recorded by the Bamako Initiative were far from achieving its main aims and objective in Nigeria.

Drug Revolving Fund (DRF), which is a drug management program involves drugs selection, drug quantification, source and method of drug procurement, storage, distribution and utilisation of drug aimed at achieving optimal drug administration in the nation's health care delivery became one of the eight (8) components of primary health care. The main objective of the 1998 document on National Drug Policies from where the DRF concept evolved included the following [7].

1. To make effective, safe, low cost drugs available to meet the needs of the majority population.
2. To ensure that drugs are used rationally and
3. To develop or encourage where economically and technically feasible National Pharmaceutical Production that support economic growth and overall development strategy of the country .

The concept of DRF is to have initial capital to buy the drugs and supplies; this money is known as **seed capital**. Once the drugs are sold, the fund recovered will be used to replenish the stock of drugs used. The Drug Revolving Fund as a concept was started simultaneously in all the state of the federation in 1990 when the Federal Ministry of Health provided the sum of one million Naira (N1, 000,000.00) to each state and hundred thousand Naira (N100, 000.00) to each local government as a take-off grant [13].

In Bauchi state the scheme was officially launched in February 1990 with assorted drugs and materials worth about N5.2 million[14]. This study intends to assess its achievements, problems and prospects some 15 years after its introduction.

STATEMENT OF PROBLEM

Drugs Revolving Fund (DRF) scheme is the drug management programmes in the nation's health care delivery system. It is intended to meet the health care need of the majority of the population through a self-sustaining programme. Under this policy, government provides through its existing public health facilities, adequate, safe, efficacious and affordable drugs to the patients at all times. DRF is a recovery scheme in which drug sale revenue is ploughed back into drug purchase in a self-sustaining basis.

The Drug Revolving Fund (DRF) scheme involves drug selection, drug quantification, procurement, proper inventory control, distribution and rational drug use[15]. However, drugs are procured with little regards to the needs and priorities of the health care in the country. Availability of the drugs in the health system is largely a response to the sale promotional activities of the manufacturers and distributions, and often bears little relation to the actual need of the population[16]. And since patients are the ultimate users of drugs, they

make the final decision about whether or not to seek health care, where to seek it, and what medicine to actually take and at what interval or duration. These decisions are influenced by many factors, including cultural beliefs, accessibility to health service delivery point, availability and affordability of drugs and services, the communication skills and attitude of health workers, routes of administration of the drugs and community belief about the efficacy of certain drugs [17]. Thus, in-accessibility, non availability, non-affordability and irrational drug use could lead to a decline in facility utilization, increase self-medication with its consequent development of resistant strains of bacterial and viral infections, demoralized public health workers and lost of public confidence in general health programmes introduced by governments[17]. On the other hand, private sector source of drug have proven to be expensive and unaffordable to the low-incomers and restricted to urban centres. The growing demand for reasonable price drugs and government's inability to provide and monitor drug management has resulted in the proliferation of fake and adulterated drugs in our markets. Fake, substandard, adulterated and unregistered drugs are prevalence in our markets[18]

AIMS AND OBJECTIVES

General – To evaluate the DRF management in General Hospital, Toro of Bauchi state

Specific objectives

1. To assess the operation and management of DRF in the health facilities.
2. To assess the essential drug availability in General Hospital, Toro.
3. To assess the rational use of drugs in the health facility
4. In the light of the findings, to make appropriate recommendations.

JUSTIFICATION

Many societies consider drugs as key health technologies and when they run out of stock, the credibility of the health system is lost leading to poor facility utilization, escalation of irrational use of drug and its related effect[19].

Therefore, drug availability, accessibility and affordability alongside with rational use should be evaluated regularly in our health facilities.

The state general hospitals are secondary care level, which serves as referral centres for the primary care level. Therefore state general hospitals should be equipped with essential drugs that treat the most prevalent diseases, well-trained and motivated staffs for effective health care delivery in the community.

In Bauchi state the DRF scheme was officially launched in February 1990 with assorted drugs and materials worth about N5.2 million including the N100, 000.00 allocated for procurement of stationeries and other logistics for the take off. And as a medical officer in-charge of one of the General Hospitals in the state I would want to, through this project attempt to evaluate the DRF scheme in relation to its operation and management, availability of essential drugs, storage facilities and rational use of drugs with a view to making relevant recommendation and ensure its implementation.

CHAPTER TWO

LITERATURE REVIEW

It is estimated that one third of the world population lacks regular access to essential drugs, with this figure rising to over 50% in the poorest parts of Africa and Asia [20]. Although there has been an improvement in access to drugs worldwide from one third in 1975 to two-third in 1990, this has not been reflected significantly in developing countries [21]. Drug access is a combination of three factors: Availability, affordability and rational use. In developing countries, drugs of standard quality are not available; the majority of the population cannot afford the high cost of the available drug therapies and drugs are not rationally used [1]. According to the World Health Organization (WHO), rational use of drugs requires that patients receive quality, efficacious drugs appropriate to their needs, in doses that meet their individual requirements, for the adequate period of time and at the lowest cost to them and to the community[17].

However, many developing countries do not manufacture drugs locally, so they rely on importation and drug donation from the developed countries. Health workers and communities rely on government to ensure quality of drugs. Substandard or counterfeit drugs are a growing problem[21]. WHO database of counterfeit drugs reported 771 cases in 1999, 77% of which are from

developing countries. Counterfeit drugs are a waste of money because they are illegal copies of particular brands of drugs and patients are lured to buy them expensively as though they were buying the standard brand, and if substandard they prolong treatment period, exacerbate the condition being treated and help create drug resistance with its associated problems. Thus, the availability of substandard drugs in a country is an indication of irrational drug use [21].

A multitude of factors have been found to lead to irrational use of drug and these affect at various levels at which drugs are handled. The weak economic conditions in developing countries that resulted in general poor infrastructure and other economic indices are a cause of lack of access to drugs by many in these countries. Research studies conducted by International Health Organisation such as WHO revealed that weak laws and regulations at the national level in a country encourages dubious individuals with selfish interest to get involved in drug handling and supplies, with resultant counterfeit or substandard drugs. Similarly at the health facility level, unreliable source of drug supplies, poor planning of drug needs, poor infrastructure for storage, poor information management system and lack of information and training of the prescribers coupled with heavy patient load, pressure from patients and peers alike and lack of diagnostic tools has contributed to irrational drug use. While at the consumer level, patient's cultural beliefs, the communication skill and

attitude of health workers, accessibility to and nature of health service points, community belief about efficacy of certain drugs, route of administration affect patient's decision about whether or not to seek health care, where to seek it, what medicine to actually take and at what interval or for what duration [24].

Drug shortage, presence of large quantities of expired drugs and presence of drugs that are not required by a health facility are manifestation of inappropriate use of drugs. The use of drug when no drug is needed, use of wrong drug and poor prescribing habits, which include too many drugs for a patient, referred to as poly pharmacy or over prescribing of particular drug or dosage form are manifestation of inappropriate use of drugs[22]. Drugs commonly used incorrectly include antibiotics, anti-diarrhoeal, injection and anti-malarial drugs are seen in many communities [17].

Studies done in Cameroon and Nigeria also indicate that drugs are a valuable resource in developing countries and their availability is considered an indicator of the quality of care. Uzochukwu and associates indicated in their study about access to drugs in Nigeria, that patients' visit dropped by 50% to 75% when the most commonly drugs run out [22].

According to figures gathered by surveys presented to the World Health Organisation, in 2000, about 60% of antibiotics in Nigeria were prescribed unnecessarily[23]. In Nepal, over 50% of the antibiotic prescribed in 1996 was not

needed and 40% of medicines expenditure in the same year was wasted due to inappropriate prescriptions. Globally, the figure for unwarranted antibiotic prescription stand roughly at 50%. A survey done in Nigeria to look at drug use and antibiotic prescribing in 2002 reveals that the percentage per prescription was more than 50% for out-patient and 97% for in-patients as compared to the W.H.O. recommendations of 20% to 26% [23].

Drug use indicators in Nigeria show very high levels and often reflect irrational drug use. The average number of drugs prescribed per patient had been found to vary from 3 – 7, the prescribing rate of injection has a range of 40 – 70% and antibiotic use rate exceeds 50%[28].

Household survey and other community based studies in Africa, Asia and Latin America conducted by WHO have found that up to 80% of illness episodes are self-treated with modern pharmaceuticals. The most common drugs were analgesic for treating pain, common cold, fever, followed by antibiotics for treating cough, common colds and general sickness, vaginal infections, abdominal pain and wounds and then vitamins for fortifying the body [25].

