FACTORS INFLUENCING AVAILABILITY OF ESSENTIAL DRUGS IN PRIMARY HEALTH CARE FACILITIES IN KISARAWE DISTRICT, COAST REGION.

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE UNIVERSITY OF DAR ES SALAAM.

OCTOBER, 2000.

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DECLARATION

I hereby declare that this dissertation is my original work, and that it has not been submitted for a diploma or degree in any other University.

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DEDICATION

I dedicate this dissertation to my dear father and my late mother, who made it all possible, and to my dear wife Joyce, and my son Gabriel, with love.

ABSTRACT

This study focused on "Factors influencing availability of essential drugs in primary health care facilities in Kisarawe district, Coast Region". It was conducted in a good spirit of assisting District Health Management Team to improve drug availability in public primary health care facilities. Previous research findings do not provide sufficient information regarding factors which could influence drug availability in public primary health care facilities. A total of seven out of thirteen public primary health care facilities in the district were selected and studied. They included the available two health centres, and among eleven dispensaries, five were selected randomly.

For the purpose of this study few factors were studied. Factors which were studied included drugs supply, staffing, prescribing patterns, storage conditions, number of users per month and availability of other partners delivering health care within the catchment area. Availability of reference manuals such as the 'standard treatment guidelines' from the Ministry of Health was also determined. Information was collected by interviews, observations and review of records.

Study findings showed that drug availability was better in the health centres than in the dispensaries, which possibly related to the large quantity of stock supplied to health centres, less number of users per month, presence of better storage conditions and presence of other alternatives of health care delivery (such as missionary dispensary and medical stores).

Although dispensaries had higher proportion of correct prescriptions (91.2%) compared to the health centres (81.5%), they recorded low drug availability. This could be attributed to the fact that dispensaries received low quantity of stock than health centres, had more users per month compared to health centres, had poor storage conditions as some facilities stored drugs at home, and lacked alternative options for health care delivery within their catchment areas.

In both groups of primary health care facilities, drug supply was regular and none of the facilities had the 'standard treatment guideline' from the Ministry of Health. The cold chain was operating in the health centres only. In the dispensaries visited the cold chain was about to collapse as there was either no kerosene or the refrigerators needed repair.

Analysis of prescriptions from Health Management Information System (HMIS) record books for the previous six months showed that the higher the qualification of the prescriber the higher the proportion of correct prescriptions.

These findings were in line with the current on-going health sector reforms in Tanzania. Unlike other studies, this study offers more information on factors studied. Information gathered from the study and recommendations given at page 43 of this dissertation can guide the District Health Management Team (DHMT) in improving drug availability, staffing, and the quality of care in primary health care facilities.

ACKNOWLEDGEMENT

This dissertation could not have been completed successfully had it not been for the valuable contributions I received from a number of persons including members of academic staff of the Institute of Public Health, Muhimbili University College of Health Sciences of the University of Dar es Salaam.

First of all, I would like to acknowledge the immense assistance I received from my supervisors, Dr. A. Kessy and Dr. K.S. Mnyika who devoted much of their time in going through and shaping the research plan at various stages. Their constructive criticisms and comments were of enormous assistance at all stages of the development of this dissertation.

I further wish to express my gratitude to Mrs. R. Mpembeni and Mr.F.J. Mayunga of the Department of Epidemiology and Biostatistics for their assistance during data processing.

Mention should also be made of the contributions I received from the two research assistants, Mr. I. Hango, an intern pharmacist from Muhimbili Medical Centre and Mr. H. Mzige, a clinical officer from Maneromango health centre, who virtually perceived the research work as theirs and devoted all their time and effort to ensure that the data collection was completed on schedule. I am similarly grateful to all the in-charges and staff of the primary health care facilities in Kisarawe district where research for this dissertation was conducted. They played fundamental role to the successful completion of this work.

I cannot forget to acknowledge the sacrifice of my son Gabriel, of his right to parental care during the period my of studies. Support from my mother-in-law, Mary should also be put on record for supporting my child during my absence.

I finally wish to thank the Ministry of Health without whose sponsorship my training and subsequent research project could not have been possible.

H.F.H. IRUNDE.

OCTOBER, 2000.

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ABBREVIATIONS AND ACRONYMS

AMO	Assistant Medical Officer
CA	Clinical Assistant
CO	Clinical Officer
CMS	Central Medical Stores
DHMT	District Health Management Team
DMO	District Medical Officer
EDP	Essential Drugs Programme
EPI	Expanded Programme on Immunization
HMIS	Health Management Information System
INRUD	International Network for Rational Use of Drugs
MA	Medical Assistant
MCHA	Maternal and Child Health Aide
MOH	Ministry of Health
MSD	Medical Stores Department
MSH	Management Science for Health
NEDLIT	National Essential Drug List for Tanzania
RMA	Rural Medical Aide
TBAs	Traditional Birth Attendants
TDHS	Tanzania Demographic and Health Survey
WHO	World Health Organization

CHAPTER ONE

1.1. INTRODUCTION

Tanzania is one of WHO's member state and, in joining the Organization she has agreed that health is a human right and, access to essential drugs is a critical part of this fundamental human right. Drugs play a crucial role in health restoration, prevention and diagnosis of various diseases. They may also be used to influence certain physiological conditions and behaviour modification.

To effect provision of essential drugs to the primary health care facilities, the Essential Drugs Programme (EDP) in Tanzania was initiated in 1983 (Munishi, 1991). This was because of the pressing conditions of scarcity of medicines in most of Tanzania health units; especially the rural health centres and dispensaries. The acceptance of EDP in Tanzania was influenced by three major factors: The first one was the economic crisis, which persisted during the 1970s. It had reduced capability of the government to afford provision of drugs in its health care facilities. The second factor was development of WHO concept of essential drugs programme. Thirdly, the state had developed a paternalistic welfare system, which provided medicines free of charge (Munishi, 1991).

The operating principle of drugs supply system in Tanzanian EDP was creation of two types of "ration kits". The first was the dispensary kit intended to contain medicines to treat 1,000 attending cases for an estimated period of 30 days. Each type of drug contained in the kit was expected to last for thirty days, when replenishment was delivered by opening of a new kit for the ensuing month. The

second kit was larger and designed for a health centre; estimated to serve 2,000 cases a month.

When the EDP started in 1983 it was considered proper to organise a vertical program. The government medical procurement agency – the Central Medical Stores (CMS) was considered inefficient at initiation of EDP. While EDP continued to use the CMS premises and improved the CMS system, the EDP procurement system was a detached unit. Quantities of drugs required for specific health units in remote or to other parts of the country were packed abroad. The orders were packed into dispensary and health centre kits without considering morbidity patterns.

In 1993, the CMS was transformed into an autonomous public sector institution, the Medical Stores Department (MSD), which was to take over both management of the EDP and procurement of other government medical supplies. MSD was expected to consider all problems which occurred previously under the vertical system which was internationally oriented, and improve drug supply to primary health care units in rural and remote areas.

