RATIONAL USE OF MEDICINES IN RELATION TO PHARMACEUTICAL SUPPLY SYSTEM IN MUNICIPAL HOSPITALS OF DAR ES SALAAM REGION

By

BWILE, Paschal Protas B

Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Pharmaceutical management of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***Rational Use of medicines in relation to pharmaceutical supply system in municipal hospitals of Dar-es-Salaam region***, in partial fullfilment of the requirement for degree of the Master of Science of Pharmaceutical management of Muhimbili University of Health and Allied Sciences.

……..

Dr. R.S. Malele

(Supervisor)

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DEDICATION

This work is dedicated to my lovely wife Kwanduvenosa Christopher Kisula and my daughter Leocadia Paschal Bwile.

ABSTRACT

Background: Pharmaceutical management involves set of practices aiming at ensuring timely availability and appropriate use of safe, effective and quality pharmaceuticals and services in any health care setting. Rational use of medicines is often associated with efficiency of pharmaceutical supply system that operates in the health care system. Pharmaceutical supply system involves planning and programming for pharmaceutical requirements, procurement, storage and distribution which are the necessary steps towards rational use of medicines.

Study design: A cross-sectional descriptive study to determine rational use of medicines in relation to pharmaceutical supply system in three conviniently selected municipal hospitals of Dar-es-Salaam region was conducted between January and May 2011.

Study objective: To determine impact of pharmaceutical supply system on rational use of medicines in municipal hospitals of Dar-es-Salaam region.

Materials and methods: Retrospective data was collected from July 2009 to June 2010 for the pharmaceutical supply system performance, availability of Tracer medicines and mechanisms to improve rational use of medicines. A total of three hundred (300) out-patients were prospectively interviewed for collection and verification of data on hospitals' fulfillment on patients' prescribed medicines requirements using World Health Organization medicine use indicators and operational checklists.

Results: The supply system had the order delivery time of 1 day and service level i.e. order fulfillment performance of 54.9%, hospitals made on average 76 procurement orders in year 2009/2010 with an average of more than twelve procured on emergency basis. 8.9% of the tracer medicines were found to have expired on the day of visit and only 40% of the stock records were found to have no discrepancies. Mean average number of medicines per prescription was 2.8 ± 1.2, with only 60.4% of the prescribed medicines dispensed, 55.7% prescribed in generics and 89.4% prescribed from the NEMLIT. 49.7% was the average percentage of reference materials available in the

hospitals. Other mechanisms of improving rational use of medicnes included establishment of HTC, inservice training and prescribing reviews. The average percentage time out of stock was 29.9% i.e. on average one of the tracer medicines was out of stock for atleast 29 days.

Conclusion: There is a need for more emphasis on the improvement of pharmaceutical supply system performance as it has influence on rational use of medicines by influencing availability of medicines.

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LIST OF ACRONYMS AND ABBREVIATIONS

ALU	Arthemether and Lumefantrine
ASA	Acetyl salicylic acid
BNF	British National Formulary
CHF	Community Health Funds
CMS	Central Medical Stores
DDH	Designated District Hospital
DLD	Duka la dawa
DMO	District Medical Officer
EML	Essential Medicines List
HIV/AIDS	Human Immunodefiency Virus/ Acquired Immuno-Deficiency syndromme
HTC	Hospital Therapeutics Committee
ILS	Intergrated Logistic System
MOH&SW	Ministry of Health and Social Welfare
MO^{I}/C	Medical Officer In-charge
MRF	Medicine Revolving Funds
MSD	Medical Stores Department
MSH	Management Sciences for Health
MUHAS	Muhimbili University of Health and Allied Sciences
NEMLIT	National Essential Medicine List of Tanzania

NHIF	National Health Insuarance Funds
NHP	National Health Policy
OPD	Out Patient Department
ORS	Oral Rehydration Salt
PHF	Public Health Facility
STG	Standard Treatment Guidelines
TB	Tuberculosis
TNF	Tanzania National Formulary
TPH	Tanzania Pharmaceutical Handbook
VP	Vertical Programme
WHO	World Health Organization

CHAPTER ONE

1.1.0 Introduction

Low income countries have a limited budget allocated to health care particularly for procurement of pharmaceuticals. It is necessary to optimize expenditures for purchase of pharmaceuticals by selecting essential medicines and promoting rational use of medicines. Tanzania developed its essential medicines list (NEMLIT) since 1983 and the updated third edition of 2007 has provided a rational basis not only for pharmaceutical supply at various levels within the health care system, but also promotes rational use of pharmaceuticals.

Hogerzeil reported inefficient and irrational use of medicines as a widespread problem at all levels of health care system. Per capita wastage from inefficiencies and irrational use tend to be greatest in hospitals; this is particularly upsetting since resources are scarce (Hogerzeil et al 1989). However, the study done in Nepal reported that improved pharmaceutical supply and cost-sharing resulted in more appropriate prescribing in terms of dosage, but it also led to more polypharmacy and excessive medicine use (Chalker J et al 1992). Similarly from the studies done in Bangladesh and Nigeria found that medicines were apparently prescribed according to which medicines were available at health centres and not necessarily according to the patient needs (Guyon et al 1994; Benjamin et al 2002)

Pharmaceutical management has been identified as a key area that deserves improvement. Often the first problem identified is that district health facilities particularly hospitals do not have enough medicines in stock. Furthermore, it has been shown that lack of availability of essential medicines form a problem for the treatment of diseases that predominantly affect the developing countries (Pecoul et al 1999). The availability of pharmaceuticals has been one of the most visible symbols of quality of care of any health care system. In Nigeria, patient visits dropped by 50% to 75% when health facilities ran out of commonly used medicines (World Bank1994). Ensuring

regular supply of pharmaceuticals to hospitals has been one of the important steps towards improvement of quality of health care.

However, it is also necessary to address medicine use patterns by ensuring that the supplied medicines are used rationally. Therefore, it is the aim of this study to determine rational use of medicines in relation to the pharmaceutical supply system at the municipal hospital levels of health care system in Tanzania.

1.2.0 Statement of the problem

Careful management of pharmaceuticals is directly related to health system's ability to address public health concerns. The pharmaceutical supply system in district hospitals often runs into difficulty of achieving their goals of supplying medicines continously and uninterupted. Increased supply of medicines often is associated with increased opportunity for appropriate use.

Inappropriate patterns of medicines use behavour can result into wastage of scarce economic resources that could otherwise be used for other necessities. Unnecessary overuse of medicines can stimulate inappropriate patient demand and lead to medicine stock outs and loss of patient confidence in the health system.

Inappropriate use of medicines is harmful for patients in terms of poor patient clinical outcomes and avoidable adverse drug reactions. Overuse of antimicrobials exerts pressure to increase rates of antimicrobial resistance equally overuse of injections with the risks in transimission of Human Immunodefiency Virus /Acquired Immunodeficiency Disease Syndromme (HIV/AIDS).

There is need to determine how medicines essential to saving lives and improving health are supplied and used appropriately at district hospitals. Efficient pharmaceutical supply system increases the chances of improving rational prescribing, use and lowering treatment costs.

1.3.0 Rationale of the study

Inadequate pharmaceutical supply system may compromise rational use of medicines which is one of the major problems in the current world of pharmaceutical field. Currently in the United Republic of Tanzania, about 70% of essential medicines are imported, which consume a large part of the country's foreign exchange reserves. Needlessly to say of the little contribution of donated pharmaceuticals in the supply of essential medicines in the country. Furthermore, contribution of local industries is only 30% of the pharmaceutical needs in the country which is still very small. It is consequently necessary to use pharmaceutical supplied in a rational manner since resources are scarce.

This study will provide information to be used in identification of the gaps in rational use of medicines in relation to the pharmaceutical supply system. Furthermore information provided will be used to advice relevant authorities on improvement of supply and appropriate use of pharmaceuticals within the public health facilities. To my knowledge there has not been a study addressing rational use of medicines in relation to the pharmaceutical supply system in the country.

1.4.0 OBJECTIVES

1.4.1 Broad Objective

To determine the impact of pharmaceutical supply system on rational use of medicines in district hospitals of Dar-es-salaam-Region

1.4.2 Specific objectives

1. To determine the procurement system for tracer medicines in district hospitals of Dar-es-salaam-region
2. To determine the efficiency of inventory management system in district hospitals of Dar-es-salaam
3. To determine how effective is the inventory management of tracer medicines in the district hospitals
4. To determine the percentage of tracer medicines available in the district hospitals for the year 2009/2010
5. To determine the mechanisms used in district hospitals of Dar-es-salaam region to improve rational use of medicines

1.4.3 Research questions

1. At what average percentage are the procurement ordered medicines (per procurement cycle) delivered at the health facilities by the existing pharmaceutical supply system?
2. What is the status of medicine stocks and the existing inventory management system particularly in the hospitals?
3. Are there any means or stratergies used at health facilities of interest hospitals to improve and monitor rational use of the supplied medicines?
4. How rational are the supplied medicines used at the health facilities according to the WHO rational use of medicines indicators?

CHAPTER TWO

2.0. Literature review

Rational use of medicines is one of the crucial parts of the National Health Policy (NHP) (Amanda Le Grand 1999). The World Health Organization conference of experts which convened in Nairobi in 1985 defined rational use of medicines as follows; Rational use of medicines requires that patients receive medicines appropriate to their clinical needs, in doses that meet their own individual requirements, for adequate period of time, and at the lowest cost to them and their community (WHO 1985). To achive rational use of medicines there should be a reliable pharmaceutical supply system for the planning and programming of pharmaceutical needs, procurement, storage and distribution pharmaceuticals.