Effective treatment exists for most of the leading causes of mortality and morbidity. The challenge that remains is to ensure that people can access these drugs and be able to translate the drugs into vital technologies to improve

health. Indeed many governments and organizations have undertaken strategies steps to ameliorate problem related to drug use.

A prospective study of prescription pattern at the Pharmacy Department of ABU Zaria in 1991, to monitor rational prescribing revealed that many doctors, especially the older ones, were still using trade names instead of generic names in their prescription, some prescribed up to 6 or 7 different drugs for one ailment at a time, while some pharmacist did not know the generic names of some of the drugs[26].

In a study of Management of Drug Revolving Fund: A case study of University College, Hospital, Ibadan in 1998, it was concluded that, for the short-term, the DRF has a bright prospects, if all its objectives are strictly adhered to. The system has succeeded in University College Hospital Ibadan and the hospital has since established two other revolving funds namely (a) The Theatre Revolving Fund (b) The Radiological and Diagnostic Revolving Fund. In the long run however, they may prove inadequate to solve our drug problem in the country. There is, therefore the need to seek some long-term solution. The national Insurance Scheme should be given serious consideration [6].

In another study conducted in 2002, to compare the level of availability and rational use of drugs in Primary Health Care (PHC) facilities where the Bamako Initiative (BI) drug revolving fund programme has been operational,

with PHC centres where the BI type of drug revolving fund programme is not yet operational, found that there was more essential drugs available (35.4) in BI health centres than non-BI health centres (15.3). But more injections (64.7%) and antibiotics (72.8%) prescribed in BI health centres than non-BI health centres (25.6%) and (38.0%) respectively. However, the drugs prescribed by generic names and from the Essential Drug List were higher in the BI health centres (80 and 93%) than non-BI health centres (15.5 and 21.0%) respectively[22].

In a survey using questionnaire to determine the extend of awareness and acceptability of the Nigerian Essential Drugs List and its effect on drug procurement and prescription pattern in some health institutions. Analysis of the responses showed that there was 100% awareness on the part of professionals involved in the survey. However, medical doctors prescribe drugs without due consideration for the list while pharmacist stock and dispense drugs on a similar basis, and that the essential drug supplied by manufacturers in Nigeria was inadequate[27].

In a retrospective study of patient records from the outpatient clinic of both adult and Paediatric Department were obtained and drug use indicators were measured in a secondary health facility in Lagos, Nigeria. The result showed that the average number of drugs per prescription was 3.5 ± 1.4 with a

range of 1 – 9. And 13.8% of patients received at least one injection and 55% of the patients were prescribed at least one antibiotic[28].

In another prospective study, (Jan. – Dec. 1993) records of patients encountered were obtained by random sampling in Central Hospital, Benin City, Nigeria, to evaluate drug use profile using the WHO prescribing indicators. Result showed that the average number of drugs per encounter was 3.7, the percentage of encounters with injection and antibiotics were 37.0% and 54.2% respectively. Forty-eight percent (48%) of drugs were by generic names and 94.4% of all prescribed products were from the National Essential Drug List[29].

In a similar study to evaluate the prescription practices and of the rational use of medicine in Niger Republic, rational drug use and prescribing patterns were studied in 19 health centres in Tahoua Region. Drug use indicators were measured before and after a training intervention for nurses in using national standard treatment guidelines. Findings were compared between the two periods and found that, the average number of drugs per prescription increased from 2.96 to 3.14 ($P < 0.01$) percentage of prescription with injections from 29.9 to 36.6% ($P < 0.02$) whereas the percentage of prescription containing antibiotic decreases from 75.2% to 68% ($P < 0.01$). The average consultation time were 5.4 and 6.1 minutes for the two prospective surveys respectively, and

dispensing time were 3.1 and 3.4 minutes, longer than those noticed in most other studies in developing countries. Prescribed drugs were actually dispensed in almost 100% of the cases during the two periods. Drugs were properly labelled in 92.8% of the cases in the first survey and in 89.7% of the cases in the second ($P < 0.03$). Whereas the percentage of patients who knew the correct dosage for drugs delivered increased from 64.4% to 75.5% ($P < 0.01$)[30].

Availability and rational use of drugs was assessed in a random sample 19 peripheral health units in two governorates in Democratic Yemen in which an essential drug programme has been operational for the past few years. Findings were compared with those from seven health units in one governorate in which no such programme had been started. On average, 27 essential drugs were available in the programme area; compared with 17 in control areas. Average stock was adequate for 4 weeks in programme area and for 1 week in control areas. Health workers in the programme area scored slightly, but not significantly, better in a test on theoretical knowledge on rational drug use. However, program areas differed considerably from control areas in pattern of drug use, with few injection (24.8% vs. 57.8% of prescription) and fewer antibiotics (46.3% vs. 66.8%) being prescribed in programme areas, which also had fewer drugs per prescription (1.5 vs. 2.4). The programme has significantly

improved the availability and rational use of essential drugs in peripheral health units [31].

A prospective study of drug use carried out in 21 primary health care facilities in Northern Jordan over a three-months period, using World Health Organisation – recommended indicators [32]. In each of the 21 selected health centres 30 consecutive physicians – patient encounters were prospectively observed and the relevant data recorded on the prescription and patient care from December 1999 to February 2000. The two were developed and designed in accordance with WHO recommendation. Observations in each centre were performed over a single day and all patients were interviewed and asked about the dosage regimens for all prescribed drugs.

Both the mean time spent on physician - patient consultations (3.9 ≠ 3.5 minutes) and mean pharmacy dispensing time (28.8≠ 23.7 seconds) were short, resulting in a mean patient knowledge of prescribed drug dose of 77.7%. No centre had an essential drug list and/or formulary available. An average of 80% of key drugs were available at centres [32].

Similarly, the values of drug use indicator were studied prospectively in 4 general practice health facilities, in 4 specialist out patient health facilities and in 5 pharmacies operating in city of Kragijevae during the time period between December 1998 and march 1999. The health facilities were chosen randomly,

by implementation of random number table. In each health facilities a sample of 100 patients visits was investigated. The study showed that average consultation time had been too short. The average number of drugs per encounter (from 1 to 2.8) was higher than values of same indicators in other countries. Percentage of drugs prescribed by generic names (from 16% to 39%) was lower than in other countries. Percentage of encounters with an antibiotic prescribed (from 29% to 45%) was similar to values observed in other countries. Injections were prescribed rationally, but percentage prescribed from essential drug list (from 21 to 65%) is lower than values observed in other studies. Average dispensing time was about 24 seconds, which is too short for proper interaction between pharmacist and a patient. Name of the patients were written on the dispensed drugs in only a few cases. Patient's knowledge of correct dosage was observed in high percentage, but the validity of this finding is doubtful, since patients were not willing to cooperate with investigators[3]

EXPERIENCES ON OTHER REGIONAL PERSPECTIVES

By the end of 1995, 41 countries had adopted the principles of Bamako Initiative of these 28 in Sub-Saharan Africa, 5 in Asia and the Middle East, 2 in the former Soviet Union and 6 in Latin America and the Caribbean [9].

The Bamako Initiative (BI) experience of most countries was successful to some extend depending on system design that borders on pricing, accounting, stock management, good prescribing and consumption habits, etc.

In Somalia the introduction of an essential drug list standard treatment guidelines, adequate record keeping, staff training, public enlightenment and community mobilization made the programme a success. Similarly, success was recorded in Bangladesh, Vietnam and host lot of other countries [32].

The success of Bamako Initiative and Primary Health Care (PHC) would not have been feasible without the intervention of Donor agencies like WHO, UNICEF. UNDP, DFID who financed most of these programmes in Africa.

CHAPTER THREE

METHODOLOGY

BACKGROUND

Bauchi state was created from the then North-Eastern Region in 1976, with its headquarters in Bauchi town. It covers an area of about 32,804 square kilometres and has an estimated population of 4.343 million people (projected from 1991 Census figure using 3% growth rate). It has 20 local governments each governed by an executive chairman and local government council. The state has an executive governor as the head of government. The state is divided into three (3) geo-political zones – Katagum, Bauchi and Central Zones.

All local government headquarters are connected to the national grid and a motor able road all year round. Means of communication are state and federal television and radio media houses with television restricted to the state capital and a few advantaged local government headquarters.

The state has one Federal University, one Federal Polytechnic, three state advanced colleges and many secondary schools at least one in each local government and many primary schools. Most people in the state can read and write formal language.