The Essential Drug Concept:

In 1975, WHO defined essential drugs as "indispensable and necessary for the health needs of the population" (MSH, 1997). They should be available at all times in the proper dosage forms to all segments of the society, and the WHO conference at Alma-Ata recognised essential drugs and proper treatment of common diseases as among the eight elements of the Primary Health Care (WHO, 1998).

Consistent with public health perspectives, the essential drug concept embraces the following guiding principles (MSH, 1997):

- The vast majority of health problems for most members of the population can be treated with a small, carefully selected number of drugs.
- In practice, most doctors and other health professionals routinely use fewer than 200 drug items in treating various illnesses. Training and clinical experience should focus on the proper use of these few drugs.
- Procurement, distribution, and other supply activities can be carried out most economically and most efficiently for a limited number of pharmaceutical products.
- Patients can better be informed about the effective use of drugs when confronted with limited number of drugs.

Implementation of these principles occurs through adoption of national drug policies and through practical management improvement (MSH, 1997).

Since the concepts of national drug policies and essential drug lists were introduced by WHO in 1975 (MSH, 1997), Tanzania as a WHO member state, was not left behind in adopting a national essential drug list and put this list into practice through clinical treatment guidelines.

The Standard Treatment Guidelines and National Essential Drug List:

The Standard Treatment Guidelines and the National Essential Drug List for Tanzania (NEDLIT) were first launched in April 1991, and revised in 1997 (MOH, 1997). The Standard Treatment Guidelines aim at providing all prescribers with a set of treatment guidelines covering most common disease conditions found in the

country so that prescribing practices can be standardised (MOH, 1997). This will simplify drug quantification, procurement and supply and achieve better rational therapeutics, which is the cardinal aim of health care systems.

Current Situation:

As we start the 21st Century, one third of the world's population still lacks access to essential drugs. In the poorest parts of Africa and Asia, over 50% of the population does not have regular access to the most vital essential drugs (WHO, 2000). Today 13 million children under five years of age die every year in developing countries and about 10 million of these deaths are due to acute respiratory infections, diarrhoeal diseases, tuberculosis and malaria. Many of these deaths occur in countries that have the essential drugs list, and most of them could be prevented if the essential drugs were made available (WHO, 2000).

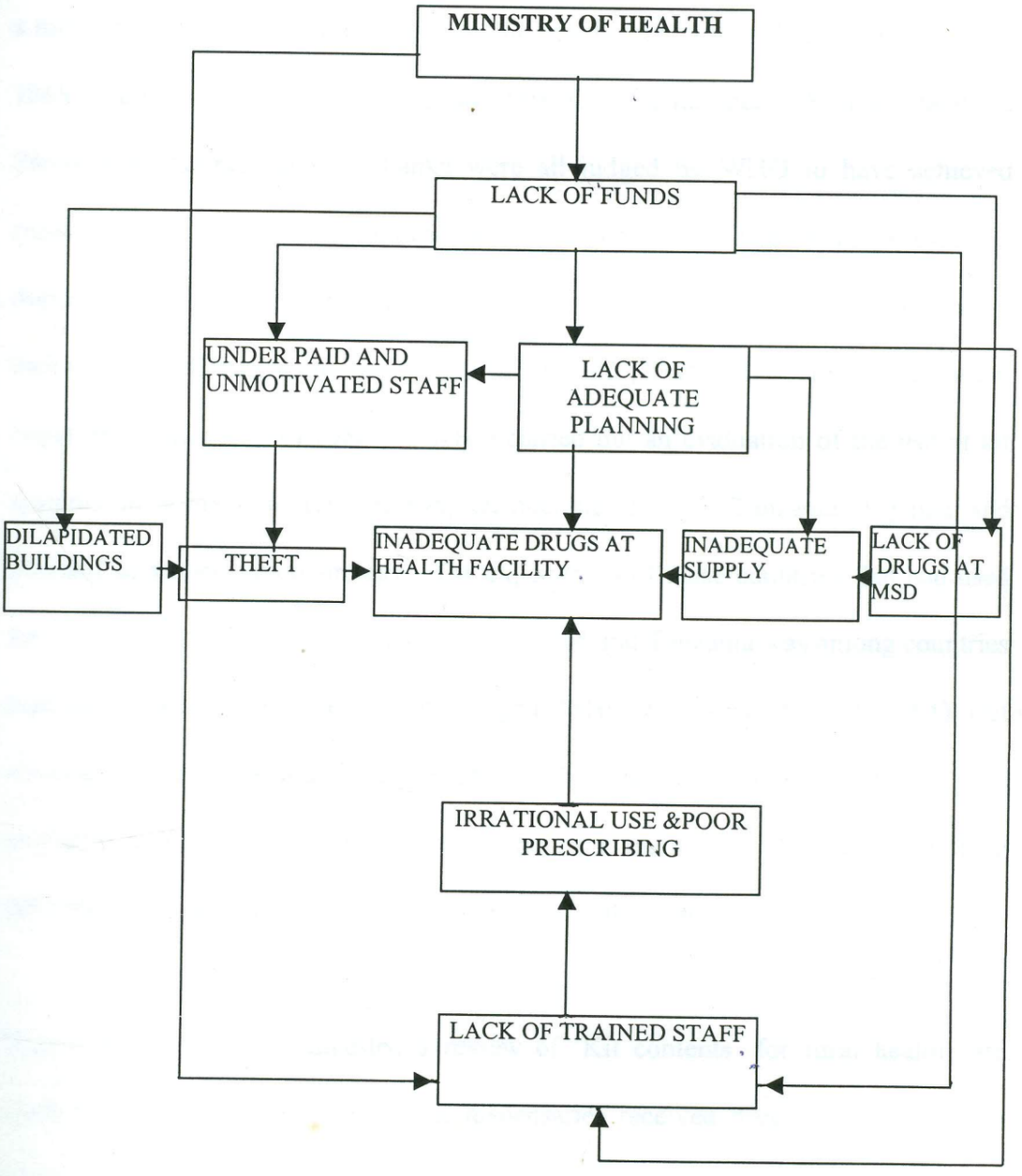
In Tanzania, there are no data collected on deaths which may be associated with lack of essential drugs. However many deaths occur but are not reported or documented, and may occur outside health care facilities where causes are socio-culturally constructed. Many of these deaths could be prevented if essential drugs were available at primary health care facilities, provision of health education to the community and availability of competent health staff.

Various researchers have documented lack of drugs in public health care facilities (Nsimba *et. al.,* 1999; Samuel, 1997) and this information was mainly obtained by interviewing patients. In 1996, the EDP programme was integrated into MSD. It is

expected that changes have occurred in supply and ensuring availability of essential drugs. However, there is need to study the current situation after these changes.