Up to date treatment with medicines is one of the most cost-effective medical interventions known, and the proportion of national health budgets spent on medicines range between 25% and 65% in low income countries (WHO 2004). It has been further reported by World Health Organization that more than 50% of national and 60% to 80% of individual health care expenditures are spent on medicines (WHO 2004). Total expenditures on medicines in low income countries were estimated that would have reached a magnitude of US $200 billion by the year 2000 (World Bank 1994). Tanzania had total medicine budget for the public sector for the year 2000 of US $14.1 million. This amount had increased to over 31 millions in the year 2006 and went up to 44 millions in the year 2008 (MoH&SW 2008).

Several studies on medicine use patterns have indicated that about 50% of all medicines worldwide are prescribed, dispensed, or sold inappropriately and 50% of patients fail to take them correctly (Walker et al 1990; WHO 2002; Sri Suryawati 2005). Irrational use of medicines such as over or under prescribing, multi-medicine prescribing, inappropriate use of medicines, prescribing unnecessary expensive medicines and unnecessary or overprescribing of antibiotics and injections are the most common

problems of use of medicines that have been documented in previous studies (Benjamin et al 2002; Hogerzeil et al 1995; Hatin et al 1999; Kane et al 1999; Simonsen et al 1999).

A number of efforts have been undertaken to improve use of the supplied medicines in health facilities, such efforts include use of; standard treatment guidelines (STG) and other reference books, generic prescribing, establishment of hospital therapeutic committees (HTC), counselling services, laboratory services and essential medicines list (WHO 2006).

Introduction of essential medicine list (EML) is to help countries including Tanzania, to rationalize the prescribing, purchasing and distribution of medicines, thereby reducing costs to the health system. Apart from that; essential medicines list regulates procurement and supply of medicines in the public sector, similary for schemes that reimburse medicine costs, medicine donations and promotion of local industries in the production of medicines.

The model essential medicine list includes about 250 medicines, which is generally considered sufficient to treat the majority of diseases (Amanda Le Grand et al 1999). Nevertheless, medicines continue to be in short supply, even when large portions of the health care budget are allocated for their procurement (van Wartensleben et al 1983; Guyon et al 1994). Large portions of the budget have been allocated in the procurement of pharmaceuticals because medicines are costly, save lives and improve health of the society in general.

High stock-outs rates of required medicines have been a big challenge to the credibility of the public health system in Tanzania so far. The study done on the national assessment on medicine supply management system in Tanzania found that availability of twenty tracer medicines was at an average of 79% in year 2008, in the medical stores department zones (MoH&SW 2007). The stock out situation measured by the number of days ranged between 1 and 183 days (MoH&SW 2007) and according to the baseline survey of year 2002 the stockout duration of 28 days was 75% (MoH&SW 2002).

The low availability of medicines is due to some factors such as poor medicine supply and distribution systems, insufficient health facilities and staff (Sitanshu et al 2009; Sakthivel et al 2005; Ndyomugyeni et al 1998; Matowe et al 2008), low investment in health, and the high cost of medicines. Other issues that affect availability of medicines include lack of careful selection, incorrect forecasting and quantification, high prices, poor quality, theft, improper storage, short expiry dates of medicines, irrational prescribing, and incorrect use of medicines by providers and patients (Foster 1991).

The pharmaceutical supply system has been described by Phanouvang as all the processes that cover planning and programming for pharmaceutical needs, procurement, storage and distribution in the country (Phanouvong 2008). In Tanzania pharmaceutical supply system involves utilization of an autonomous body i.e. Medical Stores Department (MSD) for supply of medicines in the public health facilities and some private health facilities.

Medical stores department was established in 1993 and operates on self sustaining medicines revolving funds (MRF) with nine zones in the country as shown in figure 1.

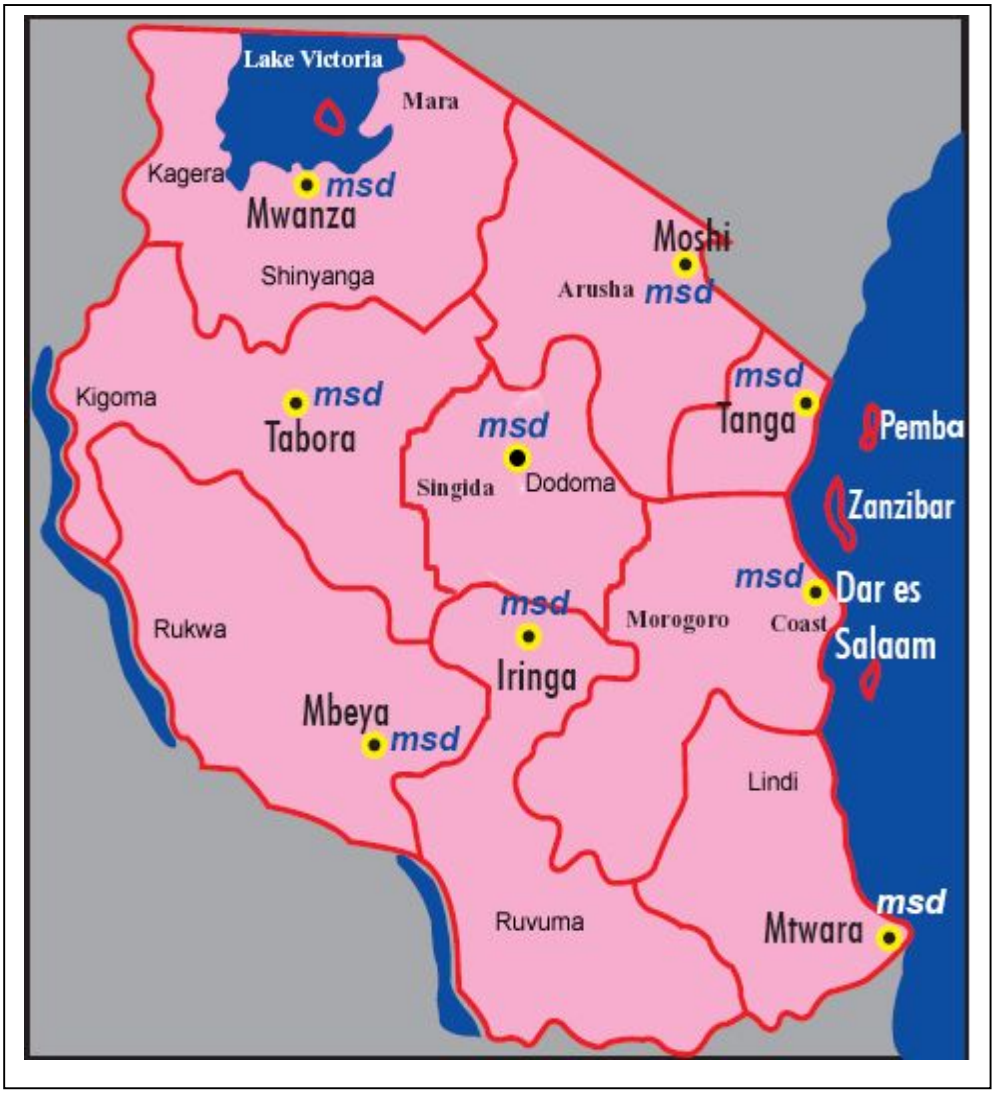


Figure1: Distribution of Medical store zones in Tanzania

Source: Medical Store Department

Several approaches to pharmaceutical supply systems have been established in both public and private sectors; these include conventional central medical stores (CMS), direct delivery (non-CMS) system and prime vendor system (MSH & WHO 1997). For the direct delivery system, the governement tenders to establish prices and supplies for essential medicines, which are then delivered directly to district's health centers and dispensaries (MSH & WHO 1997). The direct delivery system is piloted in Tanga region in the north east of Tanzania.

The prime vendor system which is a non CMS system, the government offices responsible for medicine procurement establish a contract with a single prime vendor as well as separate contracts with medicine suppliers. The prime vendor is contracted to manage medicines distribution by receiving medicines from suppliers, storing and distributing them to the districts (MSH & WHO 1997). In Tanzania the prime vendor system started operating in November 2004 for faith based hospitals and dispensaries (MoH&SW 2002).

Supply of pharmaceuticals in Tanzania generally goes through four different supply chains. Three of these are administered by MSD which include; bulk distribution of essential medicines, Kit's and indents packs distribution and Vertical programme (VP) items distribution and the fourth one would have been distribution of essential medicines by private wholesalers as shown in figure 2 below.

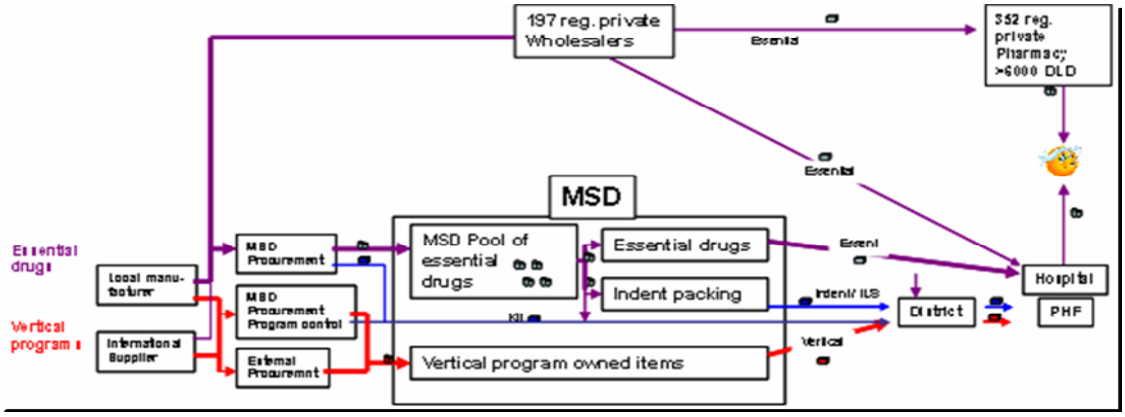


Figure 2: Flow of medicines in Tanzania

Source: Medical Stores Department

District hospitals have their own medicines accounts at MSD with funds allocated from the MOH&SW, and hold their own account with all user charges (user fees, National Health Insuarance Funds (NHIF), possibly Medicine Revolving Funds (MRF) and Community Health Funds (CHF). When an order form arrives at the MSD, money is transferred from the hospital's account to MSD account and the medicines are made available to the hospital.