The Ministry of Health is located in the state capital of Bauchi and has the responsibility of overseeing all matters relating to health care delivery in the

sate. It has the Honourable Commissioner as the Head of the Ministry and a Permanent Secretary as the Chief Accounting Officer of the Ministry. Other departments in the Ministry each headed by a Director include Hospital Services, Pharmaceutical, the Primary Health Care, Finance and Administration, Purchase and Supply and Nursing Services.

There are 15 general hospitals, one (1) specialist hospital, several urban maternities, domiciliary and under five clinics. There are two Central Medical Store, 1 drug Central Store and 1 Medical Equipment Store. All drugs and supplies purchase by state are stored in these stores before distribution to health facilities.

ORGANISATION OF STATE DRUG REVOLVING FUND

The organizational structure of DRF in Bauchi state has the Permanent Secretary of the Ministry of Health as the Chairman of State Drug Procurement Committee, the Director of Pharmaceutical services as the secretary and Chief Project Officer of the Committee. The committee is responsible for among other things initiating and articulating changes in policies that may have direct bearing on the objectives and/or operations of the DRF in the state, bulk procurement and distribution of drugs, surgical consumable and diagnostic

chemicals and materials, monitoring of DRF activities state wide and taking necessary steps towards punishing DRF erring operators.

The state Chief Pharmacist in-charge of the Central Medical Store is responsible for collation of all drugs requisition from all the health facilities in the state, initiate the preparation of all documents for procurement of the required drugs as contained in the procurement manual of the DRF scheme to the Procurement Committee. On receive of such request, the Procurement Committee use money from the DRF account to procure the drugs in accordance with state DRF operation manuals and guidelines. All procured drugs are handed over to the Central Medical Store for storage, stock taking and dispensing to the various health facilities on request.

Drugs are replenished at the health facility by requisition from the pharmacist at the facility level to the chief pharmacist at the Central Medical Store using the essential drug list. After approval, drugs will now be released to the health facility who now sell it directly to the patients in accordance with the approved price list. All proceeds from such sale are banked in a special DRF Account accessible only to the DRF Committee. The cycle repeats itself in a self-sustaining manner. However, logistics, transport and other overhead cost are provided for outside of the DRF Account.

AREA OF STUDY

General Hospital, Toro, is one of the 15 general hospitals in the state that serves as a secondary health facility for a population of over 40,000 people plus neighbouring town of Plateau state. It has 120 bed capacity comprising of maternity ward (25), female surgical & medical wards, (35) paediatric ward (25) and male surgical plus medical ward (35), an out-patient department,, dental clinic, eye clinic, pharmacy department unit, family planning department unit, health and preventive unit, laboratory unit, x-ray unit, theatre , administrative/finance department, catering/laundry department and general maintenance unit. The hospital has a workforce of 108 staffs comprising of doctors (5), Pharmacist (1), nurses (38), Administrative and supporting staffs (89). The prevalent diseases include malaria, diarrhoeal disease, URTI, malnutrition. Drug are procured by the state and supplied to all hospitals from the state Medical Stores under the DRF scheme.

The sale of drugs at the facility level is direct to the patient on the basis of a prescription sheet issued by a doctor (in quadruplicate). The patient will take the original and the duplicate copies of the prescription sheet to the pharmacy, which will be costed making reference to the approved price list. The revenue collector/cashier will issue receipt for amount collected for the costed drugs. The pharmacy or technician will dispense the drugs to the patient

with the original copy of the prescription sheet, but retain the duplicate copy, which is used in preparing the daily summary of drug sales. The revenue officer will collect all monies collected at the sale point for the day from the revenue collector and prepare total daily sales summary that will be banked the following working day into the special DRF account. Periodic stock keeping (usually quarterly) is conducted for the purpose of reconciling the physical balance of drugs with issues made and money remitted during the period.

METHODS

STUDY DESIGN

This study is a cross-sectional descriptive study at the facility. The components of the study included**:**

A. BASIC HOSPITAL INFORMATION

This assessment included**: -**

i) **Interview of the head of the facility** using a structured self-administered questionnaire was used to collect information on the demographic profile of the hospital source of funding, method of drug procurement, facility drug management, method of cost recovery and any other problems relevant to the DRF operations.

ii) **Assessment of drug storage facility** using a standard checklist of storage infrastructure by the investigator.

iii) **Drug availability in the facility** by direct inspection and personal sighting of drug stocks by the investigator using a checklist from the National Essential Drug List for secondary care level. A check list of key drugs was established before the study and was limited to 140 products selected based on the disease prevalence, importance and frequency of usage in the health facility (See Check list in appendix 5)

B. RATIONAL DRUG USE INDICATOR

This study involves the use of structured questionnaire for patient interview after their prescribed drugs have been dispensed from the pharmacy store. Trained assistants were used to collect information from patients or their relatives on essential drug availability and affordability assessed their correct knowledge of dose regimen, times of medication and duration of drug use. Also the rational drug use indicators using the WHO Universal Indicators[35] was evaluated to determine the number of drugs prescribed per encountered, number of injections prescribed, number of antibiotic prescribed, drugs actually dispensed, drugs adequately labelled and number of drugs from the National Essential Drug List and by generic prescription was obtained from their

prescription sheet and the drugs dispensed from the pharmacy store on the same questionnaire.

STUDY POPULATION

The study population included the head of the facility and all patients consulted at the Outpatient Department during the period of the study.

SAMPLE SIZE

For the patients used for the study, the sample size was determined using the formulae**: -**

$$n = \frac{Z^2 pq}{d^2}$$

Where

N = sample size

Z = standard deviation at 95% confidence interval = 1.96

P = prevalence from previous study. Thus 50% (0.5) will be used since none could be gotten from previous study.

Q = 1 – p = (1 – 0.5) = 0.5

D = level of precision = standard error using confidence interval = 0.05

Therefore

$$N = \frac{(1.96)^2 x 0.5 x 0.5}{(0.05)^2} = 384.16$$

The minimum sample size is 384, however for more precision, the sample size was increased to 520.

TOOL FOR DATA COLLECTION

Tools for data collection consisted of three (3) sets of questionnaires – First for the Head of Facility to collect information on source of funding, source and method of drug procurement, method of cost recovery, operation and management of Drug Revolving Fund in the facility. Secondly, for patients interview to evaluate drug availability and affordability, patient's correct knowledge of drug use and rational drug use indicators in the facility and thirdly, two set of checklists- one to evaluate storage facilities and the other essential drug stocks availability in the facility.

METHODS OF DATA COLLECTION

Operation of Drug Revolving Fund data including source of funding, source and method of drug procurement, running of the DRF programme, method of cost recovery and any other relevant problems hindering the smooth operation of the DRF was collected from the interview with the head of the facility by the investigator using a structured self-administered questionnaire. Drug management data at the facility was evaluated by direct on-the-spot

inspection and sighting of the drugs stock by the investigator to assess drug availability and storage facilities were collected using checklist.

Consecutive physician-patient and pharmacist–patient interactions were observed at the Outpatient Department and relevant data recorded each day until the sample size was obtained. Patients were then interviewed and asked after pharmacist-patients interaction, about the availability and affordability of drugs in the facility, their correct knowledge of drug use for all dispensed drugs. Also values of rational drug use indicators such as total number of drugs prescribed, number of injections prescribed, number of antibiotics prescribed, the used of generic prescribing, prescribing from Essential Drugs List, total number of drugs actually dispensed, and number of drugs adequately labelled were obtained using quantitative method with a structured questionnaire administered by research assistant after a short training on data collection to ensure accuracy.

There was a short training session for project assistants and a pilot study for a period of 1 – 2 weeks to test the methodology including reaction of the respondents to the procedure, their understanding of questions asked and the validity and effectiveness of the questionnaire used. There was strict supervision to ensure quality.

ETHICAL CONSIDERATION

Approval was obtained from the state Ministry of Health and verbal consent from patients and key stakeholders of the scheme.

CHAPTER FOUR

RESULTS

A. BASIC HOSPITAL INFORMATION

The Chief Medical Officer was interviewed, additionally; the Chief Pharmacist and hospital Secretary were interviewed. Data on drug availability and storage facilities were obtained through inspection using checklists and the 520 sampled patient respondents were all interviewed. The response rate was all 100%.