There are many factors influencing availability of drugs at a health care facility. For the purpose of this study, only a few factors were considered such as quantity supplied, regularity of drug supply, prescribing patterns, and storage conditions. Theft of drugs by the health care staff was not covered in this study as the logistics involved to collect such sensitive information require more time. The figure on page 6 shows some relationship of the various factors which may influence availability of essential drugs at the primary health care facilities.

Figure1. Factors influencing availability of drugs at public health care facilities.



1.2. LITERATURE REVIEW

Since the concept of essential drugs was introduced in 1975 by WHO, there has been a mixture of successes and failures in public health care facilities' drug supply. As of 1988, countries such as Algeria, Costa Rica, Cyprus, Indonesia, Kenya, Malaysia, Papua New Guinea, and Sri Lanka were all judged by WHO to have achieved reasonable success in selection, procurement, distribution and coverage for essential drugs (MSH, 1997). Other countries had achieved fair to poor results in these areas, including Cameroon, Cote De'Lvoire, El Salvador, Haiti, Honduras, Madagascar, Niger and Tunisia. In 1988-89, WHO carried out an evaluation of the use of kit systems in some countries (Kenya, Democratic Yemen, Tanzania, Uganda and Bhutan) as a distribution strategy. The experiences of these countries that had used the system over a number of years were reviewed and Tanzania was among countries claimed to have achieved national coverage (MSH, 1997; Mnyika *et. al.,* 1991). But coverage alone is not a sufficient condition, there is need to ensure that drugs are available at all times in covered areas. Therefore there is need to do research to determine availability of drugs in areas covered by the EDP.

Kasilo *et. al.*, (1992) suggested a review of 'Kit contents' for rural health care facilities. Subsequently some of the dispensaries received drugs, which were not conforming to their morbidity patterns. Some rural areas may not be suffering from a particular disease but they receive kits with drugs to treat those diseases, which are rare in their community. This leads to piling of unused drugs which later leads to piles of expired drugs. They also suggested formation of 'local kit', which will consist of locally manufactured essential drugs to supplement the international kit

which was packed abroad. Hence, there is need to research and find out whether these suggestions have been implemented.

In 1991, Munishi recommended an alternative approach to the supply of essential drugs. He suggested that regional and local authorities be encouraged to prepare and pay for supplementary drug kits. These kits would feature items whose supply was inadequate in the current kits and could be expected to vary from area to area because of differing disease patterns. By permitting flexibility, the supplementary kits would help overcome the standardised kits' inability to accommodate regional variations in health conditions, a widely recognised limitation. He went further to suggest supplementary kits to consist primarily of items produced by Tanzania's currently under-utilised pharmaceutical industries. Currently it is not known whether these useful suggestions made by Munishi have been implemented, hence a research was needed to find out whether implementation has been done.

Apart from availability of drugs, proper use is another factor of reducing scarcity. In a study done in Mbeya (Mnyika *et. al.,* 1991), it was found that clinic personnel inaccurately diagnosed illnesses in more than half of the cases they investigated and prescribed drugs irrationally in nearly two thirds of diagnosed illnesses. Their findings indicated that the supply of drugs to facilities, while necessary, is not sufficient, and that education for facility staff and for patients is also an essential component of an effective pharmaceutical supply programme. Today year 2000, is almost 10 years since this study was done, a similar study needs to be done to investigate the current situation.

In 1993, Maselle *et. al* conducted a study on prescribing patterns in Dar es Salaam Region, Tanzania. Some of the factors or drug use indicators studied included; average number of drugs per prescription, prescriptions with injections, prescriptions with essential drugs etc. Their findings were not very different from those obtained in other developing countries, however they observed relatively lower number of drugs per prescription (approximately two) which was associated with non-availability and low stock levels of drugs seen in public dispensaries. This study was conducted in Dar es Salaam therefore may not represent the situation in the rural settings in Tanzania. A similar study had to be conducted in rural settings.

On drug use, the International Network for Rational Use of Drugs (INRUD) an organization of health professionals, administrators, and researchers in developing and developed countries, have undertaken innovative programmes to quantify the use of pharmaceuticals and patient care by introducing use of indicators (Laing, 1990). The drug use indicators are broadly divided into three main groups; namely, prescribing, patient care, and local drug context system. Each group is further subdivided into several groups (Laing *et. al.*, 1991). A number of these indicators have been tested in developed and developing countries (Laing *et. al.,* 1991) and have been used in a number of studies in developing countries(WHO, 1989). One such study carried out in India and utilising hospital outpatient data found that practitioners prescribed an average of 2.9 drugs per patient, and 70% of these were combination drugs (Greenhalgh, 1987). Other studies carried out in Yemen where the Essential Drugs Programme (EDP) had been introduced revealed differences in

the average number of drugs per prescription, being lower in the EDP area compared to non-EDP facilities (Hogerzeil *et. al.,* 1989).

On the utilisation of antibiotics and injectables, one study in Indonesia revealed that 70% of patients attending a health facility received an antibiotic, while 25% of prescription for children were for injectables (WHO, 1989). On drug use manuals, a study conducted in Uganda (WHO, 2000) showed that distributing standard treatment guidelines alone didn't change prescribing habits, more has to be done such as training and supervision. Studies on the adherence to standard treatment schedules, prescribing habits, and dispensing practices are uncommon (Mnyika *et. al.*, 1991; Maselle *et al.,* 1993). The purpose of this study was to study availability of essential drugs and their use by utilising some of the drug use indicators at dispensary and health centre levels. Indicators of drug use which were used in this survey included drug prescribing such as number of drugs prescribed per case and proportions of correct prescriptions. Other indicators include those of local drug system context such as availability of essential drugs at health care facilities and presence of 'Standard treatment guidelines', a reference manual from the Ministry of Health. Again other factors which may influence availability such as presence of alternative health care delivering facilities, regularity of drug supply, staffing, number of users, quantity supplied and storage conditions.

Studies conducted previously do not give sufficient information regarding factors which can influence drug availability in public primary health care facilities. Unlike previous studies, this study offers sufficient information on factors studied and recommendations given at the end of this document can be used to institute effective

control measures. It is my expectation that the District Health Management Team (DHMT) will utilise the results of this study to improve drug availability and quality of care at Primary Health Care level. DHMT can make use of these findings to implement change. The Ministry of Health can also utilise the findings of this study for policy formulation and implementation.

CHAPTER TWO

2.1. STATEMENT OF THE PROBLEM

Despite having an essential drug list, the Tanzanian population still faces a problem of inadequate drugs at primary health care facilities (Nsimba *et. al.,* 1999; Samuel, 1997). Many factors may be associated with this problem. Such factors influencing drug availability may include; little supply or irregularity in supply, irrational use of the few available drugs, poor prescribing habits by health care staff and dilapidated buildings which result into drug destruction and theft. Lack of reference documents such as the EDP Calendar has also been mentioned as one of the problems which may contribute to poor prescribing habits (Maselle *et. al.,* 1993; Mnyika *et. al.,* 1991). Careful assessment of these few but important factors and their rectification may play a significant role in improving drug situation at primary health care facilities. This will ensure constant drug availability and therefore make primary health care truly effective.