The Hospital Therapeutics Committee or any other special committee is supposed to play a key role in pharmaceutical supply system and use of medicines in these district hospitals.

The Medical Officer in Charge (MO^{I}/C) signs the order that releases the medicines at MSD and the District Medical Officer (DMO) countersigns the order. When an order is placed with MSD for the MOH&SW budget - the medicines are made available (if money is available at the account) to the district hospital or Designated District Hospitals (DDH), the money is deducted from the hospital's allocation and credited to MSD.

Several efforts have been established to strengthern pharmaceutical management system that aim at delivering the correct medicines to patients who need them, and the steps of selection, procurement, and distribution of medicines are necessary precusors to the rational use of medicines (MSH 1995). See figure 3 below.



Figure 3: Medicine management cycle

Source: management sciences for health (MSH)

Selection involves reviewing the prevalent health problems, identifying treatments of choice, choosing individual medicines and dosage forms, and deciding which medicines should be available at the facilities. Selection of products is done in accordance with the National Essential Medicines List for Tanzania (NEMLIT) at the level of ministry of health and social welfare. The MSD further selects a list of medicines and medical

supplies for its price catalogue. Facilities such as hospitals, health centers and dispensaries use MSD price catalogue as a guide to place orders with MSD.

Procurement includes forecasting and quantifying pharmaceutical requirements, selecting procurement methods, managing tenders, establishing contract terms, assuring quality of medicines, and ensuring adherence to contract terms. In Tanzania Medical Store Department is the procuring entity spending public funds on behalf of a ministry of health, department or regional administration of the Government or public body and includes all functions that pertain to the obtaining of any medicine, works or services, including description of requirements, selection and invitation of tenderers, preparation and award of contracts. Unless otherwise the required pharmaceuticals are not available at MSD then the municipal hospital are allowed to make arrangement for local purchase.

Distribution includes the clearing of customs, stock control, stores management, and delivery to pharmaceutical depots and health facilities. The role of distributing pharmaceuticals to the health facilities is then carried out by MSD.

Use includes diagnosing, prescribing, dispensing, and proper consumption by the patients. Hospitals provide diagnostic and curative services to patients and medicines are the intergral part of patient care. Rational use of medicines in hospitals is a multidisciplinary responsibility that includes physicians, nurses, pharmacists, laboratory staff, administrators, supporting personnel, and patients.

Each hospital must establish a therapeutics committee or any other body for monitoring practices to promote safe and effective medicines use. Usually hospital pharmacy department, under the direction of qualified pharmacist who is the secretary of the hospital therapeutics committee or any other body controls the distribution of medicines and promotes their safe and rational use in the hospitals. The other roles of HTC are to carry out evaluation on the medicines use and influence on decision making in logistics management information system which is necessary for the supply system.

The law, regulations and guidelines usually specify that a pharmacist is the responsible person for the control of medications within a hospital, including procurement, storage, and distribution throughout the hospital. Even though a pharmacist is responsible for the medicine budget and the control of medications in the hospital, he or she is not responsible for the supervision of those who prescribe or administer the medicines especially in in-patients. The differing responsibilities illustrate the complexity of medicines supply (i.e. selection, procurement, storage and distribution) in relation to use in the hospitals (Sri Suryawati 2005).

Concentrated efforts should be made to the improvement in the pharmaceutical supply system and use of pharmaceuticals. However, these can be possible only when the extent to which the pharmaceutical supply system influence rational use of medicines is known. Up to-date most of the studies in Tanzania have in one way or another helped to monitor the rational use of medicines mainly to measure health care practices.

It is the objective of this study to determine the impact of pharmaceutical supply system on rational use of medicines in district hospitals of Dar es salaam-Region. The findings of this study will provide information on what should be done to improve pharmaceutical supply so as to promote rational use of medicines particulary in hospitals.

CHAPTER THREE

3.0.0. Methods and materials

3.1.0. Study design

The method was cross sectional descriptive, medicines use indicator study covering both pharmaceutical supply system and rational use of medicines. The WHO medicines use indicators (WHO/DAP/93) were used together with the World medicines situation check list to collect information (WHO/2004).

Retrospective data were collected from July 2009 to June 2010 for the pharmaceutical supply system performance, availability of Tracer medicines, and mechanisms to improve rational use of medicines. The retrospective data though had a potentially limitation on the accuracy and incompleteness of past recorded information and its access but described the general practices over the period of time. In this study the retrospective data collected covered one procurement cycle to address the seasonal variations in the supply system.

Prospective study involved assessment of inventory management and interview with a total of 300 patients of outpatient department. For the inventory management the initial data were collected on the first day of visit and then followed up for seven days to observe store officer can update the records.

3.2.0. Study settings

Sampling of study sites was conveniently done to cover the whole region of Dar-es-salaam. The study sites were from each municipal of Dar-es-salaam region namely Amana hospital in Ilala municipal, Mwananyamala hospital in Kinondoni municipal and Temeke hospital in Temeke municipal.

In each hospital the Medical officer in-charge, financial officer and supplies officer or pharmacist were interviewed for collection and validation of data on procurement system, efficiency and effectiveness of inventory management system and availability of tracer medicines as appended in the annexes I, II, III, IV and V. A list of tracer

medicines for each municipal hospital are appended in annex V, the lists were prepared from the medicines used for treatment of top ten disease conditions (excluding chronic conditions such as TB, HIV/AIDS, diabetis and Cardiovascular disease conditions) from each of the municipal hospitals to be studied. The following diseases were used to prepare the list of tracer medicines to be studied. Uncomplicated malaria, Non-pneumonia respiratory infection, Pneumonia, Anaemia, Urinary tract infection, Worms manifestations, Bloody diarhoea, Opthamological diseases, Dental diseases, Burns, minor surgery, Dermatological diseases, Diarrhoea and Anaemia.

The mechanisms used to improve rational use were determined by interviewing medical officer in-charge and pharmacist in-charge these are annexed in I and VI respectively.

A total of 100 patients from Out-Patient Department of each hospital were interviewed to determine hospital's supply of medicines to patients as appended in the annex VII (WHO/DAP/93).The tools such as questionairres and checklists that were used for data collection are appended in the Annexes I to VII.

3.3.0. Ethical consideration

Ethical clearance was sought beforehand from the Research and Publication Committee of Muhimbili University of Health and Allied Sciences. Permission to work in these hospitals was attained from respective district authorities.

All information collected was confidential and freedom of participation or opting out on the part of the outpatients was provided. The informed consent form for out-patients is appended in VIII.

3.4.0. Data collection

The data collection was done between 5th April 2011 and 10th May 2011 three municipal hospitals of Dar-es-salaam region. Structured questionnaires and operational checklists were used to collect data and information.

3.5.0. Data management and analysis

Data forms collected from all of the surveyed sites were kept into the plastic envolopes and then entered into the computer software. To ensure accuracy of the data during entry the information to be entered were counterchecked against the original filled-in questionnaires and checklists. Thereafter the collected data were analysed by SPSS version 16.0 and excel spread sheet.

CHAPTER FOUR

4. RESULTS

4.1. Procurement System

229 procurements orders were surveyed, from which it was found that the supply system had the service level of 54.9% and average lead time was 1 day. Temeke had their procurement order fulfilled by 60.3%, whereas Amana and Mwananyamala had 52.9% and 51% procurement order fulfilled respectively. Some of the medicines were partially delivered at the hospitals at the service level of supply system in that case was 3.4%.

On average 76 procurement orders were made per year with 15.3 ± 1.9 medicines per procurement order. Amana had the largest number of procurement orders (N=79) made in 2009/2010. Mwananyamala and Temeke made 72 and 78 procurement orders respectively in the procurement cycle of 2009/2010. The numbers of medicines ordered per procurement ranged between 1 and 118.

On average more than 12 unprogrammed or special procurements were reported to be conducted in 2009/2010 year in each of the visited hospital whose value contributed to about 30% of the total pharmaceutical budget for the year 2009/2010 in the hospitals. See table I, II, III, IV and figure 4 below.