The Hospital: Is a secondary health facility established march, 1986 with a 120-bed capacity consisting of male and female surgical & medical wards, pediatric ward and gynecological wards. It has 132 staff, made of 4 [3.0%] Doctors, 38 [28.8%] Nurses, 1 [0.8%] Pharmacist and 89 [67.4%] Administrative and supporting staffs

Operation and Management of DRF at the Health Facility

The Drug Revolving Fund [DRF] was introduced in the health facility in 1990.The state government is solely responsible for drug procurement using the essential drug policy through contract purchase system. The health facility was given a seed stock of drugs worth one hundred thousand [₦100,000] Naira for the DRF to take-off in 1990. Moreover, to ensure steady availability of essential drugs, a further fifty thousand [₦50,000] Naira was provided to the facility in 1999 as an emergency impress to be revolved locally at the accident and

emergency department. The facility has a price list with a fixed charge per drug and operates a special DRF account accessible only to the state DRF committee. All sales from drugs and consumables are lodged into the special DRF account, while replenishment is by requisition from the state central medical store. Ledgers and stock cards are used to monitor drug stocks. The hospital run cost recovery DRF with no provision for exemptions. However, there was no access to DRF Statement Of Account and drug stock balance to reconcile the seeded stock of drugs given.

Drug Storage Facilities

The drug store had adequate storage capacity, good light source, adequate cupboard with shelve racks and two functional air conditioners. However, it has no adequate windows, burglary proof, fans and stand-by generator (Table 1).

Drug availability

Drug availability was assessed by direct sighting of drug stock using 140 selected key drug list (selection was done from the Essential Drug List prior to the study based on disease prevalence and frequency of usage in the facility). The findings is shown in Table 2 and showed that about 70% of the selected key essential drugs were available. Only antineoplastic drugs (0%) are completely not available and has not been stock out in the last three months.

Others such as antiretroviral (42.8%), dermatological drugs (33.3%) and hormones or their substitutes (45.5%) were of low availability.

Table 1 Storage facilities available using standard checklist

Storage facility	**Available**	**Not available**
Adequate storage capacity	✓	
Adequate window		✓
Burglary proof		✓
Good light source	✓	
Cupboard	✓	
Shelve racks	✓	
Fans		✓
Air conditioner	✓	
Refrigerator	✓	
Stand-by generator		✓
Store requisition voucher [SRV]	✓	
Ledgers	✓	
Stock lists	✓	
Dispensing envelope	✓	
Counting trays and spoons	✓	

Table 2: Facility availability of drugs using a check list of 140 selected key essential drugs

DRUGS	AVAILABILITY			STOCK OUT IN LAST 3 MONTHS	
	No. of essential drug listed in that category	No. Available	%	Yes	No
Anesthetics	3	3	100		
Analgesics	5	3	60.0		
Anti allergic	2	1	50.0		
Antidote	2	1	50.0		
Anticonvulsants	4	3	75.0		
Anti infective	25	21	84.0		
Anti TB & Leprosy	5	5	100		
Anti fungal	2	2	100		
Anti viral	7	3	42.8		
Anti neoplastic	5	0	0	✓	
Anti septic	4	4	100		
Haemetenic	2	2	100		
Cardiovascular drugs	3	3	100		
Dental drugs	2	2	100		
Dermatological drugs	3	1	33.3		
In vivo drugs	2	2	100		
Diuretics	3	2	66.7		
ENT drugs	2	2	100		
Gastrointestinal drugs	7	6	85.7		
Hormones	11	5	45.5		
Immunological drugs	12	9	75.0		
Ophthalmic drugs	4	4	100		
Oxytoxics	2	2	100		
Acid-base	8	6	75.0		
Psychological drugs	3	2	66.7		
Respiratory drugs	3	2	66.7		
Vitamins	4	3	75.0		
Total	**140**	**99**	**70.7**		

RATIONAL DRUG USE

Demographic profile of patients

A total of 520 patients were interviewed with a response rate of 100%. Majority (53.6%) of respondents were children and adolescence aged less than 15 years and about 69.8% were females. Of the three major ethnic groups in the area of study, Fulanis constituted 60.4% of the total population, while the minority (others) constituted only 2.3%. Thirty six percent had at least primary education with majority of respondents having only Quaranic education and 71% of the respondents were coming to the facility for the fist time (Table 3).

Illnesses diagnosed at the Out-Patient Department

Illnesses diagnosed at the Out-Patient Department showed that malaria [23.7%], typhoid fever [[14.0%] and urinary tract infection [UTI] [11.9%] were the top three ailments diagnosed at the out-patient department. While malaria, upper respiratory infection including pneumonia were the main illnesses seen in ages <15 years, typhoid fever, urinary tract infection, hypertension and peptic ulcer diseases were the main illnesses diagnosed in older age group >15 years (Table 4).

Factor affecting availability and affordability of drugs to patients

Table 5 shows that of the 520 respondents interviewed, 386 [74.2%] acknowledged that the hospital drug price is cheaper than other sources and that 402 [77.3%] can pay for all drugs prescribed. However, only 235 [45.2%] bought all their prescribed drugs from the hospital pharmacy store. Of the 285 respondents that did not buy all their prescribed drugs from the hospital drug store, the significant variation between the high availability of drugs at an affordable price and the low purchase of prescribed drugs by the patients were highlighted in reasons given for not purchasing the prescribed drugs which ranges from not having money at hand (73.6%), husband not at home at the onset of the illness (22.2%) to non-availability of the prescribed drugs (4.2%) (Table 6).

Correct knowledge of use of prescribed drugs by respondents

Table 7 shows that of the 520 patients interviewed, 506 (97.35%) indicated that the pharmacist educated them on the use of the prescribed drugs. However, when asked about the correct dosages, only 148 (28.5%) could recall correct dosage, while 480 (92.3%) remembered how much to take, 456 (87.7%) what times to take and 267 (51.3%) for how long to take the prescribed drugs.

Rational drug use indicators

Table 8 shows the drug use indicator. The average number of drugs prescribed was 2680/520 (5.2) with a range of 2 to 8 drugs per patient. About 2267/2680 (84.6%) of the drugs prescribed were from the Essential Drug List (EDL), but only 1002/2680 (37.4%) of the prescribed drugs were by generic name. The injection-prescribing rate was 228/520 (43.9%) and 116 (50.9%) of the 228 patients who were prescribed injection received two injections. The antibiotic prescribing rate was 293/520 (56.3%). Majority, 231 (78.8%) of those prescribed antibiotics had at least two antibiotics. About 1610/2680 (60.1%) of the prescribed drugs were actually dispensed, while only 139/1610 (8.6%) of the dispensed drugs were adequately labeled with patient's name, drug name and dose regimen.

Table 3: Selected demographic characteristics of respondents

Characteristics	Number [no].	Percentage [%]
Age [years]		
<5	146	28.0
5-14	133	25.6
>15	241	46.4
Total	**520**	**100**
Sex		
Male	157	30.2
Female	363	69.8
Total	**520**	**100**
Ethnicity		
Hausa	128	24.6
Fulani	314	60.4
Jarawa	66	12.7
Others	12	2.3
Total	**520**	**100**
Education level		
No formal education	43	8.3
Quaranic education	288	55.4
Primary education	113	21.7
Secondary education	55	10.6
Tertiary education	21	4.0
Total	**520**	**100**
Status of respondent		
Fresh patient	369	71.0
Follow-up	87	16.7
Patient's relative	64	12.3
Total	**520**	**100**

Table 4: Illnesses diagnosed at the Out-Patient Department by age

Diagnosis	Ages [years]			Total	%
	<5	5-14	≥15		
URTI/Pneumonia	32	11	5	48	9.2
Malaria	68	33	22	123	23.7
Gastroenteritis	19	5	2	26	5.0
Urinary tract infection	13	22	27	62	11.9
Peptic ulcer	-	-	34	34	6.5
Typhoid fever	-	24	49	73	14.0
Hypertension	-	-	56	56	10.8
Skin diseases	5	16	2	23	4.4
Injuries	3	6	13	22	4.2
Others	6	15	32	53	10.3
TOTAL	**146**	**132**	**242**	**520**	**100**