2.2. RATIONALE

The importance of drugs in health care cannot be over-emphasized. Drugs are important in restoring health, and therefore reduction in mortality. They may also be used as preventive medicines especially in vaccination, and therefore reducing morbidity. They can further be used for diagnosis (e.g. in Mazzoti test) hence correct prescriptions. The availability of drugs in primary health care facilities in the rural areas where majority of Tanzanians live is therefore very important and it could help to reduce both morbidity and mortality.

Drug availability can only be ensured if its influencing factors are known and rectified. Such factors include appropriate prescribing, storage conditions, regular and enough supplies. In addition, presence of relevant literature and reference manuals on drug use at health facilities may influence drug availability. Such manuals play their crucial part in assisting health care staff where confusion related to treatment or dosing instructions arise, and therefore assist in the provision of better care to the patient.

Previous studies do not give sufficient information which could be used to institute effective control measures hence it was important that this study be conducted in order to explore more information which can be used for future interventions.

2.3. OBJECTIVES

2.3.1 The broad objective was:

To determine factors influencing availability of essential drugs at the public primary health care facilities in Kisarawe district.

2.3.2 The specific objectives were:

1. To determine availability of essential drugs as per 'kit' list in the public primary health care facilities in Kisarawe district in the past six months.
2. To determine proportions of correct prescriptions and compare them with drug availability in health care facilities.
3. To determine the average number of users of the primary health care facilities per month in the past six months and compare them with drug availability.
4. To determine the alternative health care delivery options in the catchment areas.
5. To determine the regularity of 'kit' supply to the primary health care facilities and compare with drug availability for the past six months.
6. To determine the availability and use of the 'standard treatment guidelines from the MOH.

CHAPTER THREE

3.0. METHODOLOGY

3.1. Description of the study area

This study was conducted in Kisarawe district, Coast Region. Kisarawe is one of the six districts of Coast Region. It is bordered by Ilala and Kinondoni districts in the east, Mkuranga district in the southeast, Rufiji district in the south, Morogoro district in the west, and Kibaha district in the north. The estimated population is about 100,000 people. The District covers an area of 3535 square km.

The district has good climatic conditions which favour growth of various types of cash and food crops such as coconuts, cashewnuts, fruits, groundnuts, peas, maize, rice, cassava and sorghum. (Kisarawe district, 1999)

Table 1: Some vital health statistics for the year 1999 in Kisarawe district (Kisarawe district, 1999; TDHS, 1996).

No	INDICATOR	KISARAWE DISTRICT 1999	NATIONAL LEVEL 1996
1.	Crude Birth Rate (CBR)	4.6%	4.1%
2.	Crude Death Rate (CDR)	2.8%	3.2%
3.	Infant Mortality Rate (IMR)	98/1000	88/1000
4.	Neonatal Mortality Rate (NMR)	40/1000	31.7/1000
5.	Maternal Mortality Rate (MMR)	200-400/100,000	529/100,000

There are 13 public primary health care facilities in the district. They include two health centres, Maneromango and Mzenga and eleven dispensaries which include Chole, Gwata, Homboza, Kihare, Kurui, Mafizi, Marui, Marumbo, Msanga, Sungwi and Masangaya.

It is estimated that the two health centres each has a catchment population of 50,000 people, and each dispensary serves about 7,142 of the population (Kisarawe district, 1999). Ten common diseases in the district (Kisarawe district, 1999) arranged in order of their decreasing morbidity include :

1. Malaria
2. Acute Respiratory Infections
3. Diarrhoea
4. Eye infections
5. Anaemia
6. Worm infestations
7. Pneumonia
8. Skin infections
9. Accidents
10. Urinary Tract Infections.

3.2 Study design

This was a cross-sectional study. The methodological framework was based on both quantitative and qualitative methods.

3.3 Sampling techniques and sample size estimation

The two health centers in Kisarawe district were all included in the study while 5 out of the eleven dispensaries were selected randomly, making a total of 7 public primary health care facilities which were studied. A formula to calculate sample size for two means was used to estimate the number of prescriptions required in this survey (Kirkwood, 1988).

$$N = \frac{(U + V)^2(d_1^2 + d_2^2)}{(\mu_1 - \mu_2)^2}$$

Where:

N = Sample size.

U = One sided percentage point of the normal distribution corresponding to 100% - the power. If power is 95%, U = 1.64

V = Percentage point of the normal distribution corresponding to the (two-sided) significance level. If significance level is 1%, V = 2.58

$\mu_1 - \mu_2$ = The difference between the 2 means.

d_1 and d_2 = The Standard deviations in the two groups respectively.

Previous studies conducted in India, Indonesia, Bangladesh, Nepal and Tanzania indicate only the mean number ($\bar{x}$) of drugs per prescription but not the standard deviations (Laing, 1990; Massele *et. al.*, 1993). A pilot study had to be conducted. In this pilot study, twenty prescriptions were randomly collected from both Maneromango health centre (HC1) and Marumbo dispensary (D1). The prescriptions were analysed and mean drugs per prescription ($\bar{x}$) including the standard deviation

(d) were computed. The above formula was then used to calculate the minimum sample size.

Table 2: Results of prescription analysis from the pilot study

Facility	HC1	D1
Number of prescriptions (n)	$n_1 = 20$	$n_2 = 20$
Mean ($\bar{x}$)	$(\bar{x})_1 = 1.90$	$(\bar{x})_2 = 1.65$
Standard deviation (d)	$d_1 = 0.44$	$d_2 = 0.48$

Substituting for the values,

$$N = \frac{(1.64+2.58)^2 (0.44^2+0.48^2)}{(1.9 - 1.65)^2}$$

$$N = \frac{(17.81)(0.19+0.23)}{(0.0625)}$$

$$N = 120$$

The minimum sample of 120 prescriptions could be collected from each group of primary health care facilities making a total of 240 prescriptions. However, a total of 260 prescriptions from each group of primary health care facilities were analysed, making a total of 520 prescriptions.

3.4 Data collection instrument

A structured questionnaire covering the various factors measured in this study was prepared. Checklists to determine drug availability, correctness of prescriptions, presence of alternative health delivery options, monthly users of the health care facilities, and regularity of drug supply were also designed so as to complement information obtained from the questionnaire. Furthermore a checklist was prepared

for collecting information on personnel inventory at the primary health care facilities using MOH guidelines (MOH, 1996).