N=79			
	Ordered	Received	Partially delivered
Mean number of medicines	14.0 ± 1.9	7.4 ± 1.2	0.0 ± 0.2
Total number of medicines	1105.0	584.0	1.0
Minimum number of medicines	1.0	1.0	0.0
Maximum number of medicines	118.0	77.0	1.0

Table I: Performance of procurement system on supply of medicines for Amana

N=72			
	Ordered	Received	Partially delivered
Mean number of medicines	15.8 ± 1.8	8.1 ± 1.0	0.8 ± 1.9
Total number of medicines	1140.0	581.0	58.0
Minimum number of medicines	1.0	0.0	0.0
Maximum number of medicines	79.0	52.0	13.0

Table II: Performance of procurement system on supply of medicines for Mwananyamala

N=78			
	Ordered	Received	Partially delivered
Mean number of medicines	16.2 ± 2.1	9.8 ± 1.2	0.8 ± 1.5
Total number of medicines	1265.0	763.0	61.0
Minimum number of medicines	1.0	0.0	0.0
Maximum number	88.0	48.0	5.0

Table III: Performance of procurement system on supply of medicines for Temeke

N=229			
	Ordered	Received	Partially delivered
Mean number of medicines	15.3 ± 1.9	8.4 ± 1.1	0.5 ± 1.4
Total number of medicines	3510.0	1928.0	120.0
Minimum number of medicines	1.0	0.0	0.0
Maximum number of medicines	118.0	77.0	13.0
Median	8	4	0
Order delivery time	1 day		

Table IV: Performance of procurement system on supply of medicines to the hospitals

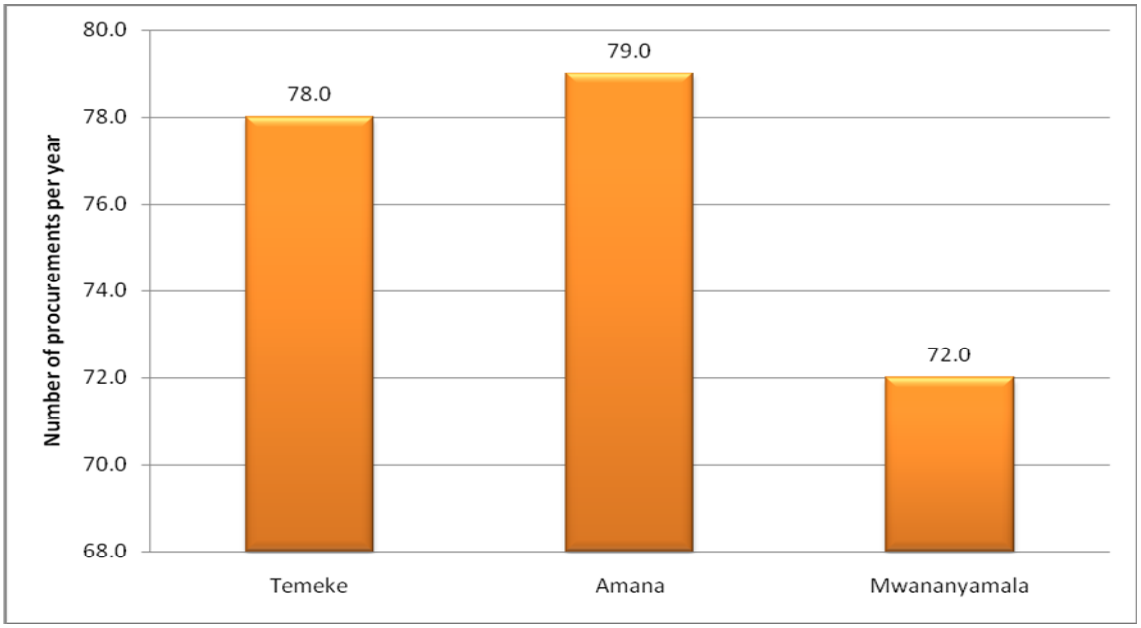


Figure 4: Number of procurement orders in 2009/2010 for each hospital

4.2. Inventory management system

Only 8.9% (n=2) out of the 30 tracer medicines were found to be expired on the day of visit. Expired medicines were separated from the usable stock and kept in secure area. Average percentage of Inventory loss due to expiration of tracer medicines was 8.9% on the day of visit.See figure 5 below

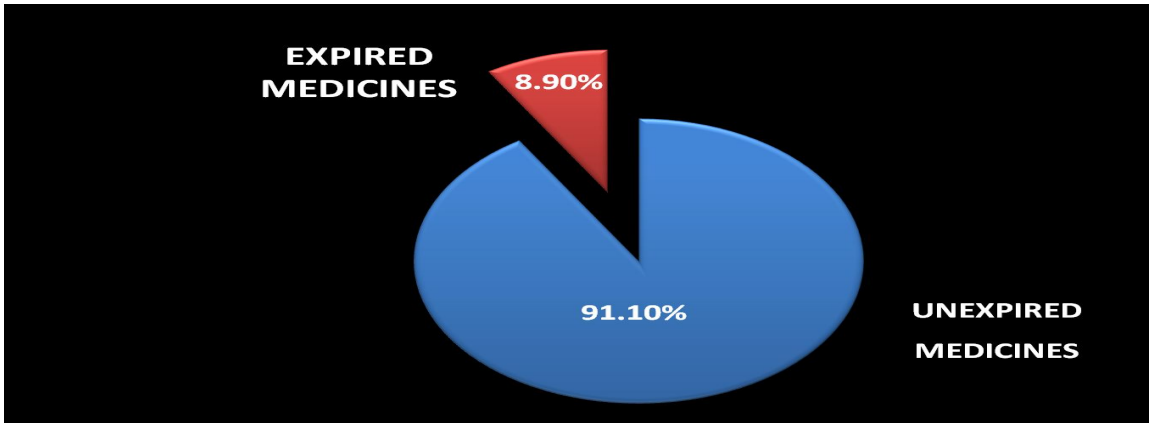


Figure 5: Efficiency of inventory management: Percentage of expiration for the tracer medicines

Further in one of the hospitals the stock of gentamycin injection was found to has unreadable labels which indicated the quality problems of the medicines.

The average percentage of stock records that correspond with physical counts was 40% (n=12) of the tracer medicines (n=30) with updated records and maintained files on the day of visit. Temeke had 70% (7 out of 10 records without discrepancies) while Amana and Mwananyamala had 30% (n=3) and 20% (n=2) respectively. See figure 6 and 7 below.

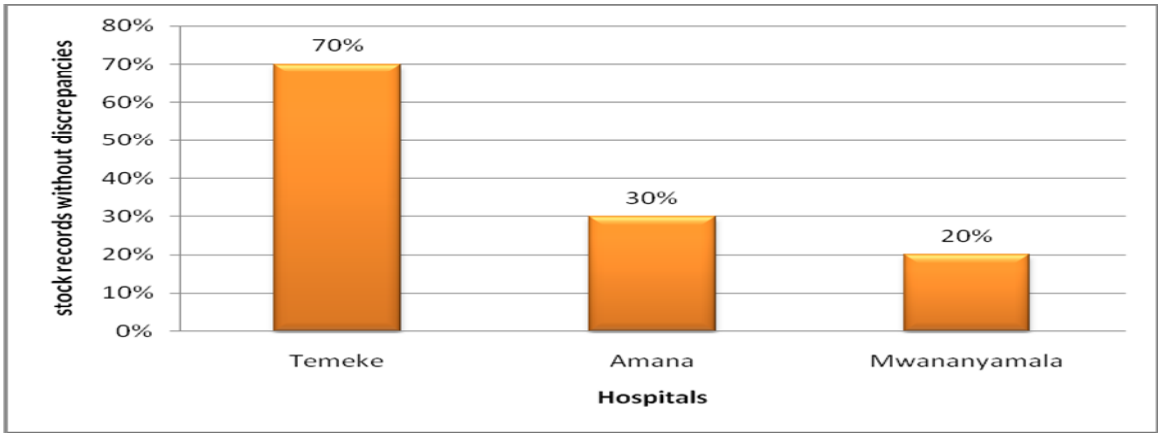


Figure 6: Percentage of stock records without discrepancies

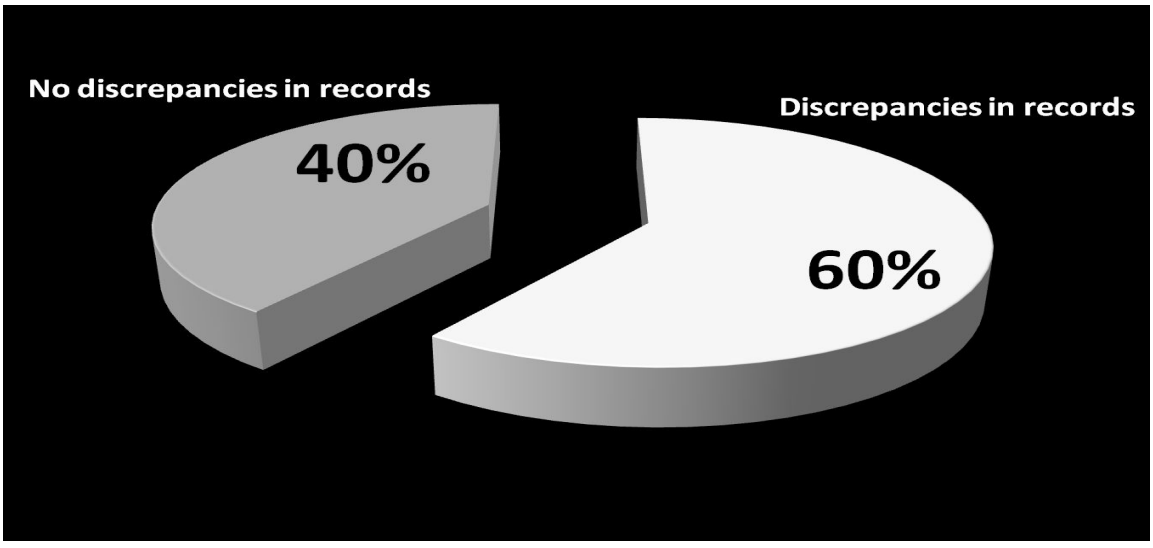


Figure 7: Effectiveness of inventory management: Percentage of discrepancies in invetory records

4.3. Rational use of medicines

4.3.1. Prescribing indicators

A total of 300 patients were interviewed to determine the hospitals fulfilment to patients' prescribed medicines. Totally, 848 medicines were prescribed to patients with the mean ± S.D number of medicines per encounter of 2.8±1.2 out of which 512 (60.4%) were dispensed to the patients. The number of medicines per prescription ranged from 1 to 8. Only 55.7% of medicines (n=472) were prescribed by generic name, whereas 89.4% (n=758) of the prescribed medicines were from the NEMLIT. See table V and figure 8 below.