Fig. 1: Histogram to show illnesses diagnosed at the Out-Patient Department

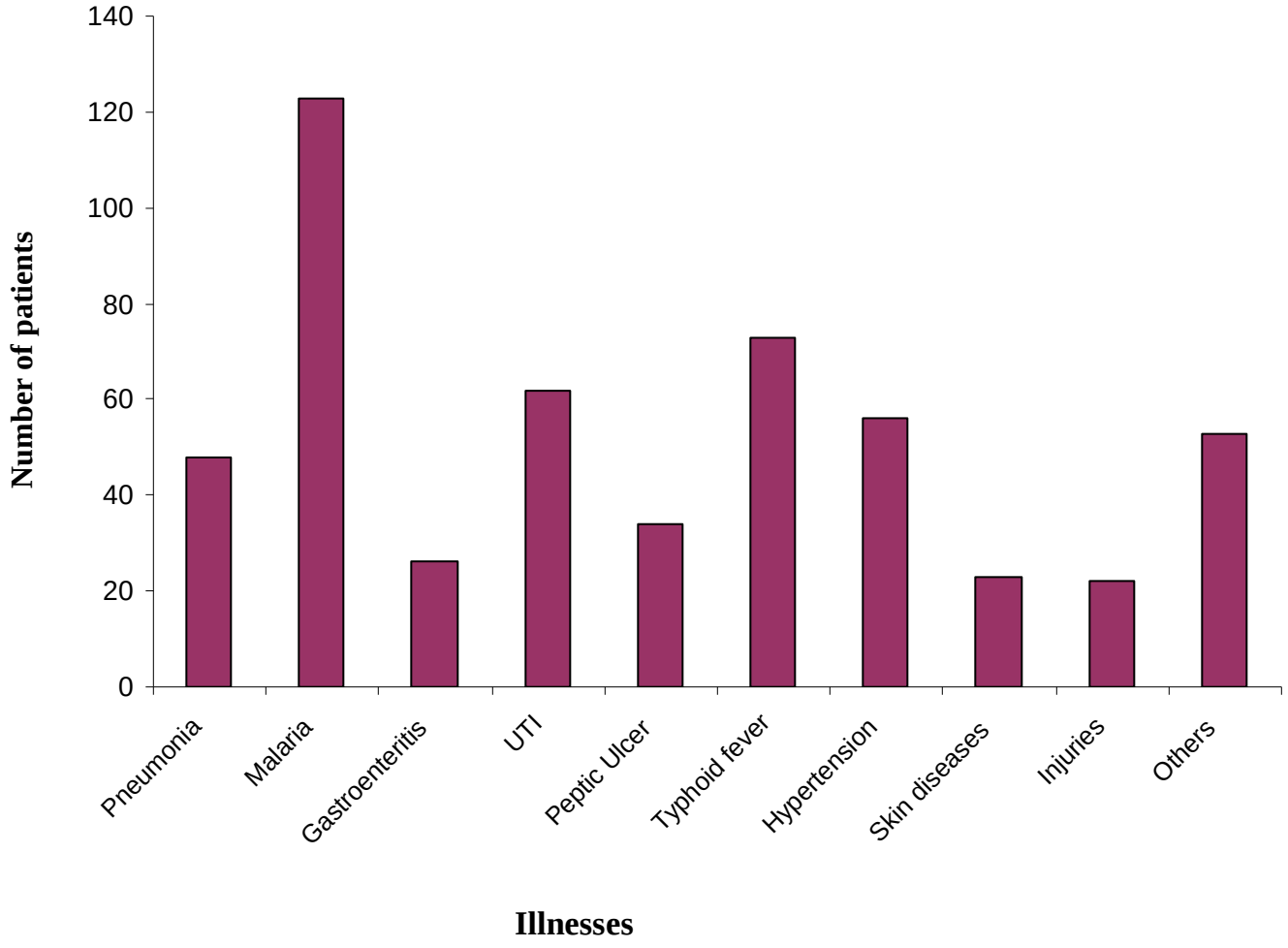


Table 5: Factors affecting availability& affordability of drug to patients

Factors	Number	Percentage (%)
All drugs prescribed are available always	498	95.8
Hospital drugs are cheaper than other sources	386	74.2
Can pay for all drugs prescribed	402	77.3
Bought all prescribed drugs	235	45.2

Fig 2: Pie chart showing reasons given by respondents for not buying all prescribed drugs

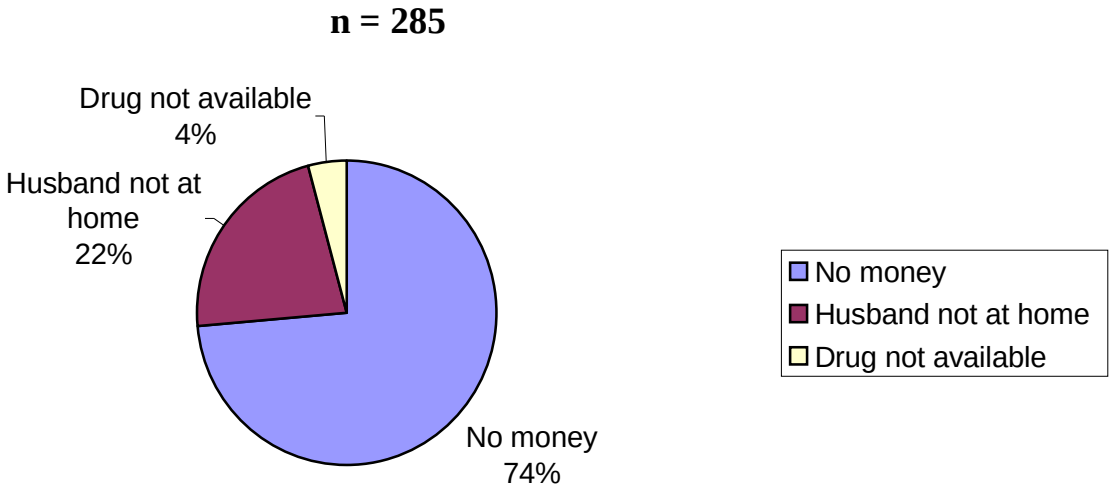


Table 6: Correct knowledge of use of prescribed drugs by respondents

Knowledge	Number	Percentage (%)
How much to take	480	92.3
What times to take	456	87.7
How long to take	267	51.3
Correct dosage	148	28.5

Table 7: Rational drug use indicators in the health facility

	Number of patient prescribe drug for each of the indicators									Indicator
INDICATORS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**	
Average drugs prescribed	-	22	280	1024	865	442	28	19	2680	**5.2/patient**
Number from EDL	13	78	880	649	385	262	-	-	2267	**84.6%**
No. of injections	25	116	87	-	-	-	-	-	228	**43.9%**
No. of antibiotics	62	140	91	-	-	-	-	-	293	**56.3%**
Prescription by generic name	-	32	69	107	131	168	154	241	1002	**37.4%**
No. of drugs actually dispensed	-	298	361	306	645	-	-	-	1610	**60.1%**
No. of drugs adequately labeled	-	57	48	25	9	-	-	-	139	**8.6%**

CHAPTER FIVE

DISCUSSION

The demographic characteristic of the hospital staffs showed gross inadequacy of the medical personnel especially pharmacist (0.76%), and doctors (3.0%) as a proportion of facility staff strength. Lack of trained health workers coupled with the weak economic condition and heavy disease burden are responsible for the poor state of health of most developing countries. Studies done in Loa people's Democratic Republic to look at practices in both public and private pharmacies indicated that 54% of the staffs in public pharmacies were medical assistants and more than 60% in private pharmacies. These cadres of health personnel cannot provide credible information to patients to ensure rational drug use[25]

This study showed that the state government is solely responsible for the organization, operation and running of the DRF in the health facility, with no community participation, contrary to the Bamako initiative[7]. The Bamako Initiative from where the concept of DRF evolved, promotes the establishment of a very viable Drug Revolving Fund through community co-management of resources to enhance cultural and financial sustainability.

The poor storage infrastructure as evident by inadequate windows, lack of burglary proof and fans would facilitate the loss of potency and wastages of some of the drugs. This finding is in line with some causes of drug wastages at the facility level [2].

The availability and stock of the essential drugs was relatively high. No relevant information of research work done on essential drug availability in Nigeria was found by this researcher. However, studies done in Cameroon and Nigeria indicated that drugs are valuable resources in developing countries and their availability is considered an indicator of the quality of care. Uzochukwu and associate indicated in their study about access to drugs in Nigeria that patients' visits dropped by 50%-75% when the most commonly used drugs run out[22]. The availability of essential drugs is a strategy to decrease medical cost, improve Quality of health care services and promote the rational use of drugs [3]

Percentages of drug prescribed from the Essential Drug List (EDL) and by generic prescribing were found to be 84.6% and 37.4% respectively. The value for prescription from the EDL is in accordance with values found in developing countries (higher than 80%)[3]. In a study in a Nigerian city hospital, prescribed product from the EDL and by generic names were found to be 94.4% and 48.o% respectively [29]. Prescribing drugs from the essential drug list issued by World Health Organization (WHO) means rational prescribing**:** the drug

from the list are older drugs already tested in practice, with established clinical use and lower cost than newer drugs [24, 3]. This ensures availability, accessibility and affordability geared towards an improved health care system.