3.5 Data collection procedures

Data collection involved interviewing staff, observations and review of records. At least one health care staff per facility was interviewed, in most cases the in-charge of the facility. Where the in-charge was not available, his/her assistant was interviewed. Both structured questionnaire and checklists were used to collect information on aspects of drug supply, prescribing patterns and storage (See annexes 2 to 9). A total of 520 prescriptions in seven primary health care facilities were recorded from the HMIS registers and analysed.

3.5.1 Drug availability

Drugs supplied through the 'kit' system were listed and determination of whether they were available in the health care facility was done. Availability was examined for the period of six months retrospectively. For each month, a drug was classified as being available if it was in stock for a period of not less than 21 days (3 weeks). This was effected through reviewing of HMIS record books and by using a checklist which indicated drug names, months, and whether the drugs were available or not available in the respective health care facility in each month. An average drug availability for each drug for a period of six months was then determined.

3.5.2 Drug prescribing patterns

A total of 260 prescriptions were recorded from the two health centres, 130 prescriptions from each. Another sample of 260 prescriptions were recorded from the five dispensaries, 52 from each. The prescriptions were then examined and each was classified as correct or not. A correct prescription should contain correct drug and dosages in relation to diagnosis and age of the patient. It should not contain more than two drug items per each diagnosis (otherwise was classified as polypharmacy, irrationally prescribed and not correct). For each health care facility, a recommended sample of prescription to be collected was divided into 2 groups, that is those prescribed at the beginning of the month and those prescribed at the end of the month. This could give the picture of prescribing habits for the whole month.

A standard prescription should contain the following information:

1. The name of the patient, age and sex.
2. The diagnosis of disease or medical problem
3. Drugs prescribed and dosages
4. The name of prescriber, title and the signature of prescriber.

Prescriptions with ill-defined diagnosis were not included in this study.

3.5.3 Number of users per month

For each health care facility studied, number of users per month was determined as follows: The total number of persons using the facility per month for the past six months was recorded from the available records and the average number of users per month established. This enabled comparison with drug availability.

3.5.4 Presence of other partners delivering health care services

Information on the presence of alternative health care delivery facilities in the catchment areas was established. These included private for profit health care facilities, private for non profit health care facilities, presence of drug stores as well as traditional birth attendants and traditional healers. A comparison of drug availability between areas with many alternatives and those with fewer alternatives was made.

3.5.5 Regularity of drug supply

'Kit' delivery cycle was examined for the past six months, that is from December 1999 to May 2000 to establish whether delivery was on time or not. It was expected that consistent delivering of 'kits' on time could ensure constant availability of drugs in the respective health care facilities. Comparison of drug availability between those facilities with regular and those with irregular supply was established.

3.5.6 Availability and use of standard treatment guidelines

Availability of the MOH reference manual was determined by asking whether it was available or not. However, it was not easy to prove whether the manual was being used or not. In that case information given by the health workers was relied upon.

3.6 Training of research assistants

Two research assistants who assisted in data collection were trained for one day. Training focused on how to administer the questionnaire and handle observation guidelines.

3.7 Data analysis

The preliminary data analysis was done at the field site. Final data processing and analysis were done at the Institute of Public Health of Muhimbili University College using Epi Info Version 6 program of data analysis for quantitative data. Open ended questions were coded and analyzed using the same program.

For comparison purposes, the primary health care facilities were grouped into two groups, that is health centres and dispensaries. List of drugs which were available throughout the period of six months prior to this study for each category of these facilities were determined and prepared. Availability of some selected groups of drugs for the period of the past six months prior to this survey was determined. The results were obtained by first determining availability of each individual drug per month and average availability of each individual drug for the past six months was determined. Later on the group averages were determined. Proportion of drug availability in each facility was determined and then proportion per each group of facilities was also determined. Analysis of prescriptions was performed and proportion of correct prescription per each category of facilities was determined. Cross-tabulations was done between professional qualification of the prescriber and correctness of prescription, the level of professional qualification with highest proportion of correct prescription was then determined. Chi-square (χ^2) analysis was used in cross-tabulations to determine significant differences in proportion of correct prescriptions per each group of facilities. T- test analysis was used in cross-tabulations to determine significance differences between mean number ($\bar{x}$) of drugs per prescription between health centres and dispensaries. In each analysis results were statistically significant if P-value was equal or less than 0.05 ($P \leq 0.05$).

3.8 Biases and limitations

Observers' bias: Some of the questions were based on observations hence they could be easily biased as they require observer's judgement. Such questions include; whether the building was dilapidated or not, whether the security of building was good or not, whether the drug store was clean or not, etc. Therefore it is possible that answers from observation questions contained observers' bias. However such questions were very few and could not possibly affect the results of this study.

Poor hospital records: Poor records and sometimes absence of records in some of these facilities led to some difficulties during collecting data.

3.9 Ethical considerations

Before conducting this research, an ethical clearance was obtained from Research and Publication Committee of Muhimbili University College of Health Sciences of University of Dar es Salaam while permission for doing the work in Kisarawe district was obtained from the District Medical Officer (DMO). Consent was sought from all in-charges of the primary health care facilities selected who allowed data collection after presenting an introduction letter from the DMO.

CHAPTER FOUR

4.0 RESULTS

Seven primary health care facilities (the 2 health centres, that is Maneromango and Mzenga, and the 5 dispensaries, that is Marumbo, Kurui, Msanga, Masanganya and Sungwi) were covered in this survey. Both the health centres and two of the dispensaries were managed by clinical officers (CO) while the remaining dispensaries were under clinical assistants (CA). All the facilities covered did not have a nurse midwife, a public health nurse, a trained nurse or a pharmaceutical assistant. However, each of the health centres had a trained laboratory assistant. Nurse assistants (auxiliaries) were available in each of the facilities. One dispensary did not have a Maternal and Child Health Aider (MCHA)

4.1 Findings from interviews with in-charges of the primary health care facilities

During the study, it was observed that all the primary health care facilities included the study in Kisarawe district depended on the 'Kit' system of supply of drugs. All in-charges of the primary health care facilities interviewed commented that drugs for pain relief (analgesics), were supplied in little amount compared to the actual needs. Three out of seven of the in-charges of the health care facilities said that antibiotics and chloroquine tablets were supplied in little amounts. Other drug items which were said to be supplied in little amounts included chloroquine injection and penicillin-V tablets. Most of the in-charges of the health care facilities argued that they were not involved in deciding on the amounts and varieties of drugs needed by their centres.

It was noted that none of the primary health care facilities under this study had all the required drug items everyday. Five out of seven of the in-charges of the primary health care facilities admitted that many drug items were not available every day in their facilities and put forward the following reasons; some drug items were being supplied in small quantities compare to actual demands and the demand of some of drug items such as analgesics was more.

All of the respondents said that they had drugs which were supplied regularly but rarely prescribed. Some possible reasons given were: -

- Drugs like chlorpromazine tablets were rarely used or there were few users.
- Items like oral rehydration salt were supplied regularly in large quantity than demands.
- Other facilities had fewer users of anti-epiletic drugs, such as phenytoin tablets.
- The demand for some drugs like antimalarials is seasonal dependence. During the rainy season the use of antimalarials increases and vice versa.