Table V: Prescribing indicators for rational use of medicines

N=300				
	Prescribed	**Dispensed**	**On EMLIT**	**In generics**
Mean ± Std. Deviation	2.8 ±1.2	1.7 ± 1.1	2.5 ± 1.3	1.6 ± 1.2
Median	3	2	2	1
Total number of medicines	848	512	758	472
Minimum number of medicines	1	0	0	0
Maximum number of medicines	8	6	8	6
Range	7	6	8	6

Table V: Prescribing indicators for rational use of medicines

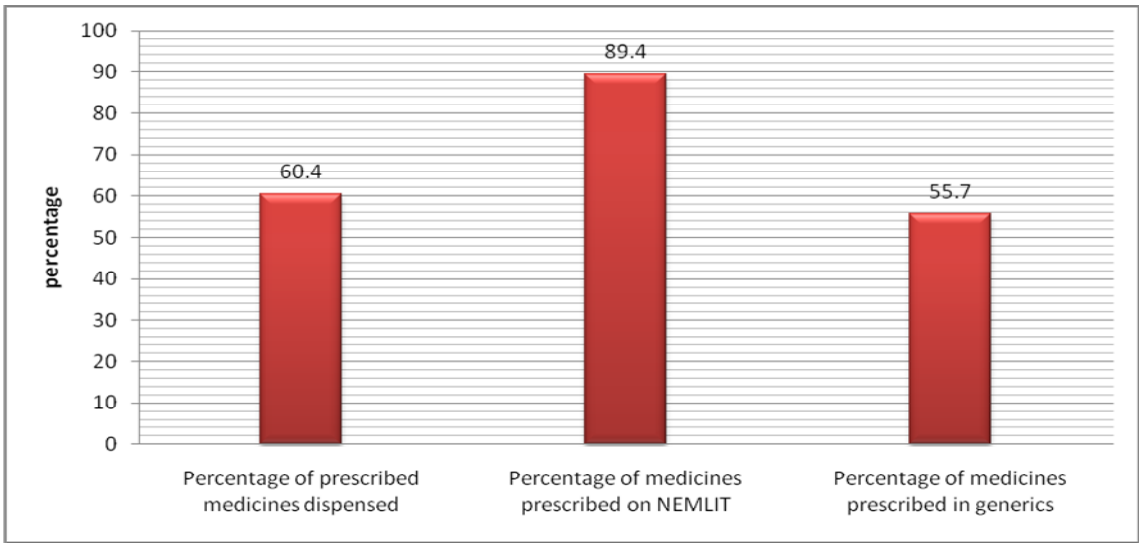


Figure 8: WHO Indicators for rational use of medicines

4.3.2. Facility indicators

4.3.2. (i). Availability of reference materials

Availability of reference materials intended for use by physicians, nurses, pharmacists and other health care personnel who provide treatment care. A list of twelve standard reference books containing information on examination, care (including pharmaceutical therapy), and follow-up services of patients was prepared to determine percentage availability of the references. It was revealed that a total average percentage availability of reference books in all hospitals was 49.7% ± 29.9%. In all hospitals the staff could produce a copy of the 2007 edition of the standard treatment guidelines (STG/NEMLIT) and HIV/AIDS standard treatment guidelines. Amana had the highest percentage (83.3% i.e. 10 reference books out of 12) available incontrast to Mwananyamala where only 25% i.e. 3 reference books out of 12 surveyed were available. One of the hospitals reported to have no malaria standard treatment guideline. See table VI and figure 9

	Hospital's name		
Reference Books	**Temeke**	**Amana**	**Mwananyamala**
BNF	**No**	**Yes**	**Yes**
GOOD DISPENSING MANUAL	**No**	**Yes**	**No**
HIV/AIDS STG	**Yes**	**Yes**	**Yes**
IMCI GUIDELINE	**No**	**No**	**No**
MALARIA STG	**Yes**	**Yes**	**No**
MARTINDALE/ PHARMACOPOEIA	**Yes**	**Yes**	**No**
MIMS	**No**	**No**	**No**
STG and NEMLIT	**Yes**	**Yes**	**Yes**
TPH	**No**	**Yes**	**No**
TB/LEPROSY STG	**Yes**	**Yes**	**No**
TANZANIA NATIONAL FORMULARY (TNF)	**No**	**Yes**	**No**
WHO FORMULARY	**No**	**Yes**	**No**

Table VI: Availability of reference materials

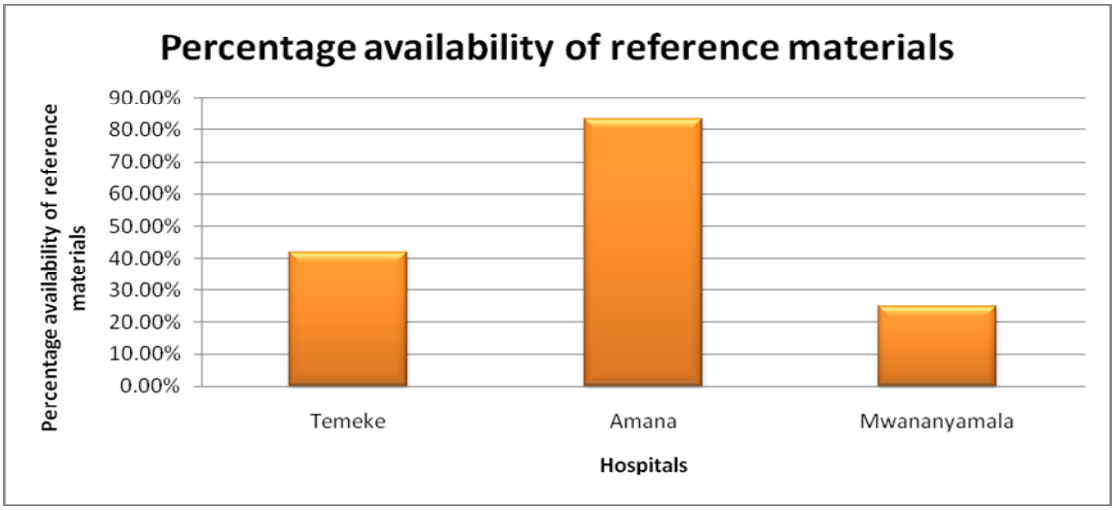


Figure 9: WHO Indicators for rational use of medicines: Percentage availability of reference materials

4.3.2. (ii). Availability of Hospital therapeutic committee

The Hospital Therapeutic Committees were found to be in place in all of the surveyed hospitals. The list of members of the committee, almanac and minutes of the meetings were documented on papers and could be reproduced for verification. See the table VII below.

Hospital's name	Composition	Date of last meeting	Meeting frequency	Minutes
Amana	Provided	1st April 2011	Quartery	Seen
Temeke	Provided	14th December 2010	Quartery	Seen
Mwananyamala	Provided	19th January 2011	When need arise	Seen

Table VII: Availability of Hospital therapeutic committee

4.3.2. (iii). Availability of tracer medicines

Average percentage time out of stock for 30 tracer medicines (10 from each of the surveyed district hospital selected according to the top ten diseases of each hospital) was 29.6% ± 11.9%. See the table VIII below.

Number of surveyed hospitals	3
Average percentage time out of stock (mean ±S.D)	29.6 ± 11.9

Table VIII: Availability of tracer medicines

The longest stocks out duration of 365 days for Mebendazole, Oxytetracycline and Whitefield ointment was alamingly very high in Temeke; as well as for cough syrup (181 days) and FEFOL (141 days). Mwanamyamala Hospital had longest stock outs for ciprofloxacin tablets (227 days), diclofenac tablets (137 days) and Whitefield ointment (362 days). As for Amana hospital ORS had been out of stock for 152 days, cough syrup for 186 days and clotrimazole cream for 187 days. Cotrimoxazole tablets and ALU medicines for treatment of pneumonia and uncomplicated malaria respectively were almost available throughout the year, except for Temeke where ALU was out of stock for 77 days. Figures 10, 11 and 12 represents the stock out days for medicines used for treatment of Top ten diseases as per the Standard Treatment Guidelines and NEMLIT of 2007 third edition.