In this study, the number of drugs prescribed ranges from 2-8 (average 5.2). The average number of drugs prescribed has been found in Nigeria to range from 3-7 (average 3.5) [28]. The findings of this study is relatively higher than similar studies in Nigeria [28.] Prescribers have a tendency of prescribing drugs more than necessary. Prescribing too many drugs for a patient is referred to as poly pharmacy and prescribers tend to embark on poly pharmacy in their attempt to treat a number of possible diseases simultaneously [22.] Irrational drug use at the prescriber's level has often been thought to be entirely due to health workers lacking information and training. Other factors include outdated prescribing practices, heavy patient load, pressure from peers and patients [24].

The percentage of antibiotic prescribed was found to be 56.3% in this study. A survey done in Nigeria to look at drug use and antibiotic prescribing in 2002 revealed that the percentage of antibiotics per prescription was more than 50% for out-patients and 97% for in-patients as compared to the WHO recommendations of 20% to 26%. In a similar studies in Nigeria the percentages of encounters with antibiotics in a Nigerian city hospital was found to be 54.2% and another secondary health facility (54.8%)[28.] The high rate of

antibiotic prescribing has some implication. First, the newer and more expensive antibiotics are frequently prescribed which may be unaffordable to most patient and poor compliance in those who may be able to start a course but not be able to finish. Secondly, it promotes resistance as antibiotic resistance have been reported from a teaching hospital in Lagos[37].

The percentage of patients encountered with an injection in this study was 43.9% compared to (37.0%)[29] in a similar study in Nigeria and (36.6%)[22] in Niger Republic. This was due to high febrile illness presumed to be malaria and typhoid fevers frequently diagnosed. Proper case management of febrile illnesses, appropriately prescribing oral dosage form of drugs in place of its injectable form and an attitudinal change in patients towards preference to injection instead of oral drugs will go a long way in decreasing the irrational use of injections in the health facility.

Though the Essential drug availability exceeds 70% in this study, the percentage of drugs actually dispensed, as a proportion of the total drugs prescribed was (60.0%). This is lower than average observed values in similar studies in Nigeria (94.4%)[29] Nepal (83.0%)[35]. Reasons given by patients during interview for non-purchase of the prescribed drugs ranges from non-availability of the prescribed drugs at the facility (4.2%), lack of money at hand (73.6%) and husband not at home at the onset of illness (22.2%). The implication of this

finding is that most patients will restore to other sources for their prescribed drugs either traditional medicine or open market with the possibility of buying fake, substandard or counterfeit drugs which may prolong treatment periods, exacerbate the conditions being treated and help create drug resistance with its associated problems.

The percentage of drugs adequately labeled (with patient's name, drug name and dose regimen) was abysmally low (8.6%), compared to similar studies in Nigeria and Niger Republic 71.6% and 89.7% respectively[30]. The WHO recommends that each drug label should contain dose regimen, drug name and patient's name[5]. In this study only dose regimens were written on the dispensing envelope, with no name of the drug or patient's name. This potentially would lead to serious consequences of drug misuse and drug abuse.

Correct knowledge of use of prescribed drugs by patients interviewed included knowledge of how much to take, what times to take and for how long to take the dispensed drugs. Only 28.5% could correctly recall the correct dosage. However, 92.3% could recall correctly how much to take, 87.7% what time to take and 51.3% for how long to take. This poor knowledge of drug use could lead to inappropriate use of drugs by patients such as stopping taking drugs as soon as symptoms recede and keeping whatever remains for others with similar symptoms or for future episode of the disease. At the same time,

the perception of some patients that dispensers are mere keepers of drugs with no significant value to add to the quality of health care makes patients not to take the information provided by dispensers seriously. In addition, the educational level of the respondents had a great influence on this result as only 36.3% have at least primary education

Much of the information on drug use indicators have either come from the tertiary facilities or the primary care level mainly due to research activities undertaken by university staff. There is paucity of drug use data from secondary health care level, which also serve a large percentage of the population, as only few studies have been conducted at this level[28].

CONCLUSION

In conclusion, the Drug Revolving Fund (DRF) in the health facility is managed solely by the state government with no community participation contrary to the objectives of the Bamako Initiative. There was relatively adequate availability of essential drugs in excess of 70%, however, drugs such as anti-retroviral and anti-neoplastic were evidently out of stock. However, poor storage facility was evident by lack of adequate window and burglary proof, lack of fans and standby generator, condition which may facilitate loss of drug efficacy and drug wastage. The rational drug use indicators were poor in terms of use of generic prescribing, high antibiotic and injectable prescribing, poor packaging and labeling by the pharmacist and poor correct knowledge of drug use by the patients.

RECOMMENDATIONS

1. Drug selection, drug quantification and procurement should be decentralized to the hospitals or the pharmacist in-charge should be empowered to purchase out of stock drugs that they need which are not readily available in the Central Medical Store to ensure sustainability of the DRF Programme.
2. The hospital drug storage facility needs to be provided with adequate windows with burglary proof, fans and stand-by generator by the Ministry of Health to maintain drug efficacy and prevent drug wastages.
3. The Ministry of Health should organize regular ongoing medical education for doctors and other prescribers to increase their knowledge about non-drug therapy and training on rational drug use through workshop and regular monitoring of prescription practices by the Principal Medical Officer In-Charge to reduce the high rate of antibiotic and injectable use in the health facilities.
4. Similar regular training and workshop to be organized by the Ministry of Health for the Pharmacy staffs in labeling and packaging of products containing patient's name, appropriate dose and clear instruction on how to use the drug to aid patients' compliance and reduce the poor knowledge of drug use by the patients.

5. The drug revolving fund committee in the Ministry of Health should improve on the use of stock cards and ledgers as a drug utilization information tool for monitoring and evaluation of drug stock and use in the facility to eliminate out-of- stock syndrome.

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APPENDIX 1

EVALUATION OF DRF PROGRAMME IN GENERAL HOSPITAL, TORO, BAUCHI STATE

HEALTH FACILITY ASSESSMENT QUESTIONNAIRE

This study is intended for academic purpose only at the Faculty of Medicines, Community Medicine Department, ABU, Zaria. I therefore count on your cooperation to make this exercise a successful one please. Your honesty and sincerity is highly needed. I assure you that all information provided would be treated with absolute confidentiality. To guarantee your confidentiality do not write your name.

To be filled by Head of Facility

(Tick appropriate answer)

1.0 DEMOGRAPHIC VARIABLE OF THE HOSPITAL

1.1 Respondent status:……

1.2 When was the hospital established?……

1.3 What is the hospital bed capacity? ……

(i) Surgery department ☐

(ii) Medical department ☐

(iii) Gynecology department ☐

(iv) Pediatric department ☐

1.4 How many doctors are in the hospital?……

1.5 How many pharmacists are in the hospital? ……

1.6 How many nurses are in the hospital? ……

2.0 METHOD OF DRUG PROCUREMENT

2.1 Who is responsible for drug procurement financing in this hospital?

i. State Gov't. ☐

ii. Local Gov't ☐

iii. Community ☐

iv. Bank loan

v. Others (specify) ……

2.2 Do you a drug policy for procurement? Yes / No

2.3 If yes, what is the procurement policy based on.

(i) National drug policy ☐

(ii) Essential drug policy ☐

(iii) Cheapest drug ☐

(iv) Others (specify) …….....

2.4 What is the method of procurement?

i. Tender board ☐

ii. Contract purchase ☐

iii. Direct purchase ☐

iv. Others (specify) ……

3.0 DRUG AVAILABILITY

(Use of 140 check list of selected essential drug list for secondary care level)

4.0 METHOD OF DRUG STORAGE

(Use of drug storage facility check list)

5.0 DRUG MANAGEMENT AT FACILITY

5.1 Do you have an essential drug list or formulary? Yes / no

5.2 Do you have a drug management team? Yes / No

5.3 Do you have an information system for monitoring and evolution of drug use? Yes / no

5.4 How do you stock – out your drugs?

i. Use stock cards ☐

ii. Use stock ledger ☐

iii. Double shelve system ☐

iv. First –in first –out method ☐

v. Others (specify)..... ☐

6.0. METHOD OF COST RECOVERY

6.1 When was DRF operation stated in this hospital ……

6.2 Was this hospital given a seed stock of drugs? Yes / No

6.3 Do you have special DRF account? Yes / No

6.4 Do you have 'petty – cash' impress system for logistics? Yes / No

6.5 Do you have drug price list? Yes / No

6.6 What price system do you use?

i) Fixed charge per drug ☐

ii) Variable charge per drug ☐

iii) Band charge ☐

iv) Others (specify) ……

6.7 How do you replenish your stock?

(i) Requisition (the pull method) ☐

(ii) Allocation (the push method) ☐

(iii) Both ☐

(iv) Others (specify)..... ☐

6.8 Are some patient exempted in this hospital? Yes / No

6.9 If yes, what categories of patients

I……

II ……

III……

Iv……

6.10 What other problems do have that hinders the smooth operation of DRF in this hospital

I. …….

II. …….

III. …….

IV. …….

V. …….

APPENDIX 2

EVALUATION OF DRF PROGRAMME IN GENERAL HOSPITAL TORO, BAUCHI STATE

QUESTIONNAIRE FOR PATIENT/ RELATIVE INTERVIEW

This study is intended for academic purpose only at the Faculty of Medicine, Community Medicine Department, ABU, Zaria. I therefore count on your cooperation to make this exercise a successful one. Please, your honesty and sincerity is highly needed. I assure you that all information provided would be treated with absolute confidentiality. To guarantee your confidentiality do not write your name.