Regarding the regularity of the kit supply to the facilities all respondents were of the opinion that transportation of the drug 'kits' from the district to their facilities was regular and on time and the system of transport was smooth.

Four out of seven of the primary health care facilities under this study had clinical officers as prescribers while the remaining three had clinical assistants as prescribers. In four facilities MCHAs were also prescribing while nurse assistants were prescribing in three facilities.

Four out of the seven of the respondents had attended a course on diagnosis and management of malaria in Tanzania which was conducted in Kisarawe in 1997.

None of the primary health care facilities had a Tanzania National Formulary, a British National Formulary nor a 'standard treatment guidelines' and essential drug list issued by the Ministry of Health. Two of the facilities had an EDP calendar and one facility had MIMS Africa as a reference material. Other two facilities had no any reference book (manual).

Five out of seven of the facilities had a prescribers manual for diagnosis and treatment of malaria issued by the Ministry of Health, three of those who had this manual claimed that they were using it.

In the study area there was no private hospital neither a private health centre. There was one missionary dispensary close to Maneromango health centre. There were no private pharmacy but four small medical stores were available selling part two poisons (over the counter products). Two of these were close to Maneromango health centre, one located close to Msanga dispensary and the fourth one located near Sungwi dispensary.

All respondents mentioned that there was a good number of Traditional Birth Attendants (TBAs) and Traditional Healers within their catchment areas. Each catchment area had an average of 30 trained TBAs. The respondents were of the views that more deliveries were assisted by TBAs than by health care staff. This was confirmed by interviewing an average of two TBAs in each catchment area who said

that they were assisting at least one delivery per month. An average of two traditional healers per each catchment area were also interviewed and claimed to attend at least two sick persons per month.

All in-charges of the primary health care facilities said that drug availability was not affected by presence of other partners because drugs were still issued free of charge in the public health care facilities.

Two out of five of the dispensaries had dilapidated buildings which needed major repair. Roofs were leaking during rainy season and they had weak doors and windows. Generally three out of five of dispensaries' buildings had poor security and drugs were stored at home by members of the staff. The two health centres had watchmen at night while dispensaries did not have.

Four facilities, that is the two health centres and two dispensaries had drugstores which were well secured and offer protection and safe storage of drugs. Three facilities, that is the two health centres and one dispensary had clean stores which were not attracting rats. During this study, it was noted that the two health centres had functioning refrigerators while dispensaries did not have. Other drugs storage facilities observed were cupboards in five facilities, wardrobes in one facility and one facility was using boxes to store drugs. In one facility we observed few vaccines which were affected by fridge being out of order.

Although there were dilapidated buildings in dispensaries, no drugs were affected because they were being stored at home by members of the staff.

4.2 Drug availability

Review of records showed that some of the drugs were available throughout the period of six months prior to the study in the two health centres and five dispensaries. Those drugs are listed on tables 3 and 4 below.

Table 3: List of drugs which were available throughout the period at the two health centres.

No	Drug
1.	Aminophylline 100mg tab
2	Benzylpenicilline 5MU vial inj.
3	Benzylbenzoate emulsion 25%
4	Chloroquine 150mg base tab
5	Chloroquine syrup 50mg/5ml Dry power
6	Chlorpheniramine 4mg tabs
7	Chlorpromazine 25mg tab
8	Chlorpromazine 25mg/ml 2ml inj.
9	Epinephrine (adrenaline)1mg/ml inj.
10	Lidocaine inj. 1% 10ml vial
11	Mebendazole 100mg tab
12	Procaine penicilline Fort. 4MU vial inj.
13	Oral Rehydration Salt sachet
14	Oxytetracycline eye oint. 0.1% 5g tube
15	Vitamin A 100.000 IU

Table 3 indicates that 15 drug items were available throughout the period of six months prior to this study at the two health centres. According to the list in the checklist (see annex 5), this is 44% of all the required drug items in health centres.

Table 4 indicates that 6 drug items were available throughout the period at the five dispensaries during the same period. According to the list in the checklist (see annex

5), this is 18% of all the required drug items in dispensaries. This indicates that, in general drug availability was better at the health centres compared to the dispensaries during the past six months prior to this study.

Table 4: List of drugs which were available throughout the period at the five dispensaries.

No	Drug
1.	Chloroquine 150mg base tab
2	Chlorpromazine 25mg/ml 2ml inj.
3	Epinephrine (Adrenaline) 1mg/ml inj.
4	Oral Rehydration Salt sachet
5	Oxytetracycline eye ointment. 0.1% 5g tube
6	Vitamin A 100.000 IU

Table 5: List of drugs which were on average available in a period of less than two weeks in dispensaries in each month for the past six months.

No	Drug
1.	Acetylsalicylic acid 300mg tab
2.	Benzoic acid cpd oint. 40g
3.	Chlorpheniramine 4mg tab
4.	Co-trimoxazole 200/40mg/5ml Susp.
5.	Metronidazole 250mg tab
6.	Paracetamol 500mg tab
7.	Phenobarbital 30mg tab
8.	Phenoxymethyl penicillin V 250mg
9.	Phenytoine 50mg tab

In health centres, all studied drug items were available for a period of more than two weeks in each month. In dispensaries 9 drug items were available for a period of less than two weeks in each month for the period of the past six months. Table 5 again suggests that dispensaries had poor availability of drugs compared to the health centres as many drug items could not last for a period of two weeks per moth.

Table 6: Comparison of drug availability between health centres and dispensaries for some selected groups of drugs for the past six months.

No	Group of drugs	Availability	
		Health Centres	Dispensaries
1.	Anti-malarials (n=3)	86%	85%
2.	Injectable antibiotics (n=2)	100%	92%
3.	Analgesics (n=2)	66%	42%
4.	Skin preparations (n=2)	78%	68%
5.	Anti-infectives (n=7)	72%	57%
6.	Hypno-sedatives (n=2)	58%	60%
7.	Anti-psychotic (n=2)	100%	98%
8.	Anti-worms (n=1)	100%	90%
9.	Anti-histamine (n=1)	100%	43%

Table 6 indicates average drug availability of some groups of drugs for the period of the past six months prior to the survey. The results were obtained by first determining availability of each individual drug per month and average availability of each individual drug for the past six months was determined. Later on the group averages were determined. In each group there was better drug availability in the two health centres compared to the five dispensaries except for hypno-sedative drugs (diazepam injection and phenobarbital tabs) which possibly were mainly used for in-patients in health centres.

Table 7: Relationship between drug availability and users per month in the past six months.