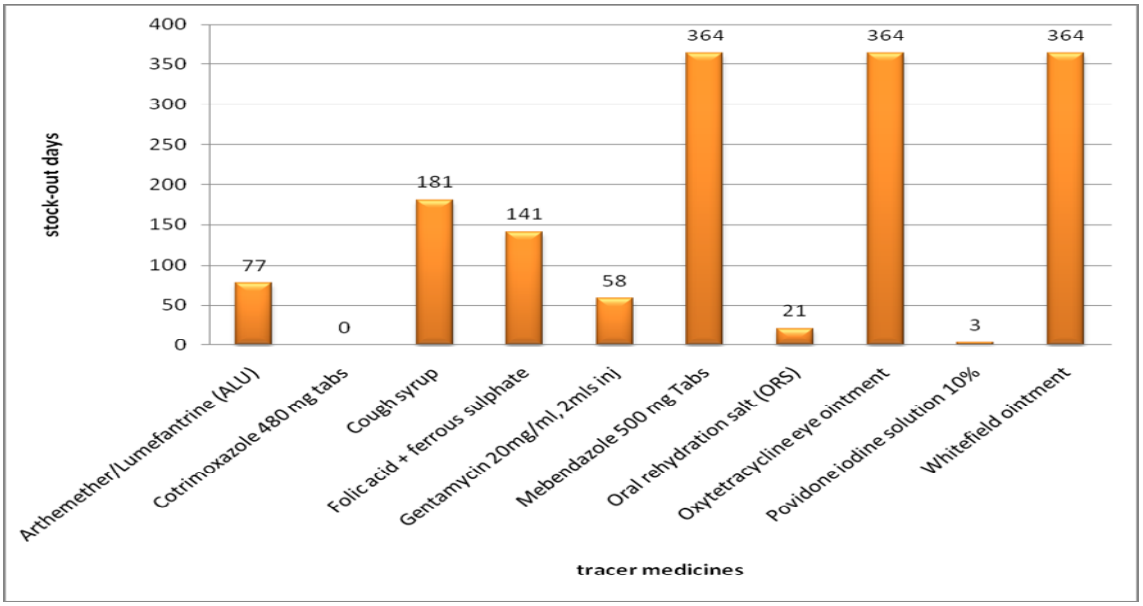


Figure 10: Stock out days for Temeke

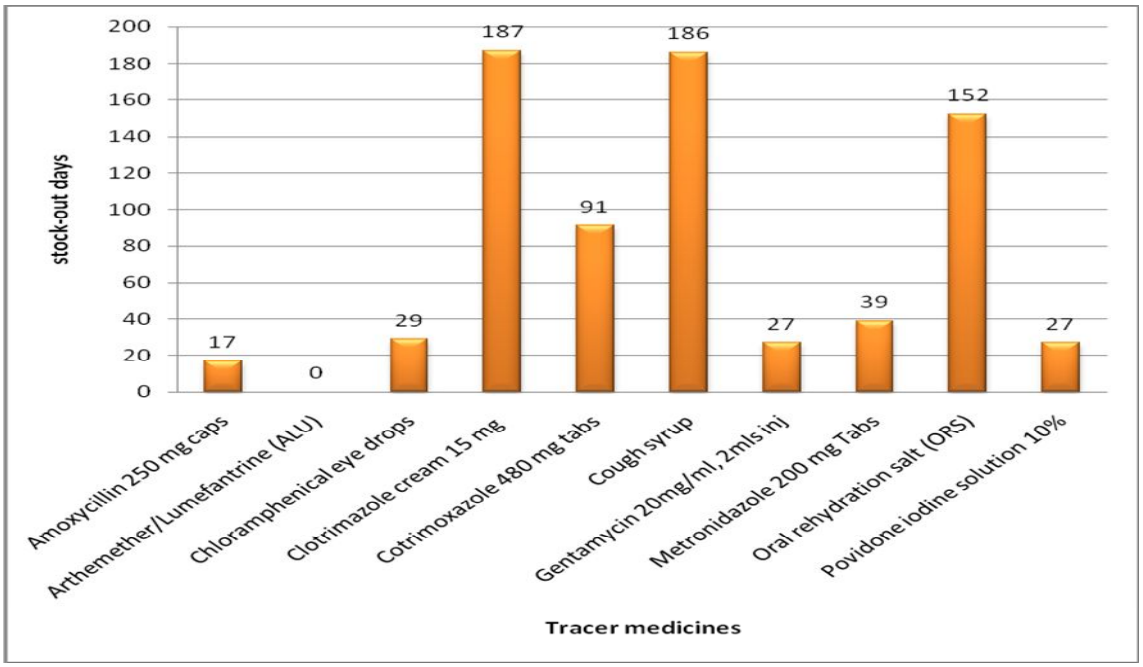


Figure 11: Stock out days for Amana

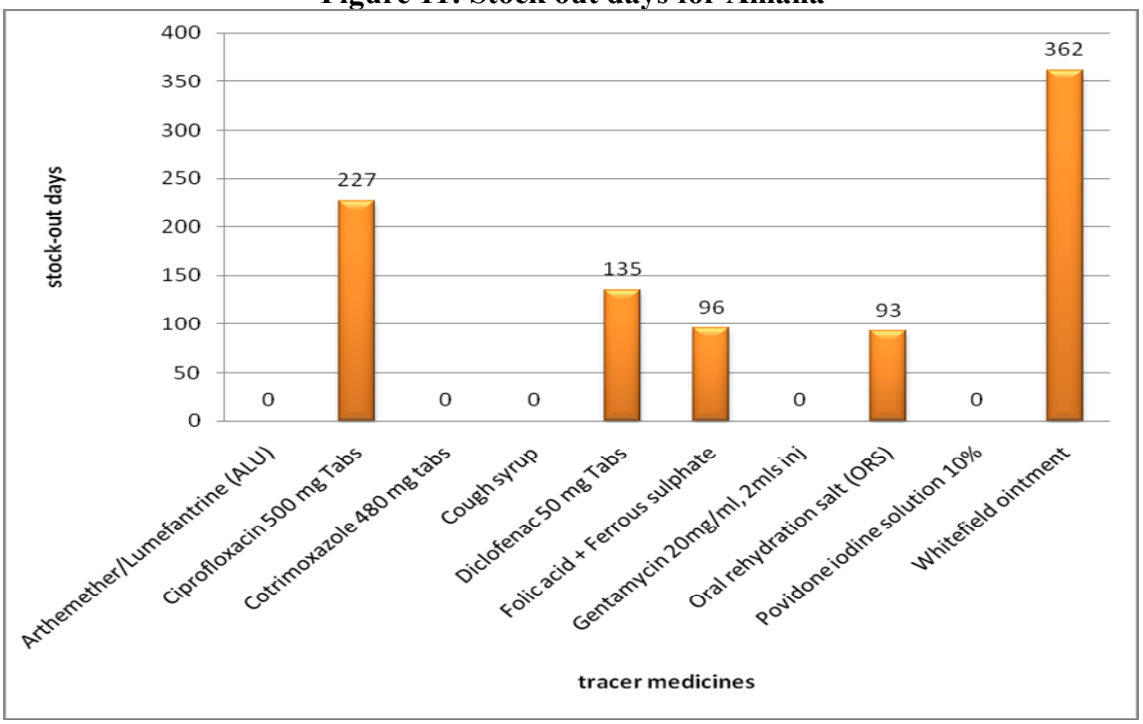


Figure 12: Stock out days for Mwananyamala

4.4. Tools or mechanisms to improve rational use of medicines

A few approaches were looked into on this aspect; these included, In-service training in rational medicines use and supply system which was reported in only one (n=1) 33.3% hospital out of three (3) hospitals surveyed. However, only two (2) pharmaceutical personnel had been reported to have had a formal training in all hospitals.

Prescribing reviews have been reported to be conducted by Hospital therapeutics committees in two (n=2) of the visited hospitals except one 33.3% (n=1) hospital that had reported to use daily morning reports as a means of providing feedback to prescribers. See figure 13 below.

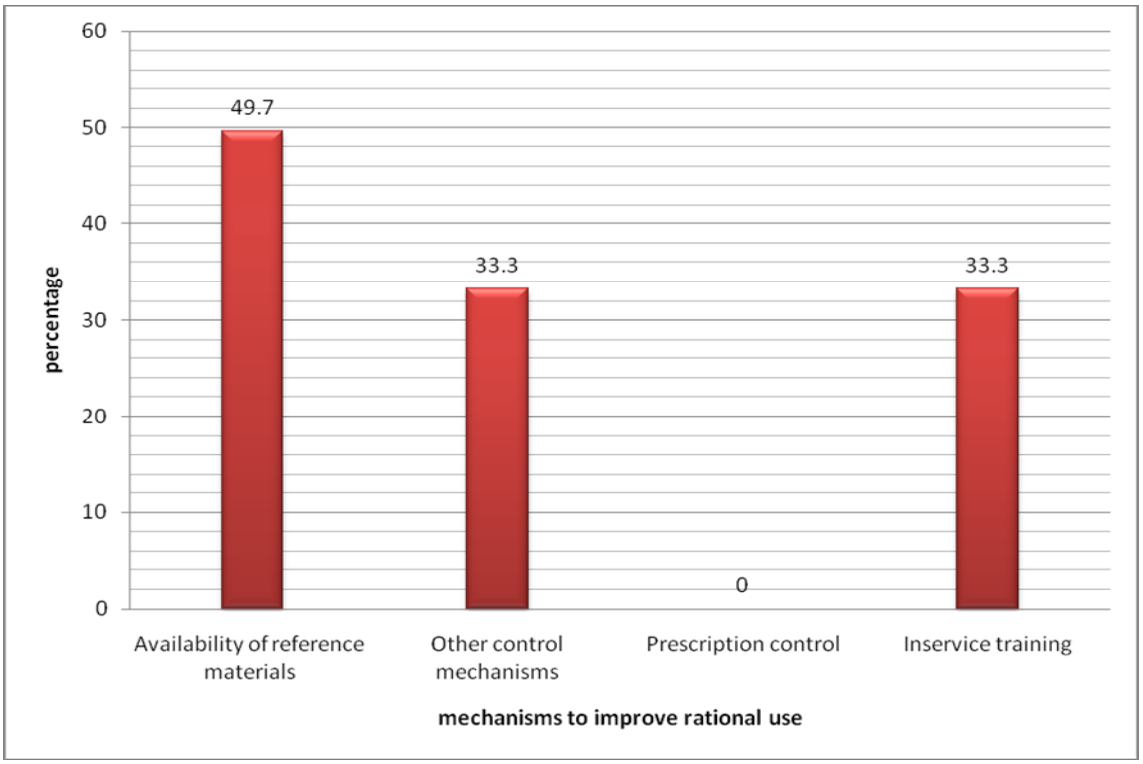


Figure 13: Mechanisms to improve rational use of medicines

CHAPTER FIVE

5. DISCUSSION

5.1. Procurement system of municipal hospitals

The study found on average each municipal hospital conducted 76 procurement orders per year which demonstrated high activity and insufficiencies of hospitals' procurement system, which indicates lack of order in procurement processes. As per standard the lower the number of procurement orders per year the better.