To be Administered by Project Assistants

(Tick appropriate answers)

1.0 DEMOGRAPHIC PROFILE

1.1 Age (years) 0-5 ☐

5-15 ☐

≥15 ☐

1.2 Sex: Female ☐ Male ☐

1.3 Literacy level

i. No formal education ☐

ii. Quadratic education ☐

iii. Primary education ☐

iv. Secondary education ☐

v. Tertiary education ☐

1.4 What are you?

i. Patient ☐

ii. Patient's relative ☐

iii. Others (specify) ☐

1.5 If patient, are you

(1) Fresh patient

(2) Follow-up

(3) Others (specify)…….....

1.6 Diagnosis ……

2.0 DRUG AVAILABILITY /AFFORDABILITY / ACCESSIBILITY

2.1 Are you able to get drugs from the pharmacy any time you visit the hospital? Yes / No

2.2 Do you find the hospital price affordable? Yes / No

2.3 If you a cause buy drugs outside the hospital, were they cheaper than Similar drugs in the hospital pharmacy? Yes / No

2.4 Did you buy all your prescribed drugs form the hospital pharmacy? Yes/ No

2.5 If no, why?

i. Prescribed drugs not available ☐

ii. Don't have money at hand ☐

iii. Husband not at home ☐

iv. Others (specify) ☐

3.0 KNOWLEDGE OF USE OF DRUGS

3.1 Are you enlightened on how to take your drugs from the pharmacy? Yes/No

3.2 Do you know how much of the drugs to take each time? Yes / No

3.3 Do you know how often and at what time to take the drugs? Yes / No

[Od (ones a day) bd (twice daily), tid (trice daily) and qds (four times)]

3.4 Do you know for how long you will continue to take the drugs? Yes/No

4.0 RATIONAL DRUG USE INDICATORS

4.1 Total number of drugs prescribed…….

4.2 Number of drugs from EDL…….....

4.3 Number of generic prescription……

4.4 Number of injection prescribed ……

4.5 Number of antibiotics prescribed.....

4.6 Number of drugs actually dispensed ……

4.7 Number of drugs adequately labeled ……

APPENDIX 3

NIGERIAN ESSENTIAL DRUG LIST FOR SECONDARY AND TERTIARY HEALTH CARE FACILITY [2003]

ANAESTHETICS

Ether
Halothane
Ketamine
Nitrous Oxide
Thiopental
Atropine
Diazepam
Morphine
Promethazine
Atracuronium
Neostigmine
Pancuronium
Suxamethonium
Bupivacaine
Lidocaine

ANALGESICS AND ANTI-INFLAMATORY

Dihydrocodeine
Fentanyl
Morphine
Pentazocine
Pethidine
Naloxone
Acetylsalicylic acid
Paracetamol
Allopurinol
Diclofenac

Ibuprofen
Indometacin
Ketoprofen

ANTI-ALLERGICS

Chlorphenamine
promethazine
Epinephrine
Hydrocortisone

ANTI-DOTE

Activated charcoal
Ipecacuanha
Deferoxamine
Dimercaprol
Methionine
Naloxone
Protamine Sulphate
Phytomenadione (vit.k1)
Sodium Calcium edetate
Sodium nitrite
Sodium thiosulphate

ANTI CONVULSANTS

Carbamazepine
Clonazepam
Diazepam
Ethosuximide
Magnesium Sulphate
Paraldehyde
Phenobarbital
Phenytoin Sodium
Sodium Valproate

ANTI-INFECTIVE

Metronidazole
Albendazole
Levamisole
Mebendazole
Niclosamide
Pyrantel
Diethyl Carbarmazine
Ivermectin
PraziQuantel
Meglumine antimonate
Melarsoprol
Pentamidine
Sodium stibogluconate
Suramin
Artemeter
ChloroQuine
Dihydroartemisinin
MefloQuine
MefloQuine + Sulfadoxine + Pyrimethamine
Proguanil
Pyrimethamine
Pyrimethamine + Sulfadoxine
Quinine
Tinidazole
Amoxicillin
Ampicillin + Cloxacillin
Benzathine benzylpenicillin
Benzyl penicillin
Ceftriaxone
Cefuroxime
Chloramphenicol
Ciprofloxacin
Cloxacillin
Co-amoxiclav
Cotrimoxazole
Doxycycline
Erythromycin
Fortified Procaine Penicillin
Lincomycin
Nalidixin acid

Neomycin
Nitrofurantoin
Phenoxymethyl Penicillin
Streptomycin
Sulfadiazine
Tetracycline

ANTI -TB & LEPROSY

Clofazimine
Dapsone
Rifampicin
Ethambutol
Isoniazid
Pyrazinamide
Thiacetazone

ANTI - FUNGAL

Amphotericin B
Fluconazole
Miconazole
Nystatin

ANTI VIRAL + ANTI RETROVIRAL (ARV)

Acyclovir
Idoxuridine
Indinavir
Nelfinavir
Lamivudine
Zidovudine
Nevirapine

ANTI MIGRAINE

Ergotamine
Pizotifen

ANTINEOPLASTICS

Azathioprine
Bleomycin
Busulphan
Chlorambucil
Cisplastin
Cyclophosphamide
Cylosporin
Cytarabine
Dexamethasone
Doxorubicin
Fluorouracil
Mercaptopurine
Methrotrexare
Prednisolone
Procarbazine
Stilboestrol
Tamoxifen
Vincristine

NEUROLOGICAL DISORDERS

Benzhexol
Biperiden
Levodopa + Carbidopa
Pyridostigmine
Aminocaproic acid

ANTISEPTIC & DISINFECTANTS

Benzoin
Cetrimide
Chlorhexidine
Coal tar
Dichloroxylenol
Glutaraldehyde

Iodine
Methylated Spirit
Povidone – Iodine
Potassium Permanganate
Sodium hypochlorite
Trichlorophenol

DRUGS AFFECTING THE BLOOD

Cyanocobalamine
Ferrous sulphate
Ferric ammonium citrate
Folic acid
Enoxaparin
Heparinoid
Heparin sodium
Warfarin sodium
Aminocaproic acid
Dextran 70
Human albumin

CARDIO VASCULAR DRUGS

Glyceryltrinitrate
Propranolol
Isosorbide
Disopyramide
Lidocaine
Procainamide
Amiloride
Amlodipril
Atenolol
Captopril
Hydralazine
Labetalol
Lisinopril
Methyldopa
Nifedipine
Prazosin

Reserpine
Digoxin

DENTAL DRUGS

Benzocaine
Lidocaine
Prilocaine
Nystatin
Zinc Chloride /Sulphate
Triamcinone

DERMATOLOGICAL DRUGS

Gentian Violet
Neomycin
Silver Sulfadiazine
Betamethasone
Calamine lotion
Hydrocortisone
Methyl Salicylate
Aluminium diacetate
Zinc oxide
Benzoyl Peroxide
Benzoic acid + Salicylic acid
Clotrimazole
Miconazole
Nystatin
Dithranol
Podophyllum resin
Salicylic acid
Benzyl Benzoate
Permethrin

IN-VIVO DIAGNOSTIC AGENTS

Barium sulphate
Meglumine Iothalamate

Sodium Iothalamate
Propyliodone
Iopanoic acid
Meglumine iodipamide
Metrizamide
Iohexol
Meglumine diatrizoate
Tuberculin PPD

DIURETICS

Amiloride + hydrochlorothiazide
Bendroflumethazide
Furosemide
Hydrochlorothiazide
Spironolactone