Facility	Proportion of drug availability	Average number of users per month
Health centres	81%	450
Dispensaries	72%	545

In table 7, proportion of drug availability was determined by using records of availability of each drug item for the past six months. Also average number of users was obtained by using records of users of each facility per month for the past six months. This table shows that health centres had higher proportion of drug availability for the past six months and that the number of users per month was low in health centres. On average drug availability was 81% and 72% for health centres and dispensaries respectively for the past six months. Records also show that the average number of users per month was 450 and 545 for health centres and dispensaries respectively.

Table 8: Relationship between professional qualification of the prescriber and correctness of the prescriptions.

No.	Prescribers	Total number of prescriptions (n=520)	Proportion of correct prescription
1.	Clinical Officers	$n_1 = 333$	87.1%
2.	Clinical Assistants	$n_2 = 136$	86.8%
3.	MCHAs	$n_3 = 43$	81.4%
4.	Nurse Assistants (Auxiliaries)	$n_4 = 8$	75.0%

Table 8 shows that Nurse Assistants had lowest proportion of correct prescription while clinical officers had highest proportion of correct prescriptions.

Table 9: Proportion of correct prescriptions per each group of facilities.

Group	Facility	Correct prescriptions
1.	Health centres	81.5% (n=260)
2.	Dispensaries	91.2% (n=260)

$\chi^2 = 10.19$ P-value = 0.001 degrees of freedom = 1

Dispensaries had higher proportion of correct prescriptions compared to health centres. Results show that the difference of proportions of correct prescriptions between the health centres and dispensaries was statistically significant ($P < 0.05$).

Table 10: Number of drugs prescribed per each prescription.

Number of drugs prescribed	Frequency	Percent
1	136	26.2%
2	313	60.1%
3	67	12.9%
>3	4	0.8%
Total	**520**	**100%**

Table 10 indicates that 86.3% of the prescriptions carried 1 to 2 drug items, 12.9% of prescriptions had 3 drug items, 0.8% of the prescriptions had more than 3 drug items.

Table 11: Mean number ($\bar{x}$) of drugs per prescription.

Item	Health Centres	Dispensaries
Number of prescription (n)	$n_1 = 260$	$n_2 = 260$
Mean ($\bar{x}$)	$(\bar{x})_1 = 2.1$	$(\bar{x})_2 = 1.7$
Variance (v)	$(v)_1 = 0.37$	$(v)_2 = 0.41$
Standard deviation (d)	$d_1 = 0.60$	$d_2 = 0.64$

t-test = 7.659 P-value =0.000

Results show that the difference between two means is statistically significant ($P<0.005$) and that the dispensaries have low mean number of drugs per prescription. As per the given definition of correct prescription in this study, low mean number of drugs per prescription contributes to high proportion of correct prescription in dispensaries.

CHAPTER FIVE

5.0 DISCUSSION

From the findings of this study, it appears that primary health care facilities in Kisarawe district are poorly-staffed. Results of the personnel inventory show that most of these cadres of staff were not available. There were no Assistant Medical Officers at the health centres visited and 3 out of 5 dispensaries in the study area were managed by Clinical Assistants. There were no Nurse Midwives nor Public Health Nurses in all the studied facilities. All five dispensaries did not have a trained laboratory assistant neither a pharmaceutical Assistant was available at the health centres.

According to the MOH (1996), we can describe these primary health care facilities that they were ill-staffed and the staffing guidelines issued by the MOH is not fulfilled. If we want to improve the quality of care in primary health care facilities, staffing should be improved. There is another staff cadre which was noted during this survey, the nurse assistants. This cadre is not mentioned by the Ministry of Health guidelines. The cadre is poorly trained by undergoing only one year course, and yet is left to conduct various technical activities which required more trained and skilled people. For example this cadre makes diagnosis, prescribes drugs, dispenses drugs, etc. In prescriptions analysis, the nurse assistants ranked the least cadre with number of correct prescriptions.

Results of this study indicate that essential drugs were not available at all times in adequate amounts, and therefore the definition of essential drugs as per WHO (1999)

is not fulfilled. Interviews revealed that some drugs were either supplied in little amounts than the actual demands or supplied in large quantities than the actual needs. These findings are complemented by those obtained through review of records where some of the few drug items were available throughout the period and others were available in less than two weeks per month. In a study conducted in Dar es salaam (Massele *et. al.,* 1993) drug availability ranged from 85% to 60%. However, the 1993 study considered only 10 drug items which were used in the treatment of five common diseases. Both the two studies were conducted under the same system of drug supply through the EDP kit and probably this might explain the similarities in the drug availability.

In the present study, the proportion of availability of injectable antibiotics was very high, perhaps suggesting that there is no abuse of this group of drugs. A study done by Massele *et. al.* in 1993 also recorded 80% availability of procaine penicillin injection. Availability of anti-infective preparations in this study was above 50%, which suggests proper use. Studies conducted in developing countries (Laing, 1990) showed that antibiotics were commonly used due to the high infection rate.

More effort is needed in order to ensure daily availability of each drug item so that definition of essential drugs can be fulfilled. In health centres about 15 out of 34, that is 44% of essential drugs were available throughout the past six months while in dispensaries only 6 out of 33, that is 18% of essential drugs were available throughout the same period. This means that, 56% of essential drugs were not

available at all times in health centres and in dispensaries 82% of essential drugs were not available at all times for the period of past six months.

The primary health care facilities in Kisarawe district still depend on the 'Kit' system of supply of essential drugs. Todate, year 2000, it is 17 years since the system was initiated in 1983. Researchers have criticised this system as being inefficient (Munishi, 1991; Kasilo *et. al.,* 1992). The system was criticised as drugs were distributed without considering morbidity patterns. Also suggestions such as local authorities such as local government be encouraged to pay for supplementary drug kits which will help overcome the vertically supplied standardised 'kits' which did not accommodate regional variation in health conditions.

According to these findings, some of these suggestions issued by researchers have been taken into consideration and various changes are being implemented. The morbidity pattern is somehow being taken care off, but there are still some problems here and there. For example, one of the catchment areas in the study area had patients suffering from schistosomiasis. This was also cited by Kasilo *et. al.* (1992) where presence of schistomiasis was observed in some villages in Bagamoyo. The current kit list does not have drugs for schistosomiasis therefore creating inconveniences to the patients who had to travel long distance seeking this drug. The issue of supplementary kit has been incorporated as currently there is local 'kit' which contains locally manufactured essential drugs to supplement the international kit.

The transportation system is now smooth due to formation of Integrated Transport Management System which is now operational in the districts and regions for the purposes of supervision and distribution of drugs and supplies including vaccines (Dr. **Hingora**: personal communication).

The MOH is currently working at integration of numerous vertical health programmes such as EPI, EDP, etc with the objective of improving their performance(MOH, 1999). In this line the Medical Stores Department (MSD) is already integrating the processes as regards procurement and distribution of drugs, vaccines and other supplies. The other objective of the integration processes is to provide cost-effective health packages that would suit local needs and priorities. Hence the previously vertical EDP system is now integrated into the Medical Stores Department.