The procurement orders ranged from 1 to 118 medicines per procurement. One medicine per order suggested poor quantification process during order preparation process during order preparation in the district hospitals. The frequency of ordering was found to be considerably high and similar in almost all of the three hospitals where at least they ordered on daily basis. The frequency of ordering should be based on storage capacity, availability of funds, and limiting administration to a minimum (e.g. meetings of the Hospital Therapeutics Committee).

Hospitals order and pick up their medicines at the same time as the ordering, as a 'cash and carry' process. Two of the three hospitals claimed that they received their medicines from MSD within 24 hours from the time of submitting an order for payment. Therefore order delivering times is not an issue in the existing supply system.

According to the study results of drug tracking conducted in Tanzania the average percentage of order fulfilment (service level) was found to be around 68%. This result is much higher compared to that found in this study where average percentage of order fulfilment was to be 54.9%. For some shipments from MSD items were only partially delivered i.e. for a particular item the hospital received less than was requested, the average percentage of items partially delivered to these 3 hospitals was 3.4% which is less than that in the drug tracking study (7.5%).

5.2. Inventory management

Known to be the heart of any medicine supply system therefore, issue for it to be effective health facilities have to accurately update stock records and reports. Stock records are primary source of information for forecasting and quantifying needs in the hospitals as well as source of data for report compilation. This is one of the key decision making information in the pharmaceutical supply system. In this study stock record-keeping systems included the use of bin cards and manual ledgers.

The quality of the stock record-keeping system has shown to have only 40% of the tracer medicines records accurate and updated which is low compared of that found in the drug tracking (56.7%). Possible reasons that may have contributed to inaccurate stock records include rarely taken physical counts, poorly motivated clerical or stock management staff and failure to write off spoilled or junk stock and duplicate entries for receipt or issues. In addition to that there might be often minimal supervision of clerical staff and limited efforts by management to reconcile discrepancies.

Such performance of the inventory management effectiveness may raise the need for further assessment of problems such as wastage, pilferage, and poor record-keeping. All of which could probably contribute to poor service delivery and financial losses at district hospital. This is a very poor situation which makes it difficulty to quantifying and monitor medicines utilisation and needs. When records are not maintained, it is difficult to know if discrepancies are due to actual issues or mistakes or pilferage.

The inventory management system has shown to be efficient as only 8.9% of the medicines were found to have expired on the day of visit. The value found in this study was lower that that of the survey conducted by the MoH&SW in 2002 where 13% of medicines were found to have had expired on the day of visit. As per standards a maximum of 5 % of expenses due to inventory loss can be tolerated. A total value of inventory loss is of less than 5% therefore, expiration may not be a cause for concern about the management of pharmaceuticals in these hospitals.

5.3. Rational use of medicines

5.3.1. Prescribing indicators

The study reports the number of medicines per encounter of 2.8 which reflects clinical judgement of prescribers. Average number of medicines per encounter was found to be less than that reported from studies in Nepal (2.91), in Brazil (8.6) and Ghana (3.6); however was much greater compared to that conducted by MoH&SW in 2008 where the average number of medicine per encounter was 2.2. The lesser the number of medicines is a positive sign since polypharmacy is known to be as one of the irrational use of medicines.

For the quality of care, delivery 60.4% of medicines prescribed dispensed to the patients. The ideal situation is to have 100 percent of medicines prescribe dispensed, short of that may be due to the inadequate pharmaceutical supply system. One of the indicators of performance of the pharmaceutiacal system is order fulfilment performance i.e. service level which in this study was found to be 54.6%. Therefore with such a low performance it coul be one probable reason for the failure to provide all prescribed medicine to patients at the district hospital.

Only 55.7% of medicines were prescribed by generic names which is more or less similar to that of the study conducted in 2008 by MoH&SW where 55.2% were prescribed in generics. Prescribing in generics helps the hospitals to have a better inventory control. This would as well help the hospitals to procure the medicines conviniently as the number of branded medicines is less than that of generic ones. This study has reported two (66.7%) of the visited hospitals using generic prescribing as a tool of improving rational use and supply of medicines in the hospitals. Generic prescribing may be improved by emphasizing on the use of generic names in procurement and prescribing as one of the stratergy.

The percentage of medicines prescribed from the national essential medicine list of Tanzania was 89.4% which is lower compared to the study conducted in Ghana (93.2%) and those conducted in Tanzania (92.5%) by MoH&SW of the prescribed medicines were from the NEMLIT.

5.3.2. Tools or mechanisms to improve rational use of medicines

Availability of reference materials intended for use by physicians, nurses, pharmacists and other health care personnel who provide treatment care was only 49.7% of reference materials. This value is alamingly low. Inorder to improve rational prescribing, lower treatment costs, and more reliable supply of medicines hospitals should ensure availability of reference books.

Prescribing reviews have been reported to be conducted by Hospital therapeutics committees in two of the visited hospitals. Hospital should use a combination of stratergies in improving rational use of medicines.

None of the hospitals had reported using prescription control as one of the means to improve rational use of medicines. This was more obvious in some hospitals that lacked prescriptions and therefore prescribers used pieces of papers as prescriptions. This was poor performance of the supply system of the district hospitals to provide prescription books.These results usually jeopardize the quality of care to patients attended in these district hospitals.

CHAPTER SIX

6.0. CONCLUSION AND RECOMMENDATION

The study suggests pharmaceutical supply systems role in the improvement of rational use of medicines. The components of supply system such as selection, procurement and inventory management are necessary precusors for the availability of medicines in the hospitals. The availability of medicines is dependent on a proper scheduled procurement of pharmaceutical supply. Efforts should concentrate on improving pharmaceutical supply to ensure constant availability of medicines.

This study has identified supply system service level as the key area that requires improvement as for hospitals need to improve their forecasting and quantification process. To achive this, necessitates personnel involved in pharmaceuticals supply system to be trained regularly in managing and rationally use the supplied medicines. Much as the supply system operation was effective enough with regards to response time, stratergies should be rainforced to maintain the performance order delivery time.

The use of medicines supplied in rational manner need NEMLIT use to be emphasized as for use generic names in procurement of pharmaceuticals and prescribing in the hospitals. The availability reference books should be ensured and staff to be emphasized to use them in procurement and use of pharmaceuticals.

Furthermore establishment of a therapeutics committee or any other body for monitoring practices to promote safe and effective medicines use should be precticed. Hospital pharmacy department, under the direction of qualified pharmacist who is the secretary of the Hospital Therapeutics committees have shown to control the distribution of medicines and promotes their safe and rational use in the hospitals.

6.1. Areas for further studies

1. To investigate on the role of human resource in the rational use of medicines in relation to pharmaceutical supply system.
2. To determine factors that affects the performance of pharmaceutical supply system in relation to supply system in hospitals.

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ANNEXES

ANNEX I: Questionnaire for Interview with Medical Officer in Charge

1. Gender: (a). Male

   (b). Female

2. Title ……

3. How is the medicine/pharmaceutical ordering organised in the hospital?

   ……
   ……
   ……

4. Who is responsible for medicine budget preparation?

   a). Pharmacist in-charge

   b). Special committee

   c). Others, Specify: ……..……...

5. Is there any Committee or body which controls medicine budget?

   a). Yes

   b). No

6. If no – how is the budget of medicines handled? Explain:
   ……
   ……

7. If yes – does it cover 100% of medicine input to the hospital?

   a). Yes

   b). No

8. Has the ordering of medicines been delegated to a committee as the sole decision maker, which medicines and how much to order?

   a). Yes

   b). No

9. If no: Please explain:

……
……

10. How is the communication on medicines situation between the prescribers and the hospital pharmacy conducted?

a). Direct communication

b). Daily meeting

c). Pharmacy announcement and posters

11. How often in the year 2009/2010 have medicine issues (supply and rational use) been on the Hospital Management agenda?

…… Note down

12. Is there any prescriber or pharmacist been in a short course on rational use of medicines?

a). Yes

b). No

13. If Yes, How many? And where?

a). Pharmacist: …… venue: ……

b). Prescribers: …… venue: ……

c). Others, Specify: …… venue: ……

14. If No; Why?

……
……
……

15. When was the last time they attended the training

a). Three months ago

b). Six months ago

c). Over one year ago

16. Is there any pharmacist or pharmaceutical personnel who have attended a short course on the pharmaceutical supply system?

    a). Yes

    b). No

17. If No, please explain:
    ……
    ……
    ……
    ……

18. If Yes, When was the last time they attended the training

    a). Three months ago

    b). Six months ago

    c). Over one year ago

ANNEX II: Financial data form

Financial information form		
Name of Hospital:		
Investigator/ Researcher:		
Date of collection:		
What is the total expenditure on pharmaceuticals relative to other hospital's expenditures?		
Hospital expenditures	Financial year 2008/2009	Financial year 2009/2010
(a). Total hospital expenditures:		
(b). Total collected user charges, Hospital income		
(c). MSD account		
(d). Expected medicine budget		
(e). Actual spending		
(f). Medicine expenditures excluding MSD		
(g). value of expired medicines		

ANNEX III: Procurement data form

Please cicle the response of the pharmacist in charge		
1. How many procurement were conducted in the year 2009/2010? Tick where appropriate		
a. Four to eight	b. Nine to twelve	c. More than twelve
2. How many unprogrammed (emergency/special) procurements occurred in the year 2009/2010?		
a. None	b. One to six	c. More than six
3. What was the value of those emergency/special procurements for the year 2009/2010?		
4. How long does it take for the district hospital to get their MSD medicines?		
a. Within 1 day	b. Between 2 to 7 days	c. More than 7 days
5. Order fulfilment by MSD towards the district hospitals for the year 2009/2010		

S.N	Date	Invoice number	Total items ordered	Items totally delivered	Items partially delivered	Items totally not delivered
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

ANNEX IV: Inventory data form

Inventory information form on the day of visit					
Name of the hospital			Date		
Reseacher					
Existing inventory control system:	Computerized		Data collected from:	Computerized	
	Manual ledger			Manual ledger	
	Bin cards			Bin cards	

S.N	Medicine name	Count unit	Record count	Physical count	Expired stock
1	Amoxycillin 250 mg Caps				
2	Alu				
3	Chloramphenicol eye drops				
4	Cotrimoxazole 480 mg tabs				
5	Diclofenac 25mg/ml, 3mls inj				
6	Ferrous sulphate + folic acid				
7	Gentamycin 40mg/2mls inj				
8	Mebendazole 100 mg tabs				
9	Oral rehydration salt (ORS)				
10	Povidone iodine solution 10%				

ANNEX V: Tracer medicines availability for each district hospital

Amana Hospital														
	Name of the medicine	July 09	Aug 09	Sep 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Stock out days
1	ALU 120/20 mg Tab													
2	Amoxycillin 250mg Caps													
3	Chloramphenicol eye drops													
4	Clotrimazole 15 gram Cream													
5	Povidone iodine solution 10%													
6	Co-trimoxazole 480 mg Tab													
7	Cough syrup													
8	Metronidazole 200mg, Tab													
9	ORS													
10	Gentamycin 2mls, 20mg/ml inj													
Mwananyamala Hospital														
	Name of the medicine	July 09	Aug 09	Sep 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Stock out days
1	ALU													
2	Ciprofloxacin 500 mg Tablets													
3	Cotrimoxazole 480 mg tablets													
4	Cough syrup													
5	Diclofenacc 50 mg Tablets													
6	Folic acid + ferrous sulphate													

7	Gentamycin 20mg/ml, 2mls													
8	Oral rehydration salt													
9	Povidone iodine solution													
10	Whitefield ointment													

Temeke Hospital														
	Name of the medicine	July 09	Aug 09	Sep 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Stock out days
1	ALU													
2	Cotrimoxazole 480 mg													
3	Cough syrup													
4	Folic acid + ferrous sulphate													
5	Gentamyicin 20mg/ml, 2mls													
6	Mebendazole 500mg Tab													
7	Oral rehydration salts (ORS)													
8	Oxytetracycline eye ointment													
9	Povidone solution10%													
10	White field ointment													

ANNEX VI: Mechanisms to improve medicines use form

Mechanisms used in the district hospitals to improve medicines use			
Name of the Hospital:		Investigator:	
Date of survey:			
1. Does the hospital have any committee or body dealing with medicines related issues?			
a. Yes		b. No	
2. Name the committee or body dealing with medicines related issues			
3. Name the member and their positions in the named committee or body			

S.N	Member's position	Position in the committee
1		
2		
3		
4		
5		
4 (a). Date of the last meeting:		
4 (b). At what interval are the meeetings?		

If No committee or body, who is dealing with the medicines related issues
Explain: ……
5. Does the Committee prepare and approve budget for procurement of pharmaceuticals?

a. Yes	b. No

If No, who prepares and approve the budget? Explain: ……
5. Is there Committee or body that carries out or reviews of prescribing practices?

a. Yes	b. No

If No, why? ……
6. Is there a periodic list of medicines prepared for it to be used in the hospital?

a. Yes	b. No
7. a). If yes who prepared the list	
7. b). If no what list of medicine is used in the hospital	

8. What are the mechanisms used to promote rational use of medicines in the hospital?		
8. (i) In-service training	a. Yes	b. No
8. (ii) prescribing by generic names only	a. Yes	b. No
8. (iii) prescription control	a. Yes	b. No
8. (iv) dispensing control	a. Yes	b. No
8. (v) others: Explain		

9. Availability of relevant reference materials		
BNF		
GOOD DISPENSING MANUAL		
HIV/AIDS TREATMENT GUIDELINE		
IMCI GUIDELINE		
MALARIA TREATMENT GUIDELINE		
MARTINDALE/ PHARMACOPOEIA		
MIMS		
STG		
TZ PHARMACEUTICAL HANDBOOK		
TB/LEPROSY TREATMENT GUIDELINE		
TNF		
WHO FORMULARY		

ANNEX VII: Patient interview form

Name of hospital				Investigator	
S.N	Date	Number of medicines prescribed	Number of medicines dispensed	Number of medicines on NEMLIT	Number of medicines prescribed in generics
1					
2					
3					
4					
5					
Total 300 patients					

ANNEX VIII: Informed Consent Form (English Version)

Study Name: Rational use of medicines in relation to pharmaceutical supply systems in district hospitals of Dar-es-salaam region

Researchers: Bwile, Paschal P.B

Sponsors: Ministry of Health and social welfare and Muhimbili University of Health and Allied Sciences (MUHAS)

Purpose of the Research: To determine the impact of pharmaceutical supply system on rational use of medicines in district hospitals of Dar-es-salaam region

Risks and Discomforts: We do not foresee any risks or discomfort from your participation in the research.

Voluntary Participation: Your participation in the study is completely voluntary and you may choose not to participate at any time. Your decision not to volunteer will not influence the treatment you may be receiving either now, or in the future.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, or any other group associated with this project.

Confidentiality: All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Your data will be safely stored in a locked facility and only research staff will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

Questions about the Research: If you have questions about the research in general or about your role in the study, please feel free to contact Mr. Bwile, Paschal P.B either by telephone at +255754 493450 or +255716 473194 or by e-mail paschal1980@hotmail.com

(Principle investigator) or Dr. Malele R.S. +255715 287955 or +255754 286955 (Principal supervisor)

This research will be reviewed by the Research and publication ethical Committee, Muhimbili University of health and Allied Sciences.

If you have any questions about this process or about your rights as a participant in the study, please contact Prof. M. M. Aboud, Chairman of the senate research and publications committee, Muhimbili University College of Health Sciences (MUHAS). P.O Box 65013 Dar-es-salaam, Tel: 2150302-6.

Legal Rights and Signatures:

I ……*(fill in your name here),* consent to participate in ……*(insert study name here*) conducted by ……. *(insert investigator name here)*. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature: …… Date: ……

Participant

Signature: …… Date: ……

Principal Investigator

ANNEX VIII: Fomu ya ombi la ridhaa (Swahili version)

Jina la utafiti: Uhusiano wa Matumizi sahihi ya dawa na mfumo wa usambazaji wa dawa kwenye hospitali za wilaya katika mkoa wa Dar-es-salaam.

Mtafiti: Bwile, Paschal P.B

Wafadhili: Wizara ya Afya na ustawi wa jamii na chuo kikuu cha afya na tiba Muhimbili (MUHAS)

Dhumuni la utafiti: Kutambulisha uhusiano kati ya mfumo wa usambazaji wa dawa na matumizi sahihi ya dawa kwenye hospitali za wilaya za mkoa wa Dar-es-salaam

Madhara na hatari: Hatutegemei madhara wala hatari yoyote kwa ushuriki wako katika ushiriki wako kwenye utafiti huu.

Ushirikishwaji kwa hiari: Ushiriki katika utafiti huu ni wa hiari na unaweza kuamua kutokushiriki muda wowote ule.

Kujitoa kwenye utafiti: Unaweza kuamua kujitoa kwenye utafiti muda wowote ule na kwa sababu yoyote ile. Maamuzi yako ya kuamua kutokushiriki hayatathiri mahusiano baina yako na mtafiti au watafiti.

Usiri wa taarifa: Taarifa zote utakazo toa wakati wa utafiti zitatunzwa kwa siri, hali kadharika jina lako halita onekana kwenye ripoti ya utafiti. Taarifa zitatunzwa sehemu salama ambapo ni watafiti tu watakao ruhusiwa kuzitumia kwa kufanikisha utafiti tu na si vinginevyo.

Maswali juu ya utafiti: Kama una swali au maswali kuhusu utafiti huu au ushirikishwaji wako kenye utafit, tafadhali jisikie huru kuwasiliana na Bwana BWILE, Paschal P.B kwa simu namba +255754 493450 au +255716 473194 au kwa barua pepe paschal1980@hotmail.com (Mtafiti Mkuu) au Dr. Malele R.S. +255715 287955 or +255754 286955 (Msimamizi mkuu wa utafiti)

Utafiti huu utapitishwa na jopo la kamati utafiti na machapisho la chuo kikuu cha afya na tiba Muhimbili (MUHAS).

Kama una maswali kuhusu mchakato au haki za ushiriki kwenye utafiti, tafadhali wasialiana na Prof. M. M. Aboud, mwenyekiti wa jopo la kamati ya utafiti na machapisho la chuo (MUHAS) kwa sanduku la posta 65013 Dar-es-salaam, au simu namba 2150302-6.

Haki za kisheria na saini:

Mimi ……*(andika jina la mgonjwa), naridhia kushiriki katika utafiti wa ……(andika jina la tafiti) Unaofanywa na ……. (andika jina la mtafiti)*. Nimesoma maelezo ya utafiti huu, nimeona umbile la kazi hii, faida zake, madhumuni yake, ushiriki katika kazi hii si wa kulazimishwa na nimeona hauna madhara kwa yeyote na yale yote yatakayotokeya ni mambo ambayo hayatarajiwi.

saini …… Tarehe: ……

Mgonjwa

Saini: …… Tarehe: ……

Mtafiti