EAR, NOSE AND THROAT (ENT) DRUGS

Chloramphenicol
Gentamicin
Betamethasone
Hydrocortisone + Neomycin
Glycerol + Sodium bicarbonate
Beclomethasone
Ephedrine
Silver nitrate

GASTRO – INTESTINAL DRUGS

Aluminium hydroxide
Magnesium trisilicate
Metoclopramide
Prochlorperazine
Promethazine
Hydrocortisone acetate + Lidocaine
Hyoscine N- butyibromide
Prapantheline bromide

Bisacodyl
Liquid paraffin
Senna
Codeine
Oral Rehydration Salts
Cimetidine
Omeprazole
Ranitidine

HORMONES AND SYNTHETIC SUBTITUTES

Dexamethasone
Hydrocortisone
Prednisolone
Ethinylostradiol
Norethisterone
Hydroxyprogesterone
Ethinyloestradiol + Levonorgestrel
Ethinyloestradiol + norethisterone
Levonorgestrel
Medroxyprogesterone acetate
Norethisterone enanthate
Copper T
Lippe`s Loop
Condoms
Diaphragms
Bromocriptine
Clomiphene
Human Insulin
Insulin zinc
Suspension (I.Z.S)
Chlorpropamide
Glibenclamide
Metformin
Levothyroxine
Carbimazole
Lugol`s Solution
Propylthiouracil

IMMUNOLOGICALS

Anti-D Immunoglobulin
Anti Gas – gangrene
Anti Rabies
Anti Scorpion Serum
Anti – Snake Serum
Gas – gangrene Antitoxin
Normal Immunoglobulin
Tetanus Antitoxin
B.C.G
D.P.T
Measles Vaccine
Poliomyelitis Vaccine
Cholera Vaccine
Hepatitis B. Vaccine
Meningoccocal Vaccine
Typhoid Vaccine (TAB)
Yellow Fever Vaccine

OPHTHALMOLOGICAL DRUGS

Acyclovir ointment
Chloramphenicol drop
Gentamicin drop
Miconazole
Oxytetracycline
Antazoline
Prednisole
Amethocaine
Atropine
Pilocarpine
Timolol
Acetazolamide
Homatropine
Phenylephrine
Tropicamide

Fluorescein Sodium
Methylcellulose

OXYTOCICS

Ergometrine
Oxytocin
Salbutamol

DIALYSIS SOLUTION

Intraperitoneal Dialysis Fluid
Haemodialysis Fluid

ACID – BASE AND WATER / ELECTROLYTE CORRECTING PREPARATION

Oral Rehydration Salt
Potassium Chloride
Darraws Solution
Glucose
Mannitol
Ringers Solution
Sodium bicarbonate
Sodium Chloride
Sodium Lactate
Water for injection

PSYCHOTHERAPEUTIC DRUGS

Diazepam
Lorazepam
Nitrazepam
Amiriptyline
Imipramine
Chlorpromazine
Flupenithixol
Fluphenazine

Haloperidol
Biperiden
Inhexyphenidyl

RESPIRATORY SYSTEM DRUGS

Epinephrine
Aminophylline
Beclomethasone
Hydrocortisone
Salbutamol
Dextromethorphan hydrobromide

VITAMINS AND MINERAL

Ascorbic Acid
Cyanobalamin
Ergocalciferol
Folic Acid
Pyridoxine
Retinol
Riboflavine
Thiamine
Vitamin B complex
Calcium Salt
Sodium Fluoride

APPENDIX 4

SELECTED CHECKLIST OF KEY DRUGS BASED ON DISEASE PREVALENCE AND FREQUENCY OF USAGE IN THE FACILITY

ANAESTHETICS

1. Ketamine
2. Diazepam
3. Promethazine

ANALGESICS &ANTI-INFLAMATORY

4. Pentazocine
5. Pethidine
6. Paracetamol
7. Diclofenac
8. Ketoprofen

ANTI-ALLERGIC

9. Chlorphenamine
10. Hydrocortisone

ANTI-DOTE

11. Naloxone
12. Phytomenadione (vit k)

ANTICONVULSANTS

13. Paraldehyde
14. Phenobarbitone
15. Phenotoin
16. Sodium valproate

ANTI-INFECTIVE

17. Metronidazole
18. Albendazole

19. Levamisole
20. Mebendazole
21. Ivermectin
22. Praziquantel
23. Artemeter
24. Chloroquine
25. Dihydroartemisin
26. Mefloquine
27. Sulfadoxine + Pyrimethamine
28. Proguanil
29. Quinine
30. Amoxicillin
31. Ampicillin + Cloxacillin
32. Benzathine Penicillin
33. Fortified Procaine Penicillin
34. Ciprofloxacin
35. Cefuroxine
36. Chloramphenicol
37. Co-Amoxiclav
38. Cotrimoxazole
39. Doxycycline
40. Erythromycin
41. Streptomycin

ANTI-TB & LEPROSY

42. Rifampicin
43. Ethambutol
44. Isoniazid
45. Pyrazinamide
46. Thiacetazone

ANTIFUNGAL

47. Miconazole
48. Nystatin

ANTIVIRAL & ANTIRETROVIRAL (ARV)

49. Acyclovir
50. Indinavir

51. Nelfinavir
52. Lamivudine
53. Zidovudine
54. Nevirapine
55. Idoxuridine

ANTINEOPLASTIC

56. Cyclophosphamide
57. Doxorubicin
58. Methrotrexate
59. Prednisolone
60. Vincristine

ANTISEPTIC

61. Chlorhexidine
62. Iodine
63. Methylated Spirit
64. Formaldehyde

DRUGS AFFECTING THE BLOOD

65. Ferrous Sulphate
66. Folic acid

CARDIOVASCULAR DRUGS

67. Propranalol
68. Atenolol
69. Hydralazine
70. Methyldopa
71. Nifedipine
72. Prazosin
73. Reserpine
74. Digoxin

DENTAL DRUGS

75. Lidocaine
76. Zinc sulphate

DERMATOLOGICAL DRUGS

77. Calamine lotion
78. Zinc oxide
79. Benzyl benzoate

INVIVO DIAGNOSTIC AGENTS

80. Barium sulphate
81. Tuberculin PPD

DIURETICS

82. Furosemide
83. Hydrochlorothiazide
84. Spinolactone

EAR, NOSE &THROAT (ENT) DRUGS

85. Silver nitrate
86. Hydrocortisone + Neomycin

GASTROINTESTINAL DRUGS

87. Ephedrine
88. Magnesium trisilicate
89. Hyoscine N-butylbromide
90. Propantheline bromide
91. Cimetidine
92. Ranitidine
93. Omeprazole

HORMONES & SYNTHETIC SUBSTITUTES

94. Levonorgestrel
95. Medroxyprogesterone acetate
96. Copper T
97. Lippe’s loop
98. Condoms
99. Diaphragms
100. Human Insulin
101. Insulin Zinc

102. Suspension (I.Z.S)
103. Clopropamide
104. Metformin

IMMUNOLOGICALS

105. Anti-D Immunoglobulin
106. Anti-Rabies
107. Anti-Snake
108. Tetanus Antitoxin
109. BCG
110. D.P.T
111. Measle Vaccine
112. Poliomyelitis Vaccine
113. Cholera Vaccine
114. Yellow fever Vaccine
115. Menningoccocal Vaccine
116. Hepatitis B Vaccine

OPHTHALMOLOGICAL DRUGS

117. Chloramphenicol eyedrop
118. Gentamicin eyedrop
119. Atropine
120. Timolol

OXYTOCICS

121. Ergometrine
122. Oxytocin

WATER/ELECTROLYTE PREPARATION

123. Oral rehydration salt (ORS)
124. Sodium chloride
125. Sodium bicarbonate
126. Glucose
127. Darrows
128. Mannitol
129. Ringer's solution
130. Water for injection

PSYCHOTHERAPEUTIC DRUGS

131. Amitriptyline
132. Imipramine
133. Chlopromazine

RESPIRATORY SYSTEM DRUGS

134. Epinephrine
135. Aminophylline
136. Salbutamol

VITAMINS &MINERALS

137. Ascorbic acid
138. Pyridoxine
139. Thiamine
140. Calcium salt

APPENDIX 5

CHECKLIST FOR STORAGE FACILITIES

Storage facility	**Available**	**Not available**
Adequate storage facility		
Adequate windows		
Burglary proof		
Good Light source		
Cupboard		
Shelve racks		
Fans		
Air conditioner		
Refrigerator		
Stand-by generator		
Store requisition voucher (SRV)		
Ledgers		
Stock list		
Dispensing envelope		
Counting trays &spoons		