There is a problem of the quantities supplied under the 'kit' system. There are drugs which are supplied in large quantities to both health centres and dispensaries, and there are products which are supplied either in low quantity or the demands are high. Findings from review of records showed that some drugs were available throughout the period while others were available in less than two weeks per month. This indicates that drug supply by using the kit system is always not related to demand.

Again supply in health centres was twice as much as that in dispensaries while average users per month was high in dispensaries compared to health centres.The referral system is currently not well functioning (MOH, 1999). This may be one

among the many factors that led health centres to have high proportion of drug availability (81%) compared to dispensaries (72%).

A study done in Mbeya indicated that better trained personnel like Medical Assistants (Clinical Officers) were capable of prescribing correct drugs for specific illness (Mnyika *et. al.*, 1991). Results of this study also showed that clinical officers had better proportions of correct prescriptions than clinical assistants, MCHAs and Nurse Assistants.

However in the present study the definition of correct prescription was more related to number of drugs per each prescription. This could imply that those facilities whose prescriptions contain many drugs per prescription could easily run out of drugs. However, results showed that, dispensaries had higher proportion of correct prescriptions (91.2%) compare to health centres (81.5%). Health centres were prescribing higher number of drugs per prescriptions. Drug availability in health centres again remained better than that of dispensaries. This can be explained by the fact that the 'kit' supplied to health centres contained twice as much as the amount of drugs supplied to dispensary, and it was observed that the average number of users per month in dispensaries was higher than that in health centres. The lower drugs per prescription in dispensaries may also have been due to non-availability and low stock levels of drugs seen in public dispensaries supplied through the kit system as part of the essential drugs programme (Maselle *et. al.*, 1993).

In dispensaries, it was noted that some drugs were being stored at home. This can allow some pilferage of drugs. Storage of drugs at home is not acceptable and was

supposed to be a temporary measure but it seems that it is a period of 2 years now since some facilities had started the system of storing drugs at home. This can affect availability of drugs in the health care facility by facilitating theft by dishonest staff if immediate measures are not taken. Theft of drugs by the health care staff was not studied in this survey due to limited time. Because salaries are very low and staff are not motivated, some dishonest staff may engage themselves in theft of drugs so that they can earn extra-income to supplement the low salaries paid by the government.

The health sector include all those who deliver health care, public or private, modern or traditional, licensed or unlicensed and includes doctors, nurses, hospitals, clinics, pharmacies, village health workers, traditional healers and traditional birth attendants (Dr. **Hingora**: personal communication).

In the study area, one missionary dispensary and two medical stores were located close to one of the two health centres. The missionary dispensary was serving about 300 patients per month while each medical store attended an average of 20 patients per month. Due to the fact that health centres recorded high availability of drugs, having other partners close or within the catchment area of one health centre might have contributed to high availability of drugs in health centres to a certain extent. There were other two medical stores, one was located close to Msanga dispensary and the other close to Sungwi dispensary. However their contribution towards drug availability in dispensaries was not significant. Some of the reasons issued for low drug availability at the studied public primary health care facilities were that the facilities were still giving 'free' services, and there were no many private or

alternative facilities. With the up-lifting of restriction of private practice for profit by the government, it is expected that the number of facilities offering services for profit will soon increase countrywide and may improve drug availability.

There was no any single facility which had the 'Standard Treatment Guidelines', the booklet which was issued by the Ministry of Health. The booklet aims at providing all prescribers with a set of treatment guidelines covering most of the common disease conditions found in the country so that prescribing practices can be standardized (MOH, 1997).

Absence of these booklets had some impacts on prescribing habits. For example, malaria cases were prescribed different number of drugs per prescriptions. Some patients were prescribed 3 types of drugs while others were prescribed 2 or 1 drug. Some of under fives were prescribed with Acetylsalicylic acid tablets which is contra-indicated due to the possibility of aggravation of Reye's syndrome (BNF, 1997). It was not clear whether paracetamol tablets were not available or it was ignorance which led children to be prescribed with aspirin. Therefore availability of the reference books, training of how to use them, effective supervision and frequent refresher courses are crucial issues.

Studies done in Uganda (WHO, 2000) showed that availability of 'Standard treatment guidelines' alone without training and supervision did not bring any impact. Hence availability should go hand in hand with training and effective supervision. A study done in Mbeya (Mnyika *et. al.*, 1991) showed that there is some

relationship between access to treatment schedules and accurate drug prescription. If there were adequate provision of treatment schedules to all health workers, diagnosis and prescriptions might improve. Health workers who had access to EDP treatment schedules were significantly better in diagnostic acumen than those without (Mnyika *et. al.*, 1991).

It was not clear on why the 'standard treatment guidelines' from the MOH were not available at the studied public primary health care facilities. Several copies were produced in 1997 which could be enough for each facility in the country. Again many copies of Tanzania National Formulary were produced in 1998 but none was found in these facilities. It is possible that these reference books were distributed to district and regional hospitals alone without considering the primary health care facilities.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Results of this study indicate that drug availability was influenced by the quantity supplied, users per month, availability of alternative health care facilities and availability of good storage conditions. Generally drug availability in public primary health care facilities is inadequate as very few drug items were available throughout the period while some drug items could not last even for a period of two weeks per month.

Dispensaries had higher proportion of correct prescriptions but low drug availability which might be described by low quantity of drug supplied and large number of users per month than the health centres. Higher proportion of correct prescriptions in dispensaries might also be related to low number of drugs prescribed per prescription which could have happened because of the few stocks supplied to dispensaries. It is my expectation that if the supply was the same, and number of users and storage conditions were the same, dispensaries could have better availability of drugs than the health centres. Therefore higher proportion of correct prescriptions could also influence drug availability. If the above factors are improved, dispensaries may also account for better availability of drugs. To ensure drug availability to all public primary health care facilities the studied factors need to be rectified and amount of drugs supplied per month should reflect average number of users.

6.2 Recommendations

1. Staffing should be improved following guidelines issued by the MOH 1996. Most of the facilities studied were poorly staffed.
2. Drugs piling in one facility should be re-distributed to other facilities.
3. Dilapidated buildings should be repaired and storage conditions be improved so that drugs can safely be stored at the health care facilities.
4. Cost sharing should be introduced in the public primary health care facilities.
5. Another system of drug supply such as Community Health Fund may now be introduced to complement the old 'kit' system which has proved to be ineffective.
6. 'Standard Treatment Guidelines' should be distributed, training be conducted to all primary health care staff and an effective supervision be established. Supervision should include investigation of prescribing patterns and re-distribution of the piling drugs.
7. A similar study may be conducted to districts with more alternatives of health care delivery and with another system of drug supply such as Community Health Fund, results should be compared.
8. Future research to assess theft of drugs by health care staff as a possible factor influencing drug availability should be conducted.